

## Sustainability indicators on national cereal production. Case of study: Venezuela

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### Abstract

The objective of this study was to evaluate indicators of cereals sustainability in Venezuela. The following criteria were included: agrobiodiversity, agrosystem efficiency, use of land resources and food security. Agrobiodiversity was evaluated using the crop surface index and the regional agrobiodiversity factor. Agrosystem efficiency included yields of the main cereal crops, experimental production/field production and the benefit-cost ratio. Use of land resource was evaluated using land availability for food production/land demanded, land used/land demanded, land degradation, land use/habitant and land irrigated. Food security included the cereal productivity index per capita, agricultural population to the total population and food disponibility. The agricultural population, the cereal productivity index per capita, yields of the main crops, total food production, agricultural area and agricultural area/habitant were combined in a sustainability index, after computing the average values with maximum probability of 1. The crop surface index and the regional agrobiodiversity factor showed values of 0.06 and 0.24, respectively. Yields of main cereals increased between 25% and 50% times during last 30 years, although the gap between experimental and field production was between 0.43 to 0.6. The benefit-cost ratio showed efficiency of 10 to 28%. The cereal productivity index per capita did not increase with population. Land availability for food production represented 2.4 times the required surface, but the land used for annual crops was 1.493.100 ha lower than demanded. The proportion of the agricultural population to the total population is 0.09. A low proportion of cultivated land (24%) is not degraded, and only 0.7% of the national surface is irrigated. The sustainability aggregated index (0.61) suggests that Venezuelan agriculture is only slightly sustainable.

**Key words:** indicators, criteria, sustainability, Venezuela, agriculture, agrobiodiversity, cereals.

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