Watershed Development and Integration in Southern Malawi

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LEARNING PAPER

PURPOSE

This summary presents a focused synopsis of the report entitled *Watershed Development: Experience from the WALA Program*. This summary contains eight sections: Executive Summary, Methods, Key Watershed Activities, Watershed Outputs; three impact examples: Remunerated Diffusion, Land Reclamation, Rising Water Table; and Top Learning Points.

EXECUTIVE SUMMARY

The Wellness and Agriculture for Life Advancement (WALA) program is a five-year $81 million food security program funded by USAID's Food for Peace office. WALA is led by Catholic Relief Services (CRS) and implemented by a consortium of private voluntary organizations (PVOs), including ACDI/VOCA, Africare, Chikwawa Diocese, Emmanuel International, Project Concern International, Save the Children, Total Land Care, and World Vision International. WALA's goal is to improve the food security of nearly 215,000 chronically food insecure households across eight Southern Malawi districts by mid-2014.

WALA's chronically food insecure households typically cultivate the most marginal land, which often is characterized by slopes prone to severe erosion. In marginal lands, water capture is more difficult, soils rapidly erode, and productivity subsequently declines. Since a centimeter of topsoil takes 100 years to form, erosion control is paramount to the protection of soil and livelihoods. Thus, WALA has implemented watershed management activities in 32 areas across eight districts.

WALA treated 2,883 hectares with 1,981 km of erosion control measures, or more than three times the length of Lake Malawi. The watershed treatment outputs include water absorption trenches (33 km), continuous contour trenches (919 km), stone bunds (318 km), check dams (333), marker ridges (377 km), and 339,336 planted trees. WALA invested over $2.2 million in Food For Work (FFW) incentives, representing a cost of $1.11 per structure-meter.

Three key impact observations include remunerated diffusion of watershed technologies beyond the project area, land reclamation through check dam implementation, and evidence of a rising water table. Using Malawi's Local Development Fund (LDF), one community paid a WALA Watershed Committee to train nearly 200 beneficiaries, resulting in a net transfer of $2,232 to the community, along with the construction of 50 km of treatments. Land reclamation efforts using check dams resulted in a boost to the average farmer's yield of $20 (or an additional 11 percent of Malawi's gross domestic product [GDP] per capita of $180). A rising water table was supported, not only by the communities' anecdotal evidence, but also by quantitative two-year time series data from one community. Their stream's flow rate nearly tripled, and the metrics from the two observation wells increased an average of 57 percent.

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METHODOLOGY

Over two weeks, qualitative methods were employed to interview 89 people through key informant interviews and informal focus groups. In-depth key informant interviews were conducted with 16 WALA staff, five external subject matter experts, and one government staff member. Over the course of six days, the interview team visited five of the 32 watersheds in four PVOs, or nearly one-fifth of the watershed area (by hectares). The focus group team conducted five semistructured focus group discussions with the Watershed Development Committees (67 people, 30 of whom were female).

Tree nursery in Domasi.
Photo by Christopher Michael Reichert for CRS.

KEY WATERSHED ACTIVITIES

Watershed Trenches. WALA implemented two types of water capture trenches: water absorption trenches (WATs) and continuous contour trenches (CCTs). WATs are used to capture and retain water, which recharge the water table. Given the relatively large size of WATs, they are not indicated for farmers' fields, but rather for the perimeters or up-watershed, such as in an adjacent forest. CCTs are excavated along contour lines in farmers' fields. The trenches reduce water runoff and percolate water into farmers' fields, increasing soil moisture content. Given the premium placed on arable land, a CCT's dimensions are considerably smaller than a WAT's.

Stone Bunds. Stone bunds are low rock walls following a slope's contour. The semipermeable barriers slow runoff rate, filter water, and spread water over a field. Where a plethora of loose stone is available, stone bunds are an indicated treatment. Over time, stone-filled slopes may morph into arable terraced farmland.

Members of the Watershed Committee standing on a large (about 12-m) check dam, which has reclaimed a barren gulley, Lingoni.
Photo by Christopher Michael Reichert for CRS.

Check Dams. Check dams are basic stone walls, or plugs, erected in eroded gullies or adjacent to footpaths and roads, in order to reclaim trenches or prevent gully formation. The specifications of the check dams must be suited to the locality, particularly the flow rate. In a relatively short period (one or two rainy seasons), gullies can be reclaimed either in a protected forest or in farmland.

Marker Ridges. A marker ridge refers to the construction of crop ridges following a contour. The main purpose of marker ridges is to hold the water within the field, allowing more water to percolate into the soil, thereby increasing soil moisture and recharging the groundwater aquifer. Vetiver grass is often planted in the contour marker ridge to reduce runoff velocity and erosion.

Afforestation. WALA afforestation activities include the raising and transplanting of trees (indigenous), fruit trees, and grass. Afforestation assists in groundwater recharging through increased cover and soil retention. Vetiver grass was raised in nurseries and transplanted throughout the watershed. Vetiver grass grows quickly and reduces erosion along embankments or reinforces watershed treatments.

WATERSHED OUTPUTS

WALA has implemented watershed management activities in 32 areas across eight districts. Over three years, WALA selected communities, formed Watershed Committees, trained technical staff, mapped watersheds with GPS technology, and facilitated construction of watershed treatments. WALA treated 2,883 hectares with 1,981 km of erosion control measures, or more than three times the length of Lake Malawi. The watershed treatments included water absorption trenches (33 km), continuous contour trenches (919 km), stone bunds (318 km), check dams (333), marker ridges (377 km), and 339,336 planted trees. WALA invested over $2.2 million in Food For Work (FFW) incentives, representing a cost of $1.11 per structure-meter.

Mitumbira's Watershed managment structure and achievements. *Photo by Christopher Michael Reichert for CRS.*

IMPACT—REMUNERATED DIFFUSION

Watershed activities occurred beyond the program area through remunerated diffusion. For example, in August 2013, the government hired 20 people from a Watershed Committee using Malawi's LDF. Nearly 200 LDF beneficiaries were trained and mentored over 12 days. The WALA Watershed Team demonstrated treatment construction techniques including marker ridges, CCTs, stone bunds, check dams, and vetiver grass planting. Each beneficiary received 93 cents per day. The total net transfer was $2,232. From this single activity, the construction output included CCTs (3,600), check dams (420), vetiver grass strips (9 km), marker ridges (29 km), and stone bunds (more than 12 km).

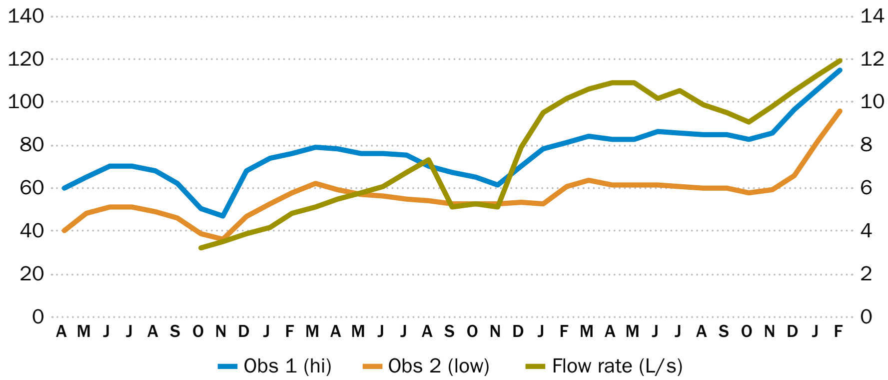
IMPACT—LAND RECLAMATION

Land reclamation was linked to check dam construction in farm fields and in the wider community. Farm field gulley reclamation translated into material gains in arable land. The average WALA farmer cultivates ½ hectare of land (about 70 m × 70 m), and it is common in the watershed areas for the farmland to be gullied on either side. If a farmer reclaims the two edges of his or her farm, the farmer can reap an additional $20 in revenue per season. As already mentioned, $20 corresponds to 11 percent of the Malawi's GDP per capita of $180; in addition, for a WALA farmer, $20 also translates into 50 percent of secondary education term or 20 L of vegetable oil. With regard to costing the ½ hectare of gulley protection and reclamation, a series of eight check dams (one for every 10 m) costs the equivalent of $140 in FFW incentives. Benefits such as pumpkin harvests, decreased topsoil erosion, and future degradation were not included in the ROI calculation.

IMPACT—RISING WATER TABLE

Communities reported a rising water table and additional surface water encompassing village streams, deep bore hole wells, and shallow wells. Streams that previously dried up were now perennial, along with bore holes and shallow wells. Two-year quantitative time-series data from one district corroborates the community's observations. From October 2011 to October 2013, the stream's flow rate nearly tripled, and the two observation wells' metrics increased by 49 percent and 64 percent, respectively (see Graph 1).

Graph 1: Makande Observational Well (cm) and Flow Rate (L/s) from Apr 2011 to Feb 2014



TOP LEARNING POINTS

1. ***FFW Return on Investment and Scale-Up.*** To construct over 1,980 km of erosion control treatment, WALA invested $2.2 million in Food For Work (FFW) incentives, which translates to a cost of $1.11 per structure-meter. Significant and considerable scale-up is possible.

2. ***Check Dam ROI.*** An average WALA farmer reclaiming gullies on his or her farm can reap an additional $20 in revenue per season, or 11 percent of Malawi's GDP per capita ($180). For a WALA farmer, $20 translates into 50 percent of secondary education term or 20 L of vegetable oil. This series of check dams costs the equivalent of $140 in FFW incentives, thus the dams "pay for themselves" in seven seasons.

3. ***Local Development Fund Opportunity.*** In one area, the Government of Malawi (GoM) has used the Local Development Fund to hire Watershed Committees for technical training, resulting in diffusion of watershed technologies beyond WALA project areas. WALA should facilitate cross-learning among the GoM and other PVOs, in order to scale up the use of the LDF mechanism or other local funding options. Experience from the private service provider (PSP) approach in Savings and Internal Lending Communities (SILC) programs could be leveraged for the watershed activities.

4. ***Treatment Marketing and FFW Targeting.*** The ridge-to-valley approach encourages complete treatment of a designated area, starting with the uppermost part of the watershed, and this should continue. Given that the treatments are relatively new to most villages, explicit marketing of particular treatments may have advantages. For example, of all the treatments, check

dams convinced communities in one rainy season that watershed treatments are effective. Check dams provided quick wins for land reclamation, which translated into palpable fiscal returns for farmers. Thus, one option may be to reserve use of FFW or other incentives for the more challenging treatments that require longer time frames for visible returns, such as stone bunds and afforestation. Another approach would be to reserve FFW or tailor FFW to focus on the community-based treatments (e.g., WATs, stone bunds, and indigenous afforestation) and use less FFW for treatments within individual farms (e.g. CCTs, check dams, and homestead fruit trees).

5. ***Incentives and Allocating ROI.*** Extrapolating from the amount of check dams created (330 km), a significant amount of gullied and barren land between fields was reclaimed. Subsequent conflict has arisen in a few cases on how to divide the new arable land, a tangible return on their investment. In order to avoid future conflict, particularly where gullies function as property markers, Watershed Committees should define how returns from the treatments will be divided. It may be that reclaimed land is simply divided among farmers, or it may be more prudent to suggest another strategy that encourages individual ownership. For example, assigning a farmer to an entire gulley and allocating all arable land reclaimed would provide an incentive for that farmer to not only construct check dams but also to maintain the structures. This may be a more cogent approach to link farmers' fiscal returns to their individual investments.

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