

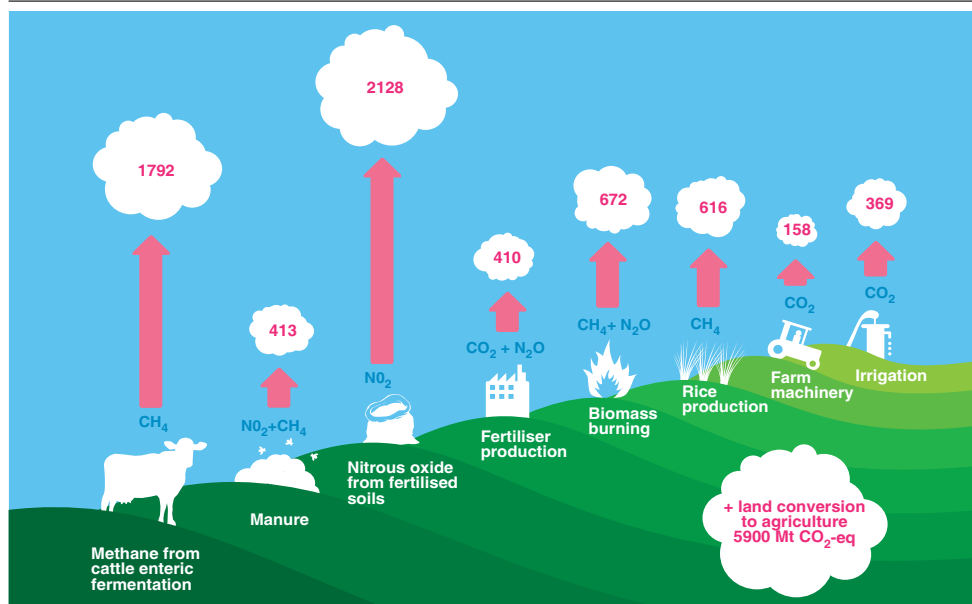
# THE BACKGROUND FOR CARBON FINANCE AND CARBON CREDITS

## THE LINK BETWEEN CLIMATE CHANGE, GHG EMISSIONS, AGRICULTURE AND FORESTRY

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.

FIGURE 1

Sources of agricultural GHGs in megatons (Mt) CO<sub>2</sub>-eq



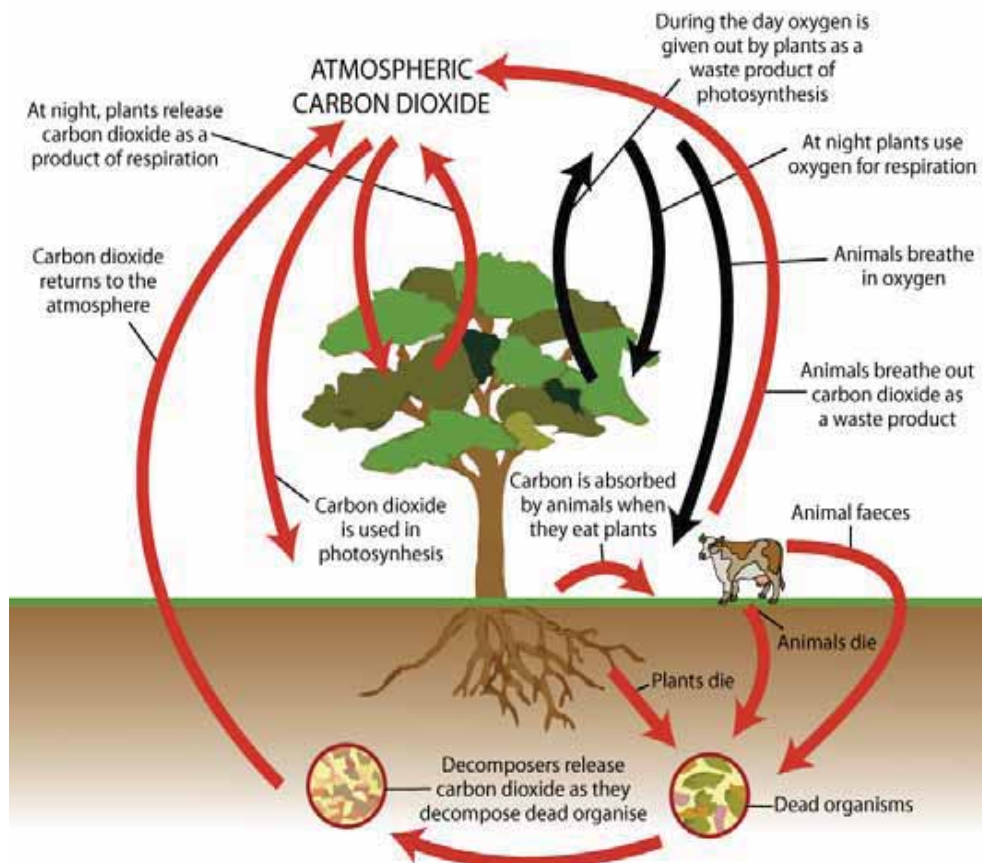
Source: Greenpeace International, 2008.

In agriculture and forestry different **sources** and **sinks** release, take up and store three types of GHGs: carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O). 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<sub>2</sub>O is released from the soil and by burning agricultural residues CO<sub>2</sub> levels rise. CH<sub>4</sub> 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<sub>2</sub> emissions is created.

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<sub>2</sub> and through their faeces carbon and N<sub>2</sub>O is released to the soil.

FIGURE 2  
Carbon cycle at plot level



Source: [www.energex.com.au/switched\\_on/being\\_green/being\\_green\\_carbon.html](http://www.energex.com.au/switched_on/being_green/being_green_carbon.html).

## 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.

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<sub>2</sub>, and planting new trees sequesters more CO<sub>2</sub>. For more information on specific agricultural land management practices see Annex 1.

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.

## CARBON FINANCE: CARBON MARKETS AND CLIMATE CHANGE

**Carbon credit:** Currency for trading carbon emissions. The unit for one carbon credit is equivalent to one ton of CO<sub>2</sub> emissions.

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<sub>2</sub> equivalents (CO<sub>2</sub>-eq)<sup>1</sup>. The CO<sub>2</sub>-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**.

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<sub>2</sub> 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<sub>2</sub>-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?*

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



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

<sup>1</sup> Global Warming Potentials (GWP) are used to compare the ability of different GHGs to trap heat in the atmosphere. Methane (CH<sub>4</sub>) has a 23 and nitrous oxide (N<sub>2</sub>O) a 296 higher GWP than CO<sub>2</sub> (IPCC, 2007).