The Impact of

APPSA

Within and Beyond Borders

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FOREWORD

The Agricultural Productivity Program for Southern Africa (APPSA) has been implemented in Malawi, Mozambique and Zambia. Malawi being a regional center of leadership (RCoL) for maize based farming systems. The initiative has made a great contribution to the National Agricultural System and agricultural Development in Malawi. A few, out of many success stories from APPSA are contained in this publication. This Magazine contains some of the great work that APPSA has contributed to Agricultural sector in Malawi. So far, APPSA has released 27 improved agricultural technologies that are already making a tremendous impact in the three countries. APPSA has also facilitated the promotion of 85 already released technologies. It has trained 43 people on long term trainings on PhD (10), Masters (23) and Bachelor's (10) Degree level. It has also sent many agricultural staff to short term trainings. APPSA has also raised magnificent infrastructure in a number of research including Chitedze (Lilongwe), Bvumbwe (Thyolo) and Kasinthula (Chikwawa). These structures included office blocks, laboratories, irrigation facilities, storage facilities just to mention a few. In general, APPSA project has been holistic in nature and its fruition is still dripping out.

A Word from the Author

STRENGTHENING THE REGIONAL CENTRE OF LEADERSHIP THROUGH INFRASTRUCTURE DEVELOPMENT

Quality output from Agricultural Research is affected by number of factors that include infrastructure that compose of buildings, laboratories, offices, storage structures among others. In Malawi, output from the national agricultural research services that is anchored on the Department of Agricultural Research Services (DARS) has been challenged with a number of factors including lack of appropriate infrastructure. Fortunately DARS has been assisted by the World Bank to ease most of these challenges. This has been made possible through their implementation of the Agricultural Productivity Program for Southern Africa (APPSA).

These structures include office space, laboratories, library, conference rooms, cold room as well as renovationand rehabilitated essential facilities.

OFFICES

APPSA has constructed magnificent administration blocks for DARS that contains offices, conference facilities, libraries among others. At Chitedze, Bvumbwe and Kasinthula Agricultural Research Stations.

The construction of all the offices including the library and conference room is completed. Each room is installed with air conditioners, in addition to the air conditioners, in between the roof and ceiling is an insulation paper which makes the room have a good cold temperature even when the air conditioner is not switched on/not working.

APPSA has also constructed laboratories at Chitedze and Bvumbwe Agricultural Research Stations

APPSA has also constructed a beautiful asphalt Chitedze Agricultural Research Station and compacted gravel roads at Chitedze, Bvumbwe and Kasinthula.

The project has also constructed anirrigation facility that has a water reservoir, pump house, sprinkler and basin irrigation system at Kasinthula Agricultural Research Stations.

WATER RESERVOIR (DAM)

At the irrigation scheme, a 3300 Littre water reservoir was constructed which is lined with a geo-membrane layer to avoid the water loss through seepage. The spill way was also constructed to safely release the excess water to a proper drainage channel. It has been recommended that the geo-membrane should be supported with bag of sand cement in order to avoid the wind to blow the geo-membrane away during the times when the reservoir is empty. APPSA project coordinator Dr. Macksson Banda recommended "This is a beautiful reservoir,there is a need to plant trees around the reservoir at least 4 meters from the margin of the reservoir" he further added "Trees will help in reducing evaporation losses from the reservoir".

A Pump houseat Kasinthula Agricultural Research Stations

A Pump house was built at 7 meters from the reservoir, in the pump house, as the name suggests, is a water pump to pump water from the reservoir to 5 hectare land where there is a sprinkler irrigation system.

In an interview with Dr H. Kazembe, the head of section for Farm Power and Machinery Unit, to comment about the pump house,

he answered, " Previously in the pump house there was a 50 horsepower pump which is meant to irrigate the land of not less than 100 hectors and our land is just 10 hectares which simply means that that pump was too big for our intended purpose which would make this reservoir to dry up in just a few days" What are the specification of the new installed pump and how good is it compared to the old one? "The new pump is 10 horsepower 36 meter head which is economic for our farmland and in addition to that it uses less electrical power than the old one" He also added that what is remaining is to test the pump if it is working efficiently and that will be done when the Electricity Supply Commission of Malawi (ESCOM) connects the power line to the pump house.

SPRINKLER IRRIGATION SYSTEM

The main flame of the system was installed and raisers will be installed when the pump house is connected with power. It was also pointed out that the hydrants are too exposed to siltation and very difficult to people to operate it, so it was suggested that a man hole should be constructed around each hydrant. The picture below depicts the present exposed hydrant without a man hole.

It was also observed that the pipes coming from the underground flow was not perpendicular to the ground which will result in poor overwrapping angles thereby negatively affecting the system's irrigation efficiency. For that reason it was recommended that the contractor should realign the pipes to be perpendicular in order to avoid the irrigation inefficiency.

When the director was asked on what is remaining on the sprinkler field and why is it being partially hard over? He replied "what is remaining is the electricity power line to be connected to the pump house by Electricity Supply Cooperation of Malawi (ESCOM), till then, the system will be tested and commissioned"

BASIN IRRIGATION

The basin irrigation facility and the canal that supplies water to the Irrigation site have been rehabilitated. Each basin has a pipe that supplies water to it from the distribution boxes.
It was reported that one of the pipes that supplies water to one basin has been stolen. To avoid such vandalisms in future Mr. Loga suggested that the pipes should be made to be movable so that they should be moved out after irrigating and be fixed again during the next Irrigation event.

ENHANCING AVAILABILITY OF VITAMIN-A

RICH MAIZE VARIETIES IN MALAWI, MOZAMBIQUE AND ZAMBIA

Vitamin A Deficiency is one of the most prevalent problems in Sub-Saharan African countries including Malawi, Zambia and Mozambique. An array of solutions have been proposed to combat Vitamin A deficiency. This includes direct Vitamin A administrationcampaigns in pre-schools and primary schools, use of plant based products as well as fortification of food products. Fortification has been identified as a quick way in responding to Vitamin A deficiency despite being expensive. It costs it approximately $1,000,000 to make 100,000 metric tons of fortified Sugar or Maize flour. This raises the costs of fortified products hence limiting access among the majority who are poor. Fortunately,there is light at the end of the tunnel, theAgricultural Productivity Program for Southern Africa (APPSA) with other stakeholders are working together within the region todevelop and promote bio-fortified maize varieties. This has proved to be an ideal solution across all social classes including small scale farmers and other marginalized societies since maize dominates the diets in all the three APPSA countries.

"The Zambia Agricultural Research Institute, ZARI, commenced the orange maize initiativewhen the Zambia Government called for fortification of Vitamin A, Iron and Zinc. The Zambians were not sure of health hazards that may be imparted by chemical fortification of food products so they opted for conventional, natural occurring bio fortification through use of orange maize as a safest option for having vitamin A in food," said Kabamba Mwansa,

a maize breeder from Golden Valley Trust who is leading the initiative in Zambia.Likewise Malawi and Mozambique shared a similar experience.

In Malawi and Mozambique, the initiative is being successfully led by Kesbell Kaonga and Pedro, respectively. The collaborative platform has shortened the breeding process through sharing of germplasm, data, informationand experiences across countries. Fato explained, "we've tested more than 50 hybrids and 300 parental lines from sister countries from which we have selected parental lines for our breeding program, have enough parental materials in our improved breeding program. We attributethisadvancement to the APPSA initiative". So far, the collaborative efforthas released a total of 11 vitamin A rich maize varieties. Malawi released five Vitamin A hybrids namely MH45A, MH46A, MH47A, MH48A and MH49A. The acronym MH means 'Malawi Hybrid' whilst the suffix 'A' represents 'Vitamin A'. EquallyZambia, released 6 hybrids. On the other side, Mozambique is yet to release two hybrids as reported by Fato. These hybrids have been successfully tested and proven well adapted across the three countries. All this, has been possible with support from the World Bank, through the APPSA regional collaborative program. Currently, farmers and other consumers are aware of the benefits of using orange maize varieties in the three countries. It was observed that most Zambian farmers are aware and willing to pay more for the benefits that comes with the Vitamin A rich varieties.A chat with Patronella Hamaida Chulu, an Extension Officer for Kapita Agricultural Campit was clear that vitamin A rich maize varieties in the area are preferred by people in the area.

"The nutritional benefits from orange maize has forced traders and consumers here in Mambweto pay higher price for the orange maize grain", Patronella appreciated,

Patronella Hamaida Chulu, an Agricultural Extension Officer for Kapita Agricultural Camp in Mambwe district Zambia appreciating some of the cobs from Pro-Vitamin A varieties grown by some of her farmers.
Photo: H. Malaidza

She further added, *"although I am an extension officer I also like growing this orange maize because it is good for my family health"*.

One of the farmers under Patronella's realms of advisory services, Manase Ngoma explained that orange maize has multiple uses in our households; the flour is used for making porridge for infants and healthy flitters that are sold for income.

"Fresh orange cobs plucked from green maize are roasted and sold for cash and the money is used to buy other household necessities",

Dr Kaonga iterated, “research has shown that vitamin A levels in the roasted maize does not change by theprocess of roasting”. Equally, Rhoda Zulu, a renownednutritionistexpressed that an acceptability assessment of vitamin-A rich maize varieties in Malawi on selected districts. The results proved that Malawian farmers have welcomed the orange maize. Arnold Kamponda, one of the farmers who has adopted Vitamin A rich maize hybrids for two years in Malawi appreciated, “It is good to get the vitamin A from our staple food otherwise we cannot afford to buy supplements or other fortified food especially in dry season when naturally occurring vitamin-A rich foods are in short supply,”.

The good news on vitamin A rich maize has also stretched to grain processors who are also keen to turn the orange grain in something more valuable. In Zambia, Mpogwe milling company is zealous to turn orange maize grain in flour in its Milling industry. They plan to multiply the maize through theirout grower scheme. On the other hand,aMalawian company known as Vita-Meal is now using vitamin A rich maize grain for processing productsincluding a vitamin rich porridge widely known as Likuni Phalaamong Malawians. The porridge made from that flour is so nutritious and usually fed to infants. Vita-Meal is also making corn puffs from maize grain. The company has also opted for pro-vitamin A maize graininstead of vitamin-A chemical concentrates. Vita-Meal is buying Orange maize from Malawian farmers at MwK160 (US$ 0.22) which is a relatively higher than white maize sold at MwK100 (US$ 0.14) per Kg. Whilst in Mozambique, Losana Farm is interested in turning orange maize grain into livestock feeds as a novel product for its clients.

Orange maize grain into livestock feeds as a novel product for its clients.
Seed availability has also been a challenge on newly released maize varieties in the three countries. Through APPSA, the collaborators have opted to partner with private companies on seed multiplication. Malawi has seven companies that have already collected parental lines of the indicated quantities for seed multiplication. Equally, Mozambique is working with Campanhia De Zembe and Nyara Yaperawhilst Zambia has partnered with Sygenta Seed Company, Mpongwe Milling Company and Chilala Milling Companyin seed multiplication.

It is eminent that Malawi and Zambia have a higher demand for using orange maize for human consumption. On the other hand, Mozambique has a higher demand for livestock feed. There is a need to place promotion mechanisms that will advocate use of orange maize for human consumption in Mozambique. There is alsoa need to advocate change of perception on Orange maize in the three countries.

Most people relates orange maize to some kind of yellow maize previously offered as relief forhunger that struck the region in the early 90s. That yellow maize came from abroad and was not liked by many.The grain had overstayed for some years in storage before delivery.People expressed that flour from that grain did not taste nice. Therefore, the misconception of Orange maize, being seen as yellow maize need to be cleared among potential consumers through appropriate promotions.

The Orange hybrids are being disseminated through a number ofpathways including demonstrations (on-farm and on-station), field days, fairs (agricultural, seed, science, trade among others), TV and Radio programs, printed media (policy briefs, brochures, factsheets, online publications, participatory variety selection, preference assessments among others.

Additionally, there are other innovative approaches used by the countries. Malawi conducts Mini field days that targets Commercial Company and other stakeholders interested with new maizevarieties. In additional, they have developed training videos that gives step by step recommendations in handling the varieties. Equally, Zambia is using an innovative approach called seed drop where theydistribute 300 kernels or grains of orange maize to farmers for free.

Farmers appreciating maize varieties rich in Vitamin A at a field day at Chitedze Agricultural Research Station in Malawi. Photo: H. Malaidza

Mr. Chazingwa, the vice chair of Kapita Camp Committee in Zambia expressed a slightly modified approach, he said "we distributed 500g packets of orange maize to 500 pupils at a nearby primary schoolwhich we advised them to plant at their homes with their families". This has been a powerful approach for testing and bringing awareness to many households within one production season. For Mozambique intends to borrow follow best promotion practices from Malawi and Zambia once it releases their two varieties.

Mwansa stressed"these varieties are awesome but there is a need to build capacity amongst specialist across the three countries on determination of Vitamin A". He added, "the Vitamin A content for the released varieties ranges from 8 to 13 parts per million (PPM), we need to increase the content to 15 PPM, which is the anticipated level by most nutritionists".

Cyprian Mwale, a maize breeder at Chitedze Research Station said "We also need to assess retention of Vitamin A over time under varying conditions with regard to moisture, heat, susceptibility to insect pests, exposure to light among others".

Finally, these are the varieties that can solve nutrition challenges in the Sub-Saharan Africa. The World Bank has done a recommendable job for facilitating development of these rich varieties through APPSA. At this point, Governments need to take these hybrids into their agricultural programs and transform the lives of their people.

Strengthening Appropriate Mechanized Innovations in Agriculture to Achieve Food Security through Demonstrations and Field Days

There is optimism that appropriate farm mechanization can improve efficiency and effectiveness of farm operations among smallholder farmer. In turn, this can bring more returns to small scale farmers hence ensuring productivity and returns in farming businesses. Additionally, this can ensure food and income availability among smallholder farming households in Malawi. Collectively, this can help the country to be food, nutritional and economically secured. In general, use of mechanized innovations among small scale farmers in Malawi as well as the Sub-Saharan Africa is low. Fortunately in Malawi.

Mechanization in African farming systems needs more consideration and appropriate policy guidelines and strategic frameworks to: improve agricultural productivity;increase employment; and to realize socio-economic growth. Mechanization does not equal tractorization. Successful mechanization suffice the needs and demand of the whole agricultural value chain with inclusion of different catego-

ries of farmers.

For the past three years, the Agriculture Productivity Program for Southern Africa (APPSA) has concentrated its effort to strengthen use of appropriate mechanized innovations in agriculture. APPSA is a World Bank funded program being implemented under the Department of Agricultural Research Services (DARS), in the the Malawi ministry of agriculture. The main mechanized innovations being promoted was the fertilizer applicator with other recently released mechanized innovations. These mechanized innovation have been used in demonstration plots where fielddays were conducted at various physiological stages of the crops. The main objective of the field days was to promote and strengthen use of appropriate mechanized innovations among small scale farmers for them to achieve food security.

Few months ago, a scientist working with DARS, Mc Lloyd Banda, expressed, "my father ever lamented that applying fertiliser in farming, is a tedious job, you researchers, haven't you developed a simple machine that can simplify this job". This shows that farmers need appropriate simple machines for their farming. On the other hand farmers cannot demand something they don't need. There is a need to refine the machines, build them with lighter and strong materials to render them portable.

Most farmers of the farmers that participated on managing the demonstration or the demonstration plots and field days, alluded that the maize crop whose crop was dressed with the fertilizer applicator was uniform and beautiful unlike the one dressed with the conventional hand method. This was attributed to the efficiency that was there during the time of fertilizer application as the machine was more precise and delivered a uniform quantity.

Farmers also observed that the fertilizer application process using the fertilizer applicator was less tedious than using the convention dollop (hand) method. One of the participating farmers, Zeli Hamesi of Magomelo Club from Kachule village explained the advantages of using the applicator as a method of fertilizer application, in her remarks she praised the technology as a Labour saving technology, which save on time and it is precise.

Used Old Methods of Applying Fertilizer

On these demonstration fields, the farmers also showcased the newly APPSA released maize varieties including Malawi Hybrid (MH), MH42A, MH 43A, MH 44A. The plots were also planted with Chitedze groundnuts (CG) varieties that are being promoted by APPSA, these included CG 8, CG9, CG10, CG11, CG 12, CG13 and CG 14.

These demonstrations and field day was also a powerful platform for disseminating APPSA technologies. Farmer appreciated the opportunity of being exposed to the newly released

In addition to the fertilizer applicator, the field days showcased a number of machinery used for groundnut (peanut) production and processing. These machines included a groundnut lifter, groundnut striper and Groundnut Sheller. The Agricultural Development Extension Officer demonstrated to the participants how the machines work. Participants were given an opportunity to reflect on the field day by asking questions, concluding and making necessary recommendation. The field day also provided an opportunity to capture feedback on the performance of the fertilizer applicator.

Farmers expressed that use of machines saves time and effort for other farm activities. It was observed that most farmers do not perceive farming as a business, hence they concentrate growing crops for food. This interventions may help to empower smallholder farmers economically there by improving their well-being.

Engaging the YOUTH in Agriculture

The youth are individuals between aged from15 to 24. APPSA is being implemented in sub-Saharan Africa countries where more than 20 percent (200 million) of the total population of are youths. One of these APPSA countries is Malawi whose 40% of its population (17.2 million) are youths.

Recent studies have shown that most youths in SSA are not schooling, not on training nor employed. For those who have completed their education, not all have steady employment.

This is a challenge to the youth who are growing to adulthood. Quite often, young adults end-up in an unstable socio-economic situation that forces them into risky behaviours. Such behaviours are detrimental to their lives as their communities' .Usually farming is available as a part time or full time employment option to the youth. Agriculture is a diverse and dynamic sector that offers a wide range of opportunities along its value chain. If governments can develop clear strategies on how to attract and support Africa's rural youth to succeed in agriculture,

the youth can contribute more to their national economies.On the other hand, agro- preneurship can reduce unemployment rate in Sub Saharan Africa including Malawi.

Owing to this development challenge, APPSA has opted to strengthen youth involvement in agriculture. From the on-set of the initiative the impact is clear. The youth have come out in multitudes with enthusiasm. The communication Officer for APPSA, Hector Malaidza commended on the commitment of the youth eminent in their active participation. He further indicated in awe, "Indeed if we want to change the world, we have to change the mindset of the youth first".

Without doubts, it is advantageous to an agricultural based economy such as Malawi if it strategically engage the youth in agricultural since they take a substantial proportion of the population. If the knowledge, skill and attitude investment is made at their young age, they will grow up to adulthood with it. As they grow, they will master and internalise the skills. As a result, they effective and efficient in their farming business.
Additionally, the youth are also been the right change agents for disseminating agricultural information and technologies. Once acquainted of new information, it's great to their education; they also transfer it to their home as well as their communities.

Youth friendly activities implemented by APPSA include information packages that aim at bringing awareness to youths. They focus on the bright side of agricultural business and professional aspects. On the other hand, the Malawi APPSA secretariat encouraged secondary schools surrounding Chitedze Agricultural Research Station to access small packages of seed for the new varieties generated and promoted by APPSA sub-projects. They were also advised to follow all recommended farming practices in their school plots. In additional, they were technically supported as education plots throughout the season. It was impressive that they successfully managed the plots whilst learning concepts of agricultural production. When the crops had matured, pupils from the participating schools were invited to a youth open day where they shared experiences. Prior to the open day, pupils and their teachers were also requested to suggest topics they wish to cover on the open day. Their suggestions were put together and formed the base of the open day. Their request were honoured, and activities were tailored to respond their needs .They even developed their own slogan where the leader

shouted "Ag-Power" and the entire group of the youths responded with "Youth on the Move". In general the activity was a great success.

For individual schools, the activities were handled by 'Agriculture Clubs'. In cases where the clubs were not yet established, the activities were handled by an Agriculture Class. They were encouraged to have a mechanism in place where the activities will continue even if key individuals completes their education. That was an element focusing on sustainability of the activities. The link person for each school was the Agriculture Teacher supported by the Head Teacher. For DARS, the responsible officers are Technology Transfer Officers, who will continue the initiative in absence of APPSA.

Most people who took part in this youth friendly activity expressed appreciations and gratitude for this novel approach of engaging the youth. They pupils also alluded that they have learnt a lot and were thankful to APPSA for being responsive to their specific needs.

Some of the pupils pledged to use what they've learnt in their academics and in farming at their respective homes.

As the team concluded this season's farming cycle. Plans have already been set for preparations of the coming season. Pupils were encouraged to think creatively, think outside the box. The facilitators stressed that their suggestions should be forwarded to their teachers. In turn, the teachers will bring the suggestions to a planning meeting. This meeting will be held at the beginning of every school term. There are three terms in Malawi, this means three planning meetings. The teachers, APPSA stuff and Technology Transfer Officers will put all ideas on one working document. Thereafter, a selected number of pupils will be engaged in grouping and priotising the activities. The process will continue until a working plan for the next season is realised.

APPSA Communications officer expressed that, from experience youth projects activities have been challenged by policy and project implementation rules. Previously, there have been initiatives that did not allow flexibility in implementing youth friendly activities. He advised that institutions and projects supporting youth initiatives, of this nature, should provide guidelines for implementation to avoid conflicts of interest. It was requested that CCARDESA and the World Bank should provide guidance at all levels in implementing youth friendly activities.

In addition, there is a need to implement stand-alone projects that will solely target the youth. A concentrated effort on the youths can yield meaningful results. On the other hand, there is a need of policy advocacy that will lead in establishing policies that can support youth development in agriculture. These should include conducive policies, financing mechanisms market sand advocating changes to mismatching systems and structures.

UNITY AND FREEDOM

CCARDESA

Centre for Coordination of Agricultural Research & Development for Southern Africa
Centre De Coordination De La Recherche Et Du Développement Agricole De L'afrique Australe
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