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COMMENTS

Comments on the special issue of *FASE* on 'Agriculture in Water-Limited Areas'

Neil C. TURNER (✉)

The UWA Institute of Agriculture and UWA School of Agriculture, The University of Western Australia, Perth WA 6009, Australia

Food security is a major concern as world population continues to increase, the area of productive land continues to decrease due to land degradation and the spread of urban and rural infrastructure, water for irrigation is becoming scarcer and more costly, and rainfall is less predictable. The predicted increases in temperature and decreases in rainfall resulting from climate change[1] could decrease yields by up to 50% in some arid and semiarid climates[2]. However, these challenges also represent opportunities[3]. Adoption of conservation agriculture techniques and improved cultivars has doubled the yield of rainfed wheat in Australia[4], while plastic-film ridge-furrow technology has increased the yield in maize by 30% to 100% in cold, water-limited environments of northern China[5].

This special issue highlights the progress in improving crop production in water-limited areas through breeding, soil amendments, mulching and weed control. While increasing precipitation use efficiency is a key to increasing crop production of rainfed agriculture in semiarid areas, in arid areas irrigation is required to obtain an economic yield. This special issue highlights the importance of improving water use efficiency (WUE) of irrigation systems by monitoring and minimizing losses in delivery systems — rivers, channels, and pipes, limiting irrigation to the most productive soils, sites and crop species, using deficit irrigation practices maximizing both production and WUE by limiting irrigation in the vegetative phase and making more water available in the reproductive phase[6], and using drip irrigation technology, particularly under mulch, rather than overhead sprinklers or flood irrigation practices. These all were practices encouraged and implemented in irrigated agriculture in semiarid areas where water supply is limited, not only in China but also in Australia, Israel and the USA. Despite the breadth of this special issue, it was not possible to cover all the challenges faced by irrigated agriculture, such as the use of recycled water or brackish water for irrigation, and the use of irrigation for crop production on saline soils, areas in which Israeli scientists have made significant advances.

While improving the efficiency of irrigated agriculture is important for feeding the world, restrictions on water available for agriculture and climate change drive the need for greater research emphasis on increasing crop production in arid and semiarid rainfed environments. Recent advances in whole genome sequencing and gene editing hold promise of speeding the development of the drought resistance of crops and pasture species and sustainably increasing the yield and WUE of food, fodder and fiber crops[3].

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Correspondence: neil.turner@uwa.edu.au

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Neil C. Turner, graduated from the University of Reading, UK, with an honors degree in Agricultural Science in 1962, obtained a PhD from the University of Adelaide, South Australia, in 1968, and a DSc from the University of Reading, UK in 1983. He was employed as a crop and tree physiologist by the Connecticut Agricultural Experiment Station, New Haven, USA, from 1967 to 1974, before joining the CSIRO Plant Industry, in Canberra, Australia in 1974. He worked for the CSIRO in Canberra and Perth for 31 years studying the agronomic and physiological responses of crops and trees to water deficits, the adaptation of crops to water-limited environments and the implications of climate change for crop production. As research leader of a multidisciplinary team of crop physiologists and soil scientists he was involved in providing management options for improved crop and pasture production on light textured and texture-contrast soils in the Mediterranean climatic regions of Australia with a focus on optimizing productivity and sustainability of dryland cropping systems including wheat, grain legumes and pastures. Since retirement from the CSIRO, he has been based at the University of Western Australia and has been a Visiting Scientist in the Institute of Arid Agroecology at Lanzhou University, China. He has published 370 peer-reviewed papers and book chapters in international journals and edited 12 books or special issues of journals. He has been honored as a Fellow of the American Society of Agronomy, the Crop Science Society of America, the Australian Academy of Technological Sciences and Engineering, the Australian Institute of Agriculture, and the Indian Academy of Agricultural Sciences, and awarded a Centennial Medal by the Australian Government, the Chancellor's Medal by the University of Western Australia, the Dunhuang Award by the Gansu Provincial Government in China and the Friendship Award by the Government of China.