AFRICA WINDMILL PROJECT

ANNUAL REPORT 2018

The year 2018 has been a great year for Africa Windmill Project in a number of ways. For instance, the organization has grown in terms of numbers as well as quality of programs that the organization provides to vulnerable communities in rural areas of Lilongwe. The very same year has also been difficult in other senses as well. The Founding Executive Director resigned from his position and needed a replacement. This has been a challenge because some programs and activities have not been done the way they were supposed to be because of the transition process. This report has been generated to share some of the highlights and challenges that the organization has gone through in the course of the year.

ENDING HUNGER

Africa Windmill Project envisions to be the leading non-profit organization in sustainable irrigation techniques for vulnerable local farmers.

We empower farmers with knowledge and skills that would help them to transform their crop production with an aim of transforming their livelihoods. We strive to teach rural farmers to produce food on a sustainable level using technologies that could be accessed by rural farmers.

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INTRODUCTION

Africa Windmill Project (AWP) envisions to be the leading non-profit organization in sustainable irrigation techniques for vulnerable local farmers. Our mission is to empower farmers with knowledge and skills that would help them to transform their crop production with an aim of transforming their livelihoods. We strive to teach rural farmers to produce food on a sustainable level using technologies that could be accessed by rural farmers.

AWP runs a four-year project that focuses on identifying the problem together with farmers (food shortage) and we start addressing the root cause using the demonstration plots to build farmers trust in the irrigation technique this is done in the first year.

Using the lessons learnt from the first year, during the second year, each farmer must be able to plan and budget for the irrigation season bearing in mind that all that will be invested will surely benefit him/her at the end.

During the third-year farmers are now on a paradigm shift. They are no longer waiting to be told when to start nor wait for assistance from government or NGOs but are able to save and invest and re-invest.

During the final year of AWP's existence in an area, emphasis is put on refresher trainings for Government Extension workers who will take over supervision of the farmers to make sure that they know exactly what to do. The Extension Workers are trained together with the farmers to make sure that knowledge is rich between the two groups.

Currently, AWP is working in Lilongwe District in the Central Region of Malawi. With support from the Ministry of Education two Agricultural Planning Areas (EPA) were identified and these are Mngwangwa and Chigonthi.

Between the two EPAs Africa Windmill Project works with 3000 farmers

The annual report is a compilation of almost all the activities that have taken place at Africa Windmill Project starting from January up to December 2018. The report covers our core activity which is irrigation agriculture in two Extension Planning Areas (EPAs) of Mngwangwa and Chigonthi in Lilongwe District. As the year comes to a close, we will try to look back at what have been our achievements as well as challenges. The report will also look at opportunities that lie ahead of the organization in the future. The report will focus on activities done in Mngwangwa and then will focus on activities in Chigonthi. There after the report will focus on some administrative issues that made headlines and some recommendations are going to be shared.

MNGWANGWA IRRIGATION PROJECT

Mngwangwa Extension Project Area was the first area that has benefited from the roll out of AWPs irrigation work. The project is in its fourth and final year of implementation. For the past three years farming households have been trained and equipped to plan for their irrigation, execute their plans and then evaluate the out comes after each year of participation. These three crucial activities have been done over and over to make sure that they stick in the minds of the farmers as well as in the minds of government extension workers who work with AWP staff. In this final year the goal of AWP is to make sure that the farmers and the extension workers get refresher trainings and then take over leadership of the irrigation that has been going on in the area.

To begin with last year's irrigation results, farmers in Mngwangwa learnt that without hard work nothing grows but weeds. However, with focus and consistency what separates one from being successful is time. By the end of the first growing season 1500 farmers has made K10,271,000 from fresh maize selling. At this stage irrigation farming left no question of whether or not there is profit in fresh maize because the results had already cleared the doubt. These great lessons were foundation for 2018 irrigation work in Mngwangwa Extension Planning Area (EPA).

In 2018 the field work started in February with educational trainings that are aimed at imparting knowledge in best crop management, entrepreneurship and group dynamics to all club members. Africa Windmill Project value trainings above everything else for knowledge is key in every art of life. The number of farmers in the project has increased from 1500 last year to 2292 this year. These new joining farmers joined the existing clubs and some established new clubs in areas where there were no clubs before. This increase in the number of farmers in the project is a direct result of the achievement that were seen last year from club members. In addition, there is also an increased support and participation of village leaders than ever before in the project this year. I have seen more village chiefs leading by example this year than never before which is expected in any developmental work. But in the past two years most village chiefs seemed not to be interested in the project they were observers.

Planning and budgeting training are among the most critical trainings in the project. Done every year to help cultivate a culture of planning and saving among farmers.

Without a vision people perish; farmers plan for their next farming season in advance and budget for everything that will be required and do savings in advance for the inputs they need to buy before irrigation work starts to avoid delays and crop damage. The inputs which every farmer must have are seed, basal and top-dressing fertilizer and pesticide. Farmers also need to plan to have enough manure to use in their garden to improve and provide additional soil nutrients. In addition, planning knowledge also help farmers do each activity on standard and at the right time to produce a quality crop that can be sold at a good price. Time management is critical in irrigation farming as in any other business. Mismanagement of time leads to failure. There is the right time for every field activity beginning with land preparation, plot layout, planting, irrigation, fertilizer application and pesticide application.

Land preparation and planting for most on-going clubs this year was between March and April. The entrepreneurship culture is now seen among farmers. Each farmer budgeted for his or her required inputs according to his or her garden size, saved money in advance towards the input budget and bought inputs in due time. Land preparation and plot layout started in the second week of March. The size of plots per individual farmer has increased too this year it is in the range of 0.5 and 1.5 acres per person. Last year the plot size range of individual farmers was 0.1 and 0.6 acres per person. The fall army worm problem is still the main challenge for maize growing farmers more especially the new joining members and newly established clubs. However, it is not a challenge anymore to most continuing farmers. They have knowledge of the Moth it's life cycle, the right pesticide to use and the right time to spray the crop. There has been very little damage of Maize this year by the army worm compared to last year. Only farmers that had not planned in advance to have the pesticide on time experienced the challenge.

FARMER TRAININGS

Agribusiness: this training is very useful at this stage that farmers now know when to produce, how to produce and how much to produce. They have gained confidence in irrigation farming and know the results are good and can now be looked from a business stand point. In irrigation farming time management is very critical as in every other business. Producing on time, at standard and without wastage helps farmers invest in things that will only translate into profit. A business culture and its principles are clearly explained and promoted to be cultivated in their daily lives. Farmers must always think of investing money before eating, the profit must be saved and reinvested. This process has to be replicated over and over again. In addition, farmers learn that without initial capital no business can start. Planning and budgeting help one to know in advance what will be required to start a business so that the savings towards the budget can start beforehand.

Food security advanced: in the training farmers learn to calculate food requirements for every family member for the whole year to avoid family food shortages. They also

learn the food groups; carbohydrates, proteins, vitamins and minerals and fats. It helps each farmer to determine how much of each food type is required. It also looks at giving guidance to a balanced diet for the health of their families. Farmers are trained to plan to meet their household food requirement in relation to the required land size. Farmers also understand that without enough household food all the money meant from irrigation is used to buy food which does not improve the family status as in the case where household food was enough. The money meant from irrigation serves other purposes such as buying fertilizer, livestock, building a new house and so on.

Irrigation technics advanced: farmers use watering cane to irrigate their crops. In the first year of the project farmers use canes to irrigate crops using what is available in communities but come up with different results altogether. In the second- and third-years advanced pumps are introduced to farmers such as treadle pump, rope and washer pump and windmill pump. Farmers are trained to know the irrigation pump they are using to irrigate crops. The different parts of a pump are dissembled and reassembled by farmers them-selves to get familiar with every part of the pump for easy maintenance once something is worn-out without the need of a technician. Female farmers are highly involved in technical trainings alike. This helps farmers to have a knowledge of every pump part including the weaker parts that require immediate replacement so that they can plan ahead of time.

Resource Management: the money that is made from irrigation farming must be used to improve a living and at the same time maintain and sustain a business. To do this, farmers are trained to save and keep money in village savings group to benefit from interest overtime. The other way of saving money is to buy assets and livestock; things that will keep adding value to the money saved. The act of saving and reinvesting is the only best way of managing resources and the only way of sustaining business at all levels. This training was introduced in the project from a need base observation. In the first year it was observed that farmers were buying more liabilities: things that would waste money than assets; things that would make money and find problems to maintain a business for a period. Each season they needed support to find inputs having wasted money made from the previous capital investment.

Participatory monitoring and evaluation: this activity helps farmers analyze what was invested in irrigation and compared to the actual output. All associated mistakes and problems are identified and look for possible solutions to improve in the next irrigation season. With pictures of best results of farmers from different clubs' farmers are encouraged to work hard in the next season to achieve great things fellow farmers have achieved. Pictures of livestock, motorcycle, grocery shops, good houses built, bags of fertilizers bough many other things are a variety of achievement others learn from. It is at this point when some farmers clearly understand that all the money, they made from irrigation was used to buy food. From this activity farmers have learnt a lot to improve in their planning both for irrigation and rainfed farming.

However, for newly established clubs it was a little different. Land preparation and plot layout was between April and June as their first planting because they were dependent on completing initial trainings first. As farmers in the project they had no idea of how to do plot layout, crop spacing and other basic crop management principles. In addition, they were dependent of the distribution of starter inputs. We planned to support 1300 farmers in the project this year all new clubs with one-kilogram Maize seed and five kilograms basal dressing fertilizer per farmer. The farmer himself was supposed to find five kilograms of top-dressing fertilizer and pesticides, it was a 50:50 input contribution. However, the procurement process was delayed due to fund transaction between the international and local office. The procurement was supposed to be completed in May. However, out of the intended seed 1300 kg and 6500 kg fertilizer we have only procured 300 kg seed and 1500 kg fertilizer as of 1st June, 2018. This delay in the procurement has greatly affected the field activities more especially planting itself.

In addition, another challenge that affected the work of new joining clubs was persistent vehicle break down. New club require a close attention as they are very much dependent on instructions and easily mistake certain things because first time is always not easy as indigenous knowledge play a major role in their farming activities as they slowly go through a farming transition. Missing the right crop spacing, missing right time of basal dressing fertilizer application and buying of wrong pesticides were among the most common mistakes committed. These mistakes were not corrected in time as a result of persistent vehicle break down and some became permanent problems. For instance; the mistake of buying wrong pesticide led to the crop damage by the army worm and members lost hope so they decided to quit farming to avoid disappointment. In fact, the right pesticide was taught to all club members in advance however in certain cases farmers made a mistake of trusting the shop owner by convincing them to buy a different pesticide of which in the end could not solve the problem and farmers were greatly disappointed.

As a matter of fact, these two errors; the act of generalizing the problem; thinking the worm is a stalk borer and trusting shop owner's advice on which pesticide a farmer should buy by simply looking at a worm picture on the bottle of a chemical negatively affected the season. On the other hand, persistent vehicle breaks down led to a loss of crop in new club members because of the communication gap that was created. The only way to correct this mistake is to improve the vehicle status so that small mistakes can be corrected before becoming permanent problem. In addition, farmers must learn to buy pesticides they know by name not pictures or trusting shop owners. Since last year farmers have been using Snow Clone and Super Clone to protect the maize from fall army worm until this year when another most powerful pesticide was introduced Snow mectin.

There are a number of differences between Snow Clone, Super Clone and Snow mectin. The first difference is the strength. Super clone and snow clone 32 milliliters of the pesticide is diluted in 16 litters of water whereas 16 milliliters of Snow mectin is

diluted in 16 liters of water. This means super clone and snow clone a 200-milliliter bottle make 6.25 sprayers of 16 litters and snow mectin make 12.5 sprayers of 16 litters. In addition, snow clone and super clone have a strong smell when spraying while snow mectin does not produce a strong smell it is user friendly. Snow mectin is best in dealing with fall army worm but also it does work to a number of pests in different crops.

FIRST & SECOND IRRIGATION SEASONS PLANTING DATA FOR CONTINUING CLUBS

MNGWANGWA PLANTING DATA FOR 2018 IRRIGATION PRROJECT			
SITE NAME	CLUB NAME	NUMBER OF FARMERS	SELF BOUGHT
Chimbayo	Chisangalaro	49	123 kg
	Mwalawoyera	53	114 kg
Lombwa	Zabweramochedwa	73	297 kg
	Khombe	40	165 kg
	Mvunguti	33	172 kg
	Tiyesenawo	45	245 kg
	Nsangu	25	108 kg
	Mgwaulo	34	122 kg
Kamphinga	Tiyanjane	31	115 kg
	Msambangalu	27	78 kg
Malikha	Mphako	23	91 kg
	Tikondane	64	247 kg
	Talandira	22	49 kg
	Chitalacha	30	71 kg
	Tiyese	32	84 kg
Miseu	Monaji	20	51 kg
Kambulire	Thiwi	27	73 kg
	Kamwankhuku	25	59 kg
	Titukulane	29	110 kg
Sunche	Tizambenawo	49	62 kg
Mpasa	Takondwa	48	125 kg
Grand total		779	2561 kg

This data of the amount of seed planted for each on going club applies to the first and second irrigation seasons. The first irrigation season here refers to planting from March to June and the second irrigation season refers to planting from July to October. These are very important seasons to make serious money from irrigation. The range of seed per farmer is between one kilogram and fifteen kilograms which is also true to say a farmer cultivate between 0.3 to 2.5 acres. The gardens of most farmers are not very big

due to increased population. The gardens are divided in small portions to sons and daughters. To achieve maximum profit farmers rent gardens in neighboring village so that one may plant between one to three gardens in a single season depending on the sizes and the capacity of a farmer to manage the crops grown.

PLANTING DATA FOR NEW CLUBS

Clubs that joined the project November last year started to undergo training March this year. The trainings that were given were a combination of the first and second year. However, the procurement of starter inputs was not done on time and again it was done partly which resulted in other clubs not receiving inputs after finishing the land preparation exercise. Clubs that had received starter inputs have been very successful most farmers benefited. Clubs that did not received starter inputs did not complete the trainings because without a crop in the garden theory only could mean very little. Such clubs will be considered next year they will start from where they stopped.

MNGWANGWA PLANTING DATA FOR 2018 IRRIGATION PRROJECT						
SITE NAME	CLUB NAME	NUMBER	SELF	STARTER	SUB	STARTER
Kawoza	Nsanda	70	45 kg	35 kg	80 kg	175 kg
	Gwilize	100	61 kg	0	161 kg	0
	Khamalathu	69	69 kg	69 kg	138 kg	345 kg
	Lundu	41	35 kg	71 kg	106 kg	355 kg
Mbilikila	Chipokosa	80	60 kg	30 kg	90 kg	150 kg
	Tiyese	45	25 kg	70 kg	95 kg	350 kg
Kambulire	Mtsukwa	100	50 kg	100 kg	150 kg	500 kg
	Takondwa	96	26 kg	58 kg	84 kg	290
Chimphepo	Gwilize	36				
	Chinguwo	83				
	Chikondi	49				
	Tikondane	89				
	Thiwi	50				
	Titukulane	39				
	Takondwa	65				
	Mwayiwathu	52				
	Kabembezi	40				
Nguluwe	Chikondi	47	15 kg	47 kg	62 kg	235 kg
	Tambenawo	56	25 kg	25 kg	50 kg	125 kg
Ngwangwa	Tiyanjane	100	65	100 kg	165 kg	500 kg
	Tiyamike	66		0		
	Nkhonkha	87		0		
	Takondwa	53	89 kg	0	89 kg	0
Grand total		**1513**	**565 kg**	**580 kg**	**1145 kg**	**2900 kg**

MNGWANGWA 2018 IRRIGATION RESULTS FOR FIRST AND SECOND IRRIGATION SEASONS (March to November) CONTINUING CLUBS					
S I T E NAME	CLUB NAME	NUMBER OF	INPUT	OUTPUT	PROFIT/LOSS
Chimbayo	Chisangalaro	49	K 1,451,400	K 3,654,700	K 2,203,400
	Mwalawoyera	53	K 1,000,000	K 2,645,060	K 1,645,060
Lombwa	Zabweramochedwa	73	K 3,504,600	K 8,567,900	K 5,053,300
	Khombe	40	K 1,947,000	K 3,872,000	K 1,925,000
	Mvunguti	33	2,029, 600	K 5,850,320	K 3,820,720
	Tiyesenawo	45	K 2,891,000	K 6,348,350	K 3,457,350
	Nsangu	25	K 1,274,400	K 4,383,360	K 3,108,960
	Mgwaulo	34	K 1,439,600	K 3,719,300	K 2,279,700
Kamphinga	Tiyanjane	31	K 1,357,000	K 3,306,890	1,949, 890
	Msambangalu	27	K 896,800	K 2,255,520	K 1,358,720
Malikha	Mphako	23	K 623,400	K 2,059,780	K 1,436,380
	Tikondane	64	K 2,914,600	K 7,246,280	K 4,331,680
	Talandira	22	K 578,200	K 1,867,300	K 1,289,100
	Chitalacha	30	K 837,800	K 2,772,920	K 1,935,120
	Tiyese	32	K 991,200	2,486, 800	K 1,495,600
Miseu	Monaji	20	K 601,800	K 1,824,520	K 1,222,720
Kambulire	Thiwi	27	K 861,400	K 2,292,100	K 1,430,700
	Kamwankhuku	25	K 696,200	K 1,918,350	K 1,222,150
	Titukulane	29	K 1,298,000	K 3,876,800	K 2,578,000
Sunche	Tizambenawo	49	K 731,600	K 2,870,560	K 2,138,960
Mpasa	Takondwa	48	K 1,475,000	K 4,281,250	K 2,806,250
Total		779	K27,371,000	K75,613,260	K 48,242,260

NEW CLUB IRRIGATION RESULTS						
SITE NAME	CLUB NAME	NUMBER OF	INPUT	OUTPUT	PROFIT/LOSS	REMARKS
Kawoza	Nsanda	70	K1 ,299, 000	K3, 500, 000	K1,299,000	
	Gwilize	100	K1, 856, 460	K4, 000, 000	K2,143,540	
	Khamalath	69	K814, 200	K2, 070, 000	K1,255,200	
	Lundu	41	K1, 250, 800	K2, 460, 000	K1,250,800	
Mbilikila	Chipokosa	80	K1, 662, 000	K4, 800, 000	K3,138,000	
	Tiyese	45	K1, 121, 000	K2, 250, 000	K1,129,000	
Kambulire	Mtsukwa	100	K1, 770, 300	K4, 120, 100	K2,349,800	
	Takondwa	96	K1, 800, 000	-	-	Planted late
Chimphep	Gwilize	36	-	-		Dint received
	Chinguwo	83	-	-		Dint received
	Chikondi	49	-	-		Dint received
	Tikondane	89	-	-		Dint received
	Thiwi	50	-	-		Dint received
	Titukulane	39	-	-		Dint received
	Takondwa	65	-	-		Dint received
	Mwayiwath	52	-	-		Dint received
	Kabembezi	40	-	-		Dint received
Nguluwe	Chikondi	47	K731, 600	K2,350, 000	K1,618,600	
	Tambenaw	56	K660, 800	K1, 680, 000	K1,019,200	
Ngwangw	Tiyanjane	100	K1, 180, 000	-		Planted late
	Tiyamike	66	K778, 800	-		Planted late
	Nkhonkha	87	K236, 000	0		Planted late
	Takondwa	53	K708, 000	-		Planted late
Grand total		**1513**	**K15,868,960**	**K27,230,100**	**K11,361,140**	

The results for new clubs show the need of farmers to improve on mistakes that contributed to poor production which resulted in poor maize prices. Some common mistakes were crop damage by livestock, un timely application of fertilizer and pesticides, poor irrigation during flowering. However, some clubs have great potential of make huge profits. However, certain clubs planted late due to the time they received starter inputs. The maize is close to maturity but not ready yet to be sold, this data will be available on January next year. This is a very good start for new clubs except one club that completely failed this year because of the shallow water table in their area and the fact that they planted very late they run out of water in wells at flowering it was really a sad development. All the maize that was planted at Nkhonkha wilted because of water shortages. Eight clubs did not plant completely, as new joining clubs in areas that are

not close to one of the on-going clubs the irrigation concept is very new and its related benefits. They did land preparation and plot layout accordingly but did not received starter inputs to demonstrate the technic on the ground since the procurement plan was not completed. Such clubs will be considered next year because this year they did three trainings but without inputs could not proceed.

2018 SUMMARIZED DATA FOR NGWANGWA IRRIGATION PROJECT

SEED PLANTED	ACREAGE	INPUT COST	OUTPUT AMOUNT	PROFIT/LOSS
3706 kg	370.6	K43,239,960	K102,843,360	K59,603,400

According to the results of the data that was collected this year it means there is need for more improvement on production than it is now. Common mistakes are greatly reducing the money the farmers are making from each irrigation season. For all on-going clubs' farmers are only making 40% of the money from each kilogram of maize seed planted. While for the new clubs in the project farmers are only making 27% of the money from each kilogram of maize seed planted. In terms of acreage the irrigation acreage has greatly increased from 170 acres last year to 370.6 acres this year. The increase in acreage is a result of the added farmers in the project but also the increase in irrigation acreage per farmer for on-going farmers due to the increased benefits from irrigation farming. As a matter of fact, there is more maize still in the field that is being sold now and some maize which is not ready yet to be sold. This data is to be collected early next year but it is part of this report because it is included on the input cost but not on the output amount.

CHALLENGES AND PROBLEMS

Throughout the project implementation process there were some challenges that in one way or the other affected the overall outcome of the results. However, the challenges were very different in nature and extent from what was faced last year during the same implementation process and period. The major challenges were not limited to the following;

Fall Army Worm

This problem was first observed early last year. Army worm damage is severe when there are no control measures taken. However, since last year snow mectin has been very successful in protecting maize from army worm damage. Only farmers that used different pesticides had a heavy investment in chemicals to successfully protect the crop. with trainings the problem is not as severe as it was when it first started.

In addition, there is a new report of a worm related problem that has been noted in October this year at Lombwa site. This time it was an underground worm which was

eating the seed planted. Siwagwe Lyton during his third season planting had planted up to three times with germination. Initially he thought the problem was the seed he planted so bought another seed and replanted but nothing came up. After replanting for the third time he found out that a strange worm was eating the seed before it could germinate. Finally, he made a nursery of maize which was transplanted later which worked successfully. New challenges require new solutions so we are working to find out about the worm its life cycle and its control and prevention measures.

Vehicle Problem

Another problem that affected the implementation of field activities was the vehicle break down. Too much vehicle breaks down did not only raise the cost of maintenance which also affect the annual budget but also puts the safety of staff at risk because the break down happens in the field. Field activities shift when the vehicle is in garage but times keeps moving as a result the delivery of trainings is done under pressure due to accumulated content.

Lack of enough funding

The procurement of inputs is done within a short period of time specifically in March and April. This is because these two months is a period when planting of the first season is done hence the need of starter inputs for new joining farmers. Due to lack of enough funding during this period only a fraction of the required inputs was bought which was less than the planned amount. Failure to meet the annual budget and plans negatively affect achievement of the goal but since this lack of funding is beyond our measure there is need to look for other alternatives to increase funding.

NEXT PLANS

We would like to maintain a same crop quality being produced by our farmers in the EPA and exploit the available markets. Now that the food security and income generating technics together with a business culture have been rooted in our farmers and there are more success stories than ever before we would like to empower Lead farmers to diffuse the technics in their respective communities. Not only lead farmers are key to diffusing these technics but also extension officers. We would like to see active involvement of extension officers in the project.

We would also like to increase the number of windmill pumps installed in the EPA targeting the most successful farmers. There are farmers that are performing greatly using water canes such farmers must be supported by installing them windmill pumps in their gardens to help them in water pumping. This may also help farmers increase irrigation acreage since water pumping will no longer be a problem. So far there is only a single windmill pump operating in the EPA which is at Suntche.

Club Trainings

Individual Starter Inputs

Windmill Pump

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Crop Management

Individual Benefits

CHIGONTHI IRRIGATION PROJECT

Introduction

Africa windmill project started in Chigonthi EPA in 2017. 14 clubs were established and demonstration gardens were set for each club. By end of 2017, 17 new clubs were added to start in 2018 making a total of 31 clubs. In first year, a number of trainings were offered on both the demonstration garden and in classrooms. The trainings covered were; Club formation, Food security, budgeting and panning, Irrigation technics, organic composting and integrated pest management trainings. A total of 450 members were trained in 2017.

This year the project has a total of 36 clubs with a total of 1261 households. The trainings that have been provided this year include Conservation farming, crop management and vegetable production, agribusiness, irrigation water management and leadership skills trainings.

This report explains how AWP has impacted the rural livelihoods of people in Chigonthi EPA by achieving greater productivity and food security.

Justification

Chigonthi is an Extension Planning Area that is richly blessed with natural resources including water, land (dry and wetlands). Most farmers are small-scale who farm on small plots of land. Traditionally, these farmers grow maize and other crops by rainwater. But with the intensification of climate change, rains in Malawi are becoming erratic and less predictable. Farmers are experiencing more frequent and severe droughts, soil erosion and destruction of crops sometimes. Over reliance on rainwater for farming poses a great challenge on food security.

Given climate change and the small farm sizes of most farmers at Chigonthi EPA, improving agricultural productivity is essential for ending hunger and achieving food security. Irrigation offers the possible alternative to shift from overreliance on rain season farming (single harvest) to all year farming (multiple harvests), making the most from a single plot, and allowing farmers to diversify, growing crops at any time and applying water efficiently. Therefore, Africa Windmill Project came in to teach families sustainable irrigation practices to achieve high productivity and food security.

Project goal

Ending hunger and poverty by teaching farmers to maximize and efficiently use available land, labor, time and water resources for irrigation to increase production, productivity and quality hence increased incomes and sustainable food security, at both household and community level.

Project objectives

1. To expand trainings to 1300 farmers
2. To increase the irrigated acreage
3. To teach farmers to double or triple the number of harvests per year
4. To stimulate and establish a business culture among the small holder farmers
5. To increase agricultural productivity for upland farming
6. To maximize the utilization of land, water, time and labor resource

IRRIGATION CLUBS

The initial part of AWP is the development of irrigation clubs with a minimum of 30 members per club. AWP reach and support farmers through these clubs. These clubs help farmers to come together to learn and share different skills.

Other clubs have been indirectly formed as daughter clubs simply by observing and learning from the successful clubs that were started by AWP. These clubs have been incorporated into the project to receive trainings from AWP.

The clubs that have born as daughter clubs include; Mlembe born from Mawandiwe, Tikondane from Mango, Kachonde from Nankhonde and Tikondane 2 from Tithandizane club.

How Irrigation clubs work – AWP strategy

Working with interested people in rural communities through the guidance of government extension workers, AWP identifies rural people who own land (especially wetland) somewhere close to a river or any natural water source close to their villages.

Initial meetings for awareness with people in the communities are held. In these meetings, people are introduced to the goals and objectives of AWP. People who are interested join the project and form a club of a minimum of 30. Anyone is allowed to join the club, as long as they have land for irrigation farming.

For the newly formed clubs, the first training that AWP offers is club formation training in which participants are trained to choose 5 committee members, the chairman, secretary, treasure and 2 committee members and to understand the roles of each position.

AWP then supports the clubs with on farm trainings and providing starter packs of 1 kg seeds and 5 kg of basal dressing fertilizer.

The project runs for 3-4 years. In the first year of our operations, clubs are formed and demonstration gardens are set up where farmers learn hands on farming skills. In the second year, farmers apply the skills they have learnt from the demonstration garden. In the third-and fourth year trainings continue and monitoring for project sustainability.

TRAININGS

This year, a number of trainings were offered. The trainings include;

Crop management and vegetable production training

In this training, farmers were trained to understand the importance of mulching, construction of nursery beds, managing crops in the field and controlling pests and diseases. Vegetable production focused on preparation of seed bed, seed and soil treatments, sowing, thinning, transplanting and managing the crop after transplanting.

Irrigation water management

After crop management training farmers were trained to manage water efficiently in order to achieve the best quality and high yield. In this training, focus was that farmers be able to determine the crop water need, time for irrigation (when to irrigate) and irrigation without wastage of water and eroding soil.

Conservation agriculture

Farmers were trained to cultivate crops with minimum soil disturbance to avoid soil compaction. Special focus was put on the principles of conservation agriculture which include growing crops on time, according to standard and without wastage.

Agribusiness skills

In this training farmers were trained to grasp and understand the basic business knowledge and entrepreneurship concepts with a view to stimulate enterprising culture among the smallholder farmers.

Most farmers were practicing subsistence farming which aims at producing crops for food and not for sell. With agribusiness training, farmers now are producing with the aim of selling at a price that gives them profit.

Leadership skills

Farmers were taught that the leadership structure of the club should be democratic, filling offices by nominations and voting during formation. The number of offices limited to chairman, vice-chairman, secretary, and treasurer and three committee members. Farmers mentioned and discussed about the good characteristics of a good leader which included good communication skills, transparency and accountability, good listening skills, able to learn from others, hardworking ability, humility, able to make sound decisions, conflict resolution skills, ability to organize members and others.

They were trained not just to be good leaders for the club but also to apply the skills taught at home and in their community.

Lead farmers training

Africa Windmill Project at Chigonthi EPA on 30th -31st May 2018 conducted a lead farmers training. About 15 lead farmers and 2 extension workers attended the training. The table below shows the names of lead farmers and extension workers who attended the trainings on day 1 and 2.

Day 1

	Name	**Section**
1	Mabvuto Chikadza	Mlezi
2	Gideon Mtimuni	Mlezi
3	Weluzani Banda	Mlezi
4	Mc Ocean Jamu	Chitedze
5	Ronald L. Masayiti	Chitukula A
6	Gladwell Lungu	Chitukula A
7	Michael Kaiyatsa	Chigonthi A
8	Edward Chimoto	Magwero

Day 2

	Name	Section
1	Mabvuto Chikadza	Mlezi
2	Gideon Mtimuni	Mlezi
3	Weluzani Banda	Mlezi
4	Mc Ocean Jamu	Chitedze
5	Ronald L. Masayiti	Chitukula A
6	Gladwell Lungu	Chitukula A
7	Michael Kaiyatsa	Chigonthi A
8	Edward Chimoto	Magwero
9	Akalasi Mpotazingwe	M'banng'ombe
10	Agness James	Chigonthi A
11	Masitenje Jackson	Dzenza
12	Elisa Kabango	Mlezi
13	Graston Chiwaya (Extension worker)	Chilitsi
14	Luwison Timoti (Extension worker)	Chitedze
15	Tchale Dazonzi	Chibade
16	George Kalumo	Chilitsi
17	Laitani Zakeyo	Chitedze

Aim of the training

Africa windmill Project work hand in hand with government extension workers, lead farmers and other agricultural committees i.e. ADC (Area Development Committee) and VAC (Village Agriculture Committee). Lead farmers play a major role in conveying messages and teaching fellow farmers what extension workers and AWP staff teach. Therefore, the aim of the lead farmers training was to train lead farmers in all Africa windmill strategies so that they can effectively and actively assist fellow farmers to better practice and follow AWP agricultural practices.

Trainings covered

The trainings that were conducted on day 1 include; Integrated Pest Management (IPM), Irrigation techniques, pumps and pump maintenance and Irrigation water management. The trainings conducted on day 2 were; Club formation & Group dynamics, Agribusiness skills, Leadership skills training and Conservation agriculture.

Integrated Pest Management (IPM)

Participants were trained on dealing with pests by employing pest control techniques that encourages natural pest control. The measures were categorised in cultural, biological, physical, chemical control as a last resort.

Irrigation techniques, pumps and pump maintenance and Irrigation water managements

Participants were trained on different irrigation techniques. They were taught on recommended dimensions of basins determining water requirement for the crop and effectively growing crops with a proper irrigation schedule.

In irrigation water management, participants learnt to irrigate without wastage and to manage production costs. They also learnt to apply water according to crop needs, in amounts that can be held in the soil and available to crops, in rates consistent with the intake characteristics of the soil and the erosion hazard of the site and to improve or maintain water quality.

Farmers club formation and group dynamics

The lead farmers were also trained on club formation and group dynamics. This training was necessary because there are cases when a number of people have interest in forming a club but they don't how to do it. Therefore, having lead farmers with knowledge on club formation and how the club should operate will really help.

Agribusiness

In agribusiness, participants were taught not just merely take farming as a business but to know that farming is business just like any other business. It requires capital, entrepreneurial skills and other resources. Emphasis was made on recording all costs of inputs (expenses) and income after selling the farm products there after calculating whether they have made profit or loss.

Leadership skills

In leadership skills training participants were asked to mention, list and discuss the characteristics of a good leader. Some of the characteristics included; Good communication skills, humility, hardworking spirit, transparent and accountability, good listening skills, ability to; learn from other people, encourage fellow members, make sound judgement, resolve conflicts and to organize members. Much emphasis was put on leaders that they have to be visionary.

Conservation agriculture

In this training focus was on minimum soil disturbance to avoid soil compaction, soil erosion and conserve water by increasing water infiltration. Principles of conservation agriculture including carrying out of every operation on the right time and season, well and avoiding un necessary loss, wasting nothing as in the natural cycles.

Farmers field exchange visit

Farmers from Kamangira, Chipeni and Chitedze were taken to Mawandiwe club at Mlezi section. These farmers said that they learnt how well basins should be made (trampling the ridges between and around the basin to avoid collapsing of soil into the basin, importance of mulching and following proper plant spacing and dimensions of irrigation basins. They also witnessed the importance of applying manure for production of healthy crops at Mr. Frazer's maize garden.

Visiting Lombwa at Mngwangwa EPA with farmers from Chigonthi EPA

Farmers from Mawandiwe, Matowe and Ndifeamodzi learnt of the success stories from their fellow farmers of Mngwangwa EPA who are in Africa windmill project clubs. At Lombwa, they witnessed how their friends started and where they are now. Others have bought iron sheets, oxcarts and motor bikes. This gave them much greater motivation to work extra hard in their farming business.

Field visit at Mphako (Tikondane club) Mngwangwa EPA

Farmers of Mawandiwe club of Mlezi section Chigonthi EPA were taken to Mngwangwa EPA where they learnt a lot of lessons through visiting the fields and asking questions from their fellows of Tikondane club which started working with Africa Windmill project since 2016. Having three years of experience in irrigation farming they poured that knowledge, skills and experience accumulated to their friends of Mlezi. The farmers at Mphako shared some of the benefits they have obtained by working with Africa windmill project. They now easily buy seed and fertilizer for upland farming, they have bought livestock.

Hearing those stories was like a spark that ignited a passion in the hearts of farmers of Mlezi to work extra hard and apply seriously the skills and farming techniques that are being delivered by Africa Windmill Project.

They also stated challenges they are faced. The major challenge was that of fore army worms a pest that destroyed maize. They tried several ways to deal with the pest but they failed. Fortunately, Africa windmill project came in with advice about the proper pesticide (snocron) to be used to overcome that challenge.

Those farmers who went for the visit were encouraged to train their fellows who did not go by first demonstrating through their gardens.

Farmer's field exchange visits give an opportunity for farmers to learn from and to teach each other. The excitement of being visited and visiting others hives them a hardworking spirit because they make sure to show their visiting fellows that they produce high quality product.

Field visit with AEDC of Chigonthi EPA

Mrs. Chagunda and two extension workers Mr. Timoti of Chitedze section and Mrs. Mitaye of Mlezi section were taken to visit and appreciate the great work that AWP is doing in those sections.

In response to the farmers request that the AEDC for Chigonthi EPA Mrs. Chagunda should visit them to see the works that they are carrying out with Africa Windmill, a field visit was organized on 9th August 2018. The AEDC went through irrigation maize fields and appreciated the work that has been done. She gave advice to the famers that they should get hold of what they are learning from Africa Windmill Project so that when the project phases out, they should continue benefiting from it. She further advised them to know, understand and have a clear purpose or vision as a club, individual or family for the farming business they are doing. Lastly, she commended the village heads for being a part of the project and urged them to continue being exemplary as leaders of the community.

During the field visit, the AEDC recommended that Africa Windmill as an organisation should be organising field days to allow more members of the community to see and learn what AWP farmers are doing. In that way more, people will adopt the strategies that AWP is teaching.

Collection of GPS coordinates

GPS coordinates for 573 farmers have been collected successfully in 25 clubs. Only a few clubs are remaining. GPS coordinates for the gardens of some other members who rely on rented gardens have not been collected. The recommendation was that only those members who have their own fields should have their coordinates collected.

End of year participatory project evaluation with farmers

Meetings with farmers were conducted where farmers identified the successes and challenges that they encountered this year and how they can best plan and prepare this year to avoid those challenges and build on their success next year.

Building a water tank at Chitedze for Layitani Zakeyo of Mango club

A tank of 18000L capacity has been belt at Layitani Zakeyo's garden. AWP provided cement, quarry stone and building tools while Mr. Layitani provided 2000 bricks, sand and labor for building of the water tank.

MaFAAS conference (Malawi Forum for Agricultural Advisory Service)

The conference was scheduled on 12 and 13 September but due to some other changes it was shifted to 18th and 19th September. The theme for the conference was hear farmers voice. In this conference farmers expressed their views including the challenges they are facing, what they expect from the government, NGOs, extension workers and researchers. The areas that were covered include; 1. Access to land 2. Access to finance 3. Markets and 4. Research

Presentations at DAECC (District Agricultural Extension Coordinating Committee)

Africa Windmill Project had a presentation on sustainable irrigation technics and food security at the District Agricultural Extension Coordinating Committee.

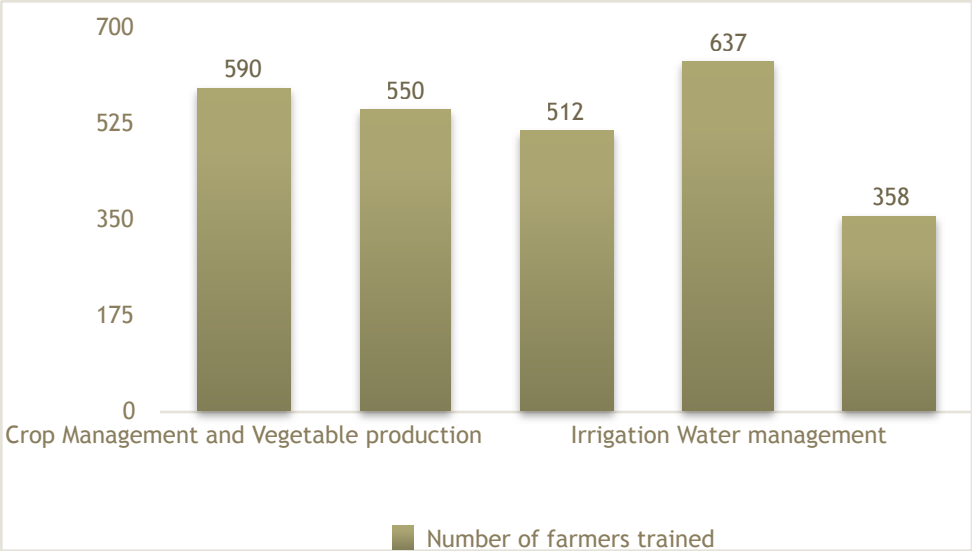
The DAECC recommended that we should have a clear basis for our statistics. We should conduct a research or survey to come up with the figures i.e. percentage of food insecurity and poverty.

Farmers training attendance

Section	Village	Name of club	Agri business	Crop Management and vegetable production	Leadership skills	Irrigation Water management	Conservation farming
Mlezi	Mlezi	Mawandiwe	28	30	23	33	26
	Katola	Tikondane	8	13	12	15	0
Chitedze	Mayenje	Mitondo	25	27	22	27	12
	Toyoyo	Chisaka	13	13	11	13	10
	Chitedze	Tikondane	16	20	18	22	19
	Ndalama	Mango	32	35	28	40	30
M'bang'ombe	Chingwengwe	Kachonde	20	27	18	23	20
	Mbang'ombe	Nankhonde	25	24	22	23	20
	Nkhota	Talandira	25	34	25	28	22
	Makalani	Phazo	11	12	0	14	0
	Katela	M'buka	15	13	0	15	0
Chilitsi	Nyani	Ntchinji	9	12	0	12	0
	Chiphwanya	Kachule	12	8	0	13	0
	Chinyama	Chinyama	22	24	24	24	20
	Mkhalapadzuwa	Mapanda	0	4	0	10	0
Chigonthi A	Chigonthi	Mteza A	12	15	17	17	15
	Guzikonde	Mteza B	18	12	18	20	17
	Kameza	Msangu	11	12	12	12	11
	Bowa	Madziabango	10	12	11	11	0
Chitukula A	Kanyendera	Chiyembekezo	22	25	25	25	0
	Dothimduka	Chidyero	16	14	14	12	11
	Kamlembo	Uzi	13	15	15	19	16

chitukula B	Chimpando	Chimpando	24	25	25	27	25
	Suza	Matowe	14	16	18	17	15
Dzenza	Chisusu	Chantambe	10	8	12	16	0
	Chimao	Kalizamgugu	16	12	16	14	0
Chibade	Kanama	Chimodzi	15	16	14	15	0
	Chikanda	Mala	23	20	25	24	0
Mlumbwira	Kamangira	Tithandizane 2	17	20	19	22	20
	Chipeni	Tikondane 2	20	21	18	20	19
	Kamangira	Umodzi	19	22	22	24	19
	Simalambo	Chibwata	12	14	13	14	11
	Chipasula	Zonde	17	15	15	16	0
Total			550	590	512	637	358

The figure below is a summary of the table above



Not all the farmers attended the trainings because some were in the gardens guarding against livestock. Those farmers who did not attended the trainings were advised to learn from fellow farmers who attended the trainings.

CAPITAL INVESTMENT AND HARVEST RESULTS

No	Club name	Village	No of members who received starter packs	Land size (acres)	Inputs (MK)	output (MK)	Net gain	Seed Kg	NPK Kg	UREA Kg
1	Mango	Ndalama	4.3	6.45	K 507,400	K 924,000	K 416,600	43 kg	215 kg	215 kg
2	Mawandiwe	Mlezi	3.0	4.5	K 354,000	K 649,000	K 295,000	30 kg	150 kg	150 kg
3	Chimpumbulu	Chimpumbulu	1.2	1.8			K 0	12 kg	60 kg	60 kg
4	Tikondane	Chitedze	1.5	2.25	K 177,000	K 153,300	-23700	15 kg	75 kg	75 kg
5	Mteza B	Guzikonde	3.2	4.8	K 377,600	K 974,900	K 597,300	32 kg	160 kg	160 kg
6	Mteza A	Chigonthi	1.6	2.4	K 188,800	K 483,300	K 294,500	16 kg	80 kg	80 kg
7	Kachonde	Kachingwe	3.0	4.5	K 354,000	K 250,000	-104000	30 kg	150 kg	150 kg
8	Nankhonde	M'bang'ombe	2.9	4.35	K 342,200	K 612,200	K 270,000	29 kg	145 kg	145 kg
9	Ntchinji	Nyani	1.2	1.8	K 141,600	K 160,000	K 18,400	12 kg	60 kg	60 kg
10	Kachule	chiphwanya	0.9	1.35	K 106,200	K 295,000	K 188,800	9 kg	45 kg	45 kg
11	Msangu	Kameza	0.6	0.9	K 70,800	K 104,000	K 33,200	6 kg	30 kg	30 kg
12	Madziabango	Bowa	6.0	0.9	K 70,800	K 45,000	-25800	6 kg	30 kg	30 kg
13	Matowe	Suza	1.6	2.4	K 188,800	K 106,000	-82800	16 kg	80 kg	80 kg
14	Chimuza	Kanama	0.6	0.9	K 70,800	K 170,000	K 99,200	6 kg	30 kg	30 kg

15	Chimpando	Chimpando	3.2	4.8	K 377,600	K 826,600	K 449,000	32 kg	160 kg	160 kg
16	Phazo	Makalani	0.7	1.05	K 82,600	K 151,000	K 68,400	7 kg	35 kg	35 kg
17	Talandila	Nkhota	3.1	4.65	K 365,800	K 148,000	-217800	31 kg	155 kg	155 kg
18	Tithandizane 2	Kamangira	2.7	4.05	K 318,600	K 318,000	-600	27 kg	135 kg	135 kg
19	Tikondane 2	Chipeni	1.6	2.4	K 188,800	K 300,000	K 111,200	16 kg	80 kg	80 kg
20	Mitondo	Mayenje	3.1	4.65	K 365,800	K 716,800	K 351,000	31 kg	155 kg	155 kg
21	Umodzi	Kamangira	2.5	3.75	K 295,000	K 312,000	K 17,000	25 kg	125 kg	125 kg
22	Chibwata	Simalambo	2.4	3.6	K 283,200	K 613,000	K 329,800	24 kg	120 kg	120 kg
23	Zonde	Chipasula	0.9	1.35	K 106,200	K 106,200	K 0	9 kg	45 kg	45 kg
24	Chiyembekezo	Kanyendera	1.2	1.8	K 141,600	K 215,000	K 73,400	12 kg	60 kg	60 kg
25	Chisaka	Toyoyo	1.0	1.5	K 118,000	K 245,000	K 127,000	10 kg	50 kg	50 kg
26	Chidyero	Dothimduka	0.6	0.9	K 70,800	K 152,000	K 81,200	6 kg	30 kg	30 kg
27	Uzi	Kamlembo	0.5	0.75	K 59,000	K 100,000	K 41,000	5 kg	25 kg	25 kg
28	Mala	Chikanda	1.9	2.85	K 224,200	K 252,000	K 27,800	19 kg	95 kg	95 kg
29	Kalizamgugu	Chimao	0.5	0.75	K 59,000	K 180,000	K 121,000	5 kg	25 kg	25 kg
30	Chantambe	Chisusu	0.4	0.6	K 47,200	K 60,000	K 12,800	4 kg	20 kg	20 kg
31	Chinyama	Chinyama	2.9	4.35	K 342,200	K 756,000	K 413,800	29 kg	145 kg	145 kg
32	Tilimbike	Mkhalapadzuwa	0.7	1.05	K 82,600	K 79,500	-3100	7 kg	35 kg	35 kg
33	M'buka	Katela	1.1	1.65	K 129,800	K 109,000	-20800	11 kg	55 kg	55 kg
34	Tiyanjane	Katola	0.8	1.2	K 94,400	K 120,000	K 25,600	8 kg	40 kg	40 kg
35	Mtsukamthenda	Malawi								
36	Mlembe	Mkhalamba								
37	Gwazeni	Gwazeni								
	Total		**58.0**	**87**	**K 6,702,400**	**K 10,686,800**	**K 3,984,400**	**580 kg**	**2900 kg**	**2000 kg**

Some clubs have not yet sold their crops these clubs include Chimpumbulu and Zonde. For Tithandizane club at Chitedze and Tithandizane at Kamangira, some farmers have not yet sold their crop as well. Kachonde and Madziabango clubs faced the problem of poor or no grain formation at all hence low selling prices. It was observed that the challenge was due to lack of water especially at the end of the season. In some cases, like Chidyero and Talandila, it was due forearm worms which destroyed the crops due to lack of pesticides and late application for those who managed to buy.

Mtsukamthenda, Mlembe and Gwazeni clubs are new clubs which did not receive any starter pack inputs. These clubs will start next year.

CHALLENGES FACING SMALLHOLDER FARMERS AT CHIGONTHI

Land degradation due to molding of bricks

Molding of bricks negatively affects irrigation farming in three different ways. The first one is by lowering the water table which in turn makes irrigation water in shallow wells to runout so fast. The second problem is that people who mold bricks cut down lots and lots of trees to burn the bricks. Cutting down trees causes erosion which leads to fertile soil being washed away hence low farm yields. Thirdly, big and deep pits are formed where bricks are being mold thereby removing the fertile soil suitable for crops and distorting the landscape making it impossible for crops to be grown.

Late planting due to untimely receiving of inputs

Some members planted very late because they received seed and fertilizer late. This was so challenging because by the time they were receiving seed there was hardly enough moisture in the soil to carter for the crop till the time of harvesting.

Some farmers could not afford pesticides and fertilizer

The greatest destroyer of maize, fore army caused some farmers to harvest very little or no maize harvest at all. This was not mainly because the farmers didn't know the right pesticide but rather because they didn't have enough money to buy the pesticides.

In addition to lack of pesticides, others failed to get good yields because they could not afford to buy top dressing fertilizer.

Livestock

Livestock including goats, cattle and donkeys invaded some gardens and ate all the crops. Goats cause much damage when the crop is young while cattle cause damage at both stages initial and final stages eating leaves of maize. Unlike goats and cattle, donkeys do not eat the leaves they caused great damage and loss by eating the cobs in the garden.

Some maize stalks would not produce cobs

It was noted that cobs were not formed on some maize stalks. From the analysis that was done by Pannar seed, maize plant can produce a cob without kernels inside or cannot produce a cob at all.
Below are the factors that cause such problems.

1. Poor Irrigation.
   Maize plant cannot produce a cob because of how irrigation is being done. Maize plant has shallow roots, and is, therefore, susceptible to lack of water. Sometimes some portion of the field might not have been cultivated deep enough and the roots might find a hard pan which will make it difficult to access water though irrigation might be enough.
2. Pests.
   Pest like nematodes may also infect soil surrounding the roots. These microscopic worms feed on the roots and disrupt their ability to absorb nutrients and water consequently the plant won't produce the cobs
3. Fertilization
   This is another possible cause, the amount of nitrogen availability to the plant affects the plant by fostering foliage growth, resulting in no cobs on the maize plant. If limited nitrogen is available, the plant needs lots of calcium and potassium in order to produce cobs. Therefore, if these nutrients are limiting, the maize plant won't be able to produce the cobs.
4. Spacing
   This is one of the most common reasons for no cobs on maize plant. Maize plants should be planted at not less that 18cm apart. Otherwise when they are too close, you will be too much competition for resources as a result the plant will likely no produce the cob.

Grain not formed (*Apupa*)

Most farmers complained that maize grain could not form in the cob. This was due to a number of factors, the dominant one being lack of water. Other factors that led to poor or no grain formation at all include too much manure and fertilizer and goats eating the crop during the initial stage.

There is a myth that when farmers stop applying water to maize when the cob has been formed and the stalk produce large cobs. Because of that myth, some farmers did not harvest good quality maize hence very lowest selling price.

During monitoring of crops, it was observed that bottom leaves on the maze stalks were dry although the leaves on the upper part of the maize stalk were fresh and the cob in the process of forming grains. The dryness of bottom leaves showed a lack of water in the soil (moisture stress).

Some meetings with farmers were not successful

Meetings with farmers for trainings failed in some cases, due to cultural ceremonies, memorial tomb stones, funerals and sometimes receiving of coupons. In times when farmers start to prepare their land for rain season farming, it was also difficult to meet farmers as most of them go out to work in their fields (land clearing, ridging, planting etc.) as the rains started. Another reason was that some members went to receive seed and fertilizer coupons

Water problems

Due to climate change, some gardens which used to retain water in the wells until the next rainy season are no longer holding water. This has caused some farmers to harvest very little or no crop at all.

Fore army worms

Another challenge that is posing a great challenge on food security is the fore army worms**.** Although they were told of the right pesticide for these pests, some farmers failed to harvest good quality crop because they did could not afford to buy the pesticides.

More fragmented gardens

Due to rapid population growth, land is becoming less and less for farming. This is because farmers divide small portions of their gardens to their children who wants their own land.

Next year plans

***** Early irrigation - Irrigation will start as early as February especially for those sites where water dries out before the crop matures.

* Reestablishment of demonstration gardens - There is need to establish demonstration gardens in all the clubs where farmers will be able to learn practically about conservation farming, organic composting, Mbeya fertilizer.

* Provision of irrigation equipment - Rope and washer pumps, treadle pumps and windmills will be provided where necessary to simply the work of irrigation.

* Field day - AWP should be organising field days which will create an environment for more members of the community to learn what their friends are doing and how they can benefit and change their livelihoods from modern farming practices taught by Africa windmill project

Recommendations

For all necessary data to be collected in time, there is need for timely procurement and distribution of inputs which will lead to timely planting of maize and timely harvesting hence collecting data in good time. Therefore, inputs should be provided in the early and late days of February and March respectively to maximize the moisture present in the soil and utilize the water in shallow wells before they dry up.

Evaluation meetings with farmers should be done at least twice a year as it gives the farmers knowledge and ability to assess themselves on where they are coming from, where they are and where they are going (checking progress).

Members with small fragmented plots have been advised to rent other gardens in order to increase the area of production. For those club members who cannot afford to rent other gardens, they have been advised to make the most use of their plots by following mixed cropping like planting maize with beans and planting twice or thrice a year.

There are so many farmers whose wells are suitable for rope and washer pumps. Therefore, rope and washer pumps should be provided to those farmers.

Farmers in AWP clubs should also be exposed to other forums and take part in the farmer's conferences like MaFFAS as this helps farmers to learn a lot from each other and meet experts from other agricultural sectors fields

Conclusion

The project is improving the lives of rural families by transforming their traditional subsistence low-yield crops into all year round, high yield and high-quality harvests that continuously provide food and income, greatly improving their level of self-sufficiency. This has been shown by so many farmers buying livestock, opening small businesses, renting other gardens to increase the area of production, buying iron sheets and moulding bricks to build better houses and making plans to grow more crops in the following year to make more profit. With as little as MK 15,000.00, farmers are starting new businesses and venturing into entrepreneurship

Success stories

1. **Ainess Jalebe**

Bought a bicycle from selling fresh maize

Ainess Jalebe is a member of Mteza B. She started with Africa windmill project in 2017 where she has received a number of trainings from the classroom and demonstration garden. From the inputs that she received from AWP (1kg Maize seed and 5kg fertilizer) she sold fresh maize at MK 16,500. She added MK 1,000 and bought a bicycle at MK 17,500. The bicycle has simplified the work of transportation of farm commodity and travelling.

2. **Daniel Kabwira**

11 September, 2018. Daniel Kabwira and his wife in their maize garden.

After selling fresh maize at MK 40,000 Daniel decided to buy a pig. He bought a sow at MK 38,000 while it was in its gestation period which gave birth to 10 litters.

3. Liziness Chikundemba

Liziness Chikundemba is one of the women who has emerged as a female entrepreneur with the coming in of Africa Windmill project. She received 1kg of maize seed and 5kg of fertilizer. Using these inputs, she grew maize which she sold as fresh at MK 25,000. After selling the maize she decided to invest the profit by opening tearoom. In addition to farming, she is also now making money from selling tea.

The photos above show Liziness in her tea room and on the right outside her tea room.

4. **Michael Kaiyatsa -** From simple farming and use of simple irrigation tools into commercial farming and use of machinery (from watering can to motorized pump), creation of employment and maximum utilization of resources.

Michael Kaiyatsa is the chairman of Mteza A and Mteza B. He joined Africa Windmill in 2017. He was growing different crops under irrigation using watering cans as means of irrigation and he did not know the method of using irrigation basins until he was trained by Africa windmill in 2017. He made a decision to be growing his crops in small irrigation basins as instructed by Africa windmill project coordinator. He grows tomatoes, maize, and cabbages. He grew maize in 240 basins; however, goats invaded his garden and ate maize in 49 basins. The remaining basins he sold maize at MK 143,000.00. He also grew 9600 heads of cabbages in small irrigation basins which he sold at MK 783,000.00. He planted tomatoes in basins as well which was also sold at MK 240,000.00.

From the profit obtained, Michael has now managed to buy a motorized water pump at MK 75,000.00. MK 120,000.00. He also has employed 2 permanent laborers which he pays them MK 14,000.00 per moth each. to be working on his garden. He now rents other gardens to increase the area of production. He has leased 0.75 acre at MK 30,000.00, tomato seed at MK 2,000.00 and cabbage seed at MK 18,000.00, and 3 bags of fertilizer for tomato and cabbage.

Michael Kaiyatsa in red shirt, his wife, daughter and one of his employees (Topayizi Edson) happy with the water pump he has purchased. Using the budgeting and planning training, Michael Kaiyatsa has planned to grow 7kgs of maize, 21,000 heads of cabbages o 1 acre and 0.5 acre of tomato. He has molded 20,000 bricks for which he intends to build a house and buy iron sheets next year. He also plans to buy another water pump next year 2019.

5. Boston Chikhazika

When Mr. Khazika sold fresh maize, he realized MK 35,000.00. Using this money, he paid MK 5,000 as a requirement for joining the pass on program of dairy cows and MK 6,000 as a registration fee. He also paid MK 20,000 for the calf to be passed on to him. Now he has a dairy cow of his own by MK 31,000 which he got from selling fresh maize

The picture shows Mrs. Chikhazika with a dairy calf behind her.

6. **Frazer Million**

Frazer Million is a member of Mawandiwe club in Mlezi village. He joined Africa Windmill Project in 2017. He has successfully utilized the knowledge and resources (seed and fertilizer) provided by Africa Windmill Project for food security in his household.

He sold maize at MK 136,000.00. Using this money, he plans to buy iron sheets for his house.

It is important to note that so many farmers have bought iron sheets, pigs' fertilizer which will help them to get more yields from their farms during rainy season

The high incidence of rural poverty in Malawi is both caused and reinforced by low productivity and small farm size (World Bank. 2007. Malawi poverty and vulnerability assessment: Investing in our future, Synthesis Report. Washington, DC)

Use of low-yielding seed varieties, limited access to inputs, credit or training, and poor water management, has greatly limited smallholder productivity at Chigonthi EPA this is what Africa Windmill project is striving to address.

Vegetable production

Lead farmers training

LEADERSHIP TRANSITION

In the course of the year the Founding Country Director was denied a working permit by authorities in the immigration department. This incident kick started a process that lead to the change of leadership because the Country Director could not be allowed to work legally in Malawi without the work permit. The Country Director resigned and a new Country Director was hired in July 2018. He happens to be Mr. Gibozi T. Mphanzi who joined the organization after working with YouthCare Ministries for almost 10 years. It is important to note that the organization grew reasonably in the early years of its existence. Over 3000 vulnerable farming households have been transformed from food insecure to food secure households in Mngwangwa and Chigonthi areas. The organization has also developed and improved two irrigation pumps that use sustainable energy. Mr. Christopher Adare will always be remembered for leading Africa Windmill Project during the inception for the project and the formation stage which are the most difficult times of the life cycle of the organization.

Visit to Mr. Japhet Kalimba – Chimteka Village, Mchinji

Mr. John Drake visited Africa Windmill Project in August and during his visit he had this strong desire to visit pioneer farmers who started working with AWP in its initial years. Mr. Kalimba is one of the farmers who benefited from the trials and the trainings that AWP was offering to the vulnerable farmers in Mziza village which is under Mpingu EPA. After farming for a number of years Mr. Kalimba saved money and relocated from his village in Mziza to his wife's village in Mchinji.

John wanted to find out for himself if Mr. Kalimba continued to use the knowledge and skills that he got from AWP in his new environment. His theory was that if farmers where truly transformed, they would continue to do the right things that they learn even if they moved from their initial areas of residence. This was going to prove whether AWP is doing a great job of transforming the thinking as well as the culture of rural farmers or not. During the visit, it was discovered that Mr. Japheth Kalimba had bought about six acres of land. The choice of land mattered, he had bought land for rain fed agriculture as well as went land for irrigation agriculture. By the time of the visit he had built a burnt brick house thatched with iron sheets and had built other grass thatched houses for his sons and daughters. He had two big silos for maize and one smaller one for ground nuts. This was enough proof that the knowledge and the skills that Mr. Japheth Kalimba learnt in Mziza was transformational and that it was not just for a season but something that he will use for the rest of his life.

It is interesting to note that the local neighbors had already noticed what Mr. Kalimba was doing differently with his crops. They saw that he was taking great care of his crops and that the crops were helping him make a lot of money. The neighbors gathered together to seek for his counsel and an irrigation club was formed to encourage irrigation farming in Chimteka Village in Mchinji District. As of December 2018, the club has been visited three times and the club has received 15 Rope and Washer pumps to help in the farming. The club has also been assisted in identifying a market for onions that the farmers were just keeping because of lack of a viable market. As of December 2018, over K148,000.00 worth of onions have been sold to African Bible College from the irrigation farming club in Mchinji.

The number of farmers who are interested in irrigation agriculture in the area is growing and there are plans to add new members into the club or split the club into two so that the two clubs can accommodate more members. Management will have to make a decision to see if having two clubs could be better than having one club with more than 15 members.

REFOCUSING AWP TOWARDS WINDMILLS

The name Africa Windmill Project is so telling as to what the organization is all about. It puts windmills at the center of the organization. However, a visit to the sites was telling a totally different story. When one of the Board Members, Mr. John Drake visited the organization in August there was this question of whether the name needed to be changed or windmills had to be a major part of the organization focus. Mr. Drake explained how he grew up in Texas and how windmills have provided sustainable water sources for entire communities as well as for irrigation in areas that are considered drier than some areas in Malawi.

His theory is that if windmills work in Texas, they can also work in Malawi and other parts of the world which have wind moving at certain speeds. He believes that windmills can provide energy to pump water for irrigation there by helping farmers irrigate a relatively large garden with less energy.

During the time of Mr. Drake's visit, AWP had two windmills in Mngwangwa EPA and none was working. During the visit, the AWP team managed to repair one of the windmills and brought it back to life.

The policy connected with ownership of windmills was also revisited. Starting from August 2018, windmills will belong to the individual farmer instead of a club to make sure that there is ownership of the equipment. However, club members will be granted access to the garden for learning.

As of December 2018, AWP has one working windmill in Mngwangwa EPA and the team is in a process of constructing another windmill in Chigonthi EPA.

PURCHASE OF A VEHICLE

One of the challenges that was there at Africa Windmill project was that one of the cars that were being used as field vehicles was worn out. This car was purchased from one of the farms in Kasungu after it had worked for some time. Break downs were regular and this disturbed the flow of work as well as wasted funds as well as time that the field team needed to have with farmers.

It important to share with readers that in the course of the year, Africa Windmill Project has purchased a field vehicle that will replace the Mazda that has been working in Mngwangwa since the inception of the project there. A Toyota Hilux, twin cub was purchased to replace the Mazda in November 2018. The Toyota Hilux is a second-hand vehicle and needs to be serviced and adjusted so that it reaches the quality that is needed for our field vehicles. This will be an on-going activity because some of the repairs are not as crucial.

PARTNERSHIPS AND COLLABORATION

Partnerships and collaboration play a very crucial role in the work that we are doing with vulnerable farming households in the rural areas. Transforming and developing households is something that is multifaceted and therefore cannot be thoroughly done by one organization. This work needs the coming together of different organization and different professionals to make sure that the transformational work is sustainable and it covers all areas that may need the changes.

Again, Africa Windmill Project has some expertise that needs to be shared with other organizations and individuals to add value to the work that those organizations and individuals are doing. In case of our pumps the vision is to make sure that the pumps are popularized as well as improved. AWP therefore needs likeminded individuals, institutions of learning as well as organizations that can come along the organization to make sure that irrigation technology is being used by rural farmers and that the technologies are found locally, at an affordable price and are continuously improved to meet the needs of the users.

In the course of 2018, AWP has worked with Children of the Nations mostly in assessing the Chichere farm and helping COTN to come up with a viable plan of using the farm so that it benefits the organization more than it is doing now. Chichere farm has the potential of producing enough food for the homes and school under COTN and the farm could also sell the surplus produce to make sure that it sustains itself. However, at the moment the farm is underperforming and there is need to make sure that the farm breaks even and is able to make reasonable profits.

AWP has also partnered with Pannar Seed in the course of the year. Pannar Seed produces a variety of maize seed that our farmers use in their gardens. Because of the partnership we have been able to buy seed at a wholesale price to make sure that we maximize the use of the resources that we have. There are chances that Pannar Seed could sponsor some demonstration gardens for AWP clubs in the future.

This year, AWP has also managed to meet with staff from African Institute for Corporate Citizenship (AICC). AWP will gain support in fundraising for projects as well as popularizing the pumps that are developed so that they reach more farmers in the country. AICC works across Malawi and this could help AWP reach the entire country with its knowledge and skills.

World Relief Malawi is one of the organizations that AWP has partnered with in the past. However, there was a silence in the partnership which brought to a stop the work that was being done between the two organizations. AWP has connected with WRM and there is a possibility that the partnership could be reactivated to benefit rural farmers in Salima. There is a possibility that together, WRM and AWP can raise funds which could facilitate the development of three windmills which could be installed in Salima in 2019.

In November 2018, AWP made a project presentation at the District, Agriculture, Extension Coordinating Committee which was in a way introducing the project to the coordinating committee. This helped AWP to become a member of the forum and during the first meeting AWP was voted in the steering committee for Lilongwe District as a Member. As of December 2018, AWP staff have attended at least two DAECC meetings.

It is also important to note that there is another lose partnership that is also being pursued. This is the one that exists between AWP and Dr. Kanthunzi is a Lecturer at LUANAR Bunda campus. He is interested in irrigation engineering and our pumps have excited him and there is hope that he might continue to improve and share the knowledge of the pump to other stake holders.

CONCLUSION

In the year 2018 continued with its work of transforming lives of rural farmers. The year was very crucial in Mngwangwa EPA because it was the climax of the learning process there because the project has reached its third year and will be going into its final year. Most of the work at AWP focused on making sure that the house holds that we work with are able to plan for irrigation agriculture, execute their irrigation plan, harvest their products and re-start the cycle. This has come out so clearly in the sense that farming households have now developed this culture or doing irrigation agriculture. It is important to note that as staff focused on Mngwangwa, they did not overlook the potential that Chigonthi EPA provides to AWP as such a fair amount of attention was given to Chigonthi where the project is in its second year. The organization will prioritize the use of sustainable irrigation technologies of which the major one is the windmill. These will be given to individual lead farmers who will use the technology to increase production as well as train other farmers. Africa Windmill Project will prioritize partnerships going forward because these are platforms that will help the work that is being done to be shared widely. Old partnerships are going to be reviewed and new ones are going to be formed to make sure that there is crosspollination of ideas and skills. The organization is also going to participate in sector wide forums as well as District and Area platforms. The new project vehicle will help to alleviate challenges that have been there in terms of transportation.