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HOW CAN AFRICAN AGRICULTURE ADAPT TO CLIMATE CHANGE? INSIGHTS FROM ETHIOPIA AND SOUTH AFRICA

Global Carbon Markets

Are There Opportunities for Sub-Saharan Africa?

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Human activities such as fossil fuel burning and deforestation have significantly increased the atmospheric concentration of greenhouse gases (GHG) leading to global climate change. Global climate change and its associated weather extremes pose considerable challenges worldwide, and mitigating the adverse impacts of climate change is a high priority for the international community.

To reduce global emissions and curb the threat of climate change, many countries are participating in carbon trading. Carbon trading includes allowance-based agreements that impose national caps on emissions and allow participating countries to engage in emission trading as well as project-based transactions (for example, through the CDM or Clean Development Mechanism). The CDM allows industrialized countries with greenhouse gas reduction commitments to invest in emission-reducing projects in developing countries as an alternative to generally more costly emission reductions in their own countries. Funds made available by the CDM for carbon offsets provide an opportunity for cash-strapped developing countries to fund much needed adaptation measures. The potential annual value stream for Sub-Saharan Africa from mitigating GHG emissions is estimated to be US$4.8 billion at carbon prices of US$0–20/t$CO_2$e. Moreover, agricultural mitigation measures, including soil and water conservation and agroforestry practices, also enhance ecosystem functioning, providing resilience against droughts, pests, and climate-related shocks.

Yet the potential for Africa to contribute to global reductions in GHG emissions is quite substantial. Estimates suggest Africa could potentially contribute to GHG reductions of 265 MtCO_2e (million tons of carbon dioxide or equivalent) per year at carbon prices of up to US$20 through agricultural measures and 1,925 MtCO_2e/yr at carbon prices of up to US$100/t$CO_2$e by 2030 through changes in the forestry sector. These amounts constitute 17 and 14 percent, respectively, of the global total potential for mitigation in these sectors. However, countries in Sub-Saharan Africa are marginalized in global carbon markets. Sub-Saharan Africa's share of the CDM market is nine times smaller than its global share of GHG emissions, including emissions from land use and land-use change.

This brief is based on a paper that examines Sub-Saharan Africa's current involvement in carbon markets, potential for GHG emission reductions, constraints to further participation in carbon markets, and opportunities for expanding Sub-Saharan Africa's market share.

SUB-SAHARAN AFRICA'S MARKET SHARE AND POTENTIAL

As the largest project-based market aimed at developing countries, the CDM provides the largest outlet for carbon offset projects in Sub-Saharan Africa. As of October 2008, Sub-Saharan Africa accounted for only 1.4 percent of all registered CDM projects—only 17 out of 1,186 projects—and most of these projects (14 out of 17) were located in just one country, South Africa. Thus, African projects still represent a small fraction of the entire CDM market. China dominates the CDM market with about 73 percent of volumes transacted (in 2007).

While Sub-Saharan Africa's contribution to global emissions is relatively small—5 percent of the global total—there is significant potential for the region to contribute to climate change mitigation, particularly in the forestry and agriculture sectors, which together accounted for 73 percent of emissions from the region (and 13 percent of the global total emissions from these sectors). Moreover, Africa's emissions from agriculture and land-use change and deforestation are

Table 1 Estimated Economic Mitigation Potential by Management Practice and Region

	Economic Mitigation Potential by 2030 at US$0–20/t$CO_2$e (Mt$CO_2$e/yr)					
	Cropland management	Grazing land management	Restoration of organic soils	Restoration of degraded land	Other practices	Total
East Africa	28	27	25	13	15	109
Central Africa	13	12	11	6	7	49
North Africa	6	6	6	3	3	25
South Africa	6	5	5	3	3	22
West Africa	16	15	14	7	8	60
Total	69 (26%)	65 (25%)	61 (23%)	33 (12%)	37 (14%)	265 (100%)

SOURCE: Smith et al. 2008.

expected to grow in the future due to projected intensification of agricultural production and the expansion of unexploited areas.

The mitigation potential from agricultural production is greatest in East, West, and Central Africa, with mitigation potentials of 109, 60, and 49 $MtCO_2e/yr$, respectively, at prices of US$0–20/$tCO_2e$ (see Table 1). The agricultural practices that appear to be the most promising include cropland management, grazing/land management, and restoration of organic soils.

Moreover, Africa contributes 18 percent of the total global GHG emissions from land use, land-use change, and forestry. As such, soil carbon sequestration, fire management, and avoided deforestation offer additional opportunities for mitigating GHG emissions and promoting sustainability in Africa. Africa has the potential to mitigate 1,160 MtCO2e/yr from avoided deforestation by 2030, 29 percent of the global total, as well as 665 MtCO2e/yr from afforestation and 100 MtCO2e/yr from forest management at carbon prices of US$0–100/tCO2e.

CONSTRAINTS TO SUB-SAHARAN AFRICA'S PARTICIPATION IN GLOBAL CARBON MARKETS

While Sub-Saharan Africa could contribute considerably to global reductions in GHG emissions, numerous barriers would have to be overcome. For instance, to be considered eligible to engage in carbon trading under the CDM, a clear baseline for a project must be established, and it must be demonstrated that emission reductions would not have occurred in the absence of the project (additionality rule). For many developing countries, lack of technical training and support on setting benchmarks, as well as poor availability and quality of data, are major obstacles to defining an adequate baseline and demonstrating additionality.

Africa's participation in the CDM is also constrained by high transaction costs. The costs of carbon projects include the cost of providing information about carbon benefits to potential buyers, communicating with project partners, and ensuring parties fulfill their contractual obligations. Measurement and monitoring costs are also often considerable. Likewise, the costs of negotiating land-use decisions for carbon projects involving large numbers of geographically dispersed people with different land-use objectives can be prohibitive.

In addition, the CDM targets energy and power sources, overlooking soil carbon sequestration and avoided deforestation projects, which are highly important for climate change mitigation in many African countries. The exclusion of these activities limits CDM participation by African countries and hinders their mitigation opportunities.

OPPORTUNITIES FOR INTEGRATING SUB-SAHARAN AFRICA INTO THE GLOBAL CARBON MARKET

There are several opportunities for further integrating Sub-Saharan African and other developing countries into global carbon markets. Simplifying the CDM rules for determining baselines, monitoring carbon emissions, and enforcing offsets and broadening the range of eligible projects to include avoided deforestation and soil carbon sequestration would facilitate the participation of Sub-Saharan African countries. These countries should also explore opportunities to increase participation in voluntary carbon markets. In order to take full advantage of the opportunities provided by carbon markets, Sub-Saharan African countries will also need to strengthen their institutional capacity and engage both private and public sectors in project development and implementation. International advisory services could be established to assist potential investors, project designers and managers, national policymakers, and leaders of local organizations and federations in negotiating deals and complying with measurement and monitoring requirements.

Policymakers should take care to ensure that the needs of the poor are taken into consideration. Reducing the transaction costs associated with small-scale carbon offset projects would allow the poor within these countries to benefit from carbon trading. Working with intermediary organizations that are accountable to local producers, building community-management capacity, strengthening property rights, and improving regulation of offset projects would also help ensure that social and environmental goals are met and that the poor benefit from the carbon trading system. Thus, expanding pro-poor mitigation through linking Sub-Saharan Africa to global carbon markets is both feasible and desirable for the region in terms of conserving its natural resources, contributing to the good of the global environment, and generating income to finance its development activities.

FOR FURTHER READING

Bryan, E., W. Akpalu, C. Ringler, and M. Yesuf, 2008. *Global Carbon Markets: Are There Opportunities for Sub-Saharan Africa?* IFPRI Discussion Paper (Washington, DC: International Food Policy Research Institute, 2008 forthcoming).

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