

# Harvesting agricultural carbon in Kenya

*The smallholder agricultural sector in East Africa can substantially contribute to climate change mitigation, generate carbon revenues for farmers, and enhance agrobiodiversity, while reducing farmers' vulnerability to climate change. Currently a demonstration project is being developed with support of the World Bank which will generate emission reductions based on the adoption of sustainable agricultural land management practices.*

In the Mt. Kenya region in Central Kenya, economic development is closely related to the coffee price. When coffee prices started to fall in 1997 farmers paid less attention to sound coffee management practices and as a consequence yield and quality dropped. The majority of the youth left the coffee farms and joined the increasing number of unemployed in Nairobi, which has contributed to a tremendous conflict potential. In the last two years coffee prices recovered due to increasing coffee demand in particular from Asia, but only the large coffee estates in Kenya were able to make the required investments to benefit from the price increase.

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## Sustainable agriculture can mitigate greenhouse gas emissions

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The Komothai Smallholder Farmers Cooperative in Kiambu District close to Mt. Kenya has been engaged in coffee production for generations. Most of the 9,000 members of the Cooperative have about 0.3 hectares

of coffee and about 0.3 hectares of maize-dominated subsistence agriculture. The chairman of the farmer society has witnessed ups and downs in the coffee sector, but is convinced that adopting sustainable agricultural land management (SALM) practices leading to increased productivity and production of high quality coffee is the most promising development pathway for smallholder coffee farmers in Kenya.

The BioCarbon Fund of the World Bank has identified large untapped greenhouse gas mitigation (GHG) potential in the smallholder agricultural sector in East Africa based on the adoption of SALM practices, which can contribute to climate change mitigation, generate revenue streams from carbon payments for environmental services, and maintain agrobiodiversity, while reducing farmers' vulnerability to climate change. Carbon revenues have the potential to lower

*The World Bank identified large untapped GHG potential in the smallholder agricultural sector of East Africa.*



Photo: Woelcke

barriers to the adoption of SALM practices.

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## *Providing access for smallholders to the global carbon market*

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The Government of Kenya contacted the World Bank to support the country to access the global carbon market based on land use activities. ECOM Agroindustrial Corp (EAC), an international coffee trader, identified the World Bank and German Technical Cooperation (GTZ) as implementation partners for an innovative carbon finance project in Kenya's agricultural sector. EAC will support the Komothai Farmers Cooperative and two other Cooperatives to turn sun grown low quality coffee into specialty shade grown and bird friendly coffee. GTZ will support EAC with certification for climate-resilient coffee. The World Bank provides technical assistance to generate the carbon asset and – through the BioCarbon Fund – it intends to purchase the emission reductions based on the adoption of SALM practices.

The adoption of SALM practices like agroforestry, mulching and soil and water conservation techniques will mitigate an estimated 3.5 tCO<sub>2</sub>e/ha/yr (tons of CO<sub>2</sub> equivalent per hectare and year) or more than 30,000 tCO<sub>2</sub>e/year in the total project area. Producers of certified carbon for the voluntary carbon market currently receive US Dollar 3-5/tCO<sub>2</sub>e. Under the Clean Development Mechanism (CDM) sequestration of GHGs based on agricultural land use activities are currently not eligible emissions reductions and can only be traded on the voluntary carbon market. Philip Valentine, the agronomist of EAC, is expecting that the SALM practices will increase the yield from 1.5 to 5 kilogrammes of ripe cherries per tree without adding any inorganic fertiliser. These practices also have the potential to increase climate resilience of agricultural production systems. For example, agroforestry prac-

tices reduce water stress and mulching techniques improve the soil water holding capacity.

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## *Developing a carbon accounting methodology*

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Considering that this project is the first of its kind, a number of project development and implementation barriers have to be removed. A robust, but cost effective, methodology outlining how to quantify additional emission reductions and how to monitor carbon stock changes has to be developed. In agriculture the main mitigation potential is based on soil carbon sequestration. The quantification of these emission reductions does not necessarily depend on expensive soil carbon measurements. The project is using a farmer self assessment approach based on monitoring the adoption of SALM practices and independent third party verification. The amount of carbon sequestered

is calculated using default values for carbon stock changes depending on agro-ecological zones and soil types. The century model is widely used to develop these default values. The methodology will be submitted to the voluntary carbon standard (VCS) for approval. Subsequently, it will be able to be used by any project developer for replication.

Another challenge of implementing an agricultural carbon finance project is related to the fact that although the total mitigation potential is substantive, the mitigation potential per unit area of land is comparatively small. Hence, such a project requires institutions with the capacity to aggregate emission reductions from a rather large land area. In this project the farmer cooperatives together with EAC fulfill this role.

*An example of sustainable agricultural management – SALM – with an agroforestry component.*





Furthermore, potential environmental and social impacts have to be assessed and mitigated in the project design. The project host country under the climate convention will only approve projects that have sustainable development benefits.

The project started in April 2008 and is currently finalising the carbon inventory to determine the pre-project carbon stock levels. Farmers are trained in SALM practices and the documentation for the certification process is being compiled. The adoption of SALM practices is expected to start within the next two months. Considering that coffee is one of the most important agricultural commodities in East Africa and that globally more than 70 percent is produced by smallholder farmers, it is expected that the project can be up-scaled within the pilot region and in other countries. Cooperatives in Ethiopia have already shown great interest in the approach, as have other coffee traders and roasters.

*Farmers being trained in SALM practices.*

In light of the ongoing post-2012 Climate Change negotiations, the project will contribute a case study which is expected to demonstrate that emission reductions in the agricultural sector are real and measurable and can be part of an attractive income stream for smallholder farmers. The carbon monitoring methodology and lessons learned can be incorporated into a land use-based climate change mitigation framework for terrestrial carbon covering agriculture, grassland and forest land use activities (for more details see [www.terrestrialcarbon.org](http://www.terrestrialcarbon.org)).

In the project presented, the public-private partnership was established to ensure equity among partners. Farmers receive technical advice to increase their productivity, adapt to climate change and have improved market access for the specialty coffee. In addition, the agricultural producers receive payments for contributing to climate change mitigation.

### **Acknowledgement:**

*The authors appreciate the engagement of the partners involved: Farmers Cooperative Societies – harvesting coffee & carbon/PES, ECOM Agroindustrial Corp (EAC) – the project developer aggregating the carbon, GTZ – supporting the certification & climate change investment proofing components, World Bank project management consultant team: UNIQUE forestry consultants GmbH (lead contractor), Joanneum Research, Prof. Pete Smith, University of Aberdeen*



*Photo: Woelcke*

### **Zusammenfassung**

Der kleinbäuerliche Agrarsektor Ostafrikas birgt ein großes, ungenutztes Potenzial zur Senkung der Treibhausgasemissionen, das helfen kann, die Folgen des Klimawandels zu mildern, den Bauern ein besseres Einkommen zu sichern und die Agrobiodiversität zu steigern, während die Bauern gleichzeitig für die Folgen des Klimawandels besser gerüstet sind. Die Regierung und der private Sektor Kenias haben bei der Weltbank Unterstützung für die Entwicklung des Kohlenstoffmarktes durch die Einführung nachhaltiger Praktiken des Landmanagements in der Landwirtschaft beantragt. Das Projekt in Kenia wird im Rahmen einer strategischen Partnerschaft mit ECOM Commodities und der GTZ durchgeführt.

### **Resumen**

Existe un gran potencial no aprovechado de reducción de gases tipo invernadero en el sector de la pequeña agricultura de África Oriental, que puede contribuir a mitigar el cambio climático y generar fuentes de ingresos para los agricultores. A la vez, se incrementaría la agro-biodiversidad y se reduciría la vulnerabilidad de los agricultores frente al cambio climático. El Gobierno de Kenia y el sector privado han solicitado asistencia al Banco Mundial para desarrollar el valor de los activos de carbono mediante la adopción de prácticas sostenibles en la agricultura y el uso de la tierra. El proyecto en Kenia se desarrolla gracias a una cooperación estratégica entre ECOM Commodities y la GTZ.



*Photo: Woelcke*