Budgeting for Irrigation Services Cost
and
Its Relation with the Cost Recovery Mechanisms
in Different Irrigation Schemes

by

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INTRODUCTION

THE IRRIGATION SYSTEMS in Sudan are designed to irrigate a Number (90 F) every fortnight. The FOP gates are opened to discharge 5,000 m$^3$ every 12 hours. In a 2-course rotation project (like Rahad) one of every two FOP gates is open to irrigate a Number in one week. In a 3-course rotation project (like Managil) one of every three gates is open at one time and in a 4-course rotation project (like Gezira) one of every four is open at one time.

The main canal of a 2-course rotation project is designed at a 28 factor x gross area and the minor canal at a 30 factor x gross area. Provision is made for losses in the minor canal (331/2 as in Rahad). In the 4-course rotation project the minors should be designed at factor 15, but, for providing for these losses, the canals are designed at factor 17.

In the Sugar Schemes the main canal is designed at a 42 factor while the minor canals are designed with a factor of 45 (i.e., 15-cm water depth as factor 30 satisfies 10-cm depth).

In 1980, when the cost-recovery committee first started its work, the land and water charges were distributed amongst the different crops according to the number of irrigations of each in a season (taken from notes to the new personnel of SGB) as follows:

<table>
<thead>
<tr>
<th>Crop</th>
<th>Irrigations</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELS cotton</td>
<td>16</td>
</tr>
<tr>
<td>MS cotton</td>
<td>12</td>
</tr>
<tr>
<td>Dura</td>
<td>4</td>
</tr>
<tr>
<td>Groundnuts</td>
<td>8</td>
</tr>
<tr>
<td>Wheat</td>
<td>10</td>
</tr>
<tr>
<td>Vegetables</td>
<td>14</td>
</tr>
<tr>
<td>Forests</td>
<td>14</td>
</tr>
</tbody>
</table>

The Ministry of Irrigation is working in close contact with ARC and the dams are emptied according to their recommendations of crop water requirements to be delivered to every crop, every 10-day period, with provision of transmission losses to the field.

A ministerial committee for extension in this field had already started its work in the Gezira and it is hoped that the ARC recommendations will be applied in the 1991/1992 season. The Ministry of Irrigation has already changed from the old system of number of irrigations and is distributing the irrigation cost amongst the different crops according to ARC crop water requirements during the whole lifetime of each crop, i.e.,
ELS cotton = 4,887 m³/Feddan  
MS cotton = 4,100 "  
Dura = 3,067 "  
Groundnuts = 4,103 "  
Wheat = 2,473 "  
Vegetables = 9,661 "  
Forests = 9,661 "

The cost recovery includes the following:

1 - Capital Cost  
2 - Chapter I Budget (salaries and allowances)  
3 - Chapter II Budget  
4 - Chapter III Budget

**Capital Cost**

The capital cost is recovered using the "Straight line method with the minimum attractive rate of return on first cost with salvage value = 0"

\[
CR = \frac{P - Pl}{n} + \frac{P}{2} \frac{(n+1)}{n}
\]

where

- CR = Recovery cost  
- p = Capital cost  
- n = Life of asset  
- I = Rate of interest

The lifetime of the mechanical and electrical equipment is taken as 25 years.  
The lifetime of the civil works is taken as 50 years.  
For example, Sennar Dam and Gezira canalization cost is not charged but the Managil cost is charged.
The rate of interest was 8 percent and in the early eighties the U.S. of the Ministry of Finance directed that a 6 percent rate be applied.

The most recent calculations of cost recovery of Gunaid New Electric Pumps were calculated at a 16 percent rate of interest but this rate is not approved to be applied as yet.

**Chapter I Budget (Salaries and Allowances)**

The salaries and allowances for the field staff are totally charged but the salaries of staff of the related departments at headquarters are distributed amongst the different schemes according to area and this is multiplied by the fraction

\[
\text{cropped area} / \text{rotational area}
\]

**Chapter II Budget**

The three Irrigation Services Directorates prepare their annual Chapter II Budget to meet the following:

a - silt removal from main canals, branch canals, major canals, minor canals and drains.
b - maintenance of structures in canals and drains.
c - maintenance of steel works.
d - supply of FOP pipes and gates.
e - weed control by Manual mechanical, and chemical means.
f - minor items such as health services, electricity, office expenditure, supply of tools, furniture maintenance, looking after garden, etc.

The Mechanical and Electrical Engineering Directorate prepares its Chapter II Budget to meet the following, for all its diesel and electric pumping stations:

a - gasoline or electricity cost
b - engine oil
c - gear box oil
d - grease

e - spare parts

f - pump house maintenance

g - casual labor wages

h - health services

i - miscellaneous

j - main workshop budget

k - mechanical transport budget including maintenance of vehicles and their fuel.

The Dams Directorate prepares its Chapter II Budget for dam maintenance and special equipment. The dams budget is distributed between the different schemes according to (their water withdrawn (e.g., the Gezira Scheme uses 38 percent of the Roseires Dam storage. Similarly, the Nile Waters Directorate and the HRS Budgets are distributed in the same ratios).

Chapter III Budget

Chapter III Budget includes maintenance of buildings, provision of office equipment, etc., and is distributed according to the CWR.

Certain decisions are sometimes made, e.g., the Gezira Scheme was suffering from a backlog of silt. The cubes of silt excavated in 1990/91 were excessive and were excavated at a very high cost as earthmoving equipment was availed of.

The cotton cost committee was advised to charge only 70 percent of the earthmoving cost, the ration being a reasonable measure of the normal annual silt build-up figure.

The cost-recovery mechanism was found very satisfactory by the cost-recovery committee and the same procedure has been applied to the land rates since 1980.

The purpose of cost recovery is to subsidize the tenant in the Land and Water Charges and to reduce this subsidy gradually until rehabilitation is complete and the tenant is expected to pay the actual cost.