

Agriculture and the environment

Common practices of conventional agriculture and its consequences

Common practices	Consequences
<ul style="list-style-type: none"> • Deforestation • Continuous tilling and ploughing • Removal or burn of waste from crops • Monocrops • Excessive use of fertilizers • Incorrect use of pesticides • Incorrect use of water 	<ul style="list-style-type: none"> • Loss of biodiversity • Loss of soil fertility and decrease in yield • Erosion • Increased risks of drought and floods • Food unsafety and sanitary risks • Pollution of superficial and subterranean water • Pollution and degradation of soils • GHG emissions • Invasion of pests

Source: FAO

Expansion of the agricultural borders and sustainability

- ❑ The expansion of the agricultural borders based on deforestation and/or expansion of monocrops at large scale adversely impacts natural and agricultural biodiversity.
- ❑ The advance of agriculture on forest lands may release large amounts of carbon and significantly increase GHG emissions.
- ❑ In Latin America:
 - Relevant background of deforestation of native forests and extension of monocrops at large scale related to several agricultural and forestry activities.
 - The surface assigned to the preservation and protection of natural and cultural diversity almost duplicated between 1997 and 2007.
 - Progress made in conceptual, regulatory and institutional frameworks for environmental conservation and protection.

Expansion of the agricultural borders and sustainability

Some examples of recent progress made with direct impact on commodities of immediate availability for biofuels:

- ❑ Law on Minimum Budgets for Environmental Protection of Native Forests (Argentina)
- ❑ Agroecological Zoning for Sugar Cane (Brazil)
- ❑ Soybean Moratorium in the Amazon (Brazil)
- ❑ Zoning map of areas for cultivation of oil palm with environmental criteria (Colombia)

Expansion of the agricultural borders and sustainability

Expansion of the agricultural borders and sustainability

Relevant challenges for the region:

- Enforceability of regulatory frameworks (control and penalties)
- Advance in agroecological zoning for crops with potential for production of biofuels
- Identification/quantification of marginal, degraded and underutilized lands.

Intensification of agricultural production and sustainability

Conservation Agriculture (CA) as a new agricultural paradigm

"To reconcile the conservation of the soils and the environment with production and producers with nature and other people" (AAPRESID).

Production system which purpose is to make a better use of agricultural resources through integrated soil management, water management and management of the biological resources available, together with a limited use of external production factors (FAO)



Basic Principles of CA:

- Minimum mechanical soil disturbance through direct seeding or no tillage
- Permanent organic soil cover
- Diversified crop rotation (annual crops) or plant associations (perennial crops)

Other good agricultural practices: Integrated Pest Management (IPM), use of organic manure, no burn of agricultural waste, rational use of fertilizers with nutrients reinstatement criteria, rational use of supplementary irrigation, Precision Agriculture

Intensification of agricultural production and sustainability

Benefits of Conservation Agriculture

- Drastic decrease in soil loss due to hydric or eolic erosion
- Lower soil compactation
- Increase or maintenance of organic matter content
- Soil quality benefits in air quality
- Decrease in GHG emissions due to lower use of fossile fuels and fixation of carbon in soil
- Increased efficiency in the use of available water
- Increase in soil microfauna and microflora
- Lower use of fertilizers
- Improved crop yield

Intensification of agricultural production and sustainability

Conservation Agriculture in the world and in South America

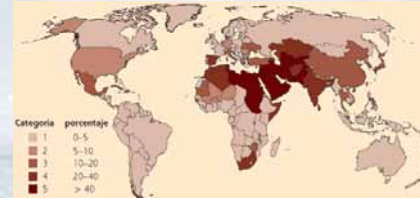
Country	Year	Area with conservation agriculture ¹ (1000 ha)	Area with conservation agriculture as a % of the total cultivated area
US	2005	25.252	14,3%
Argentina	2006	19.719	66,8%
Canada	2006	13.481	25,9%
Australia	2005	9.000	18,1%
Paraguay	2007	2.094	48,7%
Kazakhstan	2007	1.791	8,0%
Uruguay	2006	1.082	76,7%
Bolivia	2005	550	16,9%
South Africa	2005	300	1,9%
Spain	2005	300	1,6%
Venezuela	2005	300	8,7%
France	2005	150	0,8%
Chile	2005	120	5,2%
Colombia	2005	102	2,8%
China	2005	100	0,1%

1. Soil coverage > than 30% + disturbed area less than 15 cm wide or 25% of the cultivated area, whatever is lower. The data include crop rotation and monocrops
 Source: FAO 2008: AQUASTAT

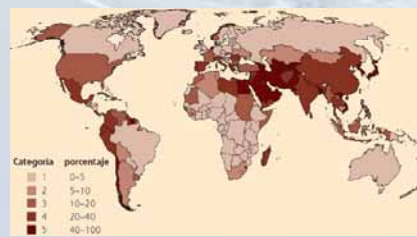
Competition for water?



Extraction of water with agricultural purposes as % of total renewable water resources



Area with irrigation infrastructure as a % of the total cultivated area



País	Agua dulce extraída para agricultura como % del total de agua dulce renovables	Agua dulce extraída como % del total de recursos de agua dulce renovables
Paraguay	0,10	0,15
Bolivia	0,19	0,23
Colombia	0,23	0,50
Venezuela	0,32	0,68
Brasil	0,45	0,72
Perú	0,86	1,05
Chile	0,86	1,36
Uruguay	2,18	2,27
Argentina	2,64	3,57
Ecuador	3,29	4,00

Source: FAO

Certification of sustainability

International initiatives in progress

- Biofuels:

- Global Bioenergy Partnership (GBEP)
- International Bioenergy Platform (IBEP, within FAO)
- Round Table on Sustainable Biofuels (RSB)
- IEA Task 29, Task 38 and Task 40 Working Groups (within the Bioenergy Agreement of the International Energy Agency)

- Raw materials:

- Round Table on Sustainable Palm Oil (RSPO)
- Round Table on Sustainable Biofuels (RSB)
- Better Sugarcane Initiative (BSI)
- Sustainable Commodities Initiative - SCI
- Forest Stewardship Council (FSC)
- Sustainable Agriculture Network (SAN)

Certification of sustainability

Sustainability principles and criteria

- GHG:** Reduction in the emissions of greenhouse gases by the biofuels productive chain, in comparison with fossil fuels.
- Environment:** Protect and even improve the quality of soils, air and water.
- Biodiversity:** Cause no damage to protected or vulnerable biodiversity, and if possible, strengthen it.
- Competition with food production:** Biomass production must not risk the security of food supply and other local applications.
- Local prosperity and social well-being:** Relief of poverty, creation of economic value for workers and local economy, no negative effects in the working conditions of the employees and in human rights, no violation of the rights of property and use of the land, etc.

Certification of sustainability

According to the Round Table on Sustainable Biofuels, the standards to develop should be:

- Simple:** Accessible for small producers, with low costs of measurement and easy to explain.
- Generic:** Applicable to any crop in any country, and enabling comparisons between crops and production systems.
- Adaptable:** Easy to revise, in order to consider new technologies and their impacts in the performance of different biofuels.
- Efficient:** They should incorporate other standards and certifications in order to eliminate duplications and reduce the inspection costs for producers and processors.

Final Considerations

- ❑ It is possible to expand agricultural production in an environmentally sustainable manner through conservation agriculture, regulation, control and certification of sustainability.
- ❑ South America is in an advantageous position as compared to other regions of the world (conservation agriculture, availability of human resources, availability of exportable balance)
- ❑ It is necessary to advance in mapping and zoning of potentially cultivable areas, marginal or idle lands and areas of high conservation value.
- ❑ R + D + I will play a fundamental role in the reduction of risks and potential adverse externalities.
- ❑ Need to expand the base of studies on balance of emissions and energy applied to the specific characteristics of the countries of the region.

