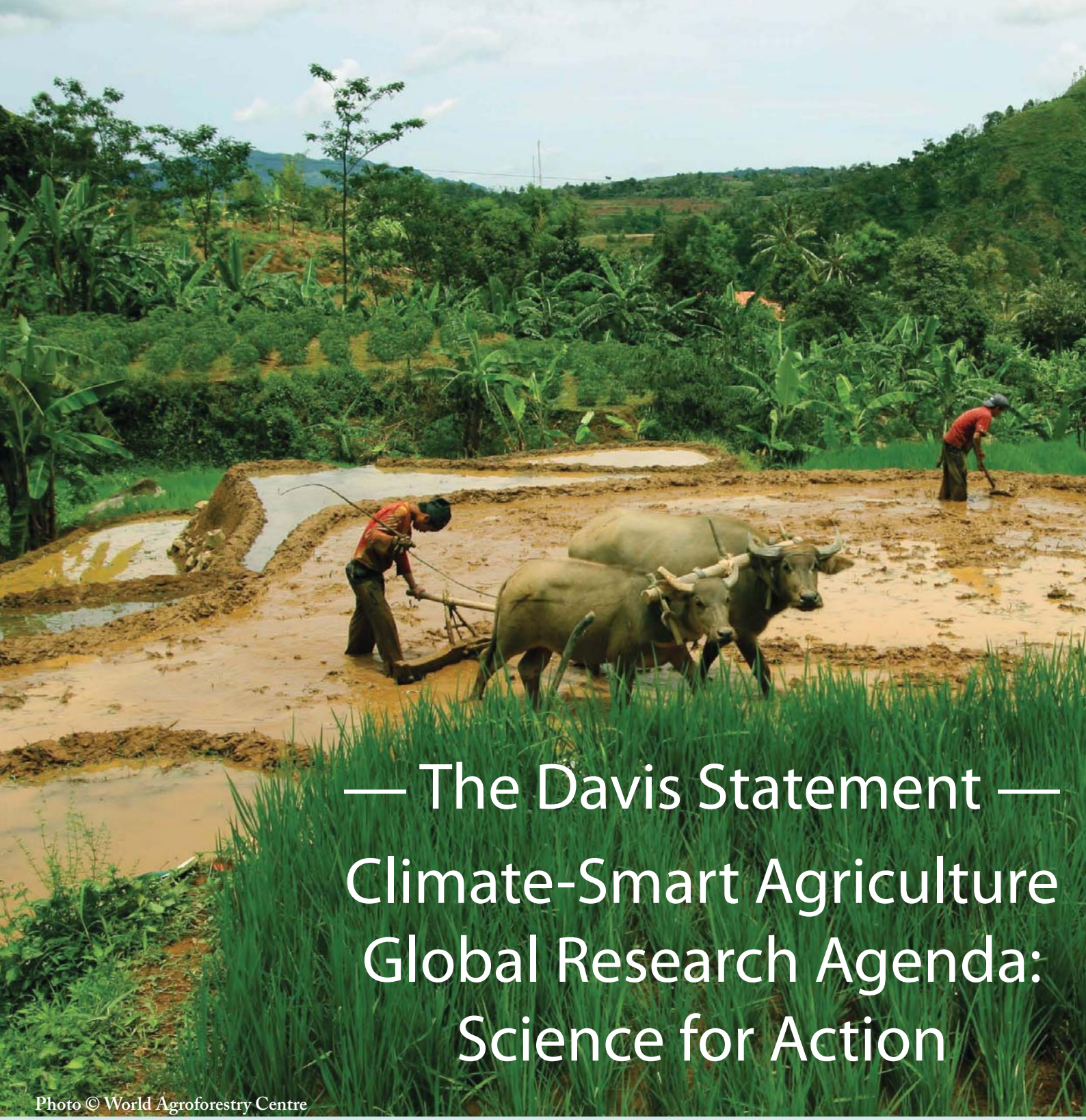

— The Davis Statement —
Climate-Smart Agriculture Global Research Agenda: Science for Action

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Climate-Smart Agriculture: Global Science Conference
19–23 March 2013 | University of California, Davis

UC DAVIS
UNIVERSITY OF CALIFORNIA

Ministry of Economic Affairs, Agriculture and Innovation

THE WORLD BANK
Working for a World Free of Poverty

Climate-Smart Agriculture: Global Science Conference
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Global Research Agenda: Science for Action

I. Background

Over 300 participants from 35 countries, representing scientific institutions, universities, multilateral organizations, governments, international organizations, farmers' organizations, private sector and civil society organizations convened at the 2nd Global Science Conference on Climate-Smart Agriculture at the University of California, Davis, to explore avenues to move forward on scientific priorities in climate-smart agriculture and to catalyze transformative actions.

Participants presented key scientific findings relevant to climate smart agriculture, identified priorities for new research and explored potential opportunities to strengthen science-policy integration to provide global food security and nutrition, alleviate poverty, support sustainable development and promote ecosystem services in agricultural[1] landscapes. The conference focused on three key themes:

- Sustainable Farm and Food Systems: Options for sustainable intensification, agroecosystem management and food systems;
- Landscape and Regional Scales: Land use, ecosystem services and regional resilience;
- Integrative and Transformative Institutional and Policy Aspects: Bridging across scales to link science and practice to ensure food security and nutrition, poverty alleviation and multiple ecosystem services.

The participants of the UC Davis conference took the recommendations of the 2011 Global Science Conference on Climate-Smart Agriculture - The Wageningen Statement - a step further to collectively create the Science-for-Action Research Agenda. This research agenda will provide the scientific basis for action across multiple levels by supporting and linking with key initiatives and global processes on agriculture, food security and climate change, including the upcoming 3rd Global Conference on Agriculture, Food Security and Climate Change in South Africa in December 2013.

II. What We Know: The State of Play

Climate-smart agriculture is a crucial approach for responding to climate variability and change, while providing the triple wins of food security, climate change adaptation and mitigation. Climate-smart agriculture entails improving and adapting the practices, policies, management, innovation, technology, and financing to increase productivity, enhance food security and nutrition, and strengthen the adaptive capacity and resilience of people, food production systems and ecosystems in agricultural landscapes. It seeks to achieve this, while reducing greenhouse gas emissions and increasing carbon storage in agricultural landscapes.

[1] Agriculture is taken to be inclusive of crops, livestock, forestry, fisheries, and aquaculture, as defined by the Food and Agriculture Organization of the United Nations (FAO).

- There are a number of ongoing initiatives at the international level in the realm of climate-smart agriculture; important commitments and actions are underway and new platforms and partnerships are being created. However, there is a need for stronger interdisciplinary collaboration, and an integrated process that links the many ongoing initiatives and provides a common framework within which to move forward.

- The science of climate-smart agriculture is advancing rapidly, resulting in new and transformative technologies, as well as improved institutional arrangements. There is also growing agreement amongst researchers, agencies, foundations and policy makers about the scientific, political and economic requirements of climate-smart agriculture. Still more science is needed, and the science must be backed by political will and economic commitment to achieve the adoption of future-oriented, science-based policies.

- Agriculture provides multiple goods and services in addition to food, including co-benefits related to greenhouse gas mitigation, water management, biodiversity, and pest-control services. Although the quantification of such co-benefits at different spatial scales is difficult, they are an important aspect of ongoing climate change interventions. To understand and value these benefits, an integrated landscape approach is considered to be an effective way to assess processes at multiple ecological scales (gene, population and ecosystem), for different types of resources and for potential responses of human communities to climate variability and change.

III. Research Priorities for Climate-Smart Agriculture

Providing food security and nutrition for 9 billion people in 2050 is an enormous challenge, especially given the uncertainty of future climate and the ongoing degradation of the resource base in many regions of the world. The multiple goals of climate-smart agriculture cannot be met without significant advancements in science and research, keeping in mind:

- Food security, livelihoods, and ecosystem services are closely affected by efforts to adapt to and mitigate climate change. Improved science will show how best to meet these multiple goals, identify trade-offs and/or set priorities among them.

- Research needs to be re-focused more specifically on the need to achieve the triple win, as it is crucial to achieve innovations that optimize agricultural crops and systems by simultaneously achieving increased productivity, enhanced resilience and reduced emissions.

- Integrative approaches to ensure sustainable increases in food production, poverty alleviation and biodiversity, while adapting to and mitigating climate change, require novel types of science-policy partnerships at local and global scales. They must involve multiple actors, stakeholders and decision-makers, multiple disciplines and both public and private sectors. The involvement of farmers, land managers, agroforesters, livestock keepers and fishers is essential for enabling effective decisions that lead to adaptive capacity and resilience, while ensuring sustainable livelihoods at the smallholder-level.

- Innovative farm practices and new genotypes, along with more efficient irrigation and water utilization, and greater use of renewable resources and agrobiodiversity-based solutions, are needed to improve food production in ways that promote mitigation and adaptive capacity. Examples include increases in nutrient availability, carbon storage, water retention and/or infiltration from soil organic matter; pest and disease resistance; and reduced incidence of eutrophication and other negative environmental impacts.

- Increased research and investments are required to further explore and scale-up new, climate-smart crop production systems such as double-story, or evergreen agriculture systems, whereby crops are managed under a full or partial canopy of trees, leading to triple-win advantages.

- Successful climate-smart agriculture is dependent upon sustainable energy use and supply. The prudent use of fossil-fuel based inputs is crucial, as is the development of biofuel production systems to provide energy and mitigate climate change without compromising food security and nutrition.

- Linkages along the value-chain include markets and financial mechanisms that support climate-smart farming practices need to be considered. For example, improving food distribution and reducing waste should be encouraged as a way to improve food security.

- Landscape and regional level research and analysis can better assess and demonstrate the tradeoffs and synergies between climate-driven changes in land management, livelihoods and sustainable development, and can support more holistic science-based policies for securing the resource-base upon which agriculture depends (for example, water, soil quality, and ecosystem services provided by biodiversity).

- We must better evaluate and quantify the effect of climate variability and change, including extreme weather events, on rural to urban migration. The effects of urbanization on rural households, agricultural labor and the loss of prime agricultural soils need to be better understood. Effective strategies for expanding links between rural and urban communities, developing urban agriculture, and promoting healthier food chains and systems are necessary.

- It is crucial to develop approaches for linking the results of forecasting systems, transition processes, scenario analyses, and contingencies for withstanding and adapting to extreme climate events, so that vulnerable and rural farming communities can better examine options and interventions that provide resilience.

IV. Climate-Smart Science: Enabling Robust Knowledge Systems & Approaches

Climate-smart science incorporates science-based knowledge systems that are tailored to local contexts and derived from interdisciplinary research, and based on participatory engagement with multiple stakeholders, at multiple scales. The science needs to be bolstered by:

- **Participatory research that involves farmers and other stakeholders as co-collaborators** early on in defining the research agenda and design, and that allows participants to learn from each other. Research results and outcomes relevant to field situations should not encounter barriers to

access. Specific groups such as women and indigenous people warrant use of context-specific participatory processes that promote sustainable practices based on local knowledge and innovation.

- **Improved methods for supporting decisions under uncertainty**, within a wide range of possible scenarios. Inputs from a wide range of stakeholders having broad knowledge and an understanding of complexities can help better design research strategies for increasing resilience under multiple uncertainties. Communication of risks to farmers must also be improved.

- **New technologies and institutions** to will speed innovation of climate-smart agriculture solutions to support the triple wins of increased productivity, adaptation and mitigation. These innovations will include better genotyping and phenotyping of stress-adapted crop and livestock breeds; the development of metrics and indicators for landscape level analysis on the ground via remote sensing and mechanisms to increase data exchange among scientists.

- **Further development and improvement of models and modeling approaches** for addressing climate change impacts, adaptation and mitigation at multiple scales (crop, field, landscape and higher). There is a need to develop data that is broader and of higher quality and to strengthen the modeling of interactions and feedbacks across scales and disciplines. Expanding the ways that modeling can be used for engaging stakeholders and decision-makers in the co-design of projects and programs will be beneficial.

- **Greater analysis of the effect of climate variability and extremes on near-term climate change scenarios.** This analysis will ensure that stakeholders and policy-makers have the best science to make informed decisions at the appropriate planning and policy time horizons.

- **Interdisciplinary interactions,** where research, modeling and technological developments take into account interactions and synergies between production and natural systems, and are complemented by a sound understanding of how governance, policy, as well as farmer response and decision-making unfold across different social-ecological contexts, and at different levels.

- **Communication of the latest scientific progress and research results** within relevant time frames and across sectors and scales in which policymakers and other stakeholders operate, such as through multi-stakeholder and multi-sector research consortiums that cross boundaries between scientists, researchers and other important local, regional and global actors such as NGOs, INGOs, governmental agencies and corporations, as well as through broader media outlets.

- **Accounting for and managing tradeoffs and synergies in climate-smart agriculture** over time and space. For example, analysis of agricultural systems is needed regarding the tradeoff between achieving yields and negative environmental impacts. Planning and implementing across landscapes helps define and address trade-offs and synergies.

- **Prioritizing research and actions for the most serious vulnerabilities** to climate change and agriculture with regards to adaptation and resilience. Greater research effort needs to be directed towards, and undertaken with, farmers and communities whose food security and nutrition is most at risk from climate change, variability and extreme weather events.

- **Best practices in climate-smart agriculture, that effectively demonstrate the value of multi-stakeholder, multi-scale programs** by combining user-friendly and accessible technologies, simple entry points, informed extension services, community engagement, learning exchange and financial risk management at the landscape level

- **Agricultural innovation that is placed in the context of the full risk spectrum** (shifts with scale, values, and various contexts) and the use of effective risk management tools, such as improved forecasts, appropriately designed safety nets and insurance instruments, along with capacity building for their implementation, and effective communication about risk, will enhance adaptation.

V. From Climate-Smart Science to Transformative Approaches that Influence Policy and Action

Transformative actions that are science-based utilize knowledge systems in new ways and can promote sustainable food systems and ecosystems in agricultural landscapes despite future climate change and extreme events. Furthermore,

- The unfolding of decision processes and their translation into action depend on the social-ecological contexts in which farmers are embedded (for example, the important role of social networks in rural communities).

- When adaptation and mitigation occur together, such as in agroforestry systems, an evaluation of tradeoffs can identify co-benefits over the short- and long-term horizons, as well as the unexpected outcomes that could support or undermine the transition process.

- Linking research to policy and incorporating social protection elements that go beyond filling research gaps, to also place emphasis on communicating the results, and building research in a way that it is active in the field and in the community is important.

- It is necessary to further develop public-private partnerships to form a more comprehensive understanding of climate impacts and to develop technologies, policies, and approaches that lead to sustainable food production *and* consumption patterns within the context of a changing climate.

- Building awareness of the need for climate-smart innovation through educational programs and activities that highlight climate-smart agriculture solutions is crucial.

- Policies and initiatives that establish stronger linkages between farmers, climate-smart supply chains, and markets are needed.

VI. The Way Forward: Integrative Actions that Bridge Across Scales

Climate-Smart Agriculture is not only an approach; it is also a continuous process of improving agriculture to achieve sustainable systems to support food security under climate change, requiring the commitment of all relevant stakeholders. Therefore, realizing climate-smart agriculture requires:

- The political and financial commitment of a diverse and representative set of stakeholders (governments, private sector, farmers, NGOs, CSOs, multilateral organizations, etc.);
- Clarity about long-term and short-term trade-offs and goals and strategies. For example, decisions are being made on multiple timescales, and the congruence and complementarity of these timescales must be addressed;
- Institutional, financial and knowledge arrangements to support a coherent process;
- Flexibility in arrangements, planning and budget to cope with variability in climate and markets;
- A holistic and service-oriented approach from science, and the interdisciplinary work of researchers to facilitate the process;

The continuous process of transforming to climate-smart agricultural systems and landscapes should be supported by flexible yet clear guiding principles that effectively bridge the science-policy gap. An effective means of achieving this would be to establish a ***Science Committee for Climate-Smart Agriculture*** that would take on the task of enhancing the intellectual and strategic basis for the research and science-policy agenda, and serve as a guiding force for long-term planning, goal-setting and monitoring of progress. Such a committee could be established in the wake of the Davis Climate-Smart Agriculture conference, based on an agreement among the major partners and organizers of the conference regarding the scope and membership of such a committee. This committee could then guide the organization of the 3rd Science Conference on Climate-Smart Agriculture, which Agropolis International has proposed to host.

Climate-smart agriculture is a concrete manifestation of the concepts and objectives expressed in a wide range of global programs and frameworks for action, such as: the Millennium Development Goals and ensuing Post-2015 Development Agenda, the United Nations Framework Convention on Climate Change (UNFCCC), the United Nations Convention to Combat Desertification (UNCCD), the United Nations Convention on Biological Diversity (UNCBD), the Global Oceans Action Summit, the Zero Hunger Challenge, as well as the upcoming 3rd Global Conference on Agriculture, Food Security and Climate Change, where a new partnership on climate-smart agriculture is expected to be launched. As such, broad acceptance of the climate-smart agriculture approach can synergistically foster greater progress toward sustainable development. A strong emphasis should be placed on exploring such connections, as well as those with private organizations, to develop partnerships that advance the ideas and goals in this statement.

Policy makers and scientists propose climate-smart agriculture as a practical and tangible way forward for achieving sustainable agricultural development to support food security in a world where climate change is already a reality. Realizing co-benefits in a dynamic environment, and improving efficiency and resilience is a very complex and ambitious matter, made still more difficult by the need to develop context-specific climate smart solutions. Developing the science and research foundations to achieve the policies required to support the transformative shift implied by climate smart agriculture is essential, but not sufficient. We need a collaborative effort with broad social participation to identify and realize effective solutions at the scale demanded by the nature of the challenge.

DATED the 22th Day of March 2013
PLACE: University of California, Davis.