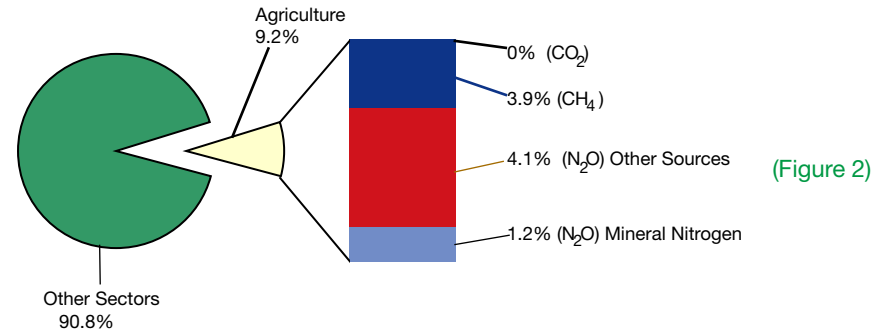


# Greenhouse gas emissions from soil are natural and inevitable.

Greenhouse gases are naturally released from soil, even when it is not being farmed. Soil emissions rise with agricultural activity, partly as a result of nitrogen input from manure, mineral fertilizers or the cultivation of legumes which capture nitrogen from the air. However, this agricultural activity provides the world with food from the existing farmed area without the need to plough up forests and other natural ecosystems.

In total, the essential activity of farming in the EU27 currently contributes only about 9% to the total greenhouse gas emissions and this percentage is declining. Approximately 1.2% of emissions are directly caused by the use of mineral nitrogen (Figure 2). Good farming practice is designed to maximize the efficient use of inputs such as fertilizer and diesel (for tractors) so that not only are food costs kept down, but greenhouse gas emissions are also kept as low as possible.



\* (CO<sub>2</sub> Carbon Dioxide) (CH<sub>4</sub> Methane) (N<sub>2</sub>O Nitrous Oxide)

In order to provide the food needed by the growing world population, yields from farmland must be increased significantly by using modern and proven farming methods. By contrast, extensifying agriculture would require more land which will result not only in the destruction of natural habitats but also in higher prices and higher greenhouse gas emissions per unit of food produced.

# 48%

**of the current world population are fed thanks to the use of mineral fertilizers.**

## Fertilizer producers and their farmer customers

### CARE about:

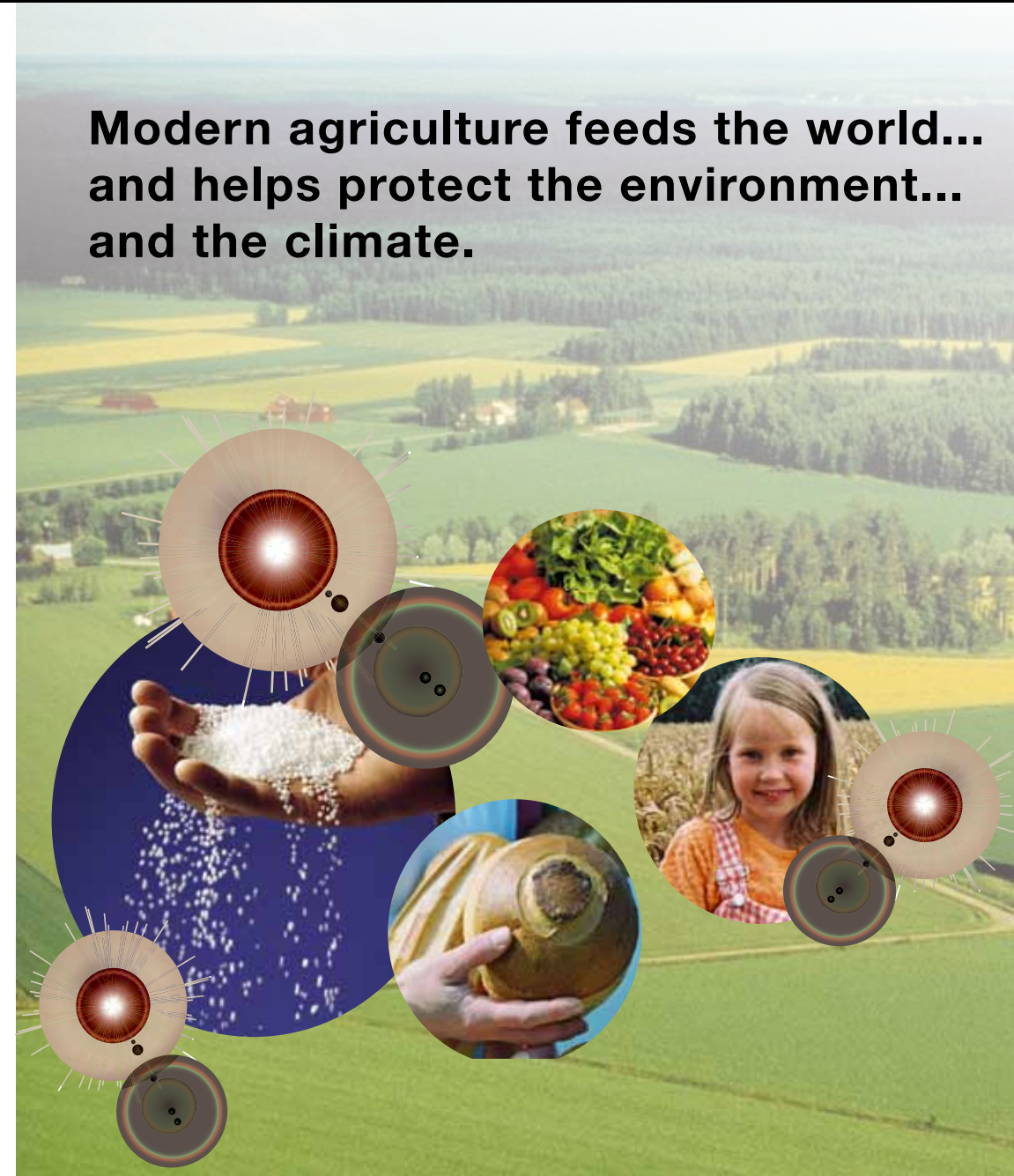
- producing enough quality food;
- not using more fertilizer than is needed by crops;
- minimising losses which could harm the environment or the climate.



**EFMA – European Fertilizers Manufacturers Association**  
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KRAM - January 2009



**Modern agriculture feeds the world... and helps protect the environment... and the climate.**

**Modern agriculture feeds the world...  
and helps protect the environment...  
and the climate.**

**Keeping pace with the growing world population is the biggest challenge facing agriculture.**

At the same time agricultural production also contributes to climate change by emitting carbon dioxide, methane and nitrous oxide (laughing gas). Farmers and their advisors work to produce the necessary amounts of food with the lowest possible emissions of greenhouse gases, using the best modern practices.

**Increasing food production whilst protecting nature.**

According to the FAO (Food and Agricultural Organization of the United Nations) the need for cereals for example will rise globally by 50% by the year 2030. This increasing need for food can either be satisfied:

- by increased yields from existing farmland; or
- by expanding farmland area into natural land

Maintaining and increasing yields from existing farmland is possible only with modern cultivation methods, including the optimal use of mineral fertilizers to replace nutrients removed in harvested produce. The alternative is a more extensive farming system, with the expectation that lower yields from a larger area could produce the food required.

**By 2030 the world  
need for cereals will  
rise by**

**50%**

**12%** of global climate gas emissions are attributable to changes in land use.

### The key question

Which of these two approaches enables the production of the necessary, and increasing, amounts of food required, with the lowest possible emissions of greenhouse gases per unit of product output (e.g. per tonne of wheat)?

Expanding farmland area, at the expense of nature, would have major impacts:

1. The decrease in biodiversity resulting from the destruction of ecologically valuable natural environments, such as forests, natural grasslands and moors.
2. Deforestation and humus depletion would release large quantities of carbon dioxide from the carbon which is currently firmly bound in wood and soil organic matter. Deforestation has also an immediate impact on the natural water cycle, resulting in an increased likelihood of flooding and drought.

**In fact the conversion of natural areas into more farmland also means more greenhouse gases.**

Already 12% of global climate gas emissions are attributable to changes in land use, such as the conversion of rain forests into farmland. With an intensification of agricultural production, this percentage would rise considerably.

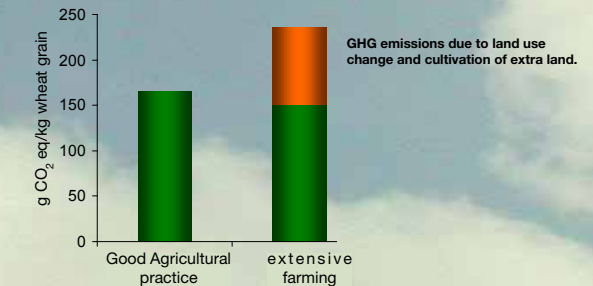
### The Challenge for farmers

The constant challenge to farmers is to increase the productivity of their land, thereby preserving forests and natural areas.

**Optimized fertilization according  
to good agricultural practice  
helps protect the climate.**

Modelled calculations of wheat production show that the displacement of natural area by farmland, which would become necessary because of the lower yields resulting from reduced fertilization, would lead to increased greenhouse gas emissions per product unit (Figure 1).

(Figure 1)



Assumptions:  
(1) N applied as AN; AN produced with BAT (i.e. incl. N<sub>2</sub>O catalyst)  
(2) Yield with GAP: 9.25 t/ha; yield with extensive farming: 7.11 t/ha  
(3) Additional farmland needed to compensate for yield difference displaces forest  
(4) Half rate N fertilization applied in extensive farming compared to good agricultural practice

