When Government Acts Against the Will of the People: The Case of Bwanje Valley Irrigation Scheme in Malawi

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Abstract: Bwanje Valley Irrigation Scheme in Malawi is an example of system failures where upgrading of an existing traditional irrigation scheme was not done with full consultation with the community. Previously, local farmers had been growing rice in rainy season by trapping flood water. Using residual moisture in dry season, they grew upland crops with less water requirement than rice. The whole set-up was farmer-managed, without any intervention from the government. This system had been going on for many years. The government decided to upgrade the existing canal network in the year 2000 with donor funding. After the upgrading, the scheme became the most modern and largest rice irrigation scheme in Malawi with a gross total area of 800 hectares. The primary purpose of the upgrading was to improve water management techniques through the provision of improved structures. The upgrading was supervised by the donor. Upon completion of the upgrading, the donor handed over the management of the scheme to Malawi government in 2002. Since the hand-over, the surrounding community has shown little interest in the scheme. Today, less than half the scheme is utilized. Several farmers have abandoned it and are cultivating elsewhere. This study provides some of the insights of what went wrong.

Key words: farmer-managed; flood water; residual moisture.

INTRODUCTION

With state of the art upgraded network of canals, Bwanje Valley Irrigation Scheme in Malawi (Fig. 1), is on the verge of collapse due to what it may appear as lack of information flow between the government and the community. Originally indigenous people had been cultivating this scheme without the interference of the government. They grew rice in rainy season by trapping flood water using raised bunds constructed by the community themselves. During dry season they grew maize using residual moisture left behind by the floods. Local leaders (village chiefs) were the custodians of the land and were responsible for land distribution and allocation among their subordinates in the scheme. Farming families from surrounding villages obeyed and followed this customary land system. In essence, the indigenous people had their own set-up on the management of the scheme. The situation changed when the government introduced the idea of improving their irrigation structures. The government upgraded the canal network financial assistance from donors. Upon completion of the upgrading, the scheme was handed over to the government of Malawi in 2002. Since the handover, the situation has never been the same again. Today, the scheme is in a state of dilapidation. The scheme is full of weeds, silt, and appears deserted (Figures 2-4). This study was done to give an account of what went wrong. Many schemes in Africa fail because of governments pushing their own agendas without community involvement. Though it is true that efficiency of existing water use can be improved by modernizing and upgrading existing irrigation and water delivery systems\cite{9,5}, cautions to bear in mind the social and cultural implications of introducing such systems. Unfortunately, modern water development has adhered to a fairly simple formula: estimate the demand for water and then built new supply projects to meet it. It is an approach that ignores concern about human equity\cite{2}. Irrigation projects involving communities often fail when human equity concerns are ignored during planning of such systems. Community or farmers’ participation is often sidelined during planning and designing of many irrigation systems\cite{2}, noted that farmers’ involvement in irrigation management and decision making delivers direct benefits at farm household level, and indirect benefits at system level. In Africa, the majority of farmers may be illiterate and lack basic knowledge of water requirement, irrigation scheduling\cite{7}, but are able to establish functional organizational structures necessary for the management of a shared irrigation water distribution system\cite{7}. There are many examples where upgrading of traditional irrigation

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schemes have failed in Africa\cite{1}, documented the case of Ethiopia, where attempted interventions to improve small-scale irrigation systems had failed\cite{1}. cited lack of full farmer involvement at different levels of project planning and implementation as the primary cause of such failures. In Nigeria\cite{6}, was also able to show that technical sustainability problems resulted, when irrigation technologies were introduced and imposed upon traditional systems.

**MATERIALS AND METHODS**

Research guide questions were used to interview individual farmers surrounding the scheme. Focus group discussions involving key informants, who included village chiefs, leaders in cooperative and clubs, members of staff from the Department of Irrigation, were also conducted. Further, secondary sources of information were also used including review of literature on the scheme, especially the feasibility study and the design study of the scheme. The research team also had a tour of the scheme to make some observations and informal interviews. A total of 1928 farmers registered at the scheme were interviewed. Descriptive statistics were used to analyze the gathered information.

**General Scheme Layout and Description:** Refer to figure 1 which shows the general layout of the upgraded Bwanje Valley Irrigation Scheme. The scheme is fed by gravity through one main canal which sub-divides into three branch canals (BCs) covering a total length of 14.8 kilometers. The intake structure consists of a 50m long and 4.5m high weir built across Namkokwe River. The structure allows a maximum of 1.136 m\(^3\)/s of water into the main canal. The 6.8 km long main canal subdivides into Branch Canal 1 (BC1), Branch Canal 2 (BC2) and Branch Canal 3 (BC3). The design capacity for BC1 is 0.395m\(^3\)/s while that for BC2 and BC3 is 0.350m\(^3\)/s and 0.385m\(^3\)/s respectively. Water is proportionally diverted from main into branch canals by means of bifurcation structures. Branch canals further divide into tertiary canals. There are 132 tertiary canals covering a total

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Fig. 1: General Scheme Layout.

Fig. 2: Top-left: Branch canal covered in weeds and silt.

Fig. 3: Top-right: Tertiary canal completely covered by weeds.

Fig. 4: Bottom: Main canal almost completely covered by weeds.
length of 60.8 km altogether. Water in tertiary canals is controlled by opening or closing of turnout and check structures’ gates. Check structures are placed just below the turnouts in the direction of flow. Each check structure is labeled in series to identify its location in the layout. Tertiary canals in turn, supply water to fields or plots through 150mm-diameter PVC pipe orifices or field inlets. There are a total of 2070 field inlets in the scheme. Each field is bordered by low bands which prevent field water from flowing to adjacent fields. Small drains collect excess water from fields to drains. There are five major drainage canals abbreviated as DC1, DC2, DC2-1, DC3, and DC4 covering a total distance of 17.3 km. An inspection road passing through the scheme covers a distance of 13.7 km. Access roads and footpaths are provided along all canals for ease of inspection.

RESULTS AND DISCUSSIONS

The present upgraded scheme is fully under government control. A scheme management committee composed of government staff and some farmers, including local leaders, runs the affairs of the scheme. Unlike before the upgrading, the scheme management committee oversees the distribution and allocation of land and water. There are rules and regulations set by the scheme management committee to be followed by all farmers in the scheme. When rules are broken it is the duty of the scheme management committee to decide on the appropriate action against the offender. Punishment can range from suspension in the scheme to expulsion, depending on the nature of the offence.

Irrigation System Before Upgrading: The study revealed that the original scheme area was almost twice the current 800 hectares. Flood irrigation system was the original irrigation system before the upgrading. In this system, during rainy season, surface run-off waters were captured by a network of raised mud bunds forming fields with pools of water where rice was grown. Rice was only grown during rainy season when rain water harvest was possible. The rainy season normally starts late October and ends mid March. The rest of the year is the dry season. During dry season, maize was grown under residual moisture in the same fields where rice was grown. The residual moisture was in many cases enough to sustain maize growth to maturity without additional irrigation. The average yields for rice and maize were 5 tones per hectare and 8 tones per hectare respectively.

Irrigation System After Upgrading: The upgrading introduced a water control system. Flood protection bunds were introduced to control surface water directing it to the nearby river, where an intake structure was built. A network of lined canals conveyed water from the intake to the scheme. Flood protection bunds were constructed to protect the scheme from surface run-off. With flood protection structures wild flooding was no longer possible, hence rice cultivation is restricted to the new upgraded scheme area, leaving out about half the original scheme size.

Utilization of the Upgraded Scheme: The study found out that, since its completion, the new upgraded scheme has never been fully cultivated. The maximum recorded cultivated area in the new upgraded scheme was 54% out of 800 hectares under rice in rainy season, and the lowest was 17% out of 800 hectares under maize in dry season. This in essence means that the scheme upgrading has reduced the cultivated area to about one-quarter of the original scheme area. Irrigation water in the upgraded scheme is never adequate and could only supply 19% of the 800 hectares sufficiently. The average yields for rice and maize have tremendously dropped to only 1.5 tones per hectare and 2.3 tones per hectare respectively from figures much higher than this before the upgrading.

Relocating Farmers: Records at the scheme show that there are a total of 2240 households registered as plot owners in the new upgraded scheme. About 50% of these households had silently left the scheme and relocated elsewhere, mostly downstream where flood waters can be accessed without the control of the upgraded canals. Strangely, the households that left the scheme still maintained their registration as plot owners in the scheme, hoping that government will one day hand over the control of the scheme back to them. During the study, 100% of the respondents indicated that insufficient irrigation water supply was their main reason for leaving the scheme, and they all agreed that irrigation water insufficiency had never been experienced before the scheme was upgraded. No doubt, the conclusion was that the upgrading introduced the water supply problem; as a result nearly half of the scheme goes uncultivated, forcing farmers to relocate to areas downstream the nearby river, where water supply appears to be plenty. Farmer relocation was also caused by the inability of the scheme management committee to adjust the irrigation calendar. The scheme management committee follows the irrigation calendar which normally does not recommend the opening of the intake gates during early periods of the rainy season. On the other hand, farmers would like intake gates to be opened during early periods of the rainy season to take advantage of early rains. The delays in the opening of the intake gates make farmers look for alternative fields outside the scheme to catch up with the rainy season. By the time the scheme management committee decides to open the intake gates, most farmers will have moved to other fields outside the scheme already. When they come back to the scheme, the cropping calendar is no longer followed, creating

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inconsistency in the distribution of irrigation activities across the scheme. As farmers abandon the scheme leaving nearly half of the scheme uncultivated each season, weeds and silt grew and accumulated in the fields. About 400 hectares (50%) showed signs of weed problem, with 214 hectares (27%) showing intensive weed invasion. Almost all field canals leading to these unweeded fields, showed silt build-up on their bottoms.

Inadequate Irrigation Water: As revealed in this study, there were a number of reasons for irrigation water to be insufficient in the upgraded scheme. Firstly, the study revealed that there was a design error in the estimation of the water requirements of the scheme. The main canal was designed to carry a gross flow of 1.13 m³/s which divides into the three branch canals as 0.395 m³/s for BC1, 0.350 m³/s for BC2, and 0.385 m³/s for BC3. The net flows in the canals were calculated as 0.336 m³/s for BC1, 0.272 m³/s for BC2, and 0.315 m³/s for BC3. This represents an overall system efficiency of 85% for BC1, 78% for BC2, and 82% for BC3. These high efficiencies are imaginable in surface systems managed by rural communities. If low efficiency of about 50% was used, canal flows and sizes could have been much bigger, and therefore irrigating larger area than is the situation now.

Secondly, most of the plots in the upgraded scheme were unleveled. For water to be conveyed easily, the fields need to be leveled. Leveling also helps to water to distribute water evenly across the fields. About 75% of the scheme was uneven and higher in elevation than the bases of the supply canals. In this situation, water could not reach most of the fields. Only about 200 hectares (25%) of the scheme had been properly leveled. The leveled area was among 152 hectares that received adequate water supply. It seemed there was a problem to understand who was responsible for leveling the scheme. According to the official documents at the scheme, the Government of Malawi was supposed to finance the leveling, although farmers thought the donor who financed the canal upgrading was also responsible for leveling. It was clear there was misunderstanding between the three parties involved, the donor, government, and farmers.

The third reason was about land ownership and farmer participation. It appeared during upgrading, government officials and traditional leaders introduced new land ownership rules. Households were required to participate in a form of providing construction labor force. Some farmers protested the idea and never participated in the construction. Ideally, those that never participated in the construction works were not allocated any piece of land in the new scheme, thus they lost their land in the scheme. So plots in the new scheme were allocated to the few households that took part in the construction. This land reallocation brought in confusion and inequality in land shares.

On paper there are 2240 registered households on the scheme. The study found out that these households are individual farmers, some coming from the same household. The actual households could be much less than this figure. Since individuals from the same household could register as separate households, the reality is that some households now have more land as a collection of different plots located at different positions in the new scheme. These households with different plots at different locations often found it hard to manage all the plots simultaneously. As a result some of the plots could not be cultivated resulting into weed growth which consequently prevented proper flow of water.

It was also noted that about 50% of the farmers who left the scheme thought that government’s plan of upgrading the scheme was a way of taking away their land. They strongly felt that government had come to take away their land in the name of upgrading, and later use it as a settlement irrigation scheme. Settlement irrigation schemes were schemes built across the country in the late 1960s or early 1970s by Malawi government with the help of donors. These irrigation schemes are managed by government but were used to settle people from across the country. Government moved people from across the county and settled them in these irrigation schemes. Somehow, farmers at Bwanje Valley Irrigation scheme thought government was playing tricks to snatch their land and use it to settle people from elsewhere, as was the case with other existing settlement irrigation schemes. As a way of protest against government decision, most households decided not to take part in the upgrading.

Water Regulation Conflicts: Although not all farmers left the scheme, those that remained are perpetually in conflicts with the new scheme management committee. Almost 100% of the conflicts had to do with scheme regulations dealing with water use and management. One regulation states that, each branch canal shall have a water guard who should physically control the flow of water in a branch canal. Since water is not enough to irrigate the whole scheme at the same time, water guards decide to rationalize water allocation depending on the need per canal. Most farmers, however, feel that water guards provide water at their own jurisdiction without necessarily following the need for water in the fields. This indicates that farmers do not understand how the water management programs work mainly due to lack of their participation in formulating these programs. All the farmers interviewed in the study seemed not to have participated in formulation of any of the regulations regarding water usage. In the end farmers feel frustrated and abandon the scheme. Another regulation requires farmers to pay an annual water fee of K50 (equivalent $0.30) per plot. This fee was supposedly used to run the daily affairs of the scheme, for example paying electricity bills for the scheme office. All respondents (100%)
expressed concern over the use of the water fee. They all seemed to know the use of the fee. About 20% indicated that they were not able to raise the K50 fee, and would leave the scheme as a result. This is an indication that the decision to have a water fee was not collective for all farmers. Further, farmers along any tertiary canal were required to fill a Water Allocation Form before water is released. The form is filled only if farmers have removed weeds and silt from their fields. The form is used as a certification for weed-free fields. Most farmers are illiterate. They find this arrangement improper, and end up not participating in weeding and de-silting. If any member of a particular tertiary does not fill the form, water is never allocated to the whole of that canal.

The study also found out that farmers don’t fill the Water Allocation Form, not just because they are illiterate, but also their fields may be located towards the end of a tertiary canal, where water mostly does not reach, and therefore choose not to participate in the clean-up exercise for fear that their efforts would be in vain since water does not reach the end of most tertiary canals anyway. As a result some portions of the tertiary canals remain unclean and therefore no water is allocated. Sometimes farmers try to clean and de-silt the tertiary canals as required, but are not skilled enough to know the exact depth to which cleaning or de-silting must be done. Eventually parts of tertiary canals remain uneven even after the clean-up exercise is done. The unevenness of the canals creates uneven distribution of water along the canal length, making it difficult for water to reach the end of the canal. As such frustration continues, abandoning the scheme becomes the option.

Growing Farmer Frustration: As frustration for continued insufficient supply and uneven distribution of irrigation water continues, some farmers rebel against the regulations. More that 80% of the farmers said the rules and regulations do not work to their benefit, given chance they could do without regulations. In fact, the study noted that some farmers have a tendency of “illegally” inserting pipes beneath tertiary canals to divert water into their fields. They decide to allocate themselves water without the knowledge of the management committee. Such farmers get more water than others, hence making water unable to evenly distribute across the canal. Others put debris across control gates in the branch canals thereby creating a bigger head of water upstream the gate and therefore more water is diverted into their tertiary canal.

Some farmers no longer follow the advice from the management committee on what crop to grow at what time. This tendency creates a situation where fields one tertiary canal may supply water for have different seasonal crops grown in the same season. Non uniform crops in fields of one tertiary canal have the implication of different water requirements at any given time. For example, paddy which requires more water, and upland crops which require less water may not be intercropped. As a result those that grow different crops with different water requirements do not participate in water allocation activities together since their water interests are different. If farmers along the same tertiary canal do different activities, they are in breach of water allocation regulations; hence authorities may not allocate water to such a tertiary canal. The end result is some farmers abandoning their plots in the scheme.

Conclusions and Recommendations: It is clear from the findings that investment in unwanted infrastructure interferes with existing social and cultural practices, thereby reducing land productivity. Government interference by constructing new irrigation structures at Bwanje Valley Irrigation Scheme brought mixed feelings among the local farmers who originally had their own set-up on how to run the scheme. What was thought to be an improvement of irrigation structures became a weapon for destruction of the scheme. Further, the introduction of government personnel to manage the activities of the scheme worsened the situation. In the end, the scheme is less productive now than it was before the so called upgrading of structures. At this point, the way forward is to facilitate a quick hand-over of the scheme management to the farmers. This process, which is still in its infancy in Malawi, may encourage farmers to come back to the scheme. But before the hand over process is done, it is recommended to carry out a comprehensive land ownership registry for the entire scheme and reallocate the land to ensure equitable land distribution which would ensure efficient land utilization. The question of inadequate water supply may be addressed by apportioning or rotation irrigation where only areas corresponding to canal capacity should be irrigated at any one time. The current water supply is only enough for a small part of the scheme. The scheme must therefore be trimmed to an effective irrigation size that matches the water supply. The government of Malawi should facilitate proper leveling of the scheme. Leveling will not only allow equal distribution of water but also improve water harvesting methods during rainy season; consequently the scheme may store enough residual moisture to grow upland crops in dry season.

REFERENCES


