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As such, agricultural management needs to not only further increase the productivity of existing farmland to meet demand by adapting good and efficient management practices, but also embrace the three pillars of sustainability:

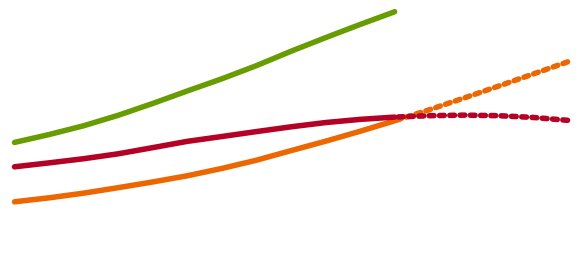
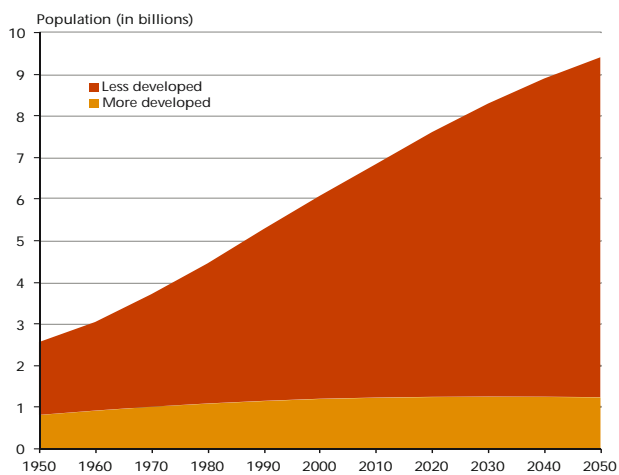


Figure 1: World population 1950 – 2050<sup>1</sup>

<Agriculture is the cultivation of land for the advantage of selected species including agricultural crops, livestock, tree crops and grazing lands.>



As of 2006, an estimated 36% of the world's workers were employed in agriculture,<sup>3</sup> down from 42% in 1996. But it still remains the most common occupation.

Agriculture's contributions to development differ around the world. The World Bank describes three types of countries:<sup>4</sup>

Type	% GDP growth contributed by agriculture	% of poor in rural areas
Agriculture-based countries e.g., sub-Saharan Africa	32%	70%
Transforming countries e.g., China, India, Indonesia	7%	82%
Urbanized countries e.g., Latin America, Europe	<5%	45%



## ✓ Good practice

Sustaining agricultural ecosystems

<Tillage is the practice of plowing or cultivating the soil to create arable land. Today, crops can be grown for several years without any tillage, often facilitated through the use of herbicides or herbicide tolerant crops. This practice, called minimum or no-till farming, reduces costs and fossil fuel use through avoidance of plowing while reducing soil erosion and improving water and nutrient retention. The possibility of adopting reduced tillage practices is determined by the different soil types.>







## ✓ Good practice

### Mitigation, se uestratio a d ada tatio

Mitigation of agricultural GHG emissions can be carried out through practices such as integrated crop management and conservation agriculture (or minimum tillage).

- > However other practices that can also mitigate emissions include improved water management in rice production, set-asides, agro-forestry (that can encourage perennial grasses, palms and trees in farming systems), as well as improved livestock and manure management.<sup>22</sup>
- > **Bioenergy and biomaterials** (*see also Chapter 6. Future challenges*) can help reduce GHG emissions, but there are a number of issues that must be considered and managed on a case-by-case basis. Care must be taken regarding land resources, net carbon emissions, and the food vs. fuel debate, biodiversity conservation and

# 4. Water

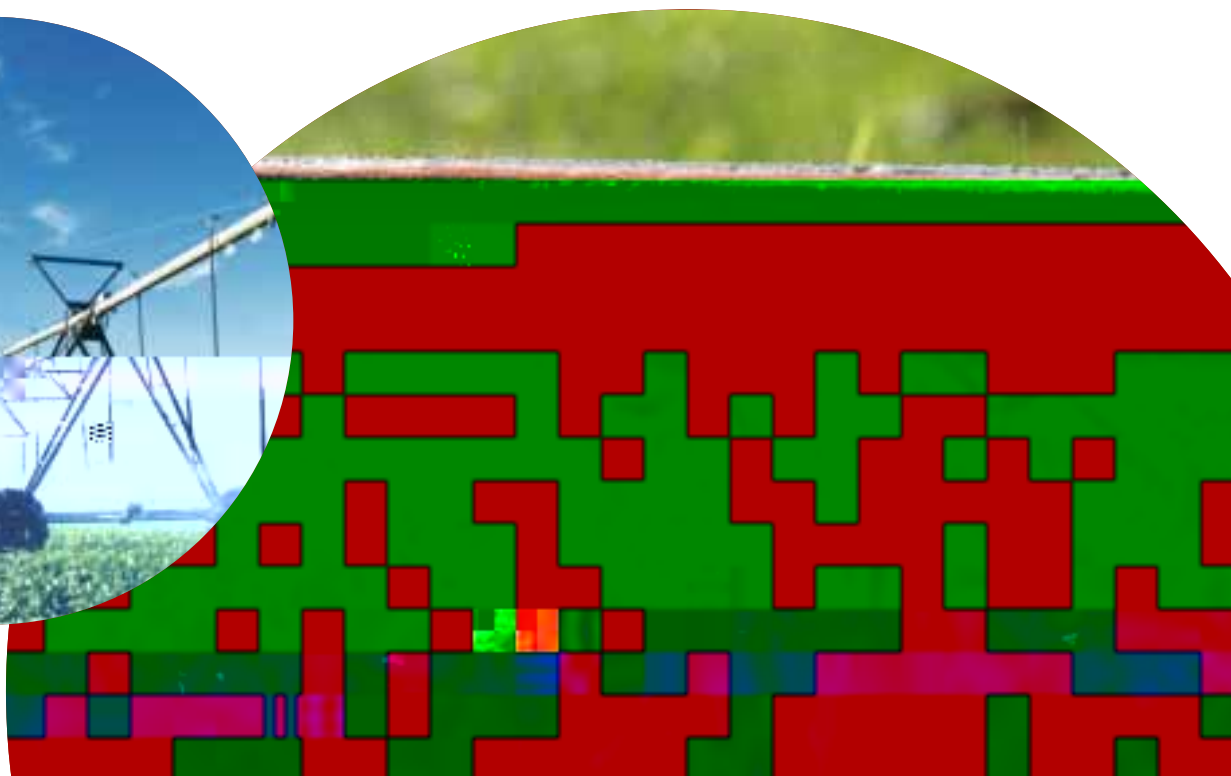
**Agriculture uses 70% of total global “blue water” withdrawals, most of which is for irrigation.**

In developing countries, as much as 80-90% of freshwater is used for agriculture. However, industrial and domestic use is competing and growing relative to that for agriculture.

Only 17% of all cropland is irrigated, but this land provides 30-40% of the

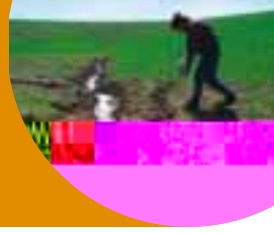
<Blue water is the liquid water flowing in rivers, lakes and groundwater aquifers.>

<Green water



# 5. Land, soil and nutrients

Land, soil and nutrients are key factors that are often linked in agricultural management practices. For example, the health of an agricultural ecosystem depends on the way the land is used, the quality of the soil and



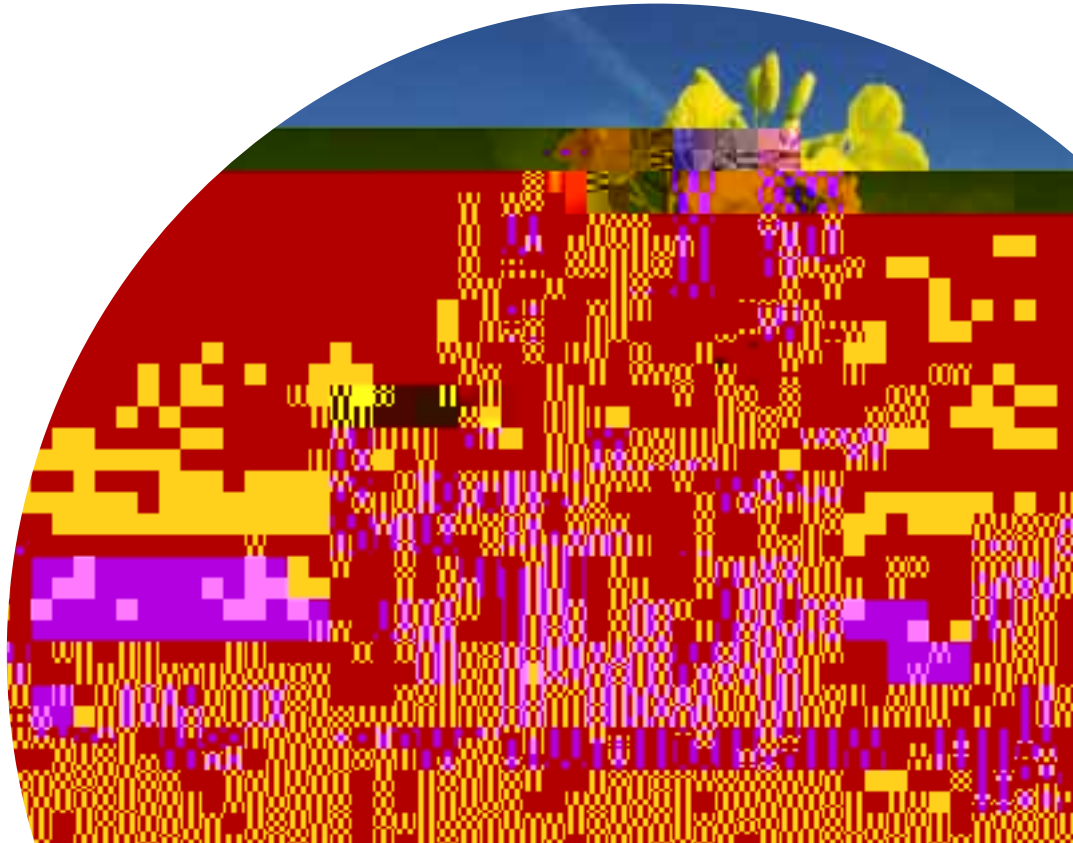
## ✓ Good practice

Land, soil and nutrient management

Soil provides the

Figure 12: Above- and below-ground carbon sequestration<sup>42</sup>





# Future challenges

In addition to the “good practice” sections in the previous chapters, **technological solutions** are also part of the solution to increasing agricultural productivity while sustaining ecosystems.

A recent review of scientific studies found **more than 80 agricultural technologies** that both increase crop productivity and improve habitat conditions for wild species.<sup>47</sup>

- > Many studies have shown how agricultural systems can be managed to **protect watersheds**.

The development of improved plant varieties have contributed to significant yield increase since the 1930s, leading to the Green Revolution in rice and wheat in the 1960s. More recently, genetically engineered crops have enabled another significant step forward in terms of yield and quality increase (e.g., higher levels of longer cotton fibers), as well as resistance to disease and pests. New improved seed varieties are already contributing to healthier diets (e.g., less trans-fatty acids) and current breeding programs show promising potential for climate change adaptation (e.g., through the breeding of stress- and drought-tolerant crops).

- > According to the International Service for the Acquisition of Agri-biotech Applications, biotech crops have already decreased CO<sub>2</sub> emissions, e.g., through the reduction of fossil fuel as tillage is avoided – with CO<sub>2</sub> savings of 14.8 million tons, or equivalent to removing 6.5 million cars from the road.<sup>48</sup>
- > Some members of the public have concerns about biotechnology – generally these refer to its perceived negative impact on food safety and the environment.

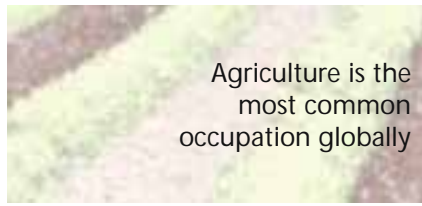
## Joining forces

It is critical to work within the **whole agricultural value chain** to achieve the goal of providing healthy and affordable food for all while protecting the environment. This means that cooperation and coordination between all stakeholders is essential. To help maintain healthy agricultural ecosystems, expertise in natural resource management, project management, agronomy, biology and other areas needs to be shared.

Mainstreaming sustainable agricultural ecosystem practices is an objective that must be shared by industry, the conservation community and consumers. Current tight agricultural markets are a signal for the urgency to act. Formal knowledge, new technologies and practices need to be combined with appropriate **local and traditional** knowledge to develop long-term, sustainable solutions.



# 7. Good news and bad



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## About the WBCSD

The World Business Council for Sustainable Development (WBCSD) brings together some 200 international companies in a shared commitment to sustainable development through economic growth, ecological balance and social progress. Our members are drawn from more than 30 countries and 20 major industrial sectors. We also benefit from a global network of about 60 national and regional business councils and partner organizations.

**Our mission** is to provide business leadership as a catalyst for change toward sustainable development, and to support the business license to operate, innovate and grow in a world increasingly shaped by sustainable development issues.

**Our objectives include:**

**Business Leadership** – to be a leading business advocate on sustainable development;

**Policy Development** – to help develop policies that create framework conditions for the business contribution to sustainable development;

**The Business Case** – to develop and promote the business case for sustainable development;

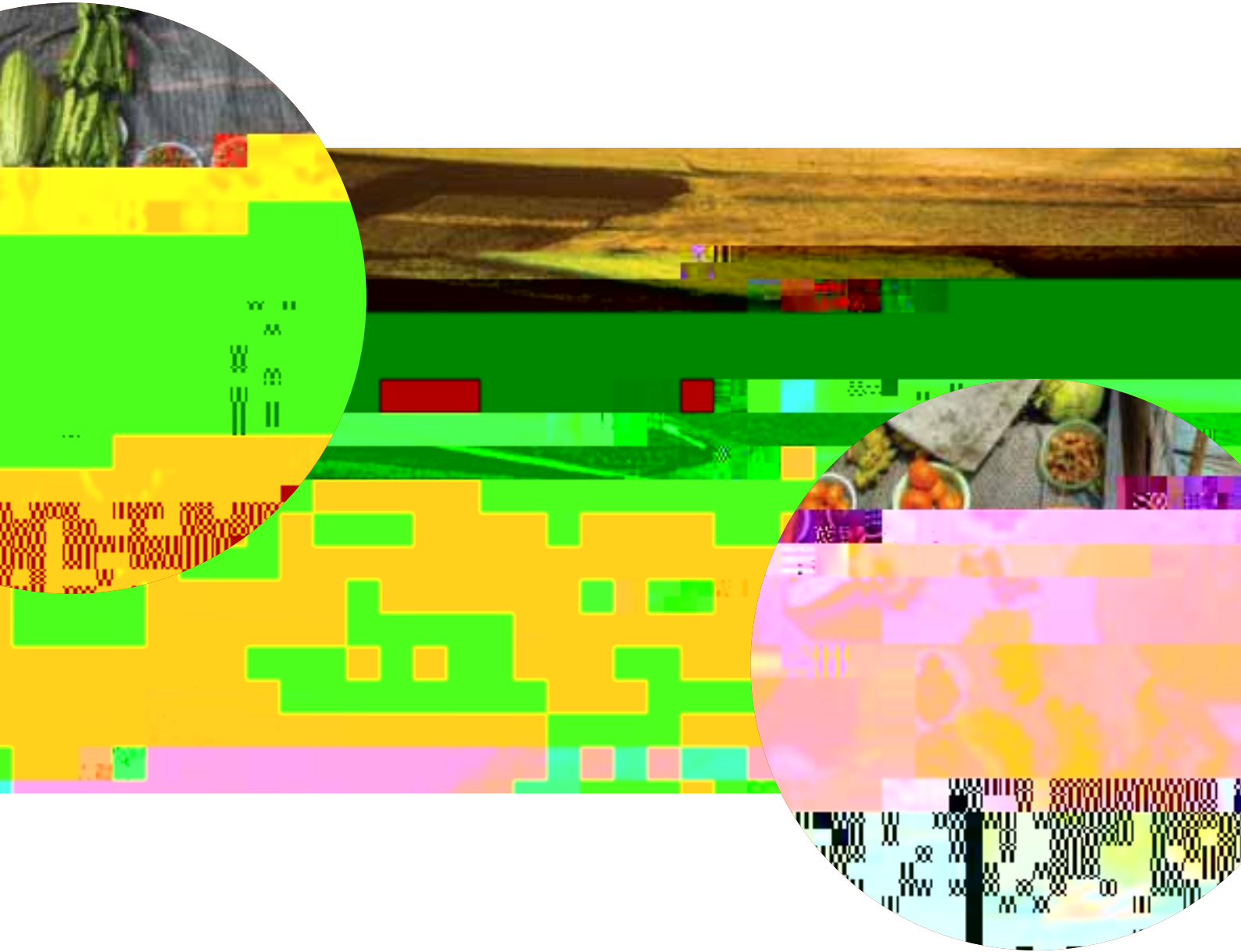
**Best Practice** – to demonstrate the business contribution to sustainable development and share best practices among members;

**Global Outreach** – to contribute to a sustainable future for developing nations and nations in transition.

[www.wbcsd.org](http://www.wbcsd.org)

## About IUCN

Founded in 1948, IUCN (International Union for Conservation of Nature) brings together States, government agencies and a diverse range of non-governmental organizations in a unique world partnership: over 1000 members in all, spread across some 160 countries.



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