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Food Production and Water Usage Issues

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Preliminary Remarks

Competition for water for alternative uses is nowadays increasing. The main user of freshwater resources is agricultural sector, whose usage of water reaches the 93% of the total reserves. Within the same sector, the irrigated agriculture, which provides the 40% of the world's food, is responsible for about 70% of global water withdrawals [1-2].

Freshwater is fundamental to produce food and since the world population is growing at a rate of 1.10% per year, an increase in food production is absolutely desirable both in future and at the present time as it is necessary to feed the worldwide areas stricken by famine. This is a hard challenge that has to be faced as soon as possible by making available larger amounts of water for some areas on one hand and adopting a more rational use of water on the other. Water is a scarce resource whose availability will be constrained in the future. It is known that under a business-as-usual scenario there may not be enough water to produce the food needed to feed the world in 2050. Wastefulness is a present problem for water use; if an increase in irrigation have been essential for providing food to human population, some irrigation systems are still characterized by overuse of water; some of them are even uneconomical.

Problem and Solution

Pressurized water irrigation methods (sprinkler and micro irrigation) are considered as the leading water saving technologies in irrigated agriculture, especially for cereal crops. Nowadays about 12% of the total world irrigated area is equipped with sprinkler irrigation. Most of the pressurized irrigated area in concentrated in Europe and Americas. With regards to sprinkler irrigation several studies in the last decades have been focusing on water saving. They sink roots on the complete understanding of thermo fluid dynamics in which in-flight water droplets are involved in order to establish which parameters of the water jet can be varied to limit the water waste [2-3]. Anyhow, it may be a good practice to combine every in-field irrigation technique with the use of innovative decisions support systems. In this sense many applications are already widespread [4].

Regarding horticulture crops, a feasible solution to produce food on large scale in both efficient and sustainable ways is hydroponics, being able to reduce freshwater usage by 70% to 90%. This is probably the main force that is pushing the diffusion of this kind of systems. Today, large-scale corporate hydroponic farms in the developed world can generate crops not just for domestic use but also for export; examples of dynamic hydroponic markets are present in Canada and in Australia, where hydroponics production had increased in land occupation by more than 200% between 1990 and 1996, and the growth is still continuing [5]. In Europe, worthy of mention is Netherlands whose hydroponic sector is already well developed. Nevertheless, hydroponics can be a good solution for food shortage situations also in developing countries as it can potentially help to overcome the problem of having poor soil or inadequate freshwater supplies. In these areas, considering the steadily rising human population, large-scale hydroponics can be the most interesting solution for the next future.

Concluding Remarks

The challenges in the adoption of the best harvesting policies on wide scale could be technical, economic and social. Clearly all of these aspects must be taken into account. Focusing just on one of them will not help in achieving goals. In this way it is fundamental for developing countries to share knowledge and resources, as only a common view of the present problems can be helpful in facing important issues like water use and food production. But hydroponics can be an opportunity for those areas affected by poor soil, water shortage and poverty. It can help in developing an internal market and in exchanging horticulture crops with cereal ones produced in other places based on irrigated agriculture.

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