Factors Affecting OM Fee Collection Rate in an Large Paddy Irrigation Scheme in Uganda

ウガンダの大規模水田灌漑地区における OM 費徴収率に影響を与える要因

○Paul Ayella*, ISHII Atsushi**, SATOH Masayoshi**

○ポール・アエラ*, 石井　敦**,佐藤政良**

1. Introduction

Improving irrigation performance will lead to effective & sustainable irrigation water management leading to increased agricultural productivity (Shui-Yan Tang 1992). Scholars and International organizations recommend users' self-governance where farmers are decision-makers while shouldering their OM fees for effective and sustainable irrigation. As an indicator of effective and sustainable irrigation; among other factors, improving Fees Collection Rate (FCR) and irrigation cost recovery is required but there have been mixed success stories in many developing countries.

Most countries adopt the cost-sharing arrangements where government constructs the infrastructures and farmers do OM but in Africa & Asian countries fee collection rate has remained rather low. Many studies have been done to address issues of FCR, but knowledge gaps still exist.

In this research, we analyzed the factors that affect OM fees collection rates at the block levels and within the blocks mainly with the geospatial location of the water supply canals, and through interviews considered other factors that influence FCR.

2. Methodology

The basic idea is that FCR is influenced by irrigation water sufficiency. Also, FCR varies with the hydrological location of the farmers with reference to the water supply canal. Analysis was done relating hydrological locations and FCR at multiple irrigation levels (blocks, tertiary & quaternary canals).

Between April and May 2020 at Doho irrigation schemes, data obtained for analysis included water fees payment records, farmer's registry & through interviews, field-based data was obtained.

Collected data were subjected to multiple regression analysis & through focused interviews; other factors influencing FCR in each block were also attained.

3. Setting

Doho, shown in Fig.1 below was selected as the survey area. Developed in 1976 in phases as a large-scale paddy irrigation scheme for technology adoption with the support of the Chinese government. It's 1000 ha with around 3820 beneficiary farmers and 11 Irrigation Blocks drawing water from R. Manafwa. Farmer's self-governance in Doho emerged around the year 2000s (Paul et al 2019).

In Doho OM fee is about 74$/hectare/year, which is about 1.5 % of the farmers' gross rice income. Doho has two planting seasons in a year.

4. Results

1) Inter-block FCR

With the expected & collected amount from each block, the fee collection rate for each block was computed. As shown in Fig. 2, The FCR decreased from upstream to downstream. Implying block location has a positive impact on the farmer's response to paying water fees.

Also computed was a regression analysis of block FCR with; the distance of the head canal from the main headworks, Number of strips & plots inside the block, average plots per strip, and percentage of farmers from the top 5 villages.

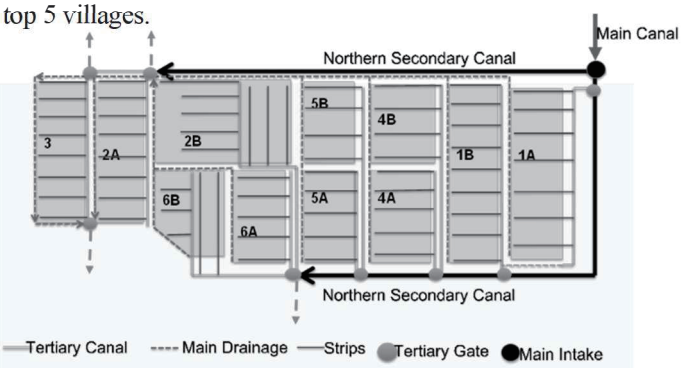

Fig.1 Schematic layout of Doho irrigation scheme

＊ 筑波大学生命環境科学研究科, Graduate school of Life and Environmental Sciences, University of Tsukuba

**筑波大学生命環境系, Faculty of Life and Environmental Sciences, University of Tsukuba

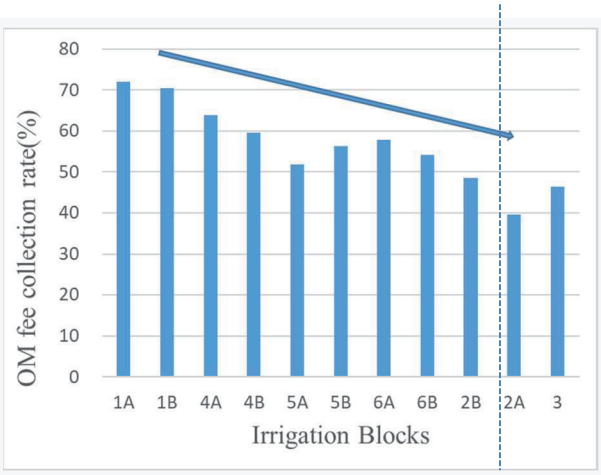

Fig. 2 Block-level fee collection rate

Except for the distance of head canals and the percentage of farmers from the top 5 villages, there was no correlation between FCR & all the other factors.

2) **Water FCR within the block**

Using the expected & collected amount of money from each strip (last terminal canal), the FCR of each strip was computed. The strip was first divided into upstream, midstream, and downstream each containing at least 10 plots. The FCR of each portion along the strip was plotted and compared as shown in Fig.3. The FCR decreases as one moves downstream along blocks, downstream along the tertiary canals & downstream along the strips. The effect of block location, strip location, and plot location on FCR was further confirmed using multiple regression analysis taking FCR as "y", block location x_1, strip location x_2, plot location x_3, and the number of plots x_4. However, other factors could still be at play and hence more examination was executed.

3) Other factors influencing FCR

The results of the field investigation and interviews on the water management of each block are shown in Fig. 4. This gives the idea that whereas location factors are most

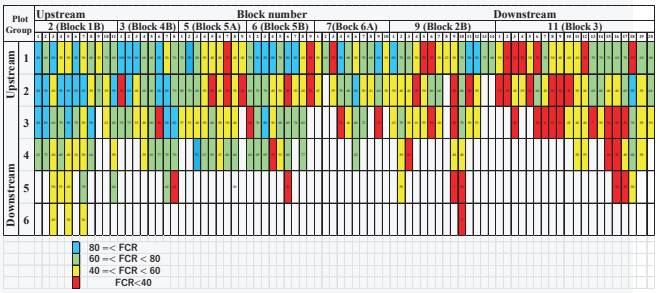

Fig 3 Farmer's compliance ratio within the blocks

	General Water Mangement Parameters	Blocks						
		1 B	4B	5A	5B	6A	2B	3
1	Comitment & Enthusiasm of block Chirman	++	+	+	+		-	-
2	Interstrip Irrigation Rotation. Flexibility of Water Distribution among the strips	++	-	-	-	-	++	-
3	Sub-Division within the blocks	++	-	-	-	-	++	-
4	Frequency of Meetings among Block Leader, Strip Leader and Extension Officer	++	+	+	++	+	+	+
5	Monthly meetings with Farmers	+	+	+	++	-	-	-

	Index					
1	++	Very Commited and Enthusiastic	+	Commited BUT Luck Enthusiasm	-	Motivated only by gains
2	++	Exist			-	Doesnt Exist
3	++	Divided with water Control Infrustures			-	Not Divided
4	++	Weekly	+	Montly		
5	++	Promply done	+	Done some time	-	Rare done

Fig. 4 Other water management parameters within the block

dominant, other factors are also at play. The commitment of block leaders, the flexibility of schedules, and the frequency of meetings could be a factor strengthening block 1B. Block 5B though midstream could be doing fair because of the consistency of monthly meetings between leaders and farmers. In 2B though inter-strip rotation exists, this factor seems canceled out by location dominance.

5. Discussion

The fee collection ratio is lower downstream at all canal levels; that may reflect insufficient water supply. To improve FCR, it will be necessary to raise the WTP of downstream farmers through equitable water distribution.

Water allocation among irrigation blocks can be improved through adjustments in water allocation schedules, and our recent studies have shown that this WUA already has the necessary capability to make such improvements.

To improve water distribution within the block, it would be desirable to strengthen the water users' organization within the block and adopt rotational irrigation within the blocks. It would also be useful to design and maintain shorter waterways at the design stage to reduce the number of rice paddy plots per strip.

References

Shui-Yan Tang (1992), Institutions and collective action: self-governance in irrigation. San Fran-cisco, Institute for contemporary studies press

Paul A, Ishii A, Satoh M (2019), Comparative analysis of two paddy irrigation schemes under contrasting water management of participatory and top-down systems in Uganda Paddy and Water Environment, 17,497–505