Carbon Finance Possibilities for Agriculture, Forestry and Other Land Use Projects in a Smallholder Context

by

Christina Seeberg-Elverfeldt

Natural Resources Management and Environment Department

Food and Agriculture Organization of the United Nations (FAO)

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This guide is intended to guide extension service advisors and institutions who work with small-scale farmers and foresters with an interest in Carbon Finance and Carbon Projects. Its aim is to support setting-up carbon projects which involve small-scale farmers. Their participation allows them to be involved in the development and implementation of the project, influence the design of the project to generate positive impacts for the farmers and increase their knowledge about carbon finance.

The guide is structured into five sections: first, the background of climate change is explained (1); second, an introduction is given to how the carbon market works (2); this is followed by an explanation of carbon project development and the timeline and project size to take into account for planning (3); four, costs to be expected during the development of carbon projects are summarised, as well as benefits (4); finally, different funds and grants are presented (5). This booklet will need constant updating, as the political framework is changing very fast, causing changes in legislation, as well as actors, funds and regulations. In addition, the available data, research and knowledge for the development of carbon projects is constantly improving which will facilitate their future upgrowth.

1. The background for Carbon Finance and Carbon Credits

The link between Climate Change, GHG emissions, Carbon and Carbon Finance

Climate change is one of the biggest threats we face. Everyday activities like driving a car or a motorbike, using air conditioning and/or heating and lighting houses consume energy and produce emissions of greenhouse gases (GHG), which contribute to climate change. When the emissions of GHGs are rising, the Earth's climate is affected, the average weather changes and average temperatures increase.

In agriculture and forestry different **sources** and **sinks** release, take up and store three types of GHGs: carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O). Many agricultural and forestry practices emit GHGs to the atmosphere. Figure 1 shows the main **sources** of agricultural GHGs: for example, by using fertilizers N_2O is released from the soil and by burning agricultural residues CO_2 levels rise. CH_4 is set free in the digestion process of livestock, as well as if rice is grown under flooded conditions. When land is converted to cropland and trees are felled, a source of CO_2 emissions is created.

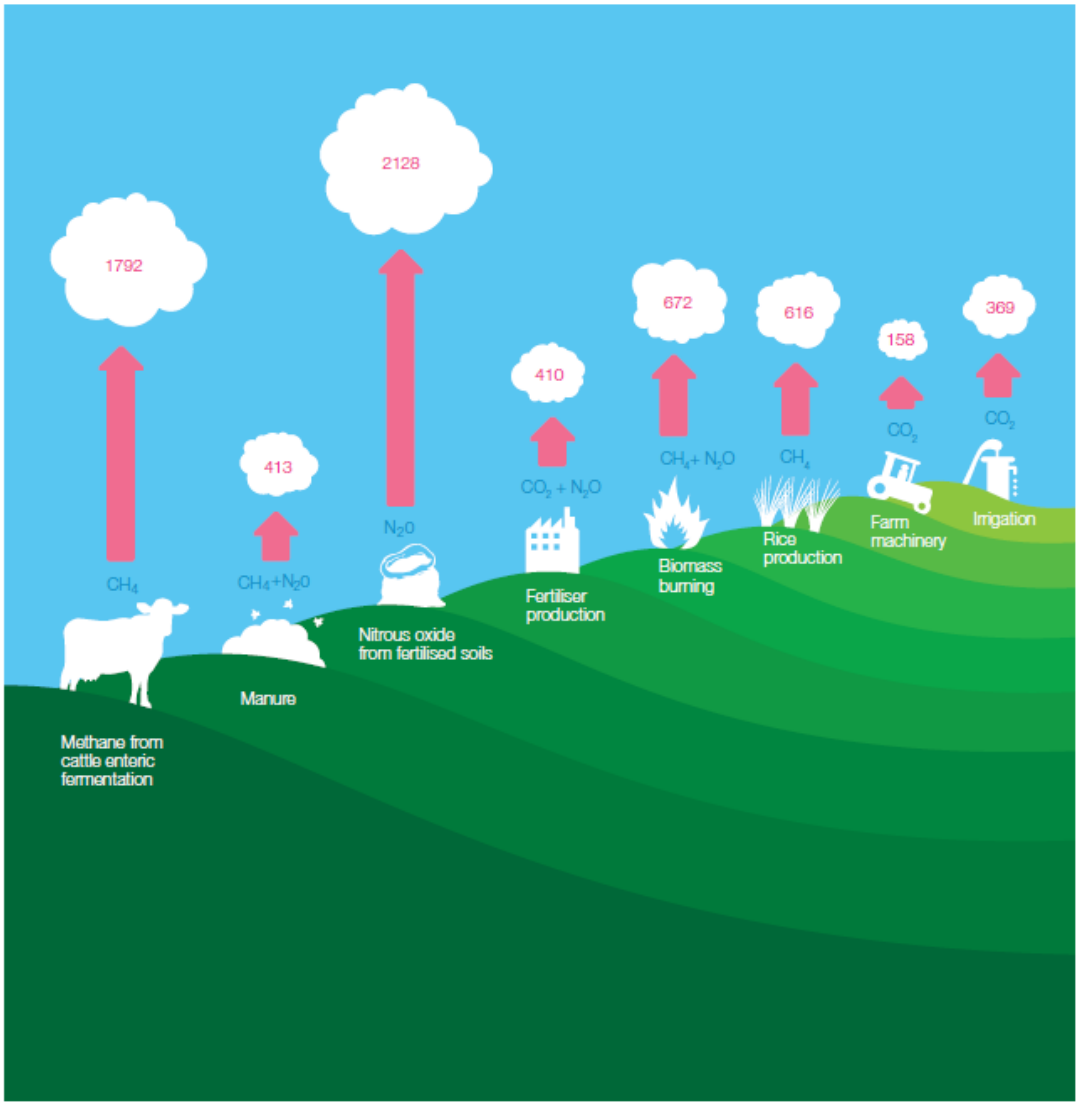

Fig 1. Sources of agricultural GHGs in megatons (Mt) CO_2-eq
(Source: Bellarby *et al.*, 2008)

Agriculture is an important contributor to climate change, but it also provides a **sink** and has the potential to lessen climate change. Figure 2 shows the components of the land carbon cycle: carbon is stored – sequestered - above-ground by plants, crops and trees, and below-ground in the soil and roots. **Carbon sequestration** means that carbon dioxide is captured from the atmosphere through photosynthesis by the tree or plant to store it as cellulose in its trunk, branches, twigs, leaves and fruit and oxygen is released to the air in return. Also the roots of the trees and plants take up carbon dioxide. Decomposing organic materials increase the amount of carbon stored in the soil, which is higher than the total amount in the vegetation and the atmosphere. Animals breathe in oxygen and breathe out CO_2 and through their faeces carbon and N_2O is released to the soil.

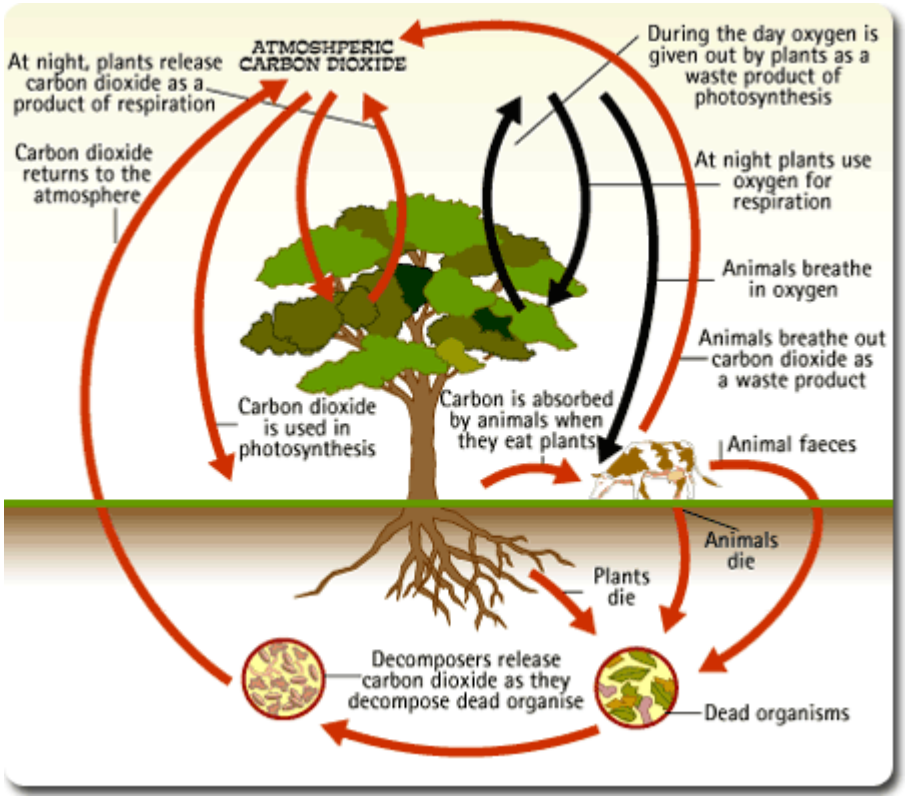

Fig. 2. Carbon cycle at plot level (Source: http://www.energex.com.au/switched_on/being_green/being_green_carbon.html)

To slow down climate change impacts, the emissions of GHGs need to be reduced immediately. As explained above several activities in agriculture and forestry contribute to GHG emissions. Changing these, and switching to new sustainable land management practices (Box 1) can support the uptake and the reduction of GHGs. Some agricultural activities can increase the amount of organic matter and carbon in the soil by using cover crops or reduce the emissions of methane through improving feeding practices. Sustainable forest management can avoid the destruction of forests and the release of CO_2, and planting new trees sequesters more CO_2. For more information on specific agricultural land management practices see Annex 1.

Box 1. In the Agriculture, Forestry and Other Land Use (AFOLU) sectors different types of activities can help to reduce or avoid emissions, or increase the removal of GHGs:

- **Forestry activities** such as afforestation and reforestation, sustainable forest management, agroforestry, avoided deforestation/reducing emissions from deforestation and forest degradation (REDD);
- **Agricultural activities** such as cropland and grazing land management, livestock management (improved feeding practices), peatland management and manure management;
- **Energy** activities such as increasing the energy-efficiency at household or community level, sustainable biofuel production, and the employment of Integrated Food and Energy Systems;
- **Biodiversity** enhancing activities such as watershed and soil management, biodiversity conservation.

Seedlings planted for dune fixation in Senegal, Photo by ©FAO/J.Koelen

Many of these practices also have additional potential benefits for the farming systems (Box 2). These sustainable activities in the agricultural, forestry and energy sector can receive financial support for their implementation. In the following chapters options how to apply for funding in the agriculture and forestry sector are explained.

Box 2. Potential Benefits of Sustainable Land and Forest Management Practices

Agroforestry: increase resilience to climate extremes through improved water retention and enriched soil fertility.
Restoration of degraded lands: restore degraded watersheds and reduce soil erosion.
In general: enhance productivity, increase income & food security through a diversified production system.

There are many ways and efforts underway to reduce carbon emissions and promote activities which help to store and remove carbon. This has made **carbon** a valuable economic commodity. To find a common unit for this commodity all GHGs are converted to CO_2 equivalents (CO_2-eq)[1]. The CO_2-eqs are traded on **carbon markets**. The markets work in a similar way to financial markets. The currency used on these markets is **carbon credits**.

Carbon market: Virtual financial place where persons buy and sell carbon credits.

Carbon credit: Currency for trading carbon emissions. The unit for one carbon credit is equivalent to one ton of CO_2 emissions.

In the carbon trade in simple terms an agreement is made between a buyer and a seller of carbon credits. Those who reduce emissions or sequester carbon, receive payments and those who have to decrease emissions can buy carbon credits to offset their emissions. "**Carbon offsetting**" means to compensate emissions which cannot be avoided by paying someone else to save – sequester - GHGs. The prices which are received for one ton of CO_2 vary a lot and depend on the type of market and the type of carbon offset project. During 2009 the prices ranged from €1.90 to €13 per ton of CO_2-eq. Over the last few years several financial instruments mechanisms and markets have emerged.

Carbon finance means***: How can one make money using carbon credits on carbon markets?***

2. Carbon Markets – which types exist and how they work

Two types of **carbon market** exist; the **regulatory compliance** and the **voluntary** markets. The compliance market is used by companies and governments that by law have to account for their GHG emissions. It is regulated by mandatory national, regional or international carbon reduction regimes. On the voluntary market the trade of carbon credits is on a voluntarily basis. The size of the two markets differs considerably. In 2008, on the regulated market US$119 billion were traded, and on the voluntary market US$704 million (Hamilton *et al.*, 2009).

The three **Kyoto Protocol** mechanisms are very important for the **regulatory market**: Clean Development Mechanism (CDM), Joint Implementation (JI) and the EU Trading System (ETS). Some countries have not legally accepted the Kyoto Protocol, but have other legally binding state and regional GHG reductions schemes.[2] Developing countries can only participate in the CDM.

[1] Global Warming Potentials (GWP) are used to compare the ability of different GHGs to trap heat in the atmosphere. Methane (CH_4) has a 23 and nitrous oxide (N_2O) a 296 higher GWP than CO_2 (IPCC, 2007).

[2] E.g. the Australian New South Wales Greenhouse Gas Abatement Scheme (NSW GGAS) and the US Regional Greenhouse Gas Initiative (RGGI) involving ten states from the East coast.

In general for small-scale AFOLU projects in developing countries, the voluntary market is more interesting than the regulatory market because the CDM market has quite complex procedures and methodologies for project registration and the majority of agriculture and forestry and "Reducing Emissions from Deforestation and Degradation" (REDD) projects are excluded. However, a brief introduction is given to the CDM, because some possibilities for small-scale projects (e.g. renewable energy) exist. Additionally, many of the established rules (see Box 3) also apply to the voluntary market.

Box 3. Some CDM rules:

Additionality: Emission reductions or sequestration must be additional to any that would occur without the project. GHG emissions after the implementation of the project have to be lower than in the business-as-usual case.

Permanence: When accounting for credits, the length of the carbon storage and the risk of loss (natural or human disturbances, such as fire, flood or pest outbreak) are an important issue. Carbon is not stored indefinitely in forest biomass and soils, therefore, a separate temporary crediting system was developed for afforestation/reforestation (A/R) projects in which credits expire roughly between five and thirty years and can be renewed and resold.

Leakage: The unplanned, indirect emissions of GHGs, resulting from project activities. For example, if the afforestation of agricultural land leads to the migration of people who used to farm this land; and who then clear forest somewhere else.

Production of biofuel from cow manure in Bangladesh, Photo by ©FAO/Giulio Napolitano

Clean Development Mechanism (CDM)

Under the Kyoto Protocol developing countries are not obliged to reduce their GHG emissions, whereas industrialised countries have to fulfil specified targets. They can achieve these by reducing GHG emissions in their own country; implementing projects to reduce emissions in other countries; or trading. This means that countries that have satisfied their Kyoto obligations can sell their excess carbon credits to countries which find it more expensive to meet their targets.

For developing countries the CDM is of most interest among the regulatory market mechanisms. An industrialised country implements an emission reduction project in a developing country. This can be an afforestation, an energy efficiency or a renewable energy project. Because of the uptake or savings of GHGs, carbon credits (CER) are generated. These belong to the industrialised country and will be used to compensate some of its domestic GHG emissions and reach their emission targets. The projects support sustainable development within the host country, as a new – additional – project is created which helps to slow down global warming. Through the project new technology is transferred to the host country, investments are made, additional jobs are created and the project reduces environmental impacts.

The carbon credits from CDM projects are called **Certified Emission Reductions** (**CER**).

All projects must utilize rigorous baseline and monitoring methodologies that have been approved by the CDM Executive Board. Any project can submit a methodology for consideration or rely on methodologies that have already been approved. So far five methodologies have been approved for agriculture, 11 for afforestation/reforestation (A/R) and six for agricultural residues/biogas[3]. At the moment the rules for AFOLU projects in CDM only allow for specific types of projects in developing countries (some examples of projects are given in Box 4):

Agriculture:

- Methane avoidance (manure management)
- Biogas projects
- Agricultural residues for biomass energy

Forestry:

- Reforestation
- Afforestation

Box 4. Examples of CDM projects:

- **Methane avoidance**: Energy and fertiliser enterprise from dumped cattle waste in Pakistan
- **Biogas**: Methane capture & combustion from poultry manure treatment at Lusakert Plant, Armenia
- **Biomass Production:** Electricity generation from mustard crop residues in India
- **Reforestation Programme**: Planting trees for timber, firewood and fodder production on degraded land in Bagepalli, India
- **Afforestation of grassland**: Establishment and management of forest plantations in Tanzania

=> for information on individual projects see **http://cdm.unfccc.int/Projects/projsearch.html**

The AFOLU sector has been very restricted and among all CDM projects only 1.1 percent are A/R projects. By July 2009 only six A/R projects have been registered under the CDM and 43 projects submitted for validation. For renewable energy projects the CDM looks

[3] **http://cdm.unfccc.int/DOE/scopes.html** (Methodologies linked to sectoral scopes)

better and around 120 projects deal with agricultural residues and 120 biogas projects (UNEP Risoe, July 2009) [4].

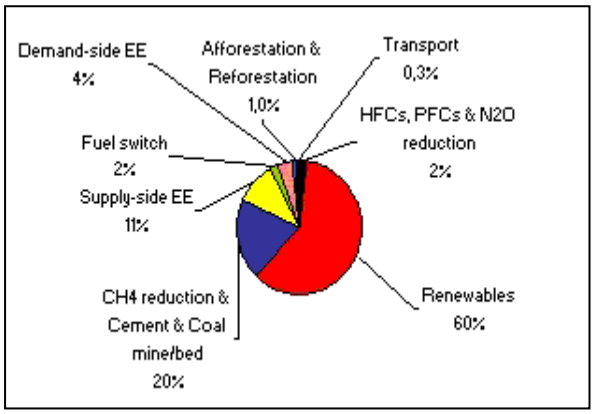

Fig.2. Percentage of CDM projects in each category (UNEP Risoe, 2009). (EE= Energy Efficiency)

In the current political discussions various countries support the inclusion of REDD, agriculture and wetlands in the Kyoto Protocol. This means that in future different types of AFOLU projects could be registered under CDM. However, as the Copenhagen meeting in December 2009 has not led to a legally binding agreement, no decisions can be taken on the proposed changes.

Recycling of organic residues from coffee production in Colombia,
Foto by ©FAO/Jeanette Van Acker

Under the CDM so-called small scale project activities can be developed. These benefit from simplified modalities and procedures, no adaptation tax has to be paid, and reduced registration and administration fees apply. Agricultural projects are only allowed to provide an annual emission reduction of 60 kt CO_2 and A/R projects of 16 kt CO_2 (represents about 400 to 800 hectares for a typical forest project planting fast-growing species). Less project types are available than within the ordinary CDM projects, but most of the above mentioned ones are included.

[4] www.cdmpipeline.org/cdm-projects-type.htm

More information on small-scale projects can be found in the CDM Rulebook: http://cdmrulebook.org/558.

A guidebook for the **formulation of A/R projects** under the CDM can be found under http://www.itto.int/en/technical_report/

Different ***CDM guidebooks*** (Legal Issues, CDM Information and Guidebook, Wind Power and CDM, PDD Guidebook, Baseline Methodologies for CDM projects, Guidebook to Financing CDM projects) can be found at: http://www.cd4cdm.org/Guidebooks.htm

Information for ***forestry and land use projects development under CDM***: http://www.cdmcapacity.org/index.htm

Voluntary Market

Carbon credits on the voluntary markets are called **Verified Emission Reductions (VER)**.

The voluntary market has become very important for agriculture and forestry projects. Voluntary carbon credits (VER) are mainly purchased by the **private sector.** Corporate social responsibility (CSR) and public relations are the most common motivations for buying carbon credits. Other reasons are considerations such as certification, reputation and environmental and social benefits. Some companies offer clients to neutralise their carbon emissions (e.g. British Airways offers carbon neutral flights and Morgan Stanley provides the equivalent amount of carbon credits). The private sector can either purchase carbon credits directly from projects, companies (e.g. Ecosecurities www.ecosecurities.com) or from carbon funds (e.g. The World Bank BioCarbon Fund).

The story behind the credits plays a crucial role in these markets. AFOLU projects are usually valued highly for their social and environmental benefits, as they deal with people's livelihoods and the protection of important ecosystems.

Control of soil erosion through crop cultivation, Photo by ©FAO/Giuseppe Bizzarri

Table 1 provides examples of agriculture and forestry carbon sequestration projects from the voluntary market. The percentage of projects by category (in 2007) is indicated in brackets for each project type (Hamilton *et al.*, 2008).

	Example	Who?	How?
Afforestation/ restoration projects (42%)	**Uchindile and Mapanda Forest Projects** in Tanzania: 10,814 hectares of degraded land will be reforested and 7,565 hectares put into conservation to protect local biodiversity.	**Green Resources** (www. greenresources.no) is the project developer. Community tree planting is promoted by giving away seedlings and providing necessary training in silviculture.	Generation of VERs over 99-years. Carbon revenues are locally reinvested and 10% is spend on community projects.
	Acacia Senegal Plantation Project, Mali. It will reforest over 17,700 hectares of Acacia Senegal over a five-year period.	Deguessi Group, a private producer of agricultural products, is the project developer and works in partnership with local communities. The **WB BioCarbon Fund** buys the credits.	Intercropping is promoted. 10,000 families receive social benefits: additional revenues generated by Arabic gum, grains and forage & CER.
REDD (28%)	**REDD** project in Sumatra/Indonesia, to protect the 750,000 hectares Ulu Masen forest.	**US investment bank Merrill Lynch**, Aceh government, the British NGO Flora and Fauna International and Carbon Conservation. Funding comes from WB Multi-Donor Fund's Aceh Env't & Forest project.	The project is expected to generate 100 million tonnes of VERs over 30 years.
	Noel Kempf Mercado Climate Action Project, Bolivia for 30 years to protect 1.5 mill ha of forest http://www.noelkempff.com.	Government of Bolivia, the Friends of Nature Foundation (FAN), The Nature Conservancy (TNC) and three energy companies implement the US $11 million project.	The aim is to stop logging activities and initiate alternative income programs for communities. It has been verified in 2005 as the first forest emission reduction project.
Agricultural soil projects (16%)	**Agricultural Carbon Project** on 60,000 ha in Nyanza and Western Provinces, Kenya.	The project developer (Swedish Cooperative Center-Vi Agroforestry - SCC-ViA) promotes adoption of sustainable agricultural land management (cropland management & rehabilitation of degraded land). The **WB BioCarbon Fund** will purchase the credits.	Smallholder farmers and small-scale business entrepreneurs organized in common interest groups, primary level cooperatives, farmer groups and informal organizations. Funds will flow back to communities and farmers involved.
Plantations/ monoculture (13%)	**Afforestation** in the states of Orissa and Andhra Pradesh in India of 3,500 ha with tree plantations.	Promotion of plantations and agroforestry. Implementation is through a joint partnership between a cooperative society, a paper industry company and another company. The **WB BioCarbon Fund** will purchase the credits.	The plantations are established on bare and highly degraded land of small and marginal farmers on their private lands. Farmer cooperatives are supported to increase representation & negotiation power.

Table 1. Land-based carbon sequestration projects

Credits from land-based carbon sequestration projects counted for 11 percent of the voluntary market transactions in 2008, declining from 16 percent in 2007 and 36 percent in 2006 (Hamilton *et al.*, 2009). The decrease in these types of projects can be attributed to the same difficulties A/R projects face in the regulatory markets – issues such as permanence, accounting uncertainty, and leakage (see Box 3).

In the USA the Chicago Climate Exchange (CCX) is an important trading system for GHGs. It accepts projects which generate emissions reductions from agricultural methane, agricultural soil, forestry and rangeland activities, but the activities need to take place in the USA http://www.chicagoclimatex.com/content.jsf?id=781.

Some other examples of land-based carbon projects can be found in the Inventory of the Forest Carbon Portal: www.forestcarbonportal.com.

3. Design and development of a carbon project

Before starting a carbon project it is important to keep several points in mind. Designing and developing a carbon project takes a long time, requires a lot of technical expertise and considerable financial resources for the initial set-up. There are ten steps to be run through to develop a carbon project of which the first five are simple checks, whether the project idea is feasible and should be pursued. The last five steps have to be taken together with a project developer who thinks that the project is viable.

1. **Type and scope of project**: A clear idea of where and which type of project needs to be developed, i.e. afforestation, reforestation, improved farming techniques (soil carbon sequestration), renewable energy project, avoided deforestation.

2. **Resources check**: One needs to be aware that a significant amount of time and money needs to be invested to develop a carbon project. Analyse why it would be attractive to engage in undertaking a carbon sequestration project and what are the driving motivations?

3. **Project group**: Farmers/villagers need to be identified who want to participate and have land or forest which can qualify for the project type determined in step 1. The project boundary (geographically) has to be established. The project area needs to be big enough to generate enough emission reductions to qualify for a carbon project: for a REDD project the minimum project size area is around 30-40,000 ha and for an A/R project 10,000 ha (pers. comment, D. Kloss, Terra Global Capital, 2009). Small-scale A/R CDM projects must result in GHG removals of less than 16,000 t CO_2 per year. In addition, **clear land-use and tenure rights** are essential.

4. **Institutional back-up**: To organise, aggregate and represent farmers, an institution is required, such as a community based organization, farmer cooperative, NGO etc., which is trusted by the project participants. It should have a robust and transparent institutional set up. In addition it is of advantage if the

institution has some expertise on carbon project development, carbon measurements and accounting (see Box 5) and business plan development.

5. **Funding**: Develop a business plan which takes into account all costs and benefits of the project. Ensure sufficient funding for the initial set-up of the project. With the information gathered in the first 5 steps a Project Idea Note (PIN) should be developed which can be used for step six.

Box 5. Carbon Accounting Models

Ex-ante Appraisal carbon-balance tool (FAO): to calculate the emissions and uptake of carbon by the project.
http://www.fao.org/tc/rome2007initiative/ex-act-carbon-tool/en/

Rapid Carbon Stock Appraisal (RaCSA) (ICRAF): to assess landscape carbon stocks.
http://www.worldagroforestry.org/sea/projects/tulsea/inrmtools/RaCSA

6. **Identification of project developer**: In collaboration with the institution a project developer has to be selected who can assist with the formulation of the project. The project developer is responsible for preparing it for the market. This can be either the back-up institution (step 4) if they have sufficient experience or a specialised project developer company (some examples: Ecosecurities www.ecosecurities.com; Ecopositive www.ep-project-finance.co.uk; ec carbon www.eccarbon.com; Terra Global Capital www.terraglobalcapital.com; Carbon Neutral Company www.carbonneutral.com), or the World Bank Carbon Finance Unit (http://go.worldbank.org/269AQO1BC0).

7. **Further steps with project developer**: From the different available standards (see Annex 2), the appropriate one has to be selected, market demand assessed, costs & revenues calculated and a commercialisation strategy developed. The project developed should start to select potential credit purchasers.

8. **Project planning/development**: The baseline and methodology need to be selected. Projects must use approved methodologies to calculate emission reductions. The project's chance of being registered and the likelihood of more rapid project preparation increases by using approved methodologies. Developing new methodologies can be resource- and time-intensive and may not be justified for smaller projects. Assess additionality, leakage and permanence and estimate the full GHG inventory of the emissions and uptake of the project. All this information will be assembled in a Carbon Project Document.

9. **Validation**: The project developer determines a third party certifier (accredited by a specific carbon standard) who will review the Carbon Project Document. It is important for the project to be validated to ensure the transparency of the project design.

10. **Registration**: The VERs of the validated project are kept in a Registry on behalf of the owner until they are bought.

The **time frame** for developing a carbon project which needs to be taken into account is approximately 12 months until the project is validated (Step 1 until 9) and 1.5 months for the registration (Step 10).

ENCOFOR has developed a **toolkit** for the design of sustainable CDM forest projects and provides a variety of tools, manuals and checklists:
http://www.joanneum.at/encofor/index.html

An overview on "**Forest Carbon Accounting: Overview & Principles**" written by Charlene Watson and supported by UNEP can be found under:
http://www.undp.org/climatechange/carbon-finance/Docs/Forest%20Carbon%20Accounting%20-%20Overview%20&%20Principles.pdf

Rainforest in Congo,
Photo by ©FAO/Giulio Napoletano

4. Costs and Benefits involved in the development of a Carbon Project

When it comes to developing a project, there are many costs involved and this is why it is vitally important to identify a **project developer** who can assist in the development and assist in obtaining the funding for the project. It takes more than two to five years (depending on how fast the project is developed and the payment agreement) before the money will be received through the sales of carbon credits. This is because in all ALOFU projects, the carbon credits would be paid only once the carbon sequestration takes place and can be measured. Therefore, it is important to identify a project developer and donors at a very early stage of the project **to arrange for specific early (up-front) payment** or compensation arrangements for the involved farmers.

It is very difficult to determine a standard figure for the costs of AFOLU projects, as they depend on the size of the project, and costs of labour and land, as well as the availability of skills.

The costs can be separated into three areas:

- the cost of **project implementation** such as land, initial surveys, ground preparation and planting, early monitoring and treatments, on-going management and tending, and recurrent forest inventory,
- the costs of ensuring and increasing the **awareness** and abilities of local participants, and
- the costs associated directly with the **development of the GHG project documentation**, auditing and registration and then on-going monitoring, reporting and verification (Baalmann and Schlamadinger, 2008).

Table 2 gives an overview of the range of costs to be expected during the different steps when developing a carbon project.

Activity	CDM	VCS	VER+	CCX	Type of cost
Planning phase					
Feasibility study	€ 15,000-25,000	€ 15,000-25,000	€ 15,000-25,000	€ 15,000-25,000	Consultancy fee
Project documentation	€ 50,000-100,000	€ 50,000-100,000	€ 50,000-100,000	€ 20,000-40,000	Consultancy fee
Data collection	€ 5,000-25,000	€ 5,000-25,000	€ 5,000-25,000	€ 5,000-25,000	Internal costs
Validation	€ 15,000-25,000	€ 15,000-25,000	€ 15,000-25,000	Not applicable	Auditor fee
Registration fee	Same as issuance fee, but capped	Not applicable	€ 550 per year	US$ 5000 per year	Administrative fee
Initial verification	€ 20,000-25,000	€ 20,000-25,000	€ 20,000-25,000	Not applicable	Auditor fee
Operational phase					
Ongoing monitoring	€ 3,500-25,000	€ 3,500-25,000	€ 3,500-25,000	€ 3,500-25,000	Internal costs
Ongoing verification	€ 10,000-20,000	€ 10,000-20,000	€ 10,000-20,000	€ 10,000-15,000	Auditor fee
Issuance fee	US$ 0.10 per tCO_2e for the first 15,000 per year, US$ 0.20 per tCO_2e beyond that	€ 0.05 per tCO_2e	€ 150 for up to 1000 tCO_2, €0.03 per tCO_2e beyond that	US$ 0.12 per tCO_2e for Non-Annex I countries	Administrative fee

Table 2. Carbon project development costs of land use projects
(Source: FAO, 2010)

In a survey conducted by Baalman and Schlamadinger (2008), as well as reported by the World Bank the costs for certification up to the point of registration per A/R CDM project were indicated to range between US$200,000- 250,000.

The prices which farmers receive per tonne of CO_2 differ between projects. According to a study by the World Agroforestry Centre they usually reflect the lowest prices on the Chicago Climate Exchange (CCX), which is around US$ 4 (Chomba and Minang, 2009). In the Nhambita community carbon project in Mozambique smallholder farmers are paid for their agroforestry practices and REDD. They receive US$ 4.5 per tCO_2 or an

Box 5. Co-benefits of a carbon project

- knowledge generation on project preparation, planning and management
- gum, firewood, timber and non-timber forest products
- legal aid for defining land-tenure rights
- payments to improve infrastructure, food security
- seedlings
- employment
- improved production

(Source: Jindal et al, 2008)

Cocoa agroforestry systems in Indonesia

average of US$ 34.70 per household per annum over seven years (Jindal, Swallow & Kerr, 2008). Other projects do not provide cash incomes to projects, but access to fruits, minor timber, firewood and other non-timber forest products (see Box 5 for other co-benefits generated through carbon projects). In addition, not all land or forest sequesters the same amount of carbon, as it depends on the quality of land, and the new land use that is implemented or on the planted tree species.

5. Funding possibilities for AFOLU Carbon Projects

This chapter provides information on funding possibilities for AFOLU projects. Several funds and grant programmes exist for carbon sequestration projects, as well as some funds or NGOs which support small-scale conservation or rural development projects. Certain indicators of the project idea have to be identified (type, size, target groups, geographical focus) to search the presented options for applicability. See Annex 3 for two case studies with more details.

Name	**BioCarbon Fund** (BioCF) of the World Bank
Description of fund	Based on a public/private partnership model which aims to deliver cost-effective emission reduction and support biodiversity conservation and poverty alleviation.
Project type	AFOLU projects: Afforestation, Reforestation, REDD, Agriculture
Geographical focus	Open
Case study	**Facilitating Reforestation for Guangxi Watershed Management in Pearl River Basin in China** Afforestation of 4,000 ha, 75% with native species and 25% eucalyptus. Social benefits are additional employment, direct income increases through sale of non-timber products and benefits from CER
Weblink	http://wbcarbonfinance.org/Router.cfm?Page=Funds&ItemID=24670

Name	**Community Development Carbon Fund (CDCF) World Bank**
Description of fund	Spread benefits of carbon finance to the poorest countries and poor communities in all developing countries, which would otherwise find it difficult to attract carbon finance because of country and financial risk. It is a multi-donor Trust Fund - a public/private partnership.
Project type	All CDM projects, including AFOLU, are eligible
Target group	Least Developing countries – community benefits are a requirement
Geographical focus	Open
Weblink	http://wbcarbonfinance.org/Router.cfm?Page=CDCF&ItemID=9709&FID=9709

Name	**CASCADe programme**
Description of fund	Aims at enhancing African expertise to generate carbon credits to open up opportunities for African participation in the CDM and voluntary carbon markets. The project was launched in December 2007 at the Bali UNFCCC conference. Its duration will be three years.
Project type	AFOLU sector, REDD and bioenergy activities
Target group	Enhancing expertise to generate African carbon credits in LULUCF as well as bioenergy activities
Geographical focus	Seven target countries (Benin, Cameroon, Democratic Republic of the Congo, Gabon, Madagascar, Mali, Senegal)
Case study	**Madagascar**: Large scale application of **restoration techniques and management of soil fertility**, especially in cropping systems with permanent vegetative cover minimum tillage in the region Bongolava in an area of 1000 ha over five years **Senegal**: Improving the living conditions of the local population of the Sine-Saloum Delta through **mangrove ecosystem restoration** over 14 years on 410 ha of mangrove plantations.
Weblink	http://www.cascade-africa.org/Accueil_en/tabid/56/language/en-US/Default.aspx

Name	**German Climate Protection Fund**
Description of fund	The International Climate Protection Initiative has been working since 2008 with annual funds of 120 million Euros. All projects run one to five years.
Project type	- promoting a climate-friendly economy - promoting measures for adaptation to the impacts of climate change and - conserving biodiversity with climate relevance (carbon sinks, especially of forests and other ecosystems such as wetlands)
Target group	Project can be carried out by federal implementing agencies, government organisations, NGOs, business enterprises, universities and research institutes, and by international and multinational organisations and institutes, e.g. development banks, United Nations bodies and programmes.
Geographical focus	Developing, newly industrialising and transition countries
Financial support	between €500,000-€2,500,000 per project
Case study	**Mexico: Climate Change Mitigation in Five Representative Ecosystems:** The project will maintain existing carbon reservoirs in forests and wetlands and will enable the affected regions and their populations to better adapt to climate change impacts. **Philippines**: Adaptation to climate change and Protection of biodiversity (GTZ, National Department of Environment and Natural Resources)
Weblink	http://www.bmu-klimaschutzinitiative.de/en/home_i

Name	**GEF Small Grants Programme: Climate Change**
Description of fund	Grants are given towards climate change abatement, prevention of land degradation and climate change adaptation
Project type	Removal of barriers to energy efficiency and energy conservation; promoting the adoption of renewable energy by removing barriers and reducing implementation costs; conservation and restoration of arid and semi-arid areas; efficient stoves and biogas to reduce forest loss; integrated watershed management; soil conservation; afforestation; prevention of forest fires; and organic farming.
Target group	NGOs and Community Based Organizations (CBO)
Geographical focus	Open
Financial support	The maximum grant amount per project is US$50,000, but averages around US$20,000. Grants are channelled directly to CBOs and NGOs.
Weblink	http://sgp.undp.org/index.cfm?module=projects&page=FocalArea&FocalAreaID=CC

Bioenergy:

Name	**UNEP's Rural Energy Enterprise Development (REED) Programme**
Description of fund	Initiative offering enterprise development services and start-up financing to 'clean energy' enterprises. Since beginning in 2000, REED has financed 44 enterprises that are now returning capital each year to an investment fund that is then re-invested in new enterprises.
Project type	Energy
Target group	Open
Geographical focus	Five African countries (AREED), Brazil (B-REED) and China (C-REED)
Weblink	http://www.unep.fr/energy/activities/reed/areed.htm

For an overview of additional funds see the **Climate Funds Update**. This is an independent website that provides information on the growing number of international funding initiatives designed to help developing countries address the challenges of climate change. http://www.climatefundsupdate.org/

The **Sourcebook on Financing for Sustainable Forest Management** compiles information on funding sources, policies and delivery mechanisms, with particular focus on projects in developing countries. Its contents come from various sources: donor agencies and countries, Collaborative Partnership on Forests (CPF) members, international forest-related organizations and instruments, developments banks, private sources, regional processes, foundations and international non-governmental organizations.
http://www.fao.org/forestry/cpf-sourcebook/en/

New ethanol "CleanCook" stove, Photo by Gaia Association

Other sources of funding:
Some NGOs, Foundations or companies support carbon sequestration projects and it

is worthwhile contacting them with a well developed Project Concept Note:
The Nature Conservancy (www.nature.org), Flora and Fauna International (http://www.fauna-flora.org/), Amazonas Sustainable Foundation (http://www.fas-amazonas.org/en/), the carbon pool (http://www.carbonpool.com/)

Some other funds could also be of interest which do not necessarily target carbon projects but small scale conservation or rural development projects. They are investment funds and NGOs prepared to invest in small companies who meet certain conservation criteria, which could include sustainable land management objectives.

Name	**Verde Ventures**
Type of fund	Investment fund of Conservation International
Target	Funds projects which promote biodiversity conservation
Website	http://web.conservation.org/xp/verdeventures/

Name	**Eco Enterprises Fund**
Type of fund	Managed by The Nature Conservancy (TNC)
Target	Works mainly in Latin America and the Caribbean. Invest in small and growing environmentally- and socially-responsible ventures in sustainable agriculture (including apiculture, aquaculture and community-based energy), sustainable forestry, ecotourism and non-timber forest products, as well as carbon, biodiversity offsets and climate change mitigation and adaptation.
Website	http://www.ecoenterprisesfund.com/index.htm

Name	**Root Capital**
Type of fund	Nonprofit social investment fund
Target	Pioneering finance for grassroots businesses in the developing world. Work with artisan and farmer associations that build sustainable livelihoods and transform rural economies in poor, environmentally vulnerable places.
Website	http://www.rootcapital.org/index.php

Name	**Gatsby Charitable Foundation**
Type of fund	Promotes income generation through selected programmes and grants
Target	Supporting basic agriculture and small scale manufacturing and enterprise in selected African countries.
Website	http://www.gatsby.org.uk/developing.html

Name	**Alliance for a Green Revolution in Africa** (AGRA)
Type of fund	African led partnership with initial support from the Rockefeller Foundation and the Bill & Melinda Gates Foundation.
Target	Grants for projects and programmes which develop practical solutions to boost farm productivity and incomes for poor. They only give grants for charitable purpose.
Website	http://www.agra-alliance.org/

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Annex

Annex 1. Agricultural land management practices which have GHG mitigating effects

(based on Annex 7.1 from FAO, 2009):

Improved cropland management	
Improved agronomic practices	• Use of cover crops • Improved crop/fallow rotations • Improved crop varieties • Use of legumes in crop rotation
Integrated nutrient management	• Increased efficiency of nitrogen fertilizer; organic fertilization; legumes and green manure; • compost; animal manure
Tillage/residue management	• Incorporation of residues • Reduced/zero tillage
Water management	• Irrigation • Bunds/zai • Terraces, contour farming • Water harvesting (e.g. runoff collection techniques, water storage tank construction, devices for lifting and conveying water)
Perennials and Agroforestry	• Live barriers/fences • Various agroforestry practices: undersowing of Tephrosia vogelii, pigeon • pea and Sesbania sesban in maize for soil fertility improvement; dispersed tree • interplanting (e.g. Faidherbia, Acacia • polycantha, A.galpiniii. and contour grass hedges)
Improved pasture and grazing management	
Improved pasture management	• Improving forage quality and quantity • Seeding fodder grasses • Improving vegetation community structure (e.g. seeding fodder grasses or legumes; reducing fuel load by vegetation management)
Improved grazing management	• Stocking rate management • Rotational grazing
Restoring degraded land	•
	• Re-vegetation • Applying nutrient amendments (manures, biosolids, compost)

Annex 2: Standards

A variety of **standards** have been developed in the AFOLU sector and the following are of interest:

- **VCS Standard**: The VCS Program provides a robust, new global standard and programme for approval of credible voluntary offsets. VCS offsets must be real (have happened), additional (the project can only be implemented because of the carbon finance component), measurable, permanent (not temporarily displace emissions), independently verified and unique (not used more than once to offset emissions). (http://www.v-c-s.org/) A **tool** has been developed to provide guidance for dealing with the methodological issues of AFOLU projects and to determine the land eligibility. At the time of writing it can be used for four activities: 1. Afforestation, Reforestation and Revegetation; 2. Agricultural Land Management; 3. Improved Forest management; 4. REDD, but the activity types will probably expanded in the near future, eg to wetlands.

Voluntary Carbon Standard
Tool for AFOLU Methodological Issues
The steps to be followed are:
Step 0*: follow the general methodological guidance* (determination and quantification of the baseline and the project scenario; measurement, estimation and monitoring of GHG sources and leakage for baseline and project scenario)e
Step 1*: determine the land eligibility* (the land must be used for the eligible AFOLU activities)
Step 2*: determine the project boundary* (geographic boundary, crediting period, sources and sinks, GHG types, and carbon pools)
Step 3*: determine the carbon pools* (living biomass or dead organic matter)
Step 4*: establish a project baseline* (demonstrating the business-as-usual situation and the with-project scenario)
Step 5*: assess and manage leakage* (any increase in greenhouse gas emissions that occurs outside a project's boundary (but within the same country), but is measurable and attributable to the project activities needs to be accounted for)
Step 6*: estimate and monitor net project greenhouse gas benefits* (using IPCC 2006 guidelines the GHG emissions are estimated)
(http://www.v-c-s.org/docs/Tool%20for%20AFOLU%20Methodological%20Issues.pdf)

Other standards exist which can also be used for AFOLU projects:

- **VER + Standard** developed by TÜV SÜD, a Designated Operational Entity (DOE) for the validation and verification of CDM projects accepts AFOLU projects, including REDD http://www.tuev-sued.de/uploads/images/1179142340972697520616/Standard_VER_e.pdf)
- the **California Climate Action Registry**, which provides detailed protocols for forest carbon sequestration projects (http://www.climateregistry.org/)

- the **CarbonFix Standard** emphasizes sustainable forest management (http://www.carbonfix.info/)
- the **Climate, Community, and Biodiversity Standards (CCB)** are a set of project-design criteria for evaluating land-based carbon mitigation projects and their community and biodiversity co-benefits (http://www.climate-standards.org)
- the **CCX standards** also include uniform rules for AFOLU projects (http://www.chicagoclimatex.com)

Annex 3: Two case studies of Carbon Projects

Sustainable Agricultural Land Management Project: Kenya Smallholder Coffee Carbon Project

In 2007 a pre-feasibility to identify cropping systems with a high economic mitigation potential in Kenya was started by the BioCarbon Fund of the World Bank. Coaching support was provided to shortlisted project developers to prepare promising Project Idea Notes. Finally it was decided to support two pilot projects to develop Project Design Document (see also Table 1., Agricultural Soil Project in Kenya) and it was agreed to develop a methodology under the Voluntary Carbon Standard (VCS). The project developer for the Kenya Smallholder Coffee Carbon Project is ECOM Agroindustrial Corp, an international coffee trader, which together with the World Bank and the German Technical Cooperation (GTZ) will be implementing the project.

The project aims at restoring coffee production & producing certified specialty coffee using best coffee practices, as well as reducing climate change vulnerability. It is working with the Komothai smallholder farmers cooperation which has 9000 members. The project site is located in Kiambu District in Central Kenya and during the first phase 7,200 ha are targeted of which 50% are coffee and 50% subsistence agriculture, and during the second phase it will be enlarged to 10,000 ha.

By adopting sustainable agricultural land management (SALM) practices such as agroforestry, mulching and soil and water conservation techniques, approximately 3.5 tCO_2/ha/yr or more than 30,000 tCO_2/year in the total project area during the first phase. Apart from the income through carbon credits, the coffee yields are also expected to rise. In addition the practices have the potential to increase climate resilience of agricultural production systems.

For more information, see
http://www.rural21.com/uploads/media/rural_eng_29-31_01.pdf
http://siteresources.worldbank.org/INTARD/Resources/335807-1236361651968/Timm_RWsideevent.pdf

REDD project:
The Juma Sustainable Development Reserve in Brasil

This project has been set up in 2006 in the Amazonas. The Juma Reserve has a size of 589,612 ha and is home to 370 families. The region is isolated but it is expected to have high deforestation rates in the future. The Brazilian NGO the Amazonas Sustainable Foundation (FAS) is implementing the project the project which is expected to prevent the deforestation of approximately 330,000 ha of tropical rainforest.

It is estimated to prevent 3.6 million tons of GHGs between 2006 and 2016. Until 2050 over the entire project period it is expected to displace 190 million tonnes of CO_2 eq. The project is certified through the German firm Tüv-Süd for the Climate, Community and Biodiversity Alliance (CCBA).

The funding for the project is supplied by the Amazonas state government and the Brazilian Bradesco Bank. Additionally the Marriot International hotel chain contributes US$2 million for the up-front costs of the project during the first four years.

The families which live in the region will receive payments, grants are made to community associations for social programmes and sustainable income-generating activities are promoted.

Source: Viana *et al.*, 2009

Carbon Finance Possibilities for Agriculture, Forestry and Other Land Use Projects in a Smallholder Context

Food and Agriculture Organization of the United Nations (FAO)

Rome, February 2010