
ICID Young Professional e-Forum (IYPeF)

Opportunities and Challenges of Drainage Development

Background Note for Discussion

9–30 June 2017

Introduction

Proper agricultural water management methods have a high capability to boost global food production. Moreover, improving the efficiency of food production systems is often seen as a necessity due to the increasing world population and consequent increase in food demand (e.g. Tilman et al. 2011). Whereas the role of irrigation practices in enhancing food production is widely recognized, it can be argued that the efforts to enhance the role of drainage procedures in agricultural water management has gotten far less attention (e.g. Freisem and Scheumann, 2001; Abdel-Dayem, 2000). However, drainage would have a high potential to enhance food production in many regions.

Drainage can be considered to have five specific roles: (1) food production, (2) agricultural intensification and diversification, (3) sustainable irrigated land-use, (4) rural development and (5) environmental protection (Smedema et al., 2000). It has been estimated that globally utilized cropland area is about 1450 million ha, of which 150–200 million ha have drainage systems and additionally 350–450 million ha would benefit from drainage procedures (Smedema et al., 2000). The most commonly applied drainage practices are open ditches, subsurface drains and pumped tube-wells (e.g. Abdel-Dayem 2000). Drainage is typically needed to avoid salinity and waterlogging problems. Some estimates suggest that over 50% of the global irrigated land area has developed drainage problems, while about 25 million ha has become unproductive due to lack of proper drainage procedures (Abdel-Dayem, 2000). The preceding numbers demonstrate the opportunities of drainage in global and local food production, and also demonstrate that irrigation and drainage system development need to be carried out in an integrated manner. Furthermore, as suggested by Vlotman (2017), modern land drainage design should not concentrate solely on technical field-scale drainage system design, but should have a wider consideration of the hydrological circumstances, environment, stakeholder involvement and socio-economic circumstances. The availability of new technologies, including drones, robots, satellite data and novel drainage methods, can also offer new approaches and opportunities for drainage design (Vlotman, 2017).

Although drainage can have a high potential in food production, there are also challenges in the wider adoption of the procedures. Factors leading to the unrealized potential of drainage may be partly due to the weak public support and the lack of tradition in drainage procedure establishment in many regions (e.g. Smedema et al., 2000). Therefore it may be argued that institutional mechanisms for drainage implementation have not fully developed. It is also open for debate whether it would be more efficient to consider drainage infrastructure as a public good which should be publicly funded or as a private investment of a farmer. However, it is often considered that in the initial stage, government support is needed to boost the drainage development (e.g. Smedema et al., 2000; Abdel-Dayem, 2000) and perhaps the programs could be linked to the agricultural development state of the area (Smedema et al., 2000). Improved educational programs and information distribution could also be of benefit for the enhancement of drainage development. It can be argued that active participation of different stakeholders is needed to realize the global potential of drainage in agricultural water management.



Expected outcomes

- (1) What are the most promising means to enhance and promote the role of drainage in agricultural water management?
- (2) How irrigation and drainage planners and officers currently take into account the drainage needs?
- (3) What are the current trends in irrigation and drainage organizations to put more efficient drainage procedures into operation?
- (4) What are the currently adopted drainage practices, and what type of new methods and technologies could be needed/adopted in order to improve the current means?
- (5) How currently used land drainage approaches consider drainage in a wider perspective (wider hydrological circumstances, environment, stakeholder involvement and socio-economic circumstances)? How to promote the adaptation of the comprehensive/wide perspective on drainage design (instead of solely technical field-scale drainage system design)?
- (6) How irrigation and drainage young professionals could promote the drainage issues?

References

- Abdel-Dayem S., 2000. Drainage Experiences in the Arid and Semi-Arid Regions. Proceedings of the 8th ICID International Drainage Workshop, Jan/Feb 2000, New Delhi, Volume I, Indian National Committee on Irrigation and Drainage, New Delhi.
- Freisem, C., Scheumann, W., 2001. Institutional arrangements for land drainage in developing countries. Working Paper 28. Colombo, Sri Lanka: International Water Management Institute.
- Smedema, L.K, Abdel-Daydem, S, Ochs, W., 2000. Drainage and agricultural development. *Irrigation and Drainage Systems* 14: 223–235.
- Tilman, D., Balzer, C., Hill, J., Befort, B.L., 2011. Global food demand and the sustainable intensification of agriculture. *Proceedings of the NAS* 108, 20260–20264.
- Vlotman, 2017. Beyond modern land drainage. Keynote presentation at the 13th International Drainage Workshop (IDW13) held in Ahwaz, Iran, March 2017. Available at: http://icid.org/idw13_vlotman.pdf.

