

Kalomo School Demonstration Farms, Southern Zambia



Increasing food security and nutrition for better educational outcomes.

Introduction:

Following a successful pilot, we scaled a School Demonstration Farm (SDF) project, which aimed to support five rural primary schools and up to 250 parent farmers in Kalomo, Southern Zambia, with agricultural and financial management training - to provide income, improved nutrition, school meals and enable parents to better support their children's education. This three-year project started in January 2021, with five project schools selected by African Revival: Kansumo, Kalundu, Mabuyu, Namabondo and Rural Rehabilitation (RR) Primary Schools. Despite the Covid-19 pandemic, teachers and parents were permitted to continue with the SDF project - adhering to government guidelines, handwashing, social distancing and wearing facemasks.

At the start of the project, African Revival - Investing in Education established farming groups for parents at all five schools and ensured plots were fenced with game wire. The land was prepared at each school using pit tillage, which allows water, mulching and organic fertilisers to be concentrated around the plants. In years 2 and 3, the project focused on continued crop production, a feeding program and village savings & loan associations (VSLA) activities.

Farming Training:

In year 1, 75 parent farmers were trained (M37:F38, including 15 teachers, 3 from each school) on the following topics: soils, conservation farming, land preparation (for nursery and main beds), nursery management, ripping, growing vegetables, intercropping, pomology (the science of growing fruit), zero tillage and pot hoeing. The groups were introduced to organic farming and non-chemical pesticides and fertilisers, such as: natural plant protection, mulching, compost manure, tea manure, crop residue retention and bokash. AR's SDF Project Officer, Raymond Hadangalika undertook the training.

In year 2, 45 parent farmers were trained on permaculture, as well as care and maintenance of solar irrigation systems. Informal training and guidance continued throughout year 3.

Kalundu making a natural pesticide using milk bush (right)



Seed Support:

After training, seed packs were distributed to the parent farmers, to motivate them and improve food security at the household level. Each parent farmer received 25g of tomato seeds and 25g of rape seeds.

Crop Production:

Seeds were delivered to all the project school farming groups, who raised young vegetable seedlings in nurseries, before planting for the first harvest from the very start of the project. Activities included: making the main beds, digging holes (zaipits), transplanting and then nursing seedlings. In year 1, the following vegetables were grown: cabbage, Chinese cabbage, rape, tomato, broccoli, okra, spinach and sugar loaf. Weeding helped to aerate and loosen the soil, as well as maintain soil moisture and add humus. Farmers were taught how to collect manure and plant residues and add these to the soil, to improve soil fertility, texture and water-holding capacity.



Nursery being raised at Mabuyu (left); Sowing cabbage seeds at RR (right)

In year 2, crop production continued. Farmers were provided with vegetable seeds (but fewer than they had received in year 1, to encourage farm sustainability) and the schools supplemented seeds from the previous year's proceeds, such as vegetable, maize and sunflower seeds.



Community members receiving seeds at Kalundu (left); Maize plot at Kansumo (right)



Community member buying cabbage (left); Pupils tending okra and maize at RR (right)

Fruit trees were planted at all five farms in the first year of the project, to provide more sources of essential vitamins and minerals, as well as soil stabilisation and shade. Each school was supplied with the following saplings: 5x Avocado, 10x Chestnut, 10x Custard apple, 5x Guava, 5x Mango, 10x Mexican apple, 10x Pomegranate, 10x Papaya, 5x Orange and 5x Naartjie.



Delivery of saplings to schools

In the 2021/2022 growing season, some of the SDFs were flooded and a few of the fruit trees were lost, though these were later replaced. The orchards are now growing well and fruiting in 4/5 project schools. Fewer trees have survived at Namabondo, due to the local conditions.



Headteacher Bridget inspecting the orchard at Kalundu (left); Teacher Faidah in the orchard at Mabuyu Primary School.

Solar irrigation systems were installed at all five school farms in year 2, as part of a separate project, funded by Guernsey Overseas Aid Commission. Efficient use of water and reduced labour led to increased production, with both the yield and the number of different crops that could be grown on each farm dramatically increasing. Other crops grown included: eggplant, onion, squash, watermelon, carrots and cucumbers.



Just after harvesting at Mabuyu (left) and Kansumo (right)

Sales:

Produce was shared or sold and then the proceeds split in the following ratios: 40% to be shared between the parent farmers in each group, 30% given to the host schools and 30% to be re-invested back into the farms, for sustainability and to purchase inputs for the following year.

Feeding Programme:

Feeding programmes were set up in year 2, once the farms had been established and were producing well. Schools had also fully reopened following the pandemic. Pupils were provided with vegetables (okra, tomato, green beans, garden eggs and eggplant), as well as nshima, sump and porridge. In year 3, they received mixed vegetables, fresh maize, beans, nshima sump and porridge. The vegetables supplemented meals and improved nutrition.



School	Number of meals served	
	Y2	Y3
RR	805	2,784
Kansumo	704	2,688
Kalundu	928	1,885
Mabuyu	1,020	3,444
Namabondo	351	2,062
Totals	3,808	12,863



Children receiving fresh maize at Kalundu (top); Parents prepare meals at Kansumo (bottom)

Village Savings and Loans Associations (VSLAs):

In the original budget, we had provided for an external trainer to help set up the VSLA groups, however, AR’s Project Officer, Raymond, had done relevant training and felt confident to oversee this himself, which was a large saving. In year 1, 3/5 project schools set up their saving groups, while Kansumo and Namabondo formed their groups in year 2. All five schools now have at least one active VSLA group (some have multiple groups), there are currently 195 participants in total; 75 men and 120 women.

In year 1, the three groups saved between 5,000 – 15,000 ZMW (approx. £240-£700) on the first cycle and savings doubled for all groups in the second cycle. All borrowed funds were returned with interest.



Savings group meeting at Kansumo (left) and Kalundu (right)

All schools have continued to hold regular savings meetings. The table below shows the membership and savings for cycles 1 and 2 of year 3 (dates of cycles vary at different schools):

Cycle 1

School	Membership			Savings	Borrowed	Returns	Accumulation
	M	F	Total	Amount	Amount	Amount	Amount
Kalundu	24	29	53	17,800	17,800	23,000	47,840
Mabuyu 1	12	15	27	5,840	5,840	9,230	23,800
Mabuyu 2	13	22	35	12,300	12,300	11,180	20,000
Kansumo	3	18	21	9,450	9,450	6,500	13,682
Namabondo	7	15	22	2,100	2,100	5,000	17,457
RR	7	9	16	4,150	4,150	9,300	15,950

Cycle 2

School	Membership			Savings	Borrowed	Returns	Accumulation
	M	F	Total	Amount	Amount	Amount	Amount
Kalundu	21	32	53	95,000	81,000	124,633	138,633
Mabuyu 1	25	35	60	89,619	89,619	137,525	137,525
Mabuyu 2	13	22	35	60,509	55,000	65,500	71,009
Kansumo	4	20	24	55,320	47,000	84,320	84,320
Namabondo	7	15	22	23,050	22,000	35,000	36,050
RR	4	9	13	19,585	13,332	22,839	29,365

Outcomes, Achievements and Impacts:

The project has been very successful in achieving the initial aims and there have been many positive impacts for the pupils, parents and school communities:

- **Improved agricultural skills** – More than 120 parent farmers have received formal training on modern farming techniques, conservation farming and the use of solar irrigation, with many more learning through joining the farming groups and information passed by word of mouth. Permaculture training techniques have helped to further increase yields and all farms are now in a constant cycle of planting and harvesting. Parent farmers have been able to apply what they have learnt to their own farms and small-holdings, to improve nutrition at home and further increase their income.

- Improved crop production – Increased knowledge and installation of solar irrigation systems has had a huge effect on all five school farms. Crop production has dramatically increased – both the number of different crops being grown and the yield of each. Overall production and sales profits have continued to increase year-on-year, as shown in summary by the table below (full raw data available on request):

School	Number of crops grown			Total income from sales (ZMW)		
	Y1	Y2	Y3	Y1	Y2	Y3
RR	6	10	10	3,401	20,265	18,919
Kansumo	6	11	13	1,544	9,440	9,862
Kalundu	7	10	12	2,420	10,936	14,055
Mabuyu	5	11	13	2,286	21,408	19,791
Namabondo	0	10	8	-	3,276	6,277
Totals	24	52	56	9,651	65,325	68,904

- Improved nutrition - All of the families of the participating parent farmers are now able to eat three nutritious meals per day, and pupils eat at school through the feeding programme, which has reduced absenteeism and means children are not learning on an empty stomach. Teachers are also able to buy snacks for break time.

Enrolment has increased at all the project schools and AR's Project Officer has observed the school feeding programme definitely influencing this, although many other factors have affected enrolment, including the Covid-19 pandemic, and, unfortunately, early childhood marriage and pregnancy.

Parent farmers recognise that their produce tastes better than that grown elsewhere by more traditional methods:

"Home grown vegetables from my own gardens with nurtured soils taste much better than those produced by other unnatural growing mediums." said Mrs. Carol Mwaanga, parent farmer at Mabuyu Primary School.

- Improved financial literacy – Parent farmers have learnt how to budget and save and are able to borrow money to buy school supplies, generate income and set up small businesses. They are also able to grow their own vegetables, instead of having to buy them.

"Growing organic vegetables has reduced my budget, as I do not buy vegetables and fertilisers in stores now." said Elizabeth Nkhoma, parent farmer at Kansumo Primary School.

- Improved educational standards – Increased crop production and financial literacy has not only benefitted the parent farmers, but also their children. Parent farmers are now able to buy school supplies such as books, pens, school bags and uniforms for their children and as part of the project, 30% of the profits are shared with the school, to directly benefit the children’s education. Between them, the five project schools have so far received a total of **46,165 ZMW** (approx. £2,055) over the last three years and this has been spent on scholastic materials (such as books, chalk, paper, pens, glue, flip charts and folders), renovation (fixing window panes and painting), electricity units and (at two schools) salaries for PTA volunteer teachers (raw data available on request).
- Improved academic attainment - There has been an increase in the number of children sitting and passing Primary Leaving Exams (PLE) in the project schools. At the end of the year prior to the project starting (2020), 151 children from the five project schools sat their PLE. This increased in year 1 to 202 children and in year 2 it increased again to 211 children – an increase of 40% since the start of the project (compared to an increase of 20% over the same period in five nearby control schools, which don’t have school farms). We will be able to compare PLE results for 2023 later (results available on request).

Number of children sitting PLE at project and control schools:

SCHOOL	SAT 2020			SAT Y1 2021			SAT Y2 2022		
	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL
Namabondo	21	13	34	19	21	40	18	18	36
Mabuyu	22	28	50	20	29	49	34	27	61
Kalundu	10	6	16	13	26	39	33	25	58
RR	21	21	42	24	40	64	19	14	33
Kansumo	5	4	9	6	4	10	15	8	23
TOTAL (Project Schools)	79	72	151	82	120	202	119	92	211
Siamusunse	24	23	47	55	22	77	26	26	52
Muumba	15	12	27	16	11	27	12	24	36
Matondo	22	18	40	34	28	62	16	23	39
Malala	19	11	30	25	14	39	22	18	40
Chitumbi	14	14	28	27	19	46	20	19	39
TOTAL (Control Schools)	94	78	172	157	94	251	96	110	206
GRAND TOTAL	173	150	323	239	214	453	215	202	417

The number of children passing their PLE (at division I,II or III) at project schools, increased from 74 children in 2020 (before the project started), to 94 children at the end of Year 1, to 144 children at the end of Year 2. This is an increase of 96% since the start of the project (compared to 7% in the control schools over the same period). This is a striking increase but could also be attributable, at least in part, to other factors, such as other schools opening or closing nearby, or drop-outs in control schools due to reasons other than nutrition.

Number of children passing PLE (division I,II or III) at project and control schools:

SCHOOL	PASSING 2020			PASSING Y1 2021			PASSING Y2 2022		
	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL
Namabondo	9	7	16	12	10	22	11	10	21
Mabuyu	14	11	25	7	15	22	22	23	45
Kalundu	9	4	13	18	12	30	19	25	44
RR	5	9	14	5	8	13	5	7	12
Kansumo	3	3	6	4	3	7	16	6	22
TOTAL (Project Schools)	40	34	74	46	48	94	73	71	144
Siamusunse	8	9	17	8	10	18	4	4	7
Muumba	15	10	25	10	11	21	14	18	32
Matondo	7	11	18	5	4	9	13	12	19
Malala	11	5	16	12	7	19	14	12	28
Chitumbi	14	13	27	22	19	41	10	9	20
TOTAL (Control Schools)	55	48	103	57	51	108	55	55	110
GRAND TOTAL	95	82	177	103	99	202	128	126	254

Testimonials:

Amos Nkuwa, 49yo, Teacher at Kalundu Primary School

"I am a teacher at Kalundu Primary School, my school is located about 14km SW of Kalomo town. Currently it has 7 members of staff but only 4 habitable houses and this has made some of us to be trekking the 14km to work and as a result I have always reported late. When I joined the saving group that was introduced by African Revival, I managed to save enough to purchase a bicycle, since that time I have been able to report for work on time without denying my learners access to quality education."



Annie Mutepa, 42yo, Parent farmer, Kalundu PS

"I first started saving bit by bit for my own restaurant business but due to lack of financial literacy I failed to continue. However, in 2021 when African Revival introduced village loans, I register myself and I managed to make savings that enabled me to start up a small eating place. I now own a good restaurant in town."



Fidelis Mweetwa, 33yo, Parent farmer, RR Primary School

"I was trained by African Revival on how to use different methods of growing crops, including how to protect them from pests and diseases using natural ways. Before this training, I used to struggle to grow crops because I had no money to use to buy chemicals. From the time I gained this knowledge I no longer have problems growing my vegetables. I am now able to grow enough for sale and I managed to build a better house for my small family and enough for home consumption."



Jonas Manyando, 37yo, Parent farmer, Mabuyu PS

"Being a father of five, it hasn't been easy for me to fend for the children, but the skills I acquired from the gardening training has helped me to improve on my gardening. So far, I have improved on the nutrition of my family and supplying them with other necessities like books, clothes and shoes. The two that had stopped school are now back to school. Am able to supply the community with vegetables in exchange for money."



Challenges:

- At the beginning of year 2, flooding of the farms led to some fruit trees being destroyed, although we were able to replace these due to less seeds needing to be procured (because seeds for replication were saved from crops that had been grown previously).
- Some community members initially resisted joining the savings groups at RR and Namabondo – this has improved throughout the project. At some schools we now have the opposite challenge – the savings groups are very popular, but not all members are willing to help maintain the farms. The aim is for all group members to be part of saving and farming activities, as they complement one another. This is something we have been working on in year 3, along with group sustainability – ensuring new members join the group when others leave, to maintain a group of at least 30 members at each school.
- The headteacher at Namabondo Primary School was not supportive of the project and there were various issues with the community in years 1 and 2. A fire started through negligence burnt the fence, poly pipes and the submersible cable of the solar irrigation system, although the contractor agreed to fix it and be owed by the school. In year 3, a new headteacher was posted to Namabondo and all SDF activities have since improved.
- At RR school, due to the positioning of the solar panel on the irrigation system, which was initially shaded by the water tank at certain times of the day, water only started to pump late in the morning - this issue has now been rectified by the contractor.

- The control box for the solar irrigation system broke down at Kansumo, which stalled production for a while. This has now been fixed by the school.
- Low water table has affected crop production at Namabondo – the school found a budget to make some modifications to the solar irrigation system to mitigate this challenge.
- School management can be slow to attend to challenges and replace damaged parts of the solar irrigation systems and need encouragement – we have worked on this in year 3 and believe they are now more self-sufficient.
- AR's Project Officer re-visited the SDF set up as the pilot for this project, at Munyenye Primary School. It needed help to get re-established and there was delayed re-installation of the solar irrigation system – the water tank had a crack and there was an issue with the submersible pump. This has been patched, though the school needs to replace it.

Budget:

This project was funded by multiple donors over three years, including: Play It Forward, The Charles Hayward Foundation, Guernsey Overseas Aid Commission (GOAC), AR Ball '21, The Allen Trust and an anonymous donor in year 3. Total project spend was **£28,944**, which was less than the original budget, due to savings on: fuel, staff salary (as the project started in March of year 1, not January), no need for an external trainer to set up VSLAs, seeds (farmers were able to replicate their own seeds more quickly than anticipated) and fertilisers/pesticides (farmers learnt how to make their own organic versions). A full BvA is available on request. Although the larger original budget was not fully funded, there is a project underspend, which will be re-allocated to another similar project (likely an eco-clubs project in Northern Uganda), with agreement from African Revival's Board of Trustees.

Conclusion:

The five School Demonstration Farms and VSLAs are all thriving and continuing to run independently and sustainably, with input from the Project Officer gradually reduced during the final few months of the project. We expect all of the farms and VSLA groups to continue to thrive and improve income, nutrition and educational standards for these school communities for many years to come. The solar irrigation systems have had a huge impact on the overall success of this project and they are easy to maintain with funds the farming group obtains from sales of produce. We have not observed any vandalism of the systems.

Our sincere thanks to the donors who have funded this project!

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