FARMERS ON THE CLIMATE FRONTLINE:

SIX RECOMMENDATIONS FOR ADDRESSING AGRICULTURE IN THE UNFCCC NEGOTIATIONS

AGRICULTURE IS BOTH A VICTIM OF AND A CONTRIBUTOR TO CLIMATE CHANGE AND SMALLHOLDERS IN DEVELOPING COUNTRIES WILL BE MOST SERIOUSLY AFFECTED BY THE IMPACTS.

In many regions, the first impacts of climate change can already be felt. Crops, grazing land, trees and livestock are inherently affected by climatic extremes, including too much or too little water, too high or too low temperatures and the length of the growing season. Moreover millions of farmers own less than one hectare of land, live on less than $1 a day and do not produce enough to feed their families. They are especially vulnerable to climate change.[1]

Achieving food security for all will become increasingly difficult. Climate change affects not only yields, but also food quality and safety and the reliability of its delivery to consumers.[2]

Agriculture also contributes significantly to global greenhouse gas (GHG) emissions. Agriculture, Forestry and Other Land Use (AFOLU) combined contribute 20-24% of total GHG emissions. Whilst AFOLU emissions decreased over the last decade, emissions from crop and livestock production increased, becoming the dominant source of emissions within this category.[3]

Climate-smart agriculture aims to:

- **Provide adaptation and resilience to stresses and shocks**
- **Generate adaptation and mitigation as co-benefits**
- **Take a location-specific and knowledge – intensive approach**
- **Provide integrated options that create synergies and reduce trade-offs**

The negotiation of a new international climate change agreement presents an opportunity to address agriculture's need for adaptation and its vital role in achieving the United Nations Framework Convention on Climate Change (UNFCCC) goal of limiting global temperature rise to 2°C from pre-industrial levels. Negotiators can ensure that these opportunities are not missed by firmly rooting agriculture into the following six major elements of the negotiations.

1 Wheeler, T. and von Braun, J. (2013), Climate Change Impacts on Global Food Security, Science, Vol. 341: 508-513
2 Vermeulen et al. (2012), Climate Change and Food Systems, Annual Review of Environment and Resources, 37:195-222
3 IPCC (2014): Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change

1 ADAPTATION

Adaptation in agriculture includes the research, development and adoption of improved crop varieties, livestock breeds and orphan crops that are more suitable to a changing and erratic climate.

At the farm level, adaptation includes better use of seasonal forecasting, soil, water and nutrient management, conservation technologies, and diversification of on- and off-farm activities. Farmers also require support to manage pest and disease outbreaks and to alter their cropping practices as well as reliable and affordable access to credit and inputs.

Adaptation measures against desertification, drought, floods and soil erosion already exist, but need to be significantly scaled-up – the costs of inaction are considerably higher. For every $1 spent preparing for disasters $7 is saved in the cost of post-disaster recovery efforts.[4]

THE GOVERNMENT OF BANGLADESH is working to implement the "Community-based Adaptation to Climate Change through Coastal Afforestation" project in five districts most susceptible to climate change. The project enhances coastal community resilience and introduces new options for community-based income generation such as planting protective and productive vegetation with an elevated mound and ditch structure interspersed with fish nursery ponds. An estimated 14,350 households have been able to use this model to manage and protect their assets.[5]

Such community-based action creates ownership, stimulates innovation and is likely to be more sustainable and resilient. When tailored to specific agro-ecological zones and farming systems, certain adaptation actions can also offer mitigation co-benefits.

GOVERNMENTS MUST SUPPORT, DEVELOP AND BUILD UPON COMMUNITY-BASED ADAPTATION ACTIONS.

4 Karim Dahou, et al. (2012), "Climate challenges to Africa, a call for action", OECD Journal: General Papers, Vol. 2010/4
5 Community-based Adaptation to Climate Change through Coastal Afforestation, Global Environment Facility, UNDP
6 IPCC, (2007): Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M.Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
7 IPCC (2007); IPCC (2013): Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA

2 MITIGATION

Agriculture produces GHG emissions – carbon dioxide (CO_2), nitrous oxide (N_2O) and methane (CH_4) – and thus contributes significantly to anthropogenic climate change.

The Intergovernmental Panel on Climate Change (IPCC) estimates that agriculture contributes 14% of global GHG emissions, whilst the land use, land-use change and forestry (LULUCF) sectors contributes an estimated 17%.[6]

Emissions of N_2O and CH_4, which originate from livestock and soil, are nearly 300 and 35 times more powerful than CO_2, respectively.[7] N_2O emissions from soils alone constitute around 40% of non-CO_2 emissions.[8] During the 1990's, cutting down trees and clearing land released an average of 6.4 gigatons (Gt) of CO_2 per year into the atmosphere. In comparison, global emissions from crop and livestock production rose to an average of 5.2 Gt in the 2000s and again to 5.4 Gt in 2010.

Emissions from agriculture are expected to continue to grow around 1% per year[9] – an increase incompatible with a stable climate future. Achieving the UNFCCC goal of limiting average global temperature rise to 2°C will be hard to achieve without leveraging the potential of the agriculture sector.

Globally, the soil contains about 1,500 Gt of soil organic carbon (SOC), that is more than double the amount of carbon in the atmosphere and three times that in plants, animals and micro-organisms.[10] The cumulative historic loss from ploughing and mining the soil's humus is between 50 and 78 Gt.[11] The process of carbon sequestration, adding more organic matter to the soil than decays, however, can help to minimise emissions. Agroforestry systems can capture carbon in the range of 2-4 tons per hectare per year – an order of magnitude higher than conservation farming.[12]

AGRONOMIC PRACTICES developed in Vietnam help smallholder farmers grow rice more sustainably. Core practices include alternate wetting and drying of the soil during grain filling, applying organic fertilisers, and minimising the use of synthetic fertilisers and pesticides. Between 2007 and 2011, more than 1 million farmers reduced their input use on 185,000 hectares. Average yields increased by 9-15%, whilst using 70-75% less seed, 20-25% less nitrogen fertiliser and 33% less water. The government of Vietnam anticipates that these practices will reduce GHG emissions from wet rice by 15-20% by 2020.

SUSTAINABLE LAND MANAGEMENT PRACTICES INCREASE ECOSYSTEM AND FARMER RESILIENCE TO A CHANGING CLIMATE AND MINIMISE GHG EMISSIONS.

8 IPCC 2007
9 Ibid.
10 The Montpellier Panel, December 2014, No Ordinary Matter: conserving, restoring and enhancing Africa's soils
11 Lal, R. (2004), Soil Carbon Sequestration Impacts on Global Climate Change and Food Security, Science, Vol 304: 1623-1627
12 Makumba, W., Akinnifesi, F. K., Janssen, B. & Oenema, O. (2007). Long-term impact of a Gliricidia-maize intercropping system on carbon sequestration in southern Malawi. Agriculture Ecosystems & Environment, Vol.118: 237-243

3 RISK & RESILIENCE

In the face of intensifying climatic stresses and shocks, policies that reduce the risks posed by climate change and enhance both the agricultural sector and farmer livelihoods are ever more important.

Low resilience to stresses and shocks may be indicated by a gradual decline in agricultural productivity but, equally, collapse may come suddenly and without warning. Recovery may be rapid, but more often is difficult and incomplete, thereby slowing countries' overall economic and development efforts.[13]

Farmers face a variety of market and production risks that make their incomes unstable and unpredictable from year to year. Index-based insurance programmes for managing farming risk are showing signs of promise. Those linked to local weather patterns provide an effective, market-mediated solution to smooth incomes, promote agricultural development but also make disaster relief more effective.[14]

Farmers' resilience can be improved by building stronger and healthier soils that withstand or regenerate faster after climatic stresses. A promising approach is Integrated Soil Management (ISM) that combines organic and conventional farming techniques.

KILIMO SALAMA in Kenya protects smallholder maize and bean farmers from financial loss if their crops are damaged by weather. The partnership between Syngenta Foundation, UAP Insurance, and Safaricom bundles insurance with loans for seeds, fertiliser and extension services. Eight weather stations broadcast weather updates and measure rainfall amounts; when a station detects rainfall levels that are below or above a particular crop's rainfall needs, a pay-out is triggered.[15]

RESILIENT AGRICULTURAL GROWTH DOES NOT HAPPEN BY ITSELF – IT NEEDS PRO-ACTIVE POLICIES AND INVESTMENTS.

13 The Montpellier Panel, (2012), Growth with Resilience: Opportunities in African Agriculture
14 IFAD-WFP Weather Risk Management Facility (WRMF)
15 Climate-smart agriculture: success stories from farming communities around the world, CCAFS and CTA, (2013)

4 INNOVATION & TECHNOLOGY

Successful agricultural development rests on continued technological innovation.

Technologies that enhance farmers' resilience and adaptive capacity include water catchment and conservation, the dissemination of weather data through mobile phones and the development of drought-tolerant crops.

Water is an essential but scarce input for a well-functioning agriculture sector. Already 1/3 of Africa's population is living in water-scarce regions, set to be exacerbated by climate change. Water-saving drip irrigation systems allow farmers to adapt to shrinking water availability and become more resilient to droughts and variable rainfall patterns.

Farmers can also adapt with information communication technologies (ICT). Today 75% of Africans own a mobile phone, making it increasingly easier to reach those located in remote rural areas with timely weather forecasts.[16] Information shared via SMS allows farmers to plan ahead and make better use of their resources, but only if the supporting infrastructure exists. Under-resourced national meteorological services must be equipped to supply weather information across larger areas.

THE AFRICAN AGRICULTURAL TECHNOLOGY FOUNDATION'S (AATF) Water Efficient Maize for Africa (WEMA) programme is developing drought-tolerant and insect-protected maize using conventional breeding, marker-assisted selection and biotechnology. Some of these new varieties are now available royalty-free to smallholder farmers across sub-Saharan Africa through African seed companies.

INNOVATIVE TECHNOLOGIES NEED TO BE MADE READILY AVAILABLE AND AFFORDABLE FOR SMALLHOLDER FARMERS.

16 United Nations Development Programme, Farmerline joins the Business Call to Action with commitment to provide mobile communication services to rural farmers, accessed on 28.04.2015: http://www.undp.org/content/undp/en/home/presscenter/pressreleases/2014/10/15/farmerline-joins-the-business-call-to-action-with-commitment-to-provide-mobile-communication-services-to-rural-farmers.html

5 FINANCING

Developing countries need adequate funding for adaptation and mitigation projects.

Between 2010 and 2050, the annual cost for adaptation to climate change in sub-Saharan Africa (SSA) will be at least $18 billion[17] and up to $50 billion for the entire continent,[18] in addition to the funding needed to place these countries on a low-carbon development pathway.[19] The level of financing currently reaching African countries is paltry. Of the $34 billion pledged through various climate funds, SSA received just $2.3 billion between 2003 and 2013[20], of which only 45% was allocated to adaptation projects. This funding gap must be met through public resources, allowing local governments to allocate funds according to need.

The opportunity for developing countries to adapt to and mitigate climate change through better farming and land management practices is large. Mitigation co-benefits can result from interventions including ISM and reforestation. However, farmers may need incentives to undertake these actions. These can come in the form of more secure land rights, improved knowledge, and payment for ecosystems services (PES).

Payments to farmers or landowners to better manage their land or watersheds, to conserve biodiversity or to sequester carbon have been shown to help conserve and restore forest areas and aquifers.[21] Increasing irrigation in Africa from the current 6%[22] of arable land needs to become a major priority and requires substantial investment.[23]

COSTA RICA'S PES programme has strongly contributed to reversing of one of the highest deforestation rates in Latin America. Since 1997, nearly 13,000 farmers have participated in a programme that pays land managers to conserve and sustainably manage forested areas or reforest degraded land.[24]

GIVEN THE RIGHT INCENTIVES, FARMERS IN DEVELOPING COUNTRIES CAN ADAPT TO THE ADVERSE IMPACTS OF CLIMATE CHANGE WHILST CONTRIBUTING TO THE MITIGATION OF GHG EMISSIONS.

17 World Bank (2010). Economics of adaptation to climate change - Synthesis report. Washington, DC: World Bank
18 Africa's Adaptation Gap 2, United Nations Environment Programme, (2015)
19 World Bank (2010). Economics of adaptation to climate change - Synthesis report. Washington, DC: World Bank
20 Barnard et al., (2014), Climate Finance Regional Briefing: Sub-Saharan Africa, ODI and Heinrich Böll Stiftung North America

6 CAPACITY BUILDING & INSTITUTIONS

The barriers to implementing adaptation strategies range from limited financial resources to strained institutional capacities.

These barriers can be overcome with stronger political leadership, planning, coordination and institution-building. Governments should integrate climate change planning across government departments and ministries, whilst food security and agricultural development policies should complement and reinforce national climate change adaptation and mitigation goals.

The integration of climate change adaptation strategies into national agricultural development plans under the Comprehensive Africa Agriculture Development Programme (CAADP), serves as a role model for developing countries. Global and regional initiatives that promote investment through country-led plans such as the Global Agriculture and Food Security Programme (GAFSP) and the ASEAN Integrated Food Security Network (AIFS) should be strengthened by integrating climate change goals.

THE NEW PARTNERSHIP FOR AFRICA'S DEVELOPMENT (NEPAD) Climate Change Fund offers technical and financial assistance to African Union member states and Regional Economic Communities for better planning, coordination, and implementation of climate change activities. NEPAD also provides assistance to mainstream climate change into national policies, particularly National Adaptation Plans (NAPs) and National Agriculture Investment Plans (NAIPs), and helps countries develop policies for improving frameworks in line with international bodies such as the UNFCCC.

The West African Science Service Center on Climate Change and Adapted Land Use (WASCAL) is a research programme designed to enhance the resilience of agricultural systems to climate change. WASCAL aims to identify resilient and adaptive land use systems and develop strategies to conserve or resto§re ecosystems whilst preserving the natural resource base for future generations.

NATIONAL AND REGIONAL POLICIES MUST COMPLEMENT AND REINFORCE CLIMATE CHANGE ADAPTATION AND MITIGATION GOALS.

21 Schomers, S., Matzdorf, B., Payments for ecosystem services: A review and comparison of developing and industrialized countries. Ecosystem Services (2013)
22 You et al., (2010), What Is the Irrigation Potential for Africa?, International Food Policy Research Institute (IFPRI)
23 Pedrono et al. (2015), Les service écosystémiques face au changement climatique, in Torquebiau, E., Changement climatique et agricultures du monde, Collection CIRAD-AFD
24 Porras, I., et al., (2013), Learning from 20 years of Payments for Ecosystem Services in Costa Rica, International Institute for Environment and Development

We, the members of the Montpellier Panel, believe that a sustainable climate future is not possible without recognising agriculture's role in the adaptation and mitigation of climate change.

1 RECOMMENDATION #1: ADAPTATION

Governments must support, develop and build upon community-based adaptation actions.

2 RECOMMENDATION #2: MITIGATION

Governments must fund sustainable land management practices and support farmers to increase ecosystem resilience to a changing climate whilst minimising GHG emissions.

3 RECOMMENDATION #3: RISK & RESILIENCE

Governments need to implement pro-active policies and provide investments for resilient agricultural growth.

4 RECOMMENDATION #4: INNOVATION & TECHNOLOGY

Governments need to ensure that innovative and affordable technologies are available to smallholder farmers.

5 RECOMMENDATION #5: FINANCING

Governments must provide the right incentives for farmers in developing countries to adapt to the adverse impacts of climate change while contributing to the mitigation of GHG emissions.

6 RECOMMENDATION #6: CAPACITY BUILDING & INSTITUTIONS

National and regional policies must complement and reinforce climate change adaptation and mitigation goals.

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GROWING OPPORTUNITIES FOR AFRICA'S DEVELOPMENT