Actual Changes in the Irrigation Management with 30 Year Improvement Project: A Case of the Dakalt District in the Nile Delta

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ABSTRACT

For the last three decades, many changes in irrigation infrastructure and crop pattern done. Therefore, the main idea is to compare IIP in 1983 and 2013 (30 years difference). This comparison will show historical changes before and after IIP. Effect of un free (in 1983) and free (in 2013) cropping pattern in water management and performance is discussed. The implementation of IIP in Dakalt area started in 1993. However, the farmers changed some of futures of implementation by themselves such as introducing electricity beside diesel pump units as per their experience.

Central management of the scheme with a top-down management approach were used in 1983. While, semi management approach after introducing Water User Associations (WUA) used these days (in 2013 case). In addion, water and soil salinity in different locations and in 1983 and 2013 are analyzed too for understanding it is effect on water management. Therefore, it is identified that the long-term historical assessment is essential for evaluating irrigation management performance.

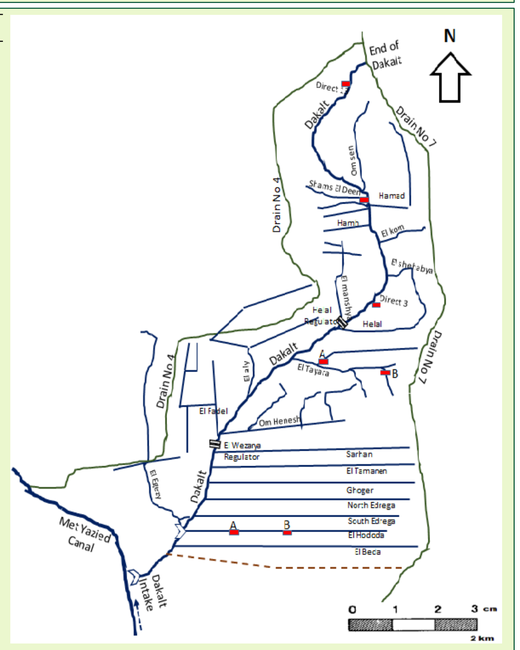
Keywords: irrigation improvement; historical assessment; water management; Dakalt district; Egypt

Materials and Methods

The command area namely Dakalt canal of IIP project in the Nile Delta is chosen and the same area before improved irrigation. Dakalt allocated on the right-hand side of Meet Yazid canal (Km 41.070). It is about 11.4 km long and serves about 2344 ha. The physical status represents the situation of the middle and north part of the Nile Delta and it is fed from Meet Yazed main canal in Kafr El-Sheikh directorate. The map of the study area is shown in figure 1.Historical data in 1983 of the study area were used and analyzed from EWUP project (EWUP, 1984). Recently, Japan Society for the Promotion of Science (JSPS) support a research project with water management research institute to develop integrated indices on water management performance in IIPs areas including our study area. The main data are allocated at different levels such as canal, Mesqa, on-farm levels. Reference evapotranspiration (ETo) was calculated, water supply and crop pattern system had been calculated.

Table and figure 1: Main Information's and map for Dakalt district area

Specification	Details information (in 2011)
Main Canal (water source)	Meet Yazied Canal (MY)
Total served area	2310 hectar
Length of the irrigation canal	11.3 km
Location of the intake	41 km RMY
Irrigation system	Rotation-Surface Irrigation
Drainage system	Open and subsurface systems
No. of Mesqas (sub-branch canal)	22
Total No of Users	4050
Population	21300
Mosques No.	30
Agriculture associations names	Eslah Dakalt, Eslah Edryga, Elwezaria, Abo raya and El sabet
Main boundaries	South: Meet Yazied Canal North: El Hamoul –El Ryiad Road East: Drain NO 7 + international road West: Dail El Kased canal + Drain NO 4
No of members of representative committees	48 member (40 from agriculture societies+ 8 from housing units)



Results

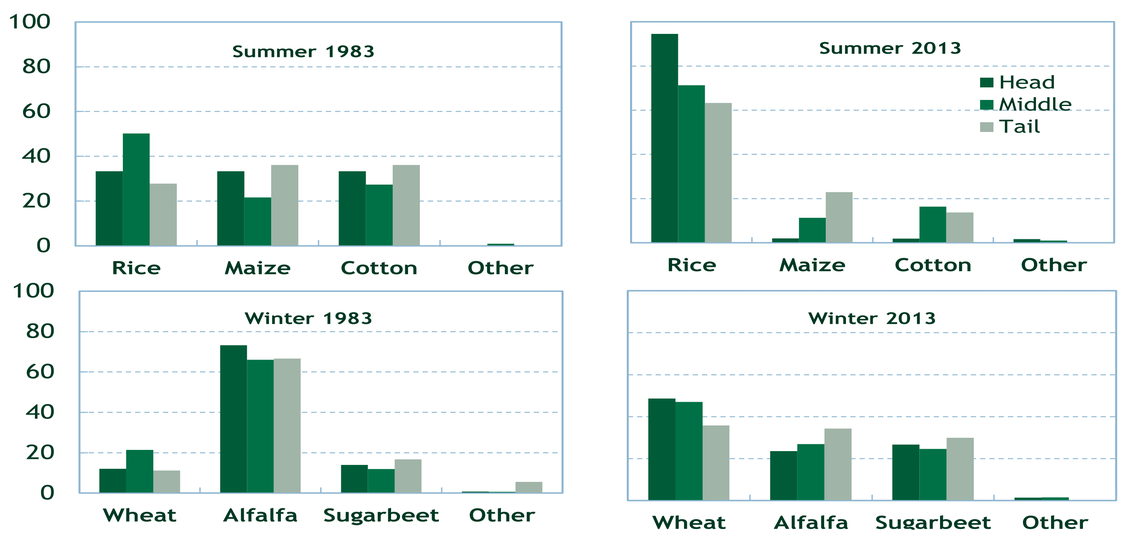


Figure 2: Crop pattern changes (1983 – 2013) in winter and summer seasons

Fig. 2 the permitted area for planting rice is 40-50%. In 1983, the real rice area was approximately to 52.7%, meanwhile in summer season of 2013 was 83.6%. The significant increasing of rice areas in summer affected negatively on planting areas of other summer crops (cotton and maize). It is clear that rice areas allocated at the head of irrigation canal have more rice areas than in the middle and tail end. Meanwhile in the year 2013, wheat areas was 47.6%. Similarly the cultivated area with alfalfa significantly decreased from 83.5% in 1983 to 25% in 2013. At the contrary, the cultivated area with sugar beet increased from 6.4% in 1983 to 28.4% in 2013. The effect of location (head, middle and tail) was not clear in winter crops. As shown in figure 3. The shortage is mainly is due to rice translating time allocated in those months. There is significant surplus amount of applied water from January to May, 1983 compared to 2013. This led to decreasing water use efficiency in 1983Higher amount of water supply achieved in the May for both seasons. In September of both years, amount of water supply was higher than the requirements and almost same. The water supply in 1983 was higher than 2013. This means irrigation time is more important than amount of water supplies. . In January 1983, there was higher amount of water (5500 m^3 ha^{-1}) due to high amount of area which cultivated with alfalfa (83.2% of the area). Alfalfa need more amount of water than wheat and beet.

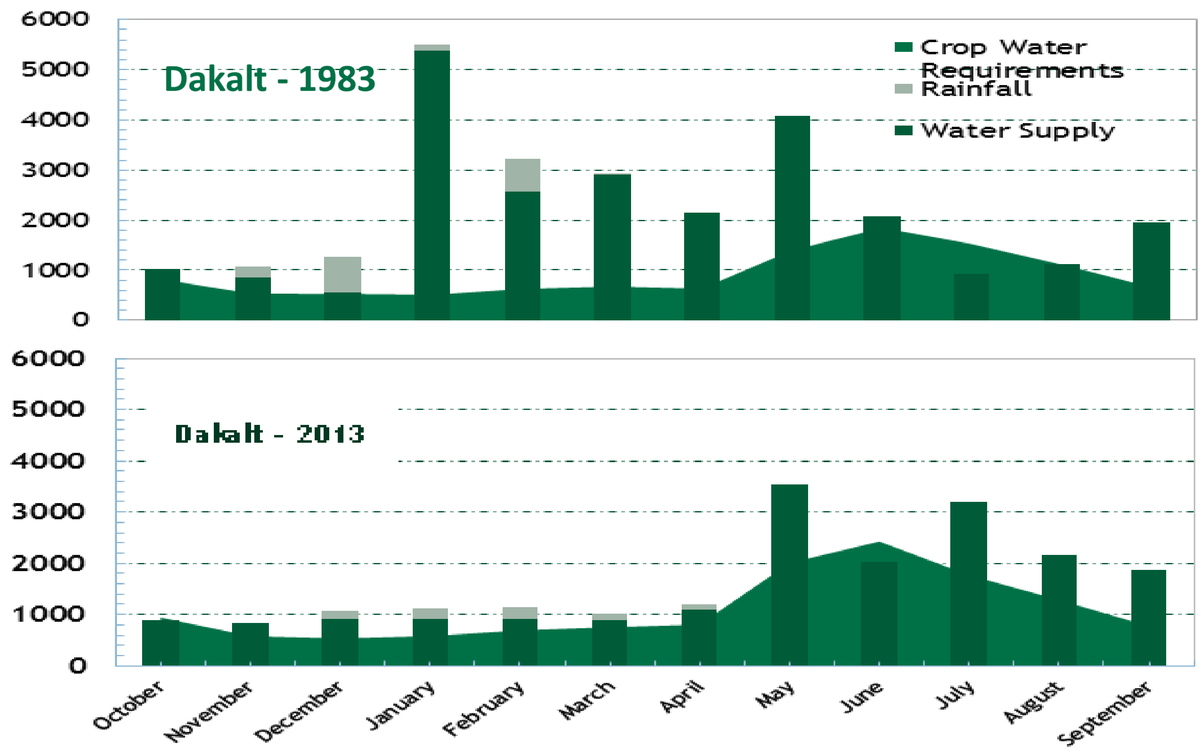


Figure 3: Applied water and crop water requirements changes (1983-2013)

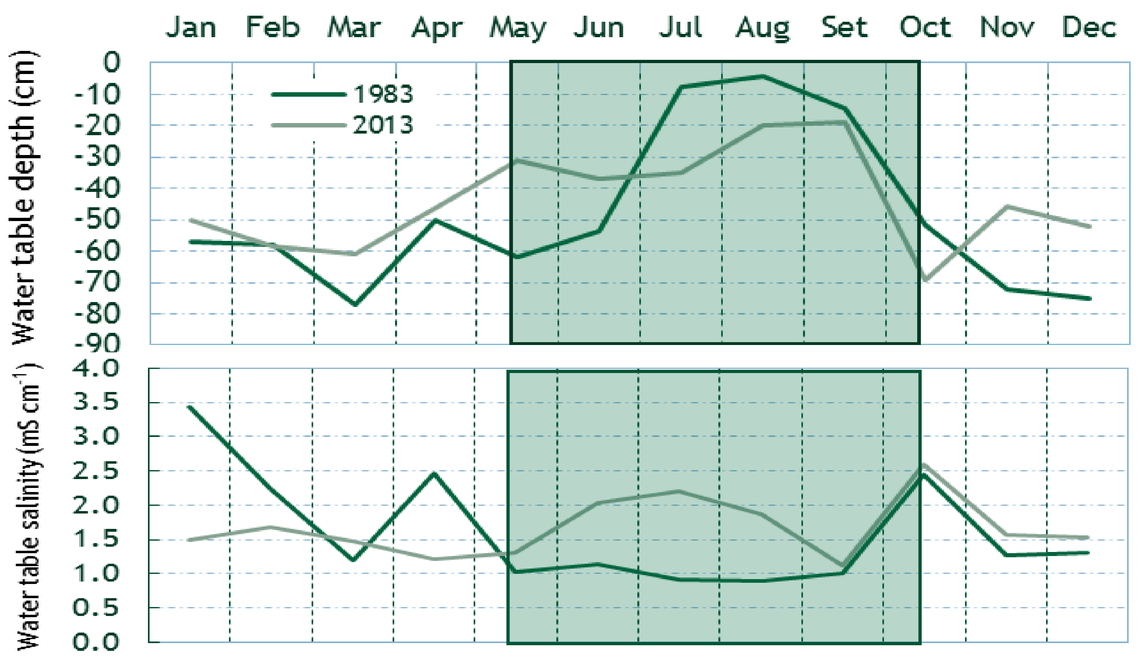


Figure 4: Water table depth and salinity fluctuation (1983 – 2013)

As shown in figure 4, water depth was shallow in summer season compared to winter season. In July, August and September 2013, water table depth was shallower compared with other months due to increasing rice areas in 2013.

Conclusions

Thirty five-year-old report of the former and first irrigation improvement project in Egypt namely: EWUP. Practically, implementation of irrigation improvement project started in 1993. Since that time up to now more than 20 years after construction. In this study, we evaluated irrigation improvement project from historical point of view. The following are our conclusions: i) changes crop pattern is the most important factor should consider for example, rice area should decrease; ii) there is wide gap in demand and supply before improvement while this gap is controlled after improvement; iii) decision making becomes complex when both quality, quantity and increasing rice planting areas which affect the available water.

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