

CHAPTER 4

Rotation by Minors¹⁵ in the Gezira Scheme

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4.1 INTRODUCTION

The Gezira Scheme Irrigation System had been operated as a Night Storage System (NS) up to the mid-sixties. At that time, only cotton was catered for and when water exceeded the cotton requirements, dura (sorghum) was irrigated. The system worked very well because the operation matched the design. The cotton numbers were irrigated alternately every 14 days. The number was completely irrigated in 7 days, then the irrigation was shifted to the alternate number. The area of the number is 90 feddans. The irrigation duty is 400 m³ per irrigation. So, the number takes 36,000 m³ per irrigation. This amount is delivered in 7 days, so the discharge rate required is about 5000 m³ day⁻¹, which matched the design discharge of the 35 cm diameter Field Outlet Pipe (FOP) feeding the *Number*.

After intensification and diversification due to the introduction of groundnut and wheat, the NS system could not cope. The alternate watering of numbers did not work anymore, because more than 50% of the gross area on each minor was irrigated at the same time, which did not confirm with the design.

The major problem has been the overlap of the groundnut and wheat crops. For many years, the Sudan Gezira Board (SGB) promised that the sowing of groundnuts will end by 20 June so that water to groundnuts will be stopped by 31 October before the 1st water allocated for wheat is given. But every year, the sowing of groundnuts mostly took place in July and continued to the end of July. As a result, the watering of groundnut continued into November and some areas were irrigated up to December. This has always created a water shortage in November.

There are a number of reasons for the delay in sowing of groundnuts. One of them is the continuing argument between the SGB inspectors and the Ministry of Irrigation (MOI) engineers. The SGB claim they will start their sowing program only when they see the water in the canals, while the MOI staff respond by saying that unless they see that land preparation is finished they will not fill the canals. An additional reason is the reluctance of tenants to plant early. This may be a tradition from the rain-fed past, that they wait for the rains to break the hard cloddy soil.

¹⁵A secondary canal in Sudan.

¹⁶A former FAO expert.

All efforts to overcome this problem have failed so far. The objective of this paper is to suggest a rotation which will put an end to this overlap between the groundnut and wheat crops.

4.2 THE ROTATION

The simple suggestion is to separate groundnuts from wheat. The suggested rotation always puts groundnut and wheat on different minors. In the main Gezira, the tenant has his tenancies in four **Numbers** on the same minor. It is suggested here that he has two of his tenancies on one minor and the other two on a neighboring Minor. On one Minor, he will have sorghum as a summer crop and wheat as a winter crop. On the other Minor, there will be cotton and groundnuts in one **Number** and fallow and winter fodder in the other **Number**. As sorghum has a shorter growing season, it is much easier to achieve the completion of all irrigations by 31 October. Thus the overlap problem may be solved. Such a Minor can then be easily operated under the old system with 50 % cropping. During the wheat season, there will be only one crop, which can be irrigated as cotton was irrigated in the past with alternate **Number** watering.

However, this system limits the areas of both sorghum and wheat to a quarter of the gross area in the main Gezira. The other Minor irrigates cotton and groundnut as summer crops and fodder as a winter crop with a fallow area. The rotation becomes: **W F S C W F S G**

4.3 ADVANTAGES OF THE NEW ROTATION

The fact that wheat follows cotton and groundnuts provides ample time for land preparation for wheat (May-Oct.). The same goes for sorghum following a fallow or a winter fodder. Similarly cotton and groundnuts follow sorghum, which again gives ample time for land preparation for cotton and groundnuts (Jan.-June).

Another advantage of this rotation is that it would be possible to dry the canals every other year. The season when only cotton, groundnuts and winter fodder are grown on a certain minor canal, the water can be stopped by the end of February and that canal can be dried for at least three months.

A third advantage is that tenants will now share two Minors and this will reduce the conflict at the Major. For example, if four Minors take off from a Major, in the past there would be four groups of tenants competing for water from that major. With the suggested rotation, there will be only two groups. The same applies to maintenance. A priority program will be easier to execute under the suggested system because a different set of crops will be grown in the two minors. The Engineer will decide on the priority depending on the crops being irrigated by each of the Minors.

4.4 DISADVANTAGES

The disadvantages are that tenants will have to work on two Minors. Accessibility to the tenancies for the tenants and their laborers will be more difficult, especially for those who are settled on the present tenancies.

The rotation is not that recommended by Agricultural Research Corporation (ARC). However, the alternatives should be weighted. In the last years, water has always been the most important single factor affecting the yields of crops. If the suggested system solves the irrigation problems, the other problems arising from its adoption could also be solved.

4.5 RECOMMENDATIONS

This paper invites the irrigation engineers, the SGB staff, the research workers from ARC, and the tenants Union to consider this suggested rotation. Then, it may be tried in one block where four minors take off from the major and see how the water management is affected by the new rotation.

A committee from the SGB, MOI and ARC should be formed to study the suggested rotation in detail and develop a sound recommendation that weighs very carefully the advantages and disadvantages of the suggested rotation.