

## **Awareness and use of yam minisett technique in Tolon district in Northern Region of Ghana**

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### **Abstract**

*Yam minisett technique was introduced in the 1980s to improve availability of yam planting materials. However, few farmers have adopted the technique leading to an inefficient seed yam system in Ghana. A field survey to assess the awareness and use of yam minisett technique was undertaken in six communities in Tolon District of Northern Region of Ghana. Structured questionnaires were administered in the six selected yam producing communities. Results showed that all the farmers were aware of the minisett technique. Their level of awareness and sources of information on the minisett technique were however varied. Fifty-five per cent (55%) of the respondents obtained their information from their colleague farmers, 35% from extension officers and 10% indicated that the information was passed on from their parents. Over forty percent (43.3 %) of the farmers have adopted the technique. Lack of technical details of the minisett technique emerged as the greatest problem militating against adoption of the technology. Adopters' main problem was low sprouting rate or difficulty in sprouting. In order to encourage uptake of the minisett technology among farmers, it is recommended that extension agents should educate farmers on the know-how that they lack especially on measures to improve sprouting.*

**Key words: Yam minisett technique, adoption, Northern region, Ghana**

## **Sensibilisation et utilisation de la technique d'igname par mini-fragmentation dans le quartier de Tolon dans la région du nord du Ghana**

### **Résumé**

*La production d'igname par mini-fragmentation a été introduit dans les années 1980 pour améliorer la disponibilité de matériel de plantation d'igname. Cependant, peu d'agriculteurs ont adopté la technique conduisant à un système inefficace d'igname au Ghana. Une enquête sur le terrain visant à évaluer la connaissance et l'utilisation de la technique d'igname par mini-fragmentation a été entreprise dans six communautés du district de Tolon, dans la région nord du Ghana. Des questionnaires structurés ont été administrés dans les six communautés productrices d'ignames sélectionnées. Les résultats ont montré que tous les répondants étaient au courant de la technique minisett. Les sources d'information et niveau de sensibilisation des agriculteurs à la technique mini-fragmentation étaient variées. Plus de quarante pourcent des répondants ont obtenu leur source d'information auprès de leurs collègues agriculteurs, 35% ont obtenu leurs informations auprès des agents de vulgarisation et 10% des répondants ont eu leurs informations auprès de leurs parents. 43,3% des*

*répondants ont adopté la technique. Le manque de détails techniques de la technique mini-fragmentation est apparu comme le plus grand problème qui s'oppose à l'adoption de la technologie. Le principal problème des adoptants était un faible pourcentage de germination ou une difficulté à germer. Afin de permettre à plus de gens d'utiliser la technologie d'igname par mini-fragmentation, il est recommandé que les agents de vulgarisation enseignent aux agriculteurs le savoir-faire qui leur manque, surtout sur les mesures pour accroître la germination.*

**Mots-clés:** *technique d'igname par mini-fragmentation, adoption, région du Nord, Ghana.*

### **Introduction**

Yam (*Dioscorea* spp) is an important tuber crop in West Africa. In Ghana, yam is one of the major staple food crops. It is the most important food crop in terms of output value, and contributes about 17% of agriculture component of Gross Domestic Product (GDP). It plays a key role in guaranteeing household food security (Kenyon and Fowler, 2000). Yam plays an important role in the cultural lives of certain communities in the yam belt as production activities and arrival of new yam are accompanied by certain ritualism, tradition and fanfare (Tetteh and Saakwa, 1991). Yam production all over the world was 57.7 million metric tons, with a chunk of this coming from sub-Saharan Africa (FAOSTAT, 2015). In 2015 a total of 430,000 ha of land was used to cultivate yam and the annual production was estimated at 7.3 million metric tons (MoFA, 2016).

One major problem militating against increased yam production is non-existence of formal seed sector where one can go and buy planting materials. Yam farmers have to save up to 30% of the previous harvest that should have been eaten or sold for income as planting materials for the next season (Orkwor and Asadu, 1997, Kambaska *et al.*, 2009). The cost of planting materials alone constitutes about 33 to 50% of the total production of yam in sub Saharan Africa (Asare-Bediako *et al.*, 2007; Kambaska *et al.*, 2009).

The high cost of planting materials among others necessitated other production methods using materials with minimum cost and high efficiency. Yam minisett technique has been found to produce setts at higher efficiency (Okonmah, 1980, Alvarez and Hahn, 1984, Okoli *et al.*, 1985; Otoo *et al.*, 1985; Igwilo and Okoli, 1988).

Despite the fact that efforts had been made through concerted extension services to make farmers aware of the yam minisett technique and to encourage them to practice it, the yam seed system available is the traditional yam milking. A study was therefore undertaken at Tolon district in Northern region of Ghana to evaluate farmers' awareness and application of the yam minisett technique. The objectives of the study were to assess the degree of awareness and use of the yam minisett technology by farmers and to assess problems farmers encounter with the technology.

### **Materials and Methods**

#### ***The study area***

This study was carried out in Tolon District of Northern Region. The area is located within latitude 9°25'N and longitude of 00° 58'W. The district experiences an annual rainfall of about 1000 and 1200 mm, which usually starts in April and ends in October and the peak of the rain usually occurs between August and September. The relative humidity is mostly high (78.8%) in the morning and low (46.0%)

during the night. Temperatures are uniformly high (34.5°C) in the dry season and low (23.4°C) in the wet season. (SARI, 2010).

**Sampling, data collection and analysis**

The study adopted a combination of both probability and non-probability sampling techniques. Purposive sampling technique was used to select yam producing communities in the Tolon District. Six communities were purposively selected; Tingoli, Tuunaayili, Cheyohi, Daasuyilli, Waribogu Kukoo, and Gbulahagu. Ten yam farmers were randomly selected from each community giving a total of 60 respondents.

Data collection was done using structured questionnaires, based on farmers' awareness of the minisett technique, their source(s) of information and problems with the use of the technique as well as general adoption behaviour. Descriptive analysis of the data was done using Statistical Package for Social Scientist (SPSS) (Version 16).

**Results**

**Demographic characteristics of respondents**

The respondents were mostly males (91.7%), majority of whom were in their youthful age (Table 1). The results also show that farmers who were 40 years and above constitute 40% of the total number of respondents. Majority of the farmers had not received any form of formal education. In other words, only 25% of the respondents had some form of formal education (Table 1).

**Farmers' sources of yam planting materials**

Apart from the yam minisett technique, the study showed that a greater percentage of the farmers obtained their planting materials through milking alone (Table 2). Other respondents also bought seed yam to supplement what they obtained through milking while a third group of farmers exchanged labour for seed yam to supplement their own

(inadequate) production of planting materials (Table 2).

**Farmers' sources of awareness**

The study showed that all of the respondents were aware of the minisett technique. There were three main sources of information on the minisett technique. About 55% of respondents obtained their information from their colleague farmers, 35% of the respondents had the information from agricultural extension officers and 10%, through their parents.

Majority of the respondents became aware of the technique through their colleague farmers (Table 3). All the respondents in Tuunaayili became aware of the technique through information received from other farmers. This source of information was however very low

Table 1: Age and educational profile of respondents

Age (years)	Percentage of respondents	Level of Education	Percentage of respondents
18 - 25	3.4	None	75
26 - 40	56.6	Basic	20
41- 60	38.3	Secondary	5
60 +	1.7	Tertiary	0
Total	100	Total	100

Table 2: Farmers means of getting yam planting materials

Means of planting materials	Percentage of respondents
Milking	75
Milking and Buying	8.3
Milking and Labour	16.7
Total	100

at Tingoli and Cheyohi (Table 3) as most of them got their information from agricultural extension agents. About a quarter of respondents in Daasuyili also received information from extension agents. Farmers from these communities have associations (Yam Farmers' Association) which helped them to get access to extension agents.

**Adoption of the yam minisett technique**

Adoption of the minisett technique was 43.3% among the respondents (26 of them), suggesting that non adopters were in the majority (56.7%). Usage of the technique was widespread in Tingoli, where all respon-

Table 3: Sources of farmers' information on yam minisett technique

Sources of information (% of respondents)			
Communities	Colle- gue farm- ers	Exten- sion offi- cers	Par- ents
Tuunaayili	100	0	0
Daasuyili	70	30	0
Tingoli	10	90	0
Cheyohi	10	90	0
WariboguKukoo	80	0	20
Gbulahagu	60	0	40

dents applied the technique and accounting for 38.5% of the adopters. This was followed by Cheyohi (Table 4). About a third of the respondents representing 11.5% of the adopters were from Daasuyili. Gbulahagu and Waribogu Kukoo were found to have the lowest adoption rate. None of the respondents from Tuunaayili had adopted the minisett technique.

Table 4: Adoption of yam minisett by farmers

Communities	Percentage of respondents)
Tuunaayili	0
Daasuyili	30
Tingoli	100
Cheyohi	90
WariboguKukoo	20
Gbulahagu	20

**Reasons for non-adoption of yam minisett technique**

Lack of knowledge in the technical details of the minisett technique was the major reason given by 56.6% of the respondents for not adopting it (Table 5). Some farmers mentioned high labour demand for aspects of the technique, such as sprouting at the nursery and crop management on the field. While a few farmers (3%) maintained that, the minisett often do not sprout well, others submitted that the process required two production seasons to produce ware yam, thus depriving their families of ware yam for the first year. A few of the respondents said the minisett technique does not fit into their farming practices.

Table 5: Reasons for non-adoption of yam minisett technique by respondents

Reasons for non-adoption	Percentage of respondents
Lack the technical details	82.0
Labour intensive nature	6.0
The minisett do not sprout well	3.0
It requires 2 seasons to produce ware yam	6.0
It does not fit into farming practices of farmers	3.0

**Problems associated with the minisett technique**

Farmers who had adopted the technique enumerated various problems they encounter when practicing in the field. Prominent among them is the challenge of low sprouting or difficulty in getting successful sprouts in the field (Table 6). Lack of or inadequate technical know-how and high cost of the technique, each accounts for about one-fifth of the problems encountered by farmers. Other problems identified in the study area include non-uniformity of sprouting and high rate of rot (Table 6).

Table 6: Problems farmers encounter with the use of the minisett technique.

Problems	Percentage of respondents
Low and difficulty in sprouting of minisett	42.3
Lack of technical know-how of minisett technique	19.3
Cost of the technique	19.2
Non-uniform sprouting of minisett	15.4
High rotting of minisett	3.8

**Discussions**

**Farmers sources of planting material**

Milking or pricking is one of the major means of obtaining planting material by yam farmers (Onwueme 1978; Okonmah, 1980; Adu-Gyamfi and Blay, 2009). In absence of one's own pricked yam sett there are other means of generating planting material such as cutting ware yam into setts and cutting of heads of ware yam. However, due to the cost of ware yam at the time of planting these options cannot be relied on. Farmers either buy left over of another farmer's sett or offer their labour to a farmer in exchange for setts. These were the options that were practiced in the Tolon district (Table 2).

**Awareness and adoption of the minisett technique**

Awareness of the yam minisett technique was very high for all the communities, and this may be due to their closeness to Savanna Agricultural Research Institute (SARI) hence had first-hand information on the said techniques from the researchers. In some communities these farmers served as a secondary source of information for their children and other farmers. Extension agents were also mentioned as a principal source and these might have come from SARI or Ministry of Food and Agriculture. Personal communication with a researcher indicated that in the 1980s research officers from SARI introduced farmers of nearby communities to the minisett technique through demonstration exercise. These trained farmers may have transferred the knowledge to their children and other farmers and that may account for high percentage of peer farmers being source of information to the respondents. Research institutions have been known to be major sources of knowledge to farmers. Oguntade *et al.* (2010) reported that intensive training by extension agents from IITA increases farmers understanding and adoption rate of the minisett technique in Oyo State in Nigeria. Over the years some of the farmers abandoned it or hardly practised the technology.

In Nigeria, awareness among yam farmers was not as high as found in Tolon district. Okoro (2008) reported awareness of 46.6 % nationwide in Nigeria. In Tolon district, the awareness was 100 among the respondents and adoption rate was 43.3 % as compared to below 30 % in Nigeria (Ogbodu, 1995; Iwueke, 1990; Okoro, 2008). It is worthy to note that Okoro did his study nationwide while this study was limited to one district.

**Reasons for non-adoption of the minisett technique**

One of the major reasons given by non-users

of the minisett technique was lack of knowledge on the technical details of the technique. Toluwase *et al.* (2017) reported that complexity of the minisett technique had negative correlation with adoption of yam minisett technique in Ekiti state. Labour required for sterilization of media and nursing the yam cuttings before they were planted on the field was a challenge. Such labour intensiveness deters farmers. Majority of the respondents in Tuunaayili, Gbulahagu and Waribogu Kukoo got to know the minisett technique through their colleague farmers. The expertise of these farmers would not be adequate for them to transfer the know-how of the technique to other farmers. Oguntade *et al.* (2010) reported that the main obstacle to the adoption of minisett technique in Nigeria was inadequate knowledge and labour requirements. Farmers prefer intercropping yam on mounds with other crops and with minisett growing on ridges they find it inappropriate to intercrop with other crops. Such intercrops like okra, *Cajanus* and some leafy vegetables are usually intercropped with yam to provide shade.

#### **Problems farmers encounter with the use of yam minisett technique**

Respondents enumerated a number of problems that militate against the adoption and application of the minisett technique. Low and difficulty in sprouting of minisett, non-uniformity of sprouting are the main hindrances to the use of the technique. Rotting of minisett was also mentioned but it was not a big problem, only about four percent of the respondents mentioned it. However, Adu-Gyamfi and Blay (2009) have reported rotting in Pona and Labreko minisett to be a major problem, 6.0% and 13.3% rotting respectively. The principal problem militating against the use of the technique given by the respondents are basically the same as those given by respondents in minisett studies conducted in Nigeria (Iwueke *et al.*, 1991,

Anuebunwa *et al.*, 1998, Okoro, 2008, Bolarinwa and Oladeji, 2009).

#### **Conclusion**

The results of this study revealed that the awareness of the minisett technique in the study area was very high and the percentage using it was high (43.3%). Non-adopters attribute their failure to use the technique mainly to lack of knowledge on the technical details of the technique. Adopters' main problem was difficulty or low sprouting of the minisett. In order to get more people to adopt yam minisett technology it is recommended that extension agents should teach farmers the technique that will lead to high percentage sprouting.

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