

## **Agricultural water management: Priorities and challenges**

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### **Abstract**

In the past few decades, advances in agricultural research lead to substantial increases in food production (e.g. Green Revolution in Asia and Latin America in the 1980s). However, the question of food security is again high-up on the international agenda because of a number of factors such as population growth, socio-political issues, inadequate agricultural infrastructures, land degradation, heavy disease burden, poor soils and unfavourable climate. The problem is enhanced by climate change and its effects on agricultural productivity and production stability. Large arid and semi-arid areas in the world have high potential in terms of agricultural productivity, however water is the main limiting factor for production. Added to that, these areas are usually ecologically sensitive, prone to environmental degradation and in need of narrowing social inequities. As a result, one of the main challenges remains the improvement of agricultural water management when the availability and quality of fresh water resources and the sustainable use of soil resources are under increasing pressure. Given the physical limitations of natural resources (e.g. land and water), the link between food security, land use and water resources is inevitable. New strategies and management options are required in order to address water use, performance and productivity of agricultural systems. Global changes (including climate) are expected to occur that will impact water and land availability to the agricultural sector, represent a hazard to the environment, whilst food production needs to be increased in volumes and quality to satisfy the ever increasing population and improve its livelihood. It is clear that sets of strategies and solutions need to be applied to mitigate the complexities of these challenges, both at small scale (e.g. field or farm) and at large operational scales (e.g. irrigation district, catchment, region, country). Furthermore, linkages between the different scales of operation need to be investigated, such as the impact of introduction of innovative management practices at small scale with the improved estimation of yields and water use at high spatial resolution. This should facilitate the widespread application of technologies (e.g. precision agriculture) and adaptation measures (e.g. agronomic and irrigation practices) aimed at achieving better performance of agricultural production.