



# Agriculture

## Emissions

Emissions from agricultural activities<sup>175</sup> account for about 15 percent of global GHG emissions (Figure 15.1). This amount is divided roughly evenly between CH<sub>4</sub> and N<sub>2</sub>O (about 45 percent each), with CO<sub>2</sub> from fossil fuel combustion and electricity use accounting for the remaining share. At the activity level, the largest agricultural source is soils management (40 percent of the sector total), where emissions result from particular tillage and cropping practices, such as fertilizer application.<sup>176</sup> The second largest source is methane emissions from livestock (27 percent of the agriculture total), which is a byproduct of the normal digestive process of cattle and other livestock. Other important agriculture sources are wetlands rice cultivation (CH<sub>4</sub>) and manure management (CH<sub>4</sub>). Agriculture also contributes to CO<sub>2</sub> through land clearing and the burning of biomass. Due to data limitations and classifications, however, these latter contributions are not readily quantifiable, or are included in the land-use change sector (Chapter 17).

Figure 15.3 and Table 11 show GHG emissions from agriculture for the major GHG-emitting countries. Together, these countries account for 72 percent of global emissions from agriculture. China and India, the two largest emitters, together account for 29 percent of the global total. The United States, EU-25, and Brazil together account for another 25 percent. All other countries individually constitute less than 2 percent of the world total.

## Sector Context

Agriculture's importance to national economies differs greatly across countries (Figure 15.4). In India, China, and Indonesia, agriculture constitutes between 15 and 23 percent of GDP, and is a source of employment for half to two-thirds of the workforce. In industrialized countries, by contrast, agriculture is between 1 and 4 percent of GDP and

Figure 15.1. GHGs from Agriculture

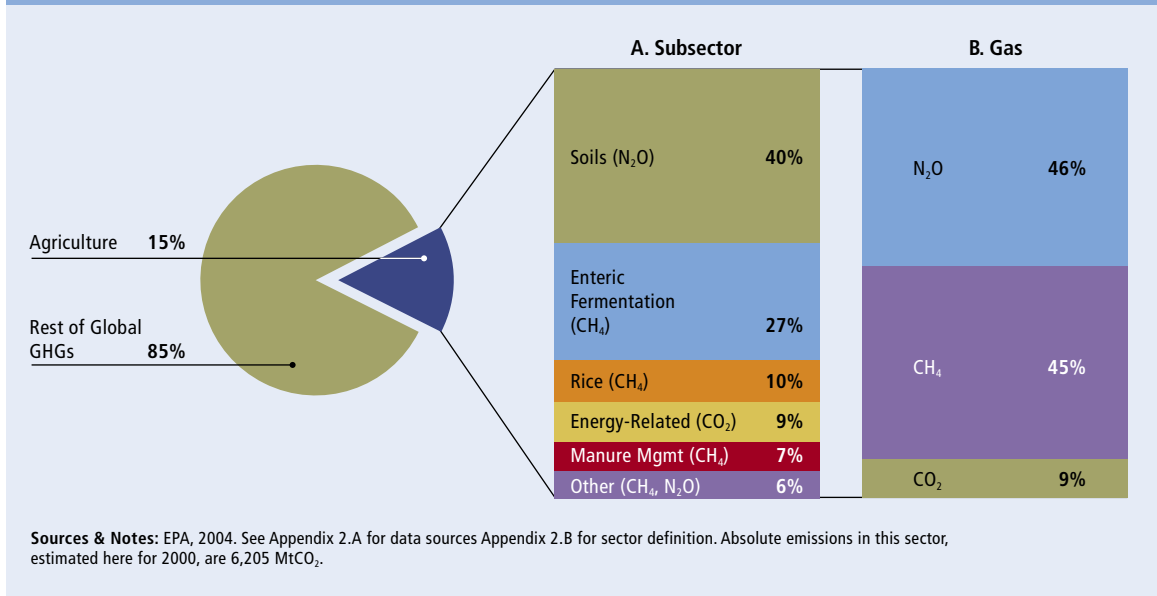
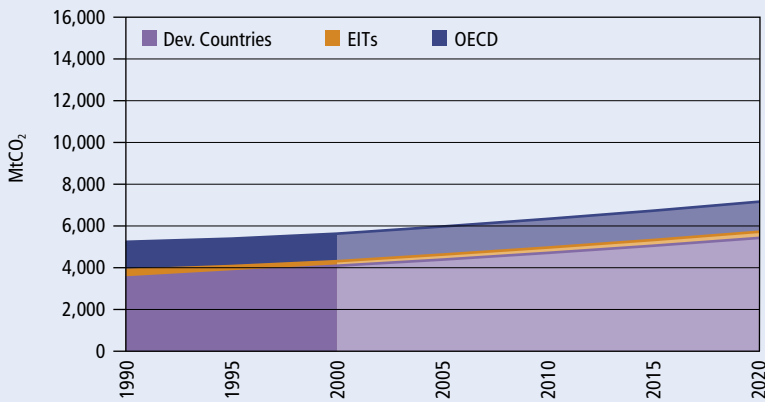


Figure 15.2. GHGs from Agriculture, Trends and Projections

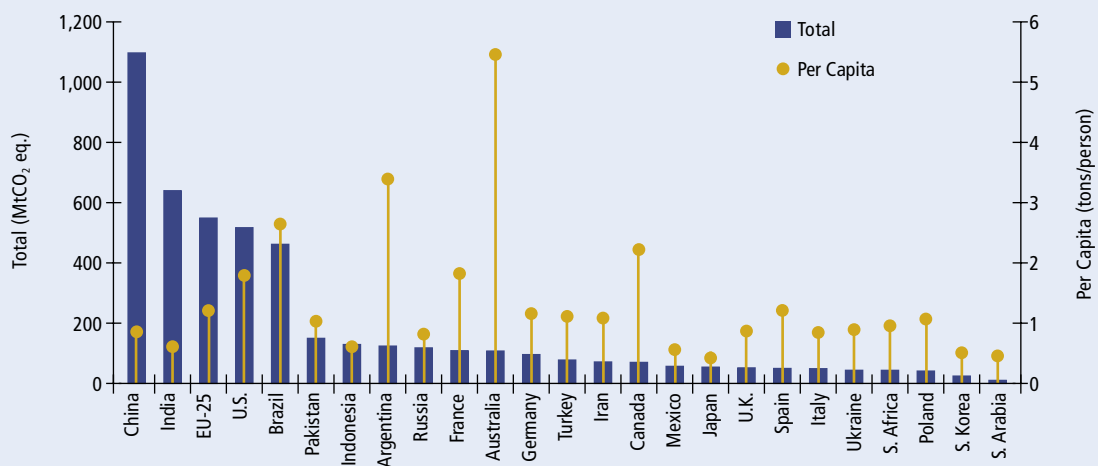


Source: EPA, 2004.

the workforce. Agriculture production is highly decentralized, consisting of loosely organized individuals and small interests, with few multinational companies involved in production. Likewise, agriculture techniques and processes vary greatly, not only by crop or livestock type, but according to local ecosystems, soil quality, labor availability, and custom. However, certain agricultural practices such as cropping techniques (for example, no-till), crop switching, and irrigation practices may be transferable.

Agricultural products are heavily traded. In 2003, world trade in agricultural products totaled \$674 billion, amounting to 9 percent of all global trade.<sup>177</sup> The level of trade in agriculture leads to difficulties in attribution of responsibility, since food consumption in importing countries is indirectly responsible for agriculturally based emissions in food exporting countries. In addition, emissions measurement in the agriculture sector is problematic. Methodologies rely on estimates of crop harvests, levels of irrigated land, and numbers of livestock. The accuracy of these indicators and their emission factors are often uncertain, especially for developing countries with sizable agriculture production.

**Figure 15.3. CO<sub>2</sub> from Agriculture, Total and Per Capita, 2000**  
*Top 25 GHG emitters*



Sources & Notes: WRI, based on CAIT and IEA, 2004a. CO<sub>2</sub> emissions are from direct fossil fuel combustion only.

**Figure 15.4. Agriculture and the National Economy**  
*Selected major emitters*

Country	% of GDP	% of workforce
India	23	59
Indonesia	17	47
China	15	66
Argentina	11	9
Russia	6	10
South Africa	4	9
Mexico	4	20
S. Korea	4	9
Australia	3	4
France	3	3
United States	2	2
Japan	1	4

Sources & Notes: World Bank, 2005; CAIT-V&A 1.0. Data is from 2001 and 2002.

