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MESSAGE FROM THE EDITOR

Water for food: this is the question!

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Usually when we talk about water scarcity we think of scarcity of tap water, but the real life-threatening situation in the next 15 years will be represented by the decrease of the availability of water for environmental uses.

Salinisation of soils, overdrafting of groundwater, and re-allocation of water from agriculture to cities and aquatic ecosystems will limit irrigated crop production in many important food-producing regions. In other words, increasing competition for water will severely limit irrigation and constrain food production.

Meanwhile, in many countries populations will exceed levels that can be fully sustained by available water supplies. If current trends continue, the livelihoods of one-third of the world's population could be affected by water scarcity by 2025.

Considering that every kilogram of grain needs approximately 1000 kg of water, water-stressed countries will increasingly turn to grain imports to balance their water budgets. The actual water requirements vary according to the type of plant, weather (evaporation) and the efficiency of irrigation.

Furthermore, dietary habits are another important variable. In Europe and in America the typical diet includes a high proportion of meat, but this trend is currently rising in emerging markets. In the USA, for example, about 1350 l of water is used to produce 100 g of beef. As a matter of fact, the typical American diet requires about 5400 l of water in the form of evapotranspiration [1]. If we consider the amount of the same nutritional value, a vegetarian diet is responsible for the consumption of 2600 l of water per day. Compared to the 2–5 l of water we need to drink daily, and 20–50 l needed for bathing and other personal needs, the 2000–5000 l of water to produce food dominates the equation of water for human needs.

Moreover, the rise in the price of basic food partially due to the production of biofuels has had devastating effects on developing countries, where about 60–75% of incomes is spent on food. In 2025 most of the water-stressed countries will be in Africa and South Asia, the same areas whose inhabitants are nowadays living in acute poverty and who are malnourished. It is debatable whether food surpluses should be exported because they will probably be insufficient for poor food-importing countries.

In addition, soil erosion affects large areas of the world, including Europe. About 17% of the total land area is affected to some degree.

Climatic conditions make the Mediterranean region one of the areas most severely affected. Changes in land use, such as abandonment of marginal land with very low vegetation cover and increases in the frequency and extent of forest fires, have had a strong impact on soil resources since historical times. In the most extreme cases, soil erosion, coupled with other forms of land degradation, has led to desertification in some areas of the Mediterranean region and eastern Europe. One of the most significant influences on the quality of soil is the cultivation systems used in agriculture. Loss of organic matter/soil biodiversity and consequently soil fertility is often driven by unsustainable practices such as deep ploughing of fragile soils and cultivation of erosion-facilitating crops such as maize.

Therefore, considering that sustainable increases in cropland area and the expansion of irrigated areas are limited by mounting barriers, fundamental changes in water management are urgently needed to ensure a sustainable future for water and food. The competition between rain-fed land, and urban and industrial uses for water must be eliminated. In a world of progressive water deficiency, rain-fed land will become more and more important to global food security.

The scientific community needs to make a huge effort to support the concept that the water productivity of the global crop base, both rain fed and irrigated must be increased. The target of this policy is to improve all methods of channelling and storing rainwater in order to increase soil moisture.

Agricultural water productivity depends on irrigation efficiency. Moreover, approximately 500 km^3 of inefficient evaporation of irrigation water could hypothetically represent a potential reduction in wasted water sufficient to grow 450×10^6 t of wheat, although only a small percentage of these losses could realistically and economically be harvested.

Under-nourishment remains a major problem and in sub-Saharan Africa the number of food-insecure people increased from 125 to 186 million people between 1997 and 2000 (FAO, 1999).

Expansion and intensification of irrigated area has contributed significantly to increase food production.

Water withdrawal for agriculture is rapidly increasing. An overuse of water is observed in some of the most fertile regions of the world (America, southern Europe, northern India, north-eastern China), mainly for agriculture, leading to a decrease of water tables. Groundwater is going to be withdrawn in a structural way.

Moreover, severe damage to water supplies has been determined by biofuels. Approximately 9000 litres of water is needed to cultivate the soy for one litre of biodiesel, and up to 4000 litres for corn to be transformed into bioethanol.

The prices of cereals are increasing, reducing their availability as food.

Politicians must understand that if we do not want to lose our crops for food or have a global scarcity of drinking water in the near future, the only logical solution is to forbid the cultivation of crops for biodiesel. Instead, we must favour alternative energies, support an increase in water productivity by better use of rain preservation, improve irrigation efficiency, support research into plant varieties that need shortened maturation time and breed crop varieties that are more salt tolerant and drought resistant.

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Reference

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