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BUILDING ON FARMER KNOWLEDGE IN SEED QUALITY CONTROL AND QUALITY ASSURANCE TOWARD SEED SOVEREIGNTY IN TANZANIA

"I sorted my paddy seed using salt-water solution which enabled me to harvest 15 bags of rice. I also sorted others by just soaking in fresh water for 24hrs but the harvest was reduced to around 13.5 – 14 bags. Last, I sorted my paddy seed by winnowing and planted, but the harvest was reduced further to around 12 bags. It seems soaking in fresh water alone (seed priming) could not remove all light seed, the same applied to winnowing hence compromising the harvest." **Mr. Salvatory Elias of Kamsamba in Momba district.**

The success story

Quality seed is among the most important parameters that farmers consider in crop production. This is because quality seed leads to good yields if other parameters are held constant. Poor quality seed with low germination potential affects the entire crop production value chain. Smallholder farmers all over Tanzania reproduce and exchange a large share of their seed. There are deep wells of farmer knowledge on seed quality control and quality assurance as an integrated part of crop production. However, the knowledge is uneven, diverse and not well documented.

There are intense pressures on farmers to abandon their diverse crops and varieties in favour of the small portfolio of improved[1] crop varieties sold by the formal sector that offer potential for cash generation. Abandoning the use of farm saved seed results in the loss of accumulated knowledge about the characteristics and uses of varieties, as well as skills related to farmer managed seed systems (FMSS). It also reduces agro-biodiversity, which is the basis for nutritional diversity and adaptation to climate change.

In 2013 the Tanzania Alliance for Biodiversity (TABIO) began an initiative to create an inventory of local seeds in one locality - Mtwara Rural. This was followed by another study on FMSS in Tanzania in 2015[2]. The study looked into the operation, benefits, successes, challenges and support for FMSS. Subsequent trainings and publication of information materials on quality control and assurance have continued to date.

This collaborative work with farmers has fortified protocols on seed quality control and quality assurance, enabling smallholder farmers to access good quality seed in terms of genetic purity that is free from seed borne diseases, weeds and pests. Further, the seeds selected and saved conform to minimum requirements in terms of physical purity, germination and moisture content. These seeds have been shared and exchanged at seed fairs, contributing to the scaling up of quality seed in local FMSS.

[1] Improved varieties are bred for industrial agricultural systems. They have reduced genetic base compared with the high variability present in the genetic materials farmed traditionally.

[2] The study reached 150 people through meetings in Igunga, Chunya, Ifakara-Kilombero, Mbozi, Masasi, Nanyumbu, Mtwara rural, and ileje, and through individual consultation in Momba and Karatu districts.

Insights into farmer seed quality control protocols

TABIO trained smallholder farmers in Masasi, Nanyumbu and Mtwara Rural on seed system quality control and assurance. TABIO also consulted other farmers groups in Ifakara-Kilombero, Igunga, Chunya and Karatu to find out how they deal with quality control and assurance in their seed system. Interaction with farmers revealed that quality assurance, though not properly documented, is part and parcel of their practice of seed selection.

Farmers primarily assess the quality of seeds by evaluating how they look and feel. They assess the width, length, weight, shape, surface texture, colour and whether it has been affected by too much moisture or exposed to too little sunlight. They may test seeds for moisture content by cracking them with their front teeth, since most of them do not own simple moisture meters. A very dry seed is usually harder to crack and also produces a sharp sound, which means that it probably has lower than the required 10-12% moisture content. Another simple method used is to shake a sample of seed with dry salt in a clean dry glass jar for several minutes. If the salt sticks to the sides of the glass jar the grain moisture content is above the safe moisture content level. If the jar surface is clear of salt, it means that the grain is dry enough to be put in storage. Farmers also check that seeds are free of contaminants such as weed seeds, other varieties of seeds and inert materials such as plastics, papers, metal and so on.

Other important factors that guide seed selection include taste, texture, aroma and processing and storage qualities. For example, farmers in Karatu, Mbozi and Ileje districts select maize seed that are delicious and sweet when roasted. Selection favours maize grain that does not break

[3] Winnowing is a basic techniques of cleaning dry seeds using a xx that is best done when there is wind. Farmers drop the seed and chaff from shoulder level and as the wind blows gently through them, the seeds are separated from chaff and other light unwanted materials.

easily upon milling and produces heavy flour that moulds properly when cooked. As for rice, farmers in Momba, Igunga, Ifakara and Mtwara Rural select varieties that are aromatic and can be smelled from a distance during cooking like Tule na Bwana, Shingo ya Mwali and Ntalima wangu. Smallholder farmers in Karatu district select beans that are tasty, fast cooking with sticky gravy (rojo in Kiswahili). Farmers avoid beans that are known to produce excessive gas when eaten.

Shared experience with quality control for paddy

Smallholder farmers in Igunga and Momba districts shared their experience of selecting quality paddy seed, which they do in three phases. In the first phase, a section of the farm is selected from which seeds will be harvested. In this section, off-types are uprooted to ensure that the remaining paddy is uniform. This is done continuously until the paddy matures for harvest. This section is then carefully harvested first with a sharp knife, threshed and winnowed[3]. The seed is then spread in a thin layer and dried in noon-day sun for two to four days, but not left out overnight so as to avoid it absorbing moisture from the air. Dried seed is preserved in specific labelled bags in a safe place in the house. The rest of the paddy to be used for food or sold for income is stored separately. Normally, seeds are stored without being treated.

Selection of paddy based on physical characteristics continues at sowing time. In this phase, farmers use a 20-litre clean water bucket and add salt to the water. They use a fresh chicken egg to guage the required solution - which should enable half of the egg to float above the water. The solution is then divided into two containers and the stored seeds are added to the solution, stirred and allowed to settle. The good quality, heavy paddy seeds settle at the bottom of the bucket while seeds of poor-quality one's float to the top. These are removed from the bucket and more stirring is done until all unwanted seeds are removed from the bucket. The seeds of good quality are then rinsed in clean water and dried (if the planting is not done immediately) or sown in the nursery ready for transplanting into the farms.

Shared experience with quality control for maize

Smallholder farmers in Ileje, Karatu and Mbozi districts, where maize is grown extensively, shared how they identify maize plants for seed selection on farm. They select maize plants with one cob as they are normally big and long. A cob with 15 lines and above is considered suitable for seed. Selected maize cobs are dried and may be stored whole or shelled. When seeds are stripped off, they are treated with wood ash or powder from particular medicinal trees such as neem. Unshelled maize cobs are stored in cribs or above the fireplace where the smoke keeps the seeds dry and reduces insect and disease damage. Selection continues at the sowing stage when the selected cobs are re-examined. From the selected cobs, farmers remove five rows of grain from the top and five from the bottom. The top grains are removed because they are small in size and the bottom ones are removed because have irregular shapes. The remaining grains of the cob are used as seeds.

Shared experience with quality control for beans

Smallholder farmers in Karatu have over 50 varieties of beans including Gogodmay, Sikay and Qaqar. Seed is selected based on yield potential and leafy characteristics. They do not select varieties that are bushy in nature as they compromise pod production. Once beans are harvested and stovers/straws are removed, they are stored in tins and gunny bags with wood ash or powder obtained from medicinal plants to prevent insect pests damage. During seed selection farmers also consider the performance of plants in the field and those that appear to be free of pests, mould and diseases (although unfortunately these are not always detectable to the naked eye).

Key Lesson

FMSS supplies almost 80% of seeds required by smallholder farmers in Africa. With its huge contribution in food production, quality control and quality assurance in the seed system must be emphasized. It is important to develop the guide of quality control and quality assurance that cut across all crops which can be used by all smallholder farmers in Africa. The Tanzanian government has acknowledged the importance of the agro-biodiversity stewarded by family farmers and their rights to continue using their own seeds by signing the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGFRA). It is important now for this Treaty to be domesticated to ensure that FMSS is systematically strengthened in the country.

CROPS4HD

This document is an output of the CROPS4HD project (www.crops4hd.org): a consortium of SWISSAID, FiBL, and AFSA supported by the SDC and LED. CROPS4HD has three major components: production, market and policy advocacy.

AFSA, which is responsible for advocacy, is a broad alliance of civil society actors involved in the fight for food sovereignty and agroecology in Africa. Its members represent small-scale farmers, pastoralists, hunters/gatherers, indigenous peoples, faith-based organisations and environmentalists from across Africa. It is a network of networks, currently with 37 members operating in 50 African countries.

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