



MBAZARDI

NEWSLETTER



JUNE - DECEMBER 2020

Editor's Note

Innovations in the Dairy Industry

Enjoy the **maiden issue** of the
MBAZARDI Newsletter

Welcome to the maiden issue of the MBAZARDI NEWSLETTER. Over the years, MBAZARDI has contributed to the growth of the agricultural sector in South Western Uganda.

In the dairy industry it has introduced alternatives for dry season feeding. Dry season feeding had previously been a challenge in cattle keeping communities with some farmers losing as much as 50% of their herds. In this issue we note the transformation achieved by farmers through alternative dry season feeding.

Quality seed is key in getting high yield from a crop. While factors like water for production and soil fertility matter, they don't amount to much with poor quality seed. With the support of MBAZARDI and ISSD, communities are engaged in commercial seed production with seed banks.

Learn about Kiruhura Women Entrepreneur's Group and ghee commercialization, how we celebrated World Food Day at the height of the pandemic and more. Welcome and happy 2021!

SUZAN K. NIMUSIIMA
Development Communications Officer
NARO - MBAZARDI

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MBAZARDI MANDATE

To undertake research in all aspects of agriculture including crops, livestock, fisheries, forestry, natural resources and social economics in the South Western Agro Ecological Zone (SWAEZ)

NARO'S GOAL

To enhance the contribution of agricultural research to sustainable agricultural productivity, sustained competitiveness, economic growth, food security and poverty eradication.

NARO'S VISION

A competitive society supported by a dynamic agricultural research innovation system.

NARO'S MISSION

To innovate for sustainable agricultural transformation.



Foreword

Research supporting agro- industrialization

DR. HALID KIRUNDA
DIRECTOR OF RESEARCH- MBAZARDI

Dear our most treasured stakeholders and esteemed readers, I am immensely pleased to introduce to you the first Newsletter of the Mbarara Zonal Agricultural Research and Development Institute (MBAZARDI). MBAZARDI is one of the Public Agricultural Research Institutes under the policy guidance of the National Agricultural Research Organization (NARO). This NARO Institute is mainly responsible for conducting adaptive and applied research aimed at providing solutions to challenges in South Western Agro-Ecological Zone.

The Newsletter shall be serving to share the recently developed technologies, innovations and management practices with stakeholders in the livestock, crop, aquaculture and agro-forestry sub-sectors. As we continue to undertake research, we have recently developed technologies essential in enhancing crop and livestock productivity and increasing efficiency in value addition or processing. Such solutions are very critical in promoting agro-industrialization in the country. To enhance our capacity to deliver on our output and outcome targets, we closely collaborate with partners including such as SNV/TIDE, Mbarara University of Science and Technology (MUST), Bishop Stuart University (BSU), NAADS/OWC and Local Governments.

While we continue to focus on enhancement of productivity in the priority commodities of dairy, banana, beans, coffee and now beef, we have also apportioned some efforts towards development of the cottage industries in the banana and dairy value chains. This aimed at counteracting the occasional drop in milk and banana farm gate prices. Besides, we have improved access of farmers to quality animal feeds for dairy cows, calves, fish and poultry. In the process of producing animal feeds, the Institute equally produces human grade



Heamatology lab MBAZARDI

food. We have inventories for the varieties of beans, maize, rice, cassava and pastures that perform best within South Western Agro-Ecological Zone. Planting materials (seed, cuttings and other vegetative parts) for the listed crops can be easily accessed from the Institute, just as the seedlings for numerous improved fruit trees and coffee varieties.

Guidelines for use in paddocking of dairy farms in South Western Uganda and information on the tree species suitable for grazing fields in the zone are available for farmers, just as the technologies for improving post-harvest handling. Locally developed starter cultures for fermenting milk into the locally desired dairy products and methods for improving banana juice extraction have been developed ready for uptake by the numerous emerging cottage industries within South Western Uganda.

On behalf of the PARI Advisory Committee, Management and staff of Mbarara ZARDI, I thank the Government of Uganda, and all our stakeholders and partners for the support towards our work.

Understanding Uganda's Dairy Industry

Challenges and interventions that have made a difference



Milking cows in the institute milking parlour

The dairy industry contributes 9% of the GDP of Uganda. South Western Uganda contributes 25% to the national milk production. It is also home to seven commercial milk processing plants. It is however important to note that some of the milk producing districts within the South Western Agro Ecological Zone like Sembabule and Rakai are categorized as central Uganda where another 24% of the national milk is produced.

Dairy farmers continue to grapple with challenges of dry season feeding, east coast fever and limited land for farming. During the dry season, milkers drop from 15 litres a day to four liters while the weaker animals die. The economic impact of the lack of pasture during the dry season is devastating. In the last four years, MBAZARDI has through different projects introduced silage and hay feeding technologies within the

The economic impact of the lack of pasture during the dry season is devastating.

zone to combat the losses incurred by the farmers during the dry season. The pastures introduced include *Chloris gayana*, *Bracharia mulato* and Napier grass. Within an average herd of 100 animals and a milking herd of 30, a farmer was losing an average of 9000 shillings per cow, per day with the dry season milk price of 1000 A LITRE.

With the introduction of dry season feeding technologies, a farmer is able to maintain an average of 13 liters from four liters a day with supplementary feeding.

Through the Technology Upscaling project, 369 demonstration sites were set up for dairy. These demonstration sites included pasture gardens, zero grazing units and water harvesting

facilities. They were set up in Rakai, Kyotera, Lyantonde, Sembabule, Kiruhura, Ibanda, Mitooma, Bushenyi, Sheema, Ntungamo, Mbarara and Isingiro districts.

MBAZARDI was also been able to support farmers under the project titled Development and Promotion of Appropriate Livestock and Fish feed Resources headed by Geoffrey Beihayo. Under this project, farmers in Ntungamo, Kiruhura and Lyantonde were supported with pasture seed and cost sharing for labor in setting up the pasture demonstration plots. These plots have served as a source of seed for pasture and hay to the farmers in those communities.

Farmers like Benon Baraara are able to make an average of 200,000 shillings a day in milk sales because of supplementary dry season feeding. Benon planted 2.5 acres of Chloris and Napier which he has been harvesting to supplement his milking herd during the dry season.

“The cows remain strong and healthy during the dry season. The milk yield also remains high. Before I started growing pasture, my milk yield would drop during the dry season” He says.

Erison Tumusiime says the desire to grow pasture came from his need to improve on his livestock breed. “I wanted a higher Friesian breed and noted that to get the best out of it, I had to supplement feeding. I have observed overtime that supplementary feeding greatly improves production in good breeds. If a cow is producing 7-8ltrs, supplementary feeding will double those liters to 15 a day” he says.

As a result of these efforts, more farmers are turning to hay and silage making to combat the effects of climate change and limited land settlements in dairy farming.

Edison Tumusiime has mobilized twenty other farmers into commercial pasture growing. They have managed to sell Chloris and Napier seed and hay to over sixty farmers from as far as Karamoja region. They have also supplied the seed to organizations like the Millennium Villages Program



Weaned heifers under the conservation of the Ankole cow program

Making beans to yield more and pay you more

How **NARO bean** varieties are enriching **farmers' lives**

Beans are a highly commercial food in the south western Agro Ecological Zone of Uganda with the region accounting for 44% of the beans produced in Uganda. This is according to a study conducted by CASA (Commercial Agriculture and Smallholder Agribusiness) Uganda. Farmers are however faced with the challenge of low quality seed with low germination rates.

Under the ATAAS Technology upscaling project, MBAZARDI managed to set up 107 bean demonstration plots of seven bean varieties in the NABE series (1,2,3,15,16,17,23,4C,5C). The demonstration plots were used as sights for training over 400 farmers in the zone through district-based field days. MBAZARDI in partnership with ISSD has also undertaken the multiplication of quality seed for fortified varieties of Narobean 1,2 and 3. In the last financial year three tonnes of bean seed were produced at MBAZARDI and sold to farmers from within the zone

With the availability of quality bean seed, the Local seed Businesses have increased from ten in 2015 to forty four in 2020. The cost of seed has also increased from 2000 – 3000 shillings in 2015 to 6000 – 7000 shillings in 2020. Farmers are also getting higher yields per acre from 320kg per acre in 2015 to 900kg per acre in 2020. The beans are preferred for their rich taste and short cooking hours. As a result, restaurants and traders have a high demand for them. They also have benefits like being iron and zinc rich which helps with nutrition security within the zone.

The beans have been promoted in districts of Sheema, Isingiro, Ibanda, Rubirizi, Rakai and Mbarara. Farmers have undertaken bean seed production with support from MBAZARDI and ISSD. Kyasimire Jolly from Isingiro is one of the farmers supported



A field trial of beans at the Institute



NARO staff monitoring ISSD activities

As a result, restaurants and traders have a high demand for them (beans).

under this project. Before she started growing seed, she was getting a yield of 300 – 400kgs per acre from planting up to 60kgs of grain. Currently, she harvests between 800 and 900kgs per acre with planting a maximum of 30kgs. She has received support in form of chemicals and extension services.

MBAZARDI is also in the process of installing a seed sorting machine to support the Local Seed Businesses with sorting, grading and packaging of quality seed in the SWAEZ.



Teaching cage aquaculture to fishermen at Rwijongo on Lake George in Bunyaruguru

Fishing you out of poverty and malnutrition

Aquaculture - the future of fisheries & poverty eradication

Capture fisheries in Uganda has presented a problem of over fishing with fishermen capturing smaller and younger fish to get an income. The South Western Agro Ecological Zone is however not one of the highest fish producing or consuming regions. This is because there are not enough water bodies to support the capture fisheries industry in the zone. This coupled with the fact that the zone has some of the highest malnutrition levels in the country presented a need for aquaculture in the zone.

The Aquaculture unit under the Livestock program at MBAZARDI has conducted research on aflatoxin contamination of fish feed, nutrition and domestication of the small catfish (ensonzi) for use as bait in capture fisheries,

MBAZARDI has supported aquaculture in the zone through working with six farmer groups and thirty-eight farmers. Of the thirty-eight farmers, five are women some of whom are living with HIV AIDS. One of these farmer groups is the Rwampara Fish Cooperative in Rwampara District. It started as a small group of fish farmers led by Mr. Deus

Mabira Fish Farmers association has so far harvested 8.5million worth of fish in two years.

Tumusiime. MBAZARDI provided fish fry, sampled the water quality in their ponds for cat fish and tilapia growth and gave them technical backstopping.

They have since grown into a cooperative with 56 members, attracting support from the Food and Agriculture Organization.

Mabira Fish Farmers association has so far harvested 8.5million worth of fish in two years. The group with the support of FAO set up cages in the water catchments within their area. MBAZARDI provided support through water testing and all other technical backstopping.

Under the Technology Upscaling project, seven farmer groups in three districts received fish fry MBAZARDI. The farmer groups were in Isingiro, Rubiriizi, Bushenyi, Jorda feeds in Nyeihanga, Rwampara District is another company MBAZARDI has supported. The company deals in fish feed and fish. It is a prequalified supplier for MAAIF and NARO. MBAZARDI supported them through training in feed formulation and record keeping.

Taking agricultural technologies where they are most needed

How farmers and **farmer groups are reaping big** from agricultural **innovations and technologies** promoted by MBAZARDI



Dr Halid together with the World Bank Monitoring Team visiting farmers in Ssembabule

Under the outreach program, MBAZARDI has worked with several groups and individuals to improve livelihoods in communities. One such group is the KWEG group in Kiruhura.

MBAZARDI wrote a CGS proposal with a group of women from Kiruhura called KWEG. They won the grant and used the money to train women in hygienic ghee making, collective ghee marketing and gave them a modern starter culture for ghee. They had started as a group of 100 women but grew to 500 across Kiruhura District.

From a monthly output of 200kgs, the group now produces 800kgs. The ghee sales have earned them half an acre of land on which their cottage industry rests. Their product range has expanded to include butter and a skin jelly made from ghee.

These seed businesses have increased access to quality seed in communities.

MBAZARDI also works with forty-four Local Seed Businesses dealing in bean and pasture seed. These groups come together to purchase quality seed and inputs for production of quality seed. The seed produced is bought by members of their communities and seed companies as certified seed. These seed businesses have increased access to quality seed in communities. They also have provided a good income for their members with a kilo of bean seed going as high as six thousand shillings compared to grain which costs two thousand shillings.

MBAZARDI currently has a functional grain mill. The purpose of this grain mill is to commercially produce quality animal feed within the zone. The recently installed mill is serving MBAZARDI and some of the



Prof. Johnson Nkuhe the C/M Advisory Committee speaking during the WFD 2020



Hon Rwamirama and RCC Capt. James Mwesigye inspecting stalls at the Institute during the World Food Day Celebrations



Dry season feeding options exhibited at WFD 2020

surrounding farms. The plan is for it to supply animal feed to farmers in the South Western Agro Ecological Zone. MBAZARDI is also in the process of installing a seed sorting machine. The machine will grade and sort seed for sale. It will be a source of employment for at least twenty-five people. It will also meet a need for quality tested seed for beans, maize and other commodities within the zone.

Previously, apart from being a source for livestock breed, the stock farm served as a model farm to the community. It was a place to learn modern livestock farming. In the 1979 war, a lot of equipment was destroyed or vandalized leaving it unfunctional. One of the destroyed apparatuses was the modern milking parlor. In 2019, with the help of SNV, MBAZARDI was able to install the modern milking parlor. MBAZARDI has also been able to install a spray race to demonstrate modern methods of livestock management.

The outreach program has organized a total of four field days one of which the Institute hosted the President of the Republic of Uganda HE Yoweri Kaguta Museveni

as he gave out tractors to over twenty farmer groups within the zone. We also hosted the Minister for Animal Industry and Fisheries Maj Bright Rwamirama in 2019. These field days were attended by a minimum of six hundred people per field day and attracted the partnership of companies like Pearl Dairy the producers of LATO milk. The Outreach program also religiously participates in the Source of the Nile Jinja Agricultural Show and World Food Day celebrations. We have showcased post-harvest handling of legumes, Aflatoxin free livestock and fish feed and an aflatoxin binder.

The program also coordinates the School and farmer visits to MBAZARDI. In FY 2019/2020 a total of nine hundred eighty-one students and one hundred eighty-four farmers in farmer groups. The majority of farmer visits come from individuals with looking for quality seed or germplasm not organized groups.



Maize flour packed at MBAZARDI on sale on WFD 2020

From milk, to ghee, to skin jelly products

How **commercialization** of ghee production is turning the fortunes of Kiruhura women **right side up**



Machines installed for Kiruhura Women Entrepreneurs Group at their Nyakasharara plant

Kiruhura Women Entrepreneur's Group (KWE) is transforming women's lives through collective marketing of ghee. The group received support under the Competitive Grant's Scheme from NARO of machinery worth 700million. The machinery includes a milk tank, milk churner, fermentation vat, Cosmetics Preparation Tank, etc and is meant to increase the capacity of the group in ghee production and standardize the quality of their ghee, butter and skin jelly products.

The group currently processes half a tonne of ghee weekly using manual methods. With the market price of ghee at twenty thousand shillings, that is a weekly revenue of ten million shillings. This is ploughed back as capital for over five hundred women divided in clusters to continue in production.

This was made possible through training from MBAZARDI in quality ghee production. The training which occurred in 2017 under the livestock program empowered the women to train more women in clean milk and ghee handling. They trained 612 women in quality ghee production and empowered them with soft loans for start up production.



Certificate of Appreciation to NARO for supporting KWE



Traditional Yogurt and ghee containers which are still used in households in South western Uganda



Sorting beans for grading in post harvest handling work

Going organic in post harvest handling work

Why **use of chemicals** in post harvest handling **should be minimised**

Beans, peas and groundnut sauces are the commonly consumed sauces in Uganda while maize flour is consumed in different forms from porridge to posho. As a food consumed by the majority of Ugandans, it is important that the process of these foods from the planting to the plating is safe for consumption.

Uganda continues to struggle with a rising cases of cancer with 21300 people dying of cancer every year 17.8% of whom are below the age of seventy-five. Although statistical data has not clearly connected cancer to agricultural chemicals, empirical evidence seems to suggest that pesticides are connected to certain types of cancer e.g cancer of the prostate.

Without some form of preservation or proper post handling, farmers can incur up to 100% loss of beans and other legumes through bruchid infestation. Although there are chemicals on the market, there is a growing need for organic post-harvest handling of produce for the sake of public health safety. A lot of the chemicals used in post-harvest handling of beans and peas leave residues which endanger the consumer.

It is therefore important that an organic post-harvest handling approach is undertaken. According to research conducted by NARO, specifically MBAZARDI, Brick ash and cow dung ash are the safest methods of preservation.

The application method for either is at 20% of the volume of legumes. It is not for 20% of the tonnage as different varieties of beans tend to weigh differently. The number of beans required to make a kilogram vary from variety to another. As a result, the space occupied by one kilogram varies from variety to variety. It is important that the farmer focuses on volumes when applying these preservatives and not the tonnage.

Although chemicals are there, there is need for organic post-harvest handling of produce for the sake of public health safety

Apart from bruchids, maize also has challenge of molding. This molding creates an environment for aflatoxins which have been associated with cancers. The effective organic method for maize and groundnut storage is use of airtight containers like jerrycans. But they truly have to be airtight to be effective. Old jerrycans with holes will not work. They also have to be filled to capacity with the grains such that there is no air inside for the growth of weevils.

As the country strives to capture export markets, chemicals have remained a stumbling block in the way of farmers who desire to export to developed countries. It is therefore important for farmers to consider safer ways to preserve harvest for longer.

Celebrating World Food Day in times of COVID

Mbarara City Mayor lauds **MBAZARDI** for **supporting agricultural** industries



MBAZARDI staff during World Food Day 2020

World Food Day is celebrated 16th October of every year. The theme for World Food Day 2020 was Grow, Nourish, Sustain. Together. Our actions are our future. It was at MBAZARDI celebrated with minimal numbers but key stakeholders. The city mayor, the Resident City Commissioner and District Production Officers were present.

The Mayor of Mbarara City Mr. Kakyembezi Robert reiterated the importance of Agriculture as an Industry and thanked NARO and MBAZARDI in the particular for supporting this industry in South Western Uganda. The Resident City Commissioner commended NARO for increasing agricultural production in Uganda but noted the need for focus on value addition to complete production chains. The guest of honor, State Minister for Animal Industry Rtd Maj Bright Rwamirama echoed the need to accelerate income growth through Agro processing. He also noted the need for milk to be promoted as a beverage of choice for public gatherings in order for farmers to earn a decent income.

He noted that Uganda currently consumes sixty-two liters of milk per capita which is low compared to the 200 liters per capita recommended by World Health Organization.

The Director MBAZARDI Dr Halid Kirunda enumerated the achievements of NARO from conserving the Ankole long horned cow to developing breeds with higher milk yields, shorter calving intervals and better body weight gain.

The DDG ATP commended government for increasing the salaries of scientists and the budgetary allocation. He expressed a hope for continued increase in emoluments to curb the growing brain drain in the agricultural research sector.

The activity which closed at 4pm attracted stakeholders in form of model farmers, Agro processors, extension staff, development partners and politicians within the zone of South Western Uganda.



RCC and Mayor Mbarara City inspect stalls during 2020 World Food Day Celebrations



Part of the MAAIF Exhibitions on WFD 2020



Pearl Dairies, a key partner with MBAZARDI in growing the Dairy sector exhibit on WFD 2020

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