

Newsletter of the Nutritious Maize for Ethiopia (NuME) Project

Message from the Project Leader

NuME is more than half-way through its project lifetime and many of the project components have shown excellent progress. The most striking examples of this are brought to you in this issue of the newsletter. Because of the hard work put into the project implementation by farmers and partner institutions, the project is now paying off.

The various dissemination activities have increased awareness about nutrition, QPM and its nutritional benefits among the target populations. As the midline survey report indicated, about 55% of the respondents of the target population were aware of QPM and its nutritional benefits; 15% had participated in a QPM field day; 35% of household heads had received QPM information from various sources; and 5% of households in target areas had grown QPM varieties.

One of the major focuses of the project has been the development of an alternative variety to AMH760Q, the sole QPM variety released for the moist highland maize growing agro-ecology of Ethiopia. The early success of NuME was predicated on this variety, but it showed susceptibility to leaf blight. It is gratifying that the joint effort of EIAR and CIMMYT bears fruit to release a new three-way hybrid variety that yields 9-10 tons ha⁻¹, 17% higher than the QPM (AMH760Q) and 9% higher than the conventional check (Jibat), which can make it easily preferred over AMH760Q in the highland agro-ecology. The variety is released under the name AMH582Q and named locally in Oromiffa as *Huluka*, meaning a 'means to overcome malnutrition'. By the same token, a three-way hybrid variety, named BHQP548, was released at the end of 2015 for the humid mid-altitude maize growing agro-ecology. The

release of BHQP548 will give farmers who were suspicious of marketing their QPM produce due to the yellow seed color of BHQP545 an option to produce a white grain QPM.

NuME has come into the limelight in the quest for model intervention that enhances the national agricultural innovation system in a scoping study by the Capacity Development for Agricultural Innovation System (CDAIS) project. CDAIS is a global partnership that aims to make agricultural innovation systems more efficient and sustainable in meeting the demands of farmers, agri-business and consumers. Founded on a network of key implementing partners from different sectors (agriculture, health, education, broadcasting media and private sectors), the experience of the NuME project was taken as one of the exemplary interventions. This was largely due to the mechanisms used in effectively integrating multi-sectoral networks to facilitate the creation of awareness on nutritional and health benefits of QPM among the wider public, which is an essential prerequisite to speed up dissemination and strengthen innovation.

The process of upgrading the QPM analysis laboratory at the EIAR headquarter has ended with the production of a QPM analytical service and fee schedule document that describes a cost recovery scheme for offering QPM analytical

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The Nutritious Maize for Ethiopia (NuME) project is implemented by CIMMYT in Ethiopia and funded by Global Affairs Canada. It is designed to help improve the food and nutritional security of Ethiopia's rural population, especially women and children, through the adoption of quality protein maize varieties and crop management practices that increase farm productivity.

services to researchers, seed producers and industrial, commercial and domestic grain consumers during and after the termination of the project. After rigorous training, standardization and cross validation of results with the CIMMYT-Mexico laboratory, the agricultural research and quality laboratory of EIAR has already started offering quality analysis to the national maize research program and the Ethiopian Public Health Institute (EPHI) using both wet chemistry (colorimetric) and near-infrared spectroscopy (NIRS) methods.

The project has also added value by adding audiovisual based educational material to the conventional types of training modules. Video footage produced by professionals in which farmers served as actors along with the equipment necessary to display the videos were distributed to the 36 project *woredas* and used during the pre-season training activities, at the beginning of the 2015-16 cropping season. Feedback collected from the

farmers indicates that because the film was produced on their own farms and in their own kitchens and by themselves, it made the training process more appealing and the message contained in it more reliable. The approach also eased the work of the trainers by providing an opportunity to describe the training module visually, which is a good example of technology experience sharing by farmers.

I hope you enjoy reading this issue of the newsletter and sincerely encourage you to circulate it within your network. Once again, I would like to present my sincere thanks and appreciation to all NuME project staff and partner institutions for tirelessly working in realizing the project goal of contributing to improving food and nutritional security for the rural households in Ethiopia. ■

Adefris Teklewold, Ph.D.
NuME Project Leader



New quality protein maize hybrids released in Ethiopia

Maize is widely cultivated in Ethiopia. The vast majority of smallholder farmers in major maize growing areas and urban poor communities heavily rely on the crop as a major staple food. Maize serves as their main source of protein and calories.

However, the commonly used conventional maize varieties are deficient in two essential amino acids (lysine and tryptophan) and therefore people largely depending on maize are at risk of protein deficiency. In such cases, quality protein maize (QPM), a breeder-derived (non-GMO) form of maize that contains twice as much lysine and tryptophan as conventional maize varieties, could fill the lysine and tryptophan intake gaps. ▶



Field performances and ears of AMH852Q (*Huluka*).

To respond to this nutritional gap, QPM variety development work started in Ethiopia in 1994 with the evaluation of hybrids, open pollinated varieties (OPV) and pools introduced from CIMMYT maize breeding stations. As a result, the first commercial QPM hybrid (BHQP542) was released in 2001. The QPM breeding work was later developed into a fully-fledged program with funding from the Government of Canada through the Quality Protein Maize Development and Promotion project (QPMD, 2003-2010), and the Nutritious Maize for Ethiopia project (NuME, 2012-2019). These projects aim to bring QPM to rural maize producers in the Ethiopian maize belt and beyond where consumers, especially young children and women, are at risk of lysine deficiency.

With joint efforts from EIAR and CIMMYT, six QPM varieties (four hybrids and two open pollinated varieties) adapted to different maize growing agro-ecologies were developed and released until 2014. The QPMD project mainly contributed to the release of these varieties. In 2015-16, two QPM hybrids were released with strong support from the NuME project. The first hybrid, BHQP548, was developed and released by the Bako National Maize Research Project for mid altitude maize growing agro-ecologies (1000-1800 MASL) of the country. The second hybrid, AMH852Q (with the local name *Huluka*), was released by the Ambo Research Center for the highland agro-ecologies (1900-2400 MASL).



Field performances of BHQP548.

These releases raise the number of QPM commercial varieties in Ethiopia to eight.

Both newly released varieties are three-way crosses developed from inbred lines with proven protein quality (> 0.075% tryptophan in the whole grain sample, as analyzed at CIMMYT headquarters' cereals quality laboratory). The hybrids have comparable or better yield potential as compared to standard check hybrids commonly grown in the same agro-ecologies. Similarly, multi-location evaluation results showed that the hybrids are relatively resistant to major maize diseases, such as *Turcicum* leaf blight, common rust and gray leaf spot. Under optimal management conditions, BHQP548 has a yield potential of 7-9 tons ha⁻¹ while AMH852Q yields 9-10 tons ha⁻¹. BHQP548 takes 140-160

days to mature in the mid altitude agro-ecologies, and AMH852Q requires 170-190 days to mature in the highland agro-ecologies.

The difference between the hybrids in days taken for maturity mainly attributes to the climatic conditions of the two agro-ecologies; that is, mid altitude is warmer than highland ecology and hastens crop maturity. Both hybrids have white grain color, semi-flint kernel texture and are highly prolific, which are desirable traits for producers and consumers. More detailed characteristics of these new hybrids and the standard checks used for comparison during the release are presented in Table 1. Eligible seed growers who are interested in producing and marketing basic and certified seeds of these hybrids can get early generation seeds from respective research centers. ■

Table 1. Characteristics and performances of newly released QPM hybrids and the standard checks.

Variety	Adaptation	Plant height (cm)	Days to maturity	Seed color	Yield (t/h)		Disease reaction			Remarks
					Research field	Farmers' field	Gray leaf spot	Leaf blight	Common rust	
BHQP548	Moist mid-altitude	265	145	White	75-85	55-70	T	MT	T	New release
BHQP542	Moist mid-altitude	220-250	145	White	70-90	50-60	T	MT	MS	QPM check
AMH852Q	Highland	250	182	White	90-100	75-85	T	T	-	New release
AMH760Q	Highland	245	183	White	85-95	75-80	T	S	MT	QPM check

Community Conversation approach in the NuME project



Community Conversation session at Shebedino woreda.

Nutritious Maize for Ethiopia (NuME) is a project initiative to help reduce food insecurity by strengthening Ethiopia's capacity to feed itself. Despite all the intervention efforts of the NuME project, the level of women's participation in all QPM dissemination activities has not reached the project target of 40%.

A baseline study has been conducted to better understand the dynamics of the existing gender gap which informed the need for introducing a community-based participatory intervention, i.e. the Community Conversation (CC) approach.

What is Community Conversation

Community Conversation (CC) is a facilitated approach which bases itself on the recognition that communities have the capacity to identify their own social, economic and environmental challenges, set priorities, mobilize human, physical and financial resources, plan for action and address their challenges sustainably.

The CC approach was chosen to address the issue of women's lower participation and to enable the

community to benefit to the fullest from the project intervention. Out of a total of 36 project woredas, two were chosen for the CC and a baseline study was conducted that determined the existing level of awareness on gender issues. Based on the identified gaps in the baseline study, a tailored CC approach was designed (including working tools, a CC facilitation manual, and a CC facilitators' training manual).

Reflections from CC participants and facilitators

In general, there is very positive feedback from participants on the CC process and the expected changes that it would bring about. This was proved by the participants' keen interest towards the CC approach and their commitment in terms

of arriving on time and actively participating in all CC sessions.

A Muslim religious leader who was one of the CC participants said: "CC is an approach which can address almost all problems in our community as it enables us to identify and solve specific issues and problems by ourselves."

Other CC participants also commented that women have begun raising their voices during CC discussions, when they used to be too shy or afraid to speak. CC facilitators have also pointed out that at the beginning of the program, there was resistance among community members for men and women to sit next to one another during the CC sessions. After attending a series of CC sessions, ►



◀ Discussion with a group of representatives of local stakeholders, Shebedino woreda.



▶ **Community Conversation session at Shebedino woreda.**

they became the ones who advocate the approach to the extent that they started sharing their family issues to the group.

A male head of the Kebele administration office and CC facilitator at Shebeino said: “CC has got a very wide scope of addressing issues, issues that even go deeper to family relationships. Now I am greatly relieved of the family problems that used to get reported to my office, such as quarrels between husband and wife.”

Attitudinal changes start to emerge after around four CC sessions (two months’ duration) were held and the program reached the third stage of the CC process, i.e. ‘concern exploration’ as per the CC manual. ■

Quotes by female and male participants of the CC sessions

“God created women and men as equal and women should not be discriminated because of their sex.”

“The foot runs, but the hand takes the medal/reward” (to refer to the reality that women do most of the farm activities but that men get rewarded for it).

“Women are the foundation for change.”

“Women are the bridge for growth and development.”

Aiming for the bigger impact: Nutritional impact for young children in Ethiopia

Undernutrition and stunting among children in Ethiopia are serious problems, partially driven by the poor nutritional properties of maize, the dominant source of calories in much of the country.

In order to address this nutritional deficiency, improved maize and wheat varieties have been developed, including quality protein maize (QPM), biofortified maize varieties that are nutritionally superior and possess other characteristics that are favorable for local production, storage and consumption. However, as with many innovations in agriculture and health, there are important challenges in ensuring appropriate adoption and use of QPM.

Since 2012, CIMMYT-Ethiopia, in collaboration with other partner organizations, has been implementing the Nutritious Maize for Ethiopia (NuME) project which develops, promotes, and disseminates QPM varieties in the country's major maize-growing areas. The project aims to achieve improved household food and nutritional security, especially for young children and women, through the adoption of QPM along with appropriate crop management practices that increase farm productivity.

Superimposed upon the NuME project, another study project, led by CIMMYT scientist Hugo De Groote and researchers from the Ethiopian Public Health Institute (EPHI) and the Harvard Chan School of Public Health, is being implemented to explore strategies that would translate QPM adoption into nutritional impacts for children in major maize growing regions in Ethiopia.

The study, funded by the Agricultural Technology Adoption Initiative (ATAI) and the NuME project, aims to evaluate two main interventions related to QPM production and consumption: (1) a program to encourage adoption of QPM, and (2) among QPM adopters, a program to encourage targeting of QPM toward consumption by infants and young children from 6-35 months, the period when they begin complementary feeding and the risk of growth faltering is

high. Ultimately, the study aims to estimate the impact of these interventions on nutritional outcomes for infants and young children, including growth (height-for-age), hemoglobin, and biomarkers of protein status.

The study is a randomized controlled trial, with two interventions related to household-level QPM production and consumption. Households who attended NuME project's QPM demonstration field days, and who also had an index child aged 2 years or below were first listed. This was followed by random selection of sample households from the eligible households.

The overall study has three treatment arms (Figure 1). A third of the sample households were assigned to the control arm, where the household's participation was limited to data collection. The remaining households

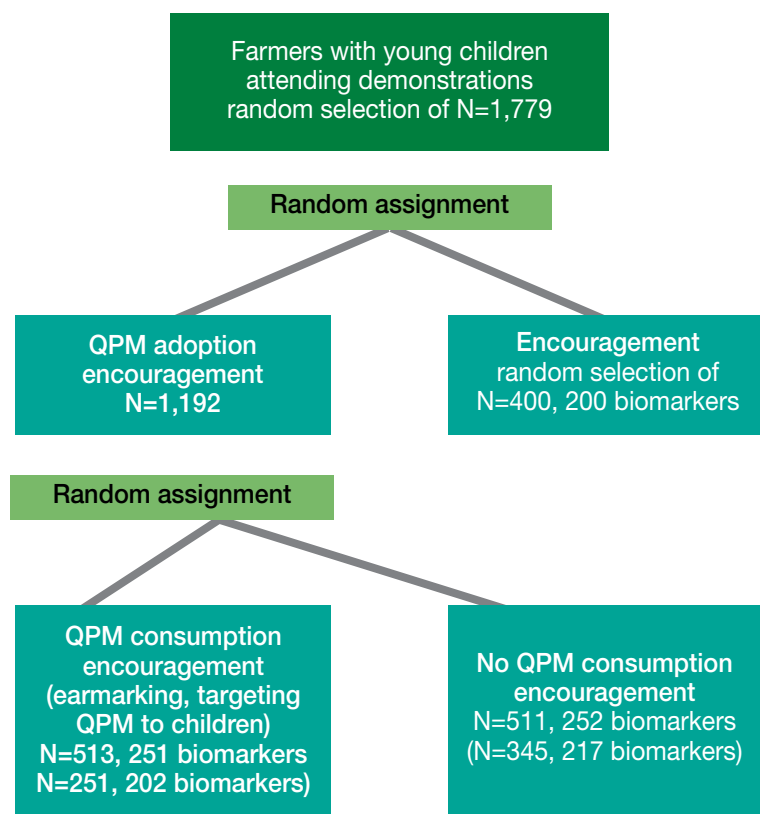


Figure 1. Skeletal framework of the study.

were split between those receiving the adoption encouragement (AE) intervention only and those receiving both the AE and consumption encouragement (CE) interventions.

In the AE intervention, households were offered guidance about the benefits of QPM consumption for young children and the opportunity to order a small amount of QPM seed to plant on their own land. The study team visited the households selected for the AE intervention in March and April 2015, and held a discussion with the head of household and the caregiver of the young children. This discussion focused on (1) the nutritional benefits of QPM, especially compared to conventional maize varieties; (2) the vulnerability children faced regarding nutritional deficiency and malnutrition and QPM's potential to mitigate these risks; (3) details about the two varieties of QPM available – one, AMH760Q, with white grains, maturing late and drought-tolerant, and the second one, BHQPY545, with yellow grains, intermediate maturity and also drought-tolerant.

After this discussion, farmers were offered the option to order up to three 2 kilogram bags of QPM seed, emphasizing that they had no obligation to order, but they were also asked not to share the seed with anyone outside of the household if they did choose to place an order. If the farmer was interested, the study team took orders for QPM seed to plant in the coming month. The seed was offered free of charge, but household heads were required to come to a central location to pick up the seed a few weeks later.

In the CE intervention, household heads and particularly caregivers of young children were offered (1) further guidance on the nutritional benefits of QPM for young children; (2) guidance on the importance of keeping QPM separate from conventional maize to prevent dilution of the nutritional benefits; and (3) tools to help them separate and ' earmark' QPM grain and flour for child consumption. The first component of the intervention was adopted and developed based on the health belief model. The second component was based on recommendations by breeders and agronomists on production and utilization of QPM. The third component was motivated by evidence from interventions in financial decision-making, which suggests that earmarking can have surprisingly large effects. Sample households in the CE group were

given labeled flour and grain bags, and spoons and bowls to feed the children in order to separate QPM from conventional maize products.

In this study, the CE intervention explores the hypothesis that providing a way to separate nutritional resources (improved maize) with a label with reference to children increases the quantity that reaches them.

The baseline survey took place at the peak of food insecurity, after planting but before harvest, in the main season of 2015, and included biological specimen collections. CE was offered before the harvest of 2015. The midline survey, including the collection of biological specimens, took place at roughly 3-4 months after harvest, when the peak effect on biomarkers was expected, while the endline, with anthropometrics, was conducted between June and July 2016 during the same season as the baseline, between planting and harvest, as households' maize stores are diminishing. ■



Posters used during consumption encouragement discussions to illustrate foods that can be made from quality protein maize.

Interactive radio: Key to scale out QPM in Ethiopia

Farm Radio International (FRI) has been working as a partner with CIMMYT in implementing the NuME project in different parts of Ethiopia. In the project, FRI is contributing to the success of the NuME project by working with Ethiopian radio stations to develop participatory radio programs in maize growing regions about nutrition, the benefits of a diversified diet, and the option of growing QPM.

Since the launch of the participatory radio programs in 2013, FRI has trained broadcasters on how to engage female and male farmers, and integrate information and communication technology (ICT) with radio to create awareness, increase knowledge and practice on planting QPM in Amhara, Tigray, Oromiya and SNNPR regional states. Using an opinion polling ICT (Beeptovote) and during field visits, FRI received various testimonies/feedback from farmers on the radio content and how it benefited them to understand and make decisions on planting QPM.



Fentie, member of the female community listening group, Bure, W. Gojjam.

Fentie, farmer and member of the women's community listening groups in Bure *woreda*, Amhara region, said: "I had already heard about *genbi bekolo* (the Amharic equivalent of QPM) prior to the radio show. Some farmers said that it is a new type of maize with protein. But I didn't know about protein and its health benefits. After listening to this program, the whole issue became clear to me. Now, I know protein is critical for the health of mothers and children. I now

know that porridge can be prepared from *genbi bekolo*. And I have heard about the practical experiences of farmers who planted and consumed it. This is what I have learnt from the radio show. It has made me eager to plant *genbi bekolo* as soon as its distribution begins."

Tilahun Admassu is a farmer from Jabi Tehnan *woreda* in the Amhara region, who participated in field demonstrations conducted by SG 2000, and explained the benefit he got from the radio program. "Even though I already had the chance to recognize and plant *genbi bekolo* prior to the program's transmission, I have also listened to the program with my family. I was curious and wanted to know the experiences of farmers in other *woredas*. I have been interviewed and shared my experiences too. I am honored to be interviewed in the program. I told them my experience, from land to plate. Listening to the program

was such a confirmation for my decision. And I look forward to plant *genbi bekolo* on a larger scale in the coming season."

The participatory radio program further focused on the nutritional benefits of QPM and 'easy to cook-how to' information. This message was appealing to farmers like Mebrihit Tsegay, female farmer from La'elay Adiabo *woreda*, Tigray region. She said: "There is one important issue that I remember from the radio program. It says that preparing porridge from *muqur ilbo* (the Tigrigna equivalent of QPM) has special health benefits. You have to prepare the porridge by mixing the *muqur ilbo* flour with a small amount of teff flour, sorghum flour, milk and egg. Then, if you feed the child this porridge, it is said that he will grow fast, strong and healthy. The radio recommends this particularly to be eaten by pregnant and breastfeeding mothers." ▶



Mebrihit Tsegay, standing by her maize demonstration plot, La'elay Adiabo, Tigray.

The interactive radio programs on scaling out QPM have also increased the popularity of the regular farmers' radio program broadcasted by regional radio stations. Tassew Mengiste is a broadcaster who produces the weekly farmer's radio show on QPM and he believed that, apart from increased listenership, FRI's interactive radio approach has impacted the quality of the radio show. In the interactive approach, a minimum of five different items are added for a 30-minute radio show.

Tassew said the approach is new compared to other radio programs aired in the radio station and now other radio programs have also started to adopt voice standards. "The radio station I am working for evaluates and nominates the best program aired in the station every Wednesday through checking audiences' feedback, assessing quality of the content, items, the interview part. The QPM radio show has repeatedly been nominated as the best of all programs."

The feedback obtained from farmers in the targeted regions confirms one important thing: sharing the voices of farmers, knowledge from research, technology and information on input supply using the interactive radio approach and ICT can bring about incredible impact on the scaling out production and consumption of QPM in Ethiopia. The past three years have also proved that interactive radio integrated with ICT can increase awareness, knowledge and create demand for QPM seed. ■



Improved agronomic recommendations for QPM varieties to be available soon

The nutritional value of QPM varieties developed by breeders is now well established. While new varieties often have different agronomic requirements to optimize production and utilization of inputs, the possibility of enhancing seed yield through increasing plant density and rate of fertilizer application needs to be investigated to fast-track QPM adoption.



Researchers measuring the NDVI (indicator of leaf greenness) using a hand held GreenSeeker in order to optimize the N fertilizer rate.

Recently released in Ethiopia, QPM varieties such as BHQPY545, MH138Q, AMH760Q and Melkassa-6Q, promoted for their nutritional value, have a number of unique genetic and phenotypic characteristics. In order to recommend the best agronomic practices for those varieties to farmers, experiments on plant population density (from 30,000 to above 100,000 plants/ha) and N fertilizer rates were conducted in the major maize growing agro-ecologies (Melkassa, Bako, Ambo and Jimma) during three cropping seasons (2013-2015). The previous recommended density for maize generally ranged between 44,444 (75 cm x 30 cm)

and 53,333 (75 cm x 25 cm). However, the initial hypothesis was that QPM varieties might have the potential for higher productivity under higher density and better use of available resources. From the preliminary results, it became clear that some QPM varieties have potential for higher productivity at higher density (above 60,000 plants/ha), while other QPM varieties (such as BHQPY545) have a relatively stable yield across a wide range of density (between 40,000 to 60,000 plants/ha) due to its prolificacy (more than two cobs produced). The response to plant density also varied between seasons as in the 2014 cropping season (severe drought), there was a very limited increase in yield with higher plant density, while in 2013 and 2015, the maximum yield was obtained above 60,000 plants/ha. Meanwhile, we have to take into account that higher inputs (seeds and fertilizers), even with a higher economic return, are not always affordable for many smallholder farmers as they lack cash during planting time.

Based on the on-station results, validation trials including newly recommended spacing (80 cm x 40-45 cm with two seeds per station) by the Agricultural Transformation Agency of Ethiopia (ATAE) were conducted in on-farm conditions this season (2016) for BHQPY545 and MH138Q.

In parallel, the potential for site-specific nitrogen (N) fertilization was tested using handheld normalized difference vegetation index (NDVI) sensors that could be used

by extension agents for better N management. Results are promising as the response to N fertilizer varies from one farm to another (due to a difference in soil fertility status). In some farmers' fields, only 10-15 kg/ha of additional N fertilizer (DAP) was enough to get the optimum yield, while most farmers attained the maximum yield between 50-75 kg/ha of N (DAP and urea). However, proper weed management is a prerequisite to use NDVI sensors on farmers' fields. At the end of the 2016 season, it is finally expected to provide a full package of improved agronomic recommendations for QPM varieties promoted in Ethiopia. ■



Densely planted experimental plots (66,000 plants per ha), 50% higher than the current recommended seeding rate (44,000/ha).



NuME: A key actor in agricultural innovation systems in Ethiopia



Funded by the European Commission and implemented by AGRINATURA and the Food and Agriculture Organization of the United Nations (FAO), CDAIS is a global partnership on Capacity Development for Agricultural Innovation Systems (CDAIS), which brings together several organizations working toward technological, managerial, organizational and institutional change in agriculture.

CDAIS aims to make agricultural innovation systems (AIS) more efficient and sustainable in meeting the demands of farmers, agri-business and consumers.

CDAIS identified NuME as one of the most successful projects in Ethiopia in its scoping study that was conducted at the inception phase of

the project. The scoping study aimed at looking into the most relevant initiatives/projects, organizations or investments that deal with agricultural and rural innovation and capacity development. The study identified NuME as one of the key actors in the AIS in Ethiopia with successful innovation experiences that can be

documented and scaled up across the innovation systems of the country. The study pointed out the following key aspects of lessons from the innovation experiences of NuME.

Multi-sectoral network of actors

The experience of the NuME project shows how multi-sectoral networks facilitate and speed up the adoption of technologies and strengthen innovation. The NuME project implementation is founded on a network of key implementing partners from different sectors – agriculture, health, education, broadcasting media and the private sector. Such multi-sectoral networking of actors could potentially encourage high rates of adoption of quality protein maize (QPM) by a large number of maize growing farmers throughout the country. High awareness has been created on nutritional and health benefits of QPM among the wider public.

Alignment with national priority needs and goals

The NuME project deals with and portrays the agriculture-health-nutrition nexus which is also aligned with the country's national food and nutrition security strategy and the UN Sustainable Development Goals (SDGs). The project, apart

from increasing maize productivity, also promotes nutrition security through dissemination and facilitating adoption of QPM varieties and improved practices.

Application of radio campaign approach

Awareness creation on the nutritional value of QPM and its advantages over conventional maize varieties is one of the cornerstones of the NuME project. The methods and strategies pursued by the project through the use of participatory radio campaigns

for which Farm Radio International (FRI) is brought on board as key implementation partner, coupled with the demonstration of different foods prepared from QPM, have been something that made the case interesting and innovative.

Strategic targeting

Women and mothers are the strategically identified target groups under the NuME project. The project has been attempting to reach women and mothers with information about the nutritional

value of QPM. Women are often the members of rural households who are responsible for the feeding and caring of children. Therefore, targeting these women was seen as the most feasible way of achieving the goal of enhancing the impact of QPM in improving the nutritional status of farm families across the country. A series of radio campaigns was designed and broadcasted, while taking into account the preferences of women and mothers regarding listening times, suitable program format and duration. ■



Manuals and brochures published and distributed

As part of its strategic intervention to widely create awareness across the country, NuME has produced a QPM guide entitled *A guide to the technology and its promotion in Ethiopia*. The guide introduces the nutritional benefits of QPM over conventional maize varieties and presents a brief overview of its historical development. It also provides information on QPM varieties available for commercial production in different agro-ecologies of Ethiopia and the agronomic management practices required for grain and seed production. It further presents a general guide on how to establish field demonstration plots and conduct field days on QPM varieties. It is meant to serve as a reference for extension experts and other stakeholders who are involved in the production, demonstration and extension of QPM in Ethiopia. To a certain extent, the guide would be a useful source of information to health professionals who are involved in health extension and to students and teachers in agricultural training centers.

A guideline on controlling the quality of QPM seeds and grains was published and made available on webpages and in hard copy. This guidebook is the first of its kind to provide recommendations and a framework for monitoring quality assurance of QPM. Guidelines are based on QPM genetics, breeding, characteristics and nutritional benefits. It lists the QPM varieties based on CIMMYT germplasm that have been released worldwide. Furthermore, it explains the concepts of seed quality control, seed production and certification systems, definition of protein quality in QPM, methods for laboratory analysis of protein quality in QPM, sampling procedures for submitting samples to the lab, and sourcing a laboratory for analysis. It also gives recommendations for quality control in both QPM grain and recycled seed. This technical bulletin is intended to serve mainly as background information based on which to develop national QPM seed and grain quality control and assurance standards in countries where QPM is produced and marketed.

The other document published is a technical brochure in English targeted to technical staff working for partner institutions, seed companies and subject matter specialists working for bureaus of agriculture. The technical brochure



tries to explain in a simple way the importance of maize in Ethiopian agriculture; the extent of maize consumption and its contribution to the daily per capita calorie intake; the deficiencies of maize as a staple; the rationale behind the development of quality protein maize (QPM); nutritional benefits of QPM, main agronomic and adaptation characteristics of QPM varieties released in Ethiopia and how to maintain open pollinated QPM varieties. The brochure also includes the contact details of research institutions and seed companies that produce different classes of QPM seed.

Another brochure with the title *An evidence-based technology brief: Improving nutritional status through consumption of quality protein maize in Ethiopia* was published by the Ethiopian Public Health Institute (EPHI), one of NuME's partner institutions taking care of the nutrition and health sector. The brochure is an outcome of a one-day technology dialogue organized in Adama on 14 May 2016. The aim of this technology dialogue was to

inform policy makers who work in the public health sector about QPM. The technology brief gives a concise account of the situation analysis with regard to the production and consumption of maize in Ethiopia and the extent of nutrient deficiencies in Ethiopia. Some subjects treated are the review of local and international evidence on the nutritional impact of QPM; the relevance of QPM technology to Ethiopian food habits and the ease of the technology to reach households in remote areas; opportunities that can favor QPM adoption and consumption; possible barriers to QPM adoption; policies backing up QPM intervention to overcome food and nutrition insecurities and the way forward. The way forward articulates two issues: to seriously get engaged in improving the consumption of QPM and the promotion of QPM use by small and large scale enterprises. The technology brief was attained by members of parliament (from the social affairs standing committee) and staff invited from the ministry of industry, universities, federal and regional health bureaus, national and international research organizations and the mass media. ■



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This is a quarterly newsletter produced by the NuME project, a five-year project that aims to significantly reduce malnutrition, especially among young children, and increase food security and household income of resource-poor smallholder farmers in Ethiopia through the widespread adoption, production and utilization of QPM.

Supported by Global Affairs Canada, NuME is implemented by CIMMYT in collaboration with the Ethiopian Institute of Agricultural Research, Ministry of Agriculture, Ministry of Health, Ethiopian Health and Nutrition Research Institute, Sasakawa Africa Association, Sasakawa Global 2000, other NGOs as well as universities and public and private seed companies.

The contents of this newsletter revolve around the day-to-day activities that the project and its stakeholders undertake by focusing on strategies such as demonstrating to farmers new QPM technologies, improved crop management practices, post-harvest handling and processing as well as improving their knowledge and skills.

Comments and articles from our readers, particularly the staff of stakeholders, are welcome.

CIMMYT is the global leader in research for development in wheat and maize and wheat- and maize-based farming systems. CIMMYT works throughout the developing world with hundreds of partners to improve food security and livelihoods by sustainably increasing the productivity of maize and wheat cropping systems.

CIMMYT is a member of the CGIAR Consortium and receives support from national governments, foundations, development banks and other public and private agencies.



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