

# Climate-smart solutions for soils and food security

*CGIAR is developing climate-smart solutions for agriculture based on soil carbon sequestration. The initiative offers ways for farmers to prepare for the effects of climate change, as well as reducing the impact that agriculture is having on the environment.*



Feeding the future world's population will require a 60 percent increase in total agricultural production. However, many agricultural production systems are already faltering. Recent research is showing that as much as the yield of 31% of total global rice, wheat and maize production is stalling, including rice in eastern Asia and wheat in northwest Europe.

Climate change is already having an effect on agriculture, introducing new pests and diseases, degrading soils and threatening water supplies. Potato farmers in the Andes have to plant their potatoes higher and higher up the mountainsides to find cooler conditions. As the climate warms up, the crop becomes vulnerable to diseases like late blight that thrive in warmer conditions.

At the same time, existing agriculture is contributing to climate change. Agriculture generates about one-quarter of global greenhouse gases, if emissions from land use change like cutting down rainforest to grow oil palm, are included. Methane is one of the most damaging greenhouse gases. The amount of methane that a single cow generates in a day has as much greenhouse effect as the CO<sub>2</sub> produced by an average car.

## **CGIAR's contribution to the 4‰ Initiative**

The international dialogue needs to make agriculture integral to all agreements and activities. The '4‰ Initiative<sup>1</sup>: soils for food security and climate,' to be launched in Paris, aims to show that food security and combating climate change are complementary and to ensure that agriculture provides solutions to climate change. This 4‰ Initiative aims to build up organic matter in soils and so increase the amount of carbon that soils absorb. This will have wide-ranging benefits in farming systems: increasing crop productivity and soil health, enhancing the water-holding capacity of the soil and sequestering carbon for climate change mitigation.

The proposed CGIAR contribution to this initiative is a 5-year, US\$ 225 million project that would reach farmers throughout Ghana, Senegal, Tanzania, Uganda, Vietnam, Nepal and Colombia to improve the resilience of their agricultural yields by 20% and offset emissions by 15% or 25 megatonnes of CO<sub>2</sub>e.

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<sup>1</sup>Literally 'Quatre pour mille', or 'Four per thousand'

This project, jointly implemented by CCAFS and WLE CGIAR Research Programs, would focus on building readiness and facilitating implementation of agricultural development with proposed actions linked to INDC commitments, covering both adaptation and mitigation. The project has a strong soils focus given the strong potential synergies, technical availability of practices, and political momentum for increased on soil carbon sequestration by the French government, hosts of COP21. We would also give attention to the need to link soil management to broader approaches to climate smart agriculture and climate risk management (e.g. seasonal forecasts to farmers; agricultural insurance; productive social safety nets) given that risk reduction is a pre-cursor to farmer investments.

We propose a global program covering Ghana, Senegal, Tanzania, Uganda, Vietnam, Nepal and Colombia, spotlighting the context specific nature of actions in the agricultural sector, and fostering South-South learning. The program would have a strong research element – much of it action research with implementing partners – to throw light on the controversies and derive general lessons for wider implementation.

At the local level, current investments in “climate-smart villages” would be leveraged to foster multi-stakeholder learning – these would involve sites where public and private actors come together to test options covering technologies (such as soil and water management, conservation agriculture, deep-rooted forage systems and agroforestry), index-based insurance (where appropriate), climate advisories and local adaptation planning. One aspect includes fostering better links between meteorological services and agricultural departments to improve advisories to farmers, using ICT and traditional extension methods. Lessons learnt at local levels will be brought into policy processes through national science-policy platforms. These national level activities would aim to enhance a Country’s readiness for climate action in agriculture, and enhance scaling up of climate-smart agriculture.

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Research is carried out by the 15 Centers, members of the CGIAR Consortium, in close collaboration with hundreds of partners, including national and regional research institutes, civil society organizations, academia, development organizations and the private sector.

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