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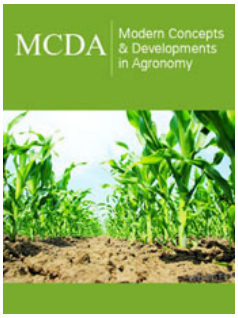
Opinion

# Water Saving - An Emerging Necessity for Sustainable Agriculture

**Devinder Mohan***

Retired Principal Scientist, India

**ISSN: 2637-7659**




***Corresponding author:** Devinder Mohan, Retired Principal Scientist, ICAR - Indian Institute of Wheat and Barley Research, Karnal 132001, India

**Submission:** March 29, 2023
**Published:** April 05, 2023

Volume 12 - Issue 4

**How to cite this article:** Devinder Mohan. Water Saving - An Emerging Necessity for Sustainable Agriculture. 12(4). MCDA. 000795. 2023.
DOI: 10.31031/MCDA.2023.12.000795



## Opinion

Making best use of the available water resources for irrigation has gained importance in many parts of the world. Water economisation has become crucial to raise the staple crops in tropical and subtropical countries. Some beginning has already been made and certain water saving strategies had been suggested/ formulated for wheat cultivation in countries like India, China, WANA region and Australia [1-3]. On the pattern of USA where specific wheat varieties like Promontory, TAM 107 and Thunderbolt were promoted for limited irrigation, the wheat improvement programme of India also responded by developing suitable varieties for different production environments of the country. Effective use of water and not water-use efficiency is the target of crop yield improvement under drought stress [4]. The problem is twofold in such countries. In some situations, the water table is depleting fast, and strategies have to be formulated for worsening it further and such conditions exist mostly in the Indo-Gangetic plains [5-7]. In certain situations, especially in the tropical region; the water bodies for irrigation like pond/ well available usually go dry after 2-3 months of monsoon. Unlike the subtropical region, the climate is also harsh due to higher temperature. Besides lesser amount of available water, the applied irrigated water also evaporates faster in such situations and the environment remains comparatively hotter below and above the soil. The level of abiotic stress enhances under such situations as dry and hot climate makes the moisture stress affects severer. Both types of situations are prevalent in India where the wheat programme modulates strategies in accordance with the demanding situation [3]. As constraints on expending irrigation become more binding, furthering yield gain in the face of additional warming is likely to present an increasing difficult challenge [8].

To handle such situations interventions are required not only by agronomic management but through varietal development also. Yield loss is bound to occur under moisture stress condition [9-11]. At places where restricted irrigation is a choice to checkmate depletion in the water table, it becomes essential to elaborate how much drop in wheat production the state or country can afford. For example, if the yield loss is high under limited irrigation (more than 20 %), the premium set for saving the water regime may turn out to be highly demanding. Under harsh environments of the tropicals also, it's better to search other winter cereal options if the yield loss turns out to be very high i.e., more than 30 %. Lower yields will certainly be non-remunerative to the farmers. To raise winter maize/ sorghum or barley may suit better for sustainable agriculture under such conditions. Irrigation scheduling and fertilizer requirement may have to be relooked and devised in accordance with existing environments. When the environment is congenial, just 2 irrigations may be enough to raise good wheat crop i.e., one as pre-sown for land preparation and another at the CRI stage [12,13]. This scheduling may not work in the region where climate is hot and dry. Another supplementary irrigation may be a necessity for proper development of the grains. To minimise the yield loss, early

planting may also prove good for agronomy management under limited irrigation.

Variety development programme may also have to be redesigned for such situations. Breeders have to decide whether screening of the rainfed genotypes is good enough or new genotypes have to be developed. Location differences are obvious in yield and quality of wheat [14,15] but location specificity can also differ between the normal and limited irrigation crop in a mega-zone. The most crucial growth development stage can vary under agro-climatically diverse production environments and newly developed genotypes must have an inbuilt mechanism to cope up such abiotic pressures [9,16]. Some erosion is bound to occur in the sustainability index [15]. Even if the productivity level is acceptable, the farmer may discontinue the restricted irrigation practices when it's hard to sustain the yield. In India, the Triticum (wheat) cultivation covers different species like durum and dicoccum, especially in the peninsular India. What holds good for common bread wheat, may not work for other species. Poor grain growth due to water limitations is totally unacceptable in durum. Environment plays big role in wheat quality [16-21]. Quality characteristics of the harnessed grains can also show deviations in comparison to the normal sown crop. The call for restricted irrigation sounds genuine but demands action on many researchable issues for making it farmer friendly, sustainable and ruminative.

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