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SECURING FOOD THROUGH WOMEN'S TRADITIONAL KNOWLEDGE IN SEED SECURITY:
The Case of Mulili Sub-Location, Makueni County Of Eastern Kenya

By Agatha Daniel Mumbua & Charles Owuor Olungah

Abstract

Although achieving seed security is quite different from attaining food security, the crisis of food insecurity can be traced to seed insecurity. A discussion of food security, without paying attention to seed security is, therefore, incomplete. It is even more incomplete without revisiting the key role of women's knowledge in ensuring seed security and consequently, food security. The decision on the type of seed to conserve falls upon the woman who knows what characteristics of the crop are most useful to the household. This study presents the findings of a survey that investigated women's indigenous knowledge in household food security in Mulîlîî sub-location, Makuenî County. It is informed by the Asset Based Community Development (ABCD) theory and the research design was both qualitative and quantitative. The targeted population comprised the rural women farmers. By use of purposive and simple random sampling, 3 elderly women (>60 years) and 56 women farmers (>18 and <60 years) were selected respectively. Data was collected through an interviewer-administered structured questionnaire and an in-depth interview guide. One focus group discussion was held and analyses were carried out using the Statistical Package for Social Sciences (SPSS) for the quantitative data and by thematic analysis for the qualitative data. Findings revealed that despite the existence of vast scientific knowledge on seed and food production, women farmers still rely heavily on their traditional knowledge in ensuring seed security and consequently, food security. Faced with new and challenging realities, they not only rely on their community's passed down practices but have also devised new methods as they innovate and experiment on the locally available materials. The study recommends revisiting this knowledge and practices with a view of not only integrating and building on the same but also for the purpose of scientifically validating and authenticating such practices.

Key words: *Seed security; traditional knowledge; seed selection; preservation and storage*

5.1 Introduction

A strong international commitment towards improving global food security was reflected by the first out of a list of eight Millennium Development Goals. [1] . In particular, the 'Hunger' target set out to halve the proportion of people who suffer from hunger between 1990 and 2015. At the time of listing the goals, it seemed realistic to expect to halve the number of chronically undernourished people by 2015. However, as the global human population increases, food security for all seems to be more ambitious than ever {International Fund for Agricultural Development (IFAD) 2002}. According to Silva et al., (2013) in 2011-13, some 842 million people, or roughly one in eight, were estimated to be suffering from chronic hunger. The vast majority of hungry people (827 million) live in developing countries {World Food Programme (WFP), 2014}. Though the figure (842 million) is considerably lower than the 868 million reported with reference to 2010-12 {Food and Agricultural Organization (FAO), 2013}, meeting the first Millennium Development Goal (MDG1) on hunger target require additional efforts now that the global population is expected to increase to 9.6 billion in 2050 (Kochhar, 2014).

In Africa, food security and nutrition is growing worse, with Sub-Saharan Africa having the largest concentration of food insecurity than in any region. [2] In Kenya, official estimates indicate that over 10 million people are food insecure. [3]

[1] *UN Millennium Project (2005)*
[2] *Frimpong (2013) and Hoevel (2013)*
[3] *International Food Policy Research Institute, IFPRI (2012)*

5.2 Seed Systems

Achievement of food security hinges considerably on food production and availability. Seed security is an indisputable pillar of healthy agriculture and a precursor to food security. Smallholder farmers use multiple channels to procure seeds. These channels are either formal or informal seed systems. The formal seed system involves a chain of activities leading to certified seeds of named varieties. The informal system, embraces most of the ways farmers themselves produce, disseminate and procure seeds. Local technical knowledge, standards and social structures guide informal seed system performance (McGuire, 2001). Typically, the notion of a seed system in economics has been limited to the "formal" seed industry (Nagarajan & Smale, 2005). Most often, the informal seed systems is treated separately by economists as vestigial or marginal to the process of economic development. Despite the undervaluing, the majority of farmers in Africa mainly get their seeds from the informal channels (Rubyogo et al., 2005).

5.3 Women's Traditional Knowledge in Seed -Security

For millennia, women have been vested as the community seed stewards, performing as selectors, keepers and propagators of seed in traditional farming – roles that are regarded as core for self-reliant agricultural production. They have developed an intrinsic ability to select, condition, treat and store the correct mix of the crops and varieties to meet their expectations (Bawa et al., 2010; Musa, 1996) while considering a myriad of plant genetic characteristics and traits that suit their unique circumstances. Such variables include taste,

colour, palatability, nutrition, storage qualities, texture, resistance to pests and diseases as well as adaptation to soil and agro-climatic conditions (Karl, 2009). Despite their crucial role in ensuring household food sufficiency, little is known about their knowledge in seed security. The study was therefore, carried out to examine the local women's traditional practices in seed selection, preservation and storage in Mũlìlììsub-location, Makùenì County.

5.4 Theoretical Framework

This paper is influenced by the Asset Based Community Development (ABCD) theory whose appeal lies in its premise that communities can drive the development process themselves by identifying and mobilizing existing but often unrecognized assets, and thereby responding to and creating local economic opportunities (Mathie & Cunningham, 2002). The basic tenet of the ABCD theory is that, although there are both capacities and deficiencies in every community, a capacities-focused approach is more likely to empower the community and therefore, mobilize citizens to create positive and meaningful change from within.

5.5 Methodology

The research design used both qualitative and quantitative methods. Women farmers were the targeted population. The sample size was made up of 56 women randomly selected from three villages namely: *Kanyonyoo*, *Wayanî* and *Ikoyo in Mulîlîî sub-location, Makuenî County.* They were then subjected to a researcher administered questionnaire. Others included 3 key informants (elderly women above 60 years) knowledgeable in the community practices and 1 Focused Group Discussion (FGD) made up of 12 purposively selected participants who have used the traditional methods in seed selection.

5.6 Results

Socio-Economic Characteristics of the Respondents

The majority of the respondents (30 percent) were aged between 21-30 years. Thirty four percent had not completed their basic primary education and only 2 percent had college qualifications. The majority (95 percent) were full-time subsistence farmers. Eighty two percent were married, with 53 percent living in male-headed households. The majority (66 percent) reported that their land is owned by their spouses and that agro-pastoralism was their main economic activity. The average land size per households was 6 acres. The smallest land size owned was 0.75 acres while the largest was 20 acres. The majority (52 percent) confirmed that they use their traditional knowledge in their farming practices sourced from the older generations.

5.7 Women's Traditional Knowledge in Seed Selection, Storage and Preservation

5.7.1 Seed Selection

The majority of the female farmers (52 percent) use traditional knowledge in food production. The elderly women confirmed that since time immemorial, women have been the sole decision-makers in seed acquisition. They determine the quality as well as the quantity of seed to select based on their own knowledge passed down from the older generations. The tradition of selecting seed at different stages during which certain characteristics are sought

for, is well entrenched in those who practise own seed saving. The majority (53 percent) reported selecting seed as the crop grows in the field while 35 percent selected seed after harvesting and before processing (Table 1) while 12 percent selected seed during storage.

Table 1: Stages of seed selection and crop characteristics sought

Stages	Characteristics sought
As crop matures in the field	• Ability to withstand drought • Intensity of the crop's • Intensity of the crop's chlorophyll • Maturity timeliness • Ability to resist pests and diseases • Number of seed heads and pods/grains
After harvesting and before processing	• The number of grain lines (in the case of maize) • Fullness of the kernels on maize cobs and grains in the legume pods • Size of the cob (in the case of maize) • Number of grains in the pods (in case of pigeon peas)
After processing and before treating	• Grain's size • Grain's health (rotten ones are discarded) • Grain's physiology (physically damaged are not selected)

Source: Field survey, 2010

Those who select seed as the crop matures in the field, usually ear-mark the identified plants by either tying colourful strings or pieces of cloth. In so doing, the selected seed is easily identified and set aside during harvesting time. In their effort to select early maturing maize seed, one elderly woman confirmed the practice of earmarking maize plants that developed tassels with fewer stalk internodes (*maongo*). This practice involved counting the number of above-the-ground internodes on the maize stalks. Though laborious, the practice enabled selection of early maturing seeds.

For those who select seed after harvesting, the number of lines particularly on maize cobs and pigeon pea pods is a trait highly sought for. This is so because '*kînyanya (maize cob with 8 lin*es) and '*kionza*' (pigeon pea pods with 7 lines) are highly preferred. . Kernel fullness too, is a factor of consideration. Maize cobs with poor or incomplete kernel sets are never selected. One elderly woman had noted thus:

> *'When selecting maize seed, we avoid 'mbemba sya mathenya' (cobs with incomplete kernels) because planting such will give us a poor harvest'* (Kalunde wa Ndilù-77 years old woman-key informant).

Amongst those who select seed after harvesting, processing and before storage, two methods, shelling and threshing are used. It is only maize seed that is shelled since the method allows for caution against physical damage of seed and cutting-off of the smaller cob end. Additionally, since the selected maize cobs are usually few, women can afford time to carefully shell. The rest of selected seed is usually threshed before treating. Some legume (cow peas, pigeon peas and beans) pods are however, never processed as they are stored. Their pods are hard enough to guard against seed-destroying insects.

After processing, those who choose to condition their seed, two methods are traditionally used. These are; winnowing and sieving. However, not all choose to condition seed before treating. The chaff acts as a protectant as it fills in the interstices between seed grains hampering insect movement. Further, after conditioning, women either sun-dry or smoke seed so as to satisfactorily reduce the moisture content and reduce chances of mouldy seeds.

5.7.2 Seed Treatment

Grain weevils, grain moths, grain borers and termites were the reported post-harvest insects of importance. Of particular importance is the large grain borer (*Prostephanus truncates*) locally referred to as '*Osama*' that destroys stored seed by tunnelling through seed and generating large quantities of dust. According to the respondents, it is the only challenging post-harvest insect because of its resistance to their usual traditional seed treatments. On seed treatment, 41% reported of mixing seed with sieved wood ash before storing (Table 2). The use of kerosene and powdered dry cells' carbon rod indicates some degree of local innovation, not historically passed down through generations.

Table 2: Traditional methods of treating seeds

Treatment methods	Effect	No. of responses	Percent (%)
Mixing with sieved ash	Ash desiccates seed. Acts too as an inert filler impeding insect movement	51	40
Mixing with pounded pepper	Changes seed taste for insect	36	29
Spraying kerosene	Pungent smell repels insects, humans too	12	10
Mixing with pounded dried leaves and bark of neem tree	Pungent smell repels insects. Changes seed taste too	10	8
Mixing with pounded leaves of tobacco	Changes seed taste for insect. Pungent smell wads off insects too	1	1
Mixing with pounded leaves of *mũtaa* plant	Pungent smells wads off insects	1	1
Mixing with soil	Acts as an inert filler, impeding insect movement	3	2
Mixing with grounded dry cells' carbon rod	The powder acts as inert filler, desiccators & protectant	9	7
Mixing with chicken droppings	Smell keeps insects away	1	1
Mixing with cow dung	Smell keeps insects away	1	1
Mixing with pounded leaves of *mũkaũ* tree	Pungent smell repels insects	1	1
Total		**126**	**100**

Source: Field survey, 2010

5.7.3 Seed Storage

After treating the seed, 94.6% reported storing the seed separately from the rest of the farm produce in gourds, clay pots, above the fireplace, plastic containers, and in small sacks. After sealing tightly, seed vessels are stored in granaries (*makůmbî).* One elderly woman, however, had noted this;

> *'In our days, after selecting, treating and putting seed in gourds and clay pots, we would secretly bury the vessels in different places within our homesteads only known to us. In so doing, the seed was safe from consumption, theft or vandalism during war".* (Nzìlanì Nzyùko - 88 years old woman - key informant).

Besides seed treatment, further strategies are reinforced to ensure seed lasts until the next planting season. Some (23%) reported that they store the selected seeds above the cooking place (Table 3). The soot from the fireplace not only camouflages seed but also, the heat generated further hardens it. One elderly woman noted thus:

> *'We used to make a kîsoa (a bunch of selected maize cobs, whose*

incompletely pealed husks are used to hang them upside down above the fireplace). With time, the soot from the fireplace would cover the cobs completely such that no insects or rodent would take note of them. Likewise, no one would be tempted to cook the same by the look of its colour' (Kasiva wa Kìmanthì - 85 years old woman-key informant).

Further strategy	How it works	No. of responses	Percent
Hanging seed (especially maize cobs) above the fireplace	Soot camouflages seed and heat hardens it	41	23
Storing seed at lower temperatures	Cold immobilises insects and impedes their multiplication	12	6.7
Storing seed in air tight containers.	No insects can gain entrance and survive	19	10.7
Smearing storage structures (*makũmbÍ*) with cow dung.	No insects can gain entrance. The smell repels insects too	13	7.3
Exposing stored seed to the scorching sun frequently.	Sun heat kills insects, further reducing moisture content	15	8.4
Storing seed in aerated places	Guards seeds against moulding	11	6.2
Hiding seed	Guards against theft or consumption at the household level	13	7.3
Burning pepper underneath the *makũmbÍ*	The smoke drives off insects, rodents too.	14	7.9
Raising *makũmbÍ* above the ground level	Keeps termites and other rodents away	16	9
Allowing goats to sleep underneath *makũmbÍ*	Goats urine inhibit multiplication of termites	8	4.5
Pouring ash underneath *makũmbÍ*	Ash impedes multiplication of termites	11	6.2
Frequent winnowing and reapplication of ash	Constantly conditions seed and renews ash efficacy	5	2.8
Total		**178**	**100**

Source: Field survey, 2010

5.8 Discussion

The study findings indicate that, irrespective of their low levels of education and technological know-how, women farmers have persisted with their traditional knowledge of seed management to secure their households' food security. Moreover, they have held a central role in maintaining seed security and consequently, food security while using their old age traditions and practices in seed selection, treatment and storage. Their use of locally available materials reveals an informal system of seed acquisition that is cheap, easily accessible and sustainable.

The stages of seed selection reveal a tradition based on varied characteristics that well suit the social, cultural, economic as well as the ecological circumstances. Some of the crop traits traditionally sought (such as early maturity and resistance to pests and diseases) constitute the major scientific objectives in the current agricultural research that have resulted in huge investments in the effort to achieving the MDG1. Some of these investments have resulted in scientific 'breakthroughs' that can well be labelled as 'unremitting failures' because of the low or total lack of adoption of the same in rural agriculture. Reasons of low adoptions can be linked to the failure on the part of the modern science to appreciate the

relevance of local traditions, particularly, women's knowledge in agriculture.

5.9 Conclusion

Food security is an important arena in which every citizen should be allowed to make a contribution. The current devolved system of governance should ensure that people's knowledge is tapped for their own development since agricultural planning will be localized in respect of the bottom-up approaches. In agriculture, it will be prudent to pay attention to the role, knowledge and capacities of all the relevant stakeholders particularly women, who are pivotal in agricultural production.

Clearly, the benefits of modern agriculture are undisputable for without them, the world would hardly feed the ever growing global population. However, let the scientists understand the role and value of indigenous knowledge as part of the solution. Before attempting to intervene, people should be understood from their own perspectives before attempting to change them.

In conclusion, new directions in development assistance and agricultural investments must recognize and support women's involvement in the full agricultural value chain, particularly, in seed security that is undeniably important in sustainable food security. The importance of their judgment and social cultural grounding in seed security, and consequently sustainable household food security, cannot be overemphasized. Sufficiency in seeds can lead to the empowerment of the agricultural sector and the role of women-farmers in this endeavour should never be overlooked, neither underestimated.

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