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Sustainable agriculture and climate change

An ActionAid rough guide

May 2009

“I am a farmer. My mother was a farmer. For my mother, rains used to come from October to April. Today, because of climate change, the rains come in December and end in March. Our local varieties do not have time to mature. We are forced to buy hybrid crops, which are much more input intensive, and we cannot afford these inputs. We are poor. So we are starving in Malawi.”

Joyce Tembenu, a widow and mother of three who farms in the Salima district, Malawi

“The way the world grows its food will have to change radically to better serve the poor and hungry if the world is to cope with a growing population and climate change while avoiding social breakdown and environmental collapse.”

International Assessment of Agricultural Knowledge, Science, Technology and Development¹

Introduction

Agriculture is now recognised as both contributing to and suffering from the negative effects of climate change. Farming accounts for as much as 32% of greenhouse gas emissions, if deforestation is included.² On the other hand, climate-driven water scarcity³ and increases in the severity of droughts and floods will affect food production, especially in subsistence sectors. Smallholders, pastoralists and artisanal fisher folk will suffer complex and localised effects of climate change. Yields from rain-fed farming in some African countries could fall by up to 50% by 2020, and by up to 30% in some central and South Asian countries by 2050, according to the Intergovernmental Panel on Climate Change (IPPC).⁴

¹ International Assessment of Agricultural Knowledge, Science and Technology for Development, Executive Summary of the Synthesis Report. Washington DC: Island Press; See also McIntyre, Beverly D., Hans R. Herren, Judi Wakhungu and Robert T. Watson, ed. 2009. International Assessment of Agricultural Knowledge, Science and Technology for Development: Synthesis Report. Washington DC: Island Press: <http://www.agassessment.org/>

² Chatham House (2009) ‘The feeding of the nine billion’, London

³ An estimated four billion people will live in countries chronically short of water by 2050, not only because of climate change, but also because of unsustainable extraction, according to IPCC. Agriculture, which accounts for 70% of global fresh-water use, will be particularly vulnerable.

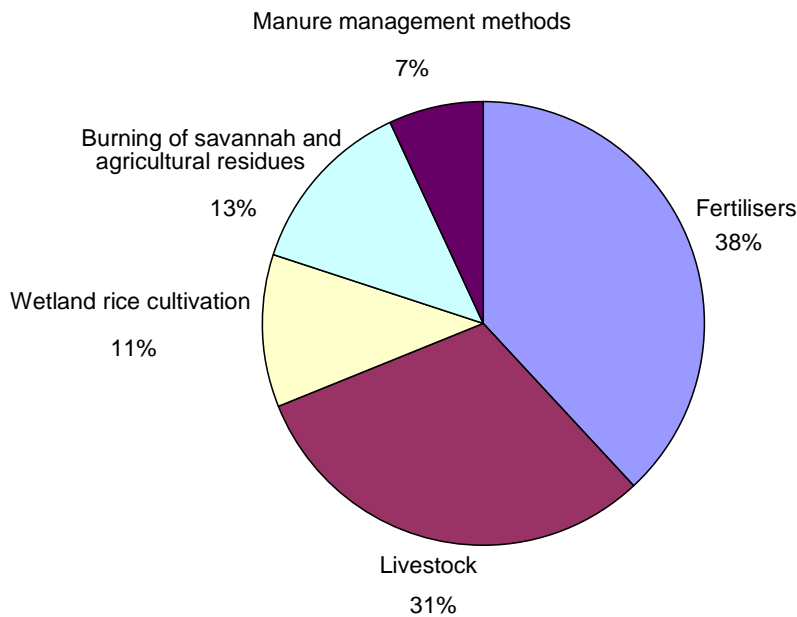
⁴ IPCC. Summary for Policymakers. *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, Parry, M.L., Canziani, O.F., Palutikof, J.P., van der Linden. P.J. and Hanson, C.E. Eds., Cambridge University Press, Cambridge, UK, 7-22, 2007: page 50, http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr.pdf

The IPCC estimates that at least 50 million additional people will be at risk of hunger by 2020 as a result of climate change. This could rise to 132 million additional people by 2050 and 266 million by 2080.⁵

What is agriculture's contribution to climate change?

Agriculture, as practiced today, accounts for nearly 14% of greenhouse gas emissions annually. Land use change, including deforestation to develop agricultural land, contributes another 19%.⁶ Industrial agriculture is a major contributor to climate change, and a significant portion of the greenhouse gas emissions created by industrial agriculture are generated by agricultural pesticides and chemicals, deforestation and the burning of biomass.⁷

Agriculture's contribution to climate change, broken down, is as follows⁸:



⁵ Ibid.

⁶ Gerald C. Nelson. "Agriculture and Climate Change: An Agenda for Negotiation in Copenhagen." International Food Policy Research Institute. March 2009.

⁷ Ibid.

⁸ EPA (forthcoming) 'Global Anthropogenic non-CO2 greenhouse gas emissions: 1990-2020', US Environmental Protection Agency, Washington DC.

Why are smallholder farmers important for climate change adaptation?

Some 470 million farms - 85% measuring less than two hectares - produce 80% of the world's food and in many cases their share of global production is growing.⁹ Given their involvement in the world's food system and current and expected climate impacts a climate change adaptation strategy that ignores smallholder farmers is doomed to failure.

Does helping smallholders to adapt to climate change have other benefits?

Although they produce most of the world's food, smallholder farmers and landless workers are among the most economically disadvantaged groups in the world. Resource-poor smallholder families make up 75% of the world's poor, half of the world's undernourished, 75% of Africa's malnourished children, and the majority of people living in absolute poverty.¹⁰ So helping smallholder farmers to adapt to climate change should also help to reduce hunger and poverty.

A more sustainable model of agriculture, focused on promoting local food supply, organic products, and biodiversity, will also have a substantial mitigation benefit.

What does climate change adaptation in agriculture look like?

Effective adaptation for smallholders requires that they follow a 'sustainable agriculture' model. This means enabling farmers to enhance water storage facilities, diversifying production to reduce reliance on a single crop, building community self-sufficiency through the use of collective stocks such as seed banks, prioritising organic production so as to reduce reliance on external inputs such as fertilisers and recognising the limitations and opportunities of the local environment.

⁹ Nagayets, Oksana. 2005. Small Farms: Current Status and Key Trends. In *Information Brief Prepared for the Future of Small Farms Research Workshop Wye College, June 26–29*. Washington DC: International Food Policy Research Institute.

¹⁰ Ibid.

Some examples...

- In Ghana, farmers are combining local and traditional practices with innovation to reduce the risk of losing their harvest to natural hazards. They practice mixed cropping and sow varieties of vegetables that are adapted to their local environment to increase the chance that at least one crop will survive.
- In Vietnam, where floods, storms and typhoons are recurrent phenomena, flood and storm prevention committees have been established. These committees play a major role in disseminating information on flood prevention and educating communities on agricultural practices that reduce risks from natural hazards.

Communities are attempting to respond to the climate crisis with the scarce resources they have. That is simply not enough. In order to avoid the devastating decreases in food production projected by the IPCC, there must be a substantial injection of new money for sustainable agricultural development.

Effective adaptation for industrial or monoculture agriculture is likely to prove more difficult since the very nature of production in such systems does not follow a sustainable agriculture model.

Can sustainable agriculture feed the world?

Third World Network researcher, Lim Li Ching, says the evidence shows, “On average, in developed countries, organic systems produce 92% of the yield produced by conventional agriculture. In developing countries, however, organic systems produce 80% more than conventional farms.” She further cites other evidence, including a finding published in 2006: “In a review of 286 projects in 57 countries, farmers were found to have increased agricultural productivity by an average of 79% by adopting ‘resource-conserving’ or ‘ecological’ agriculture.”¹¹

A joint UNEP-UNCTAD paper concluded that evidence supports the argument that organic agriculture can be good for food security in Africa — equal or better than most conventional systems and more likely to be sustainable in the longer-term. The 15 case studies examined in-

¹¹ Lim Li Ching, November 2008, “Is ecological agriculture productive?” on-line paper at TWN website. <http://www.twinside.org.sg/title2/susagri/susagri064.htm>

depth have shown increases in per hectare productivity for food crops, increased farmer incomes, environmental benefits, strengthened communities and enhanced human capital.¹²

What is the role of women in agriculture?

Since women in the developing world are largely responsible for producing and providing food for their families, the impact of climate change on agriculture also means that women - who already constitute the majority of poor people - are most adversely affected. Women depend more than men on the ecosystems that are threatened by climate change, but they lack access to and control over natural resources, technologies and credit. ActionAid's research shows that, as a result, women are more vulnerable than men to seasonal and episodic weather phenomena and to natural disasters resulting from climate change.¹³

However, women have been leading innovative efforts to adapt to the impacts of climate change. In Malawi, for example, in response to ever worsening harvests and increased food insecurity in their communities, rural women have mobilised to form women's farmers clubs. They pool resources, tools, seeds, and knowledge about agricultural practices so they can respond collectively to decreases in food production.

A significant portion of adaptation funding should be specifically dedicated to support rural livelihoods, food security, and sustainable development, particularly the needs, knowledge, and capacities of small-scale farmers. Additionally, funding should be directed specifically to women farmers, who are both particularly vulnerable to climate change but also leading innovative efforts to adapt to its impacts.

¹² UNEP-UNCTAD CBTF, (2008), *Organic Agriculture and Food Security in Africa*, UNCTAD-UNEP Capacity Building Task Force on Trade, Environment and Development. UN. Geneva & New York.

http://www.unep.ch/etb/publications/insideCBTF_OA_2008.pdf

¹³ ActionAid. *We Know What We Need: South Asian Women Speak out on Climate Change Adaptation*. 2007.

Will high-tech solutions work?

The climate crisis has created an opportunity for manufacturers, corporate scientists and foundations to promote 'high-tech' solutions to combat global hunger. These solutions include increased use of fertilizers, chemicals, and Genetically Modified Organisms (GMOs) and hybrid plants and seeds.

Yet analysis by NGOs and scientists indicate that yields from GM crop varieties are actually *lower* than conventional crops.¹⁴ Moreover, in the few developing countries where GM has been introduced so far, the use of pesticides has increased, soil fertility has been reduced, soil erosion has increased, and land ownership has become more unequal.¹⁵ Poor farmers' traditional practice of seed saving is threatened as farmers are required to sign 'use agreements' with GM seed suppliers. This in turn makes farmers more vulnerable to debt and exogenous shocks as they become more dependent on expensive external inputs.¹⁶

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¹⁴ Union of Concerned Scientists. Failure to Yield: Evaluating the Performance of Genetically Engineered Crops. April 2009. http://www.ucsusa.org/assets/documents/food_and_agriculture/failure-to-yield.pdf

¹⁵ Friends of the Earth, *Who benefits from GM crops?: The rise in pesticide use*, January 2008, p.5; and *Who benefits from GM crops?: Monsanto and the corporate-driven genetically modified crop revolution*, January 2008, p.12

¹⁶ Eric Holt-Gimenez et al. Ten reasons why the Rockefeller and the Bill and Melinda Gates Foundations' Alliance for a another Green Revolution will not solve the problems of poverty and hunger in Sub-Saharan Africa, *Food First policy brief*, No.12, October 2006, p.6