



# Sustainable Conservation and Use of Neglected and Underutilized Crops through a Pilot Community Seed/Field Bank in Adawso

FINAL TECHNICAL REPORT



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Photo front cover: Participants of the field day and diversity fair at Mangoase. Credit: Bioversity International and CIAT/R. Vernooy

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## INTRODUCTION

### Piloting a NUS community seed/field bank

In Africa, farming communities have conserved neglected and underutilized species (NUS), also known as minor or orphan crops, as part of local food systems for centuries. NUS are important for food and nutrition, as animal feed, for medicinal use; play a role in socio-cultural traditions; and contribute to income generation. NUS also contribute to securing non-food related ecosystem services from agriculture, including climate mitigation, water flow and water quality control. The NUS diversity currently available can be attributed largely to the efforts of farmer communities to sustainably use these species and varieties. However, NUS are increasingly under pressure, due to a number of forces. These include: population growth; expansion of land cultivated with staple and cash crops; dwindling pollinator and disperser populations (due to modern agriculture, environmental degradation and pollution); unavailability of seed and other planting material; migration of younger generations to cities; changing eating preferences and habits (from nutrient rich to energy rich foods); and, limited attention to and support for NUS in research, extension, education and policy (Vernooy, 2021).

The concept of community seed/field bank (sometimes known as community seed reserve) is one of the approaches to harness and protect crop diversity in a community. Community seed/field banks aim to regain, maintain and increase the control of farmers and local communities over seeds and to strengthen cooperation among farmers and between farmers and others involved in the conservation and sustainable use of agricultural biodiversity (Vernooy et al., 2015). The community seed bank system also facilitates access to a diverse collection of seeds and planting materials within the farmers' community, while also creating opportunities for generating revenue to support the conservation of local varieties and the sustainability of the seed bank through the sale of seeds.

This report describes the efforts to establish a pilot community seed bank in Ghana, using the farmer-based association (FBA) managed community seed/field bank approach (Vernooy *et al.*, 2020) to promote the conservation and utilisation of NUS. The community seed/field bank addresses the major challenge in Ghana to give farmers and their communities access to planting materials, including NUS (Baa-Poku, 2019). The pilot initiative takes place in Adawso, in the Akwapim North District, which is a site known for high diversity of root and tuber crops, cereals, legumes, fruit tree species and vegetables. Adawso has a high diversity of NUS crops as well. The Adawso community is situated in the forest zone with a bi-modal rainfall and farming as its main activity. The community has about 3,900 inhabitants and is a major source of food supply to Koforidua (18.6 km from Adawso) and Accra (59.3km from Adawso). The town has offices of Ministry of Food and Agriculture (MoFA) and Agriculture Extension Agents (AEA), which offer extension services to the farmers. A farmer-based association (Nyonkopa farmer group) in the community is vibrant with an active membership of 120 (83 men and 37 women).

To sustainably conserve these crop species for food and nutrition security and adaptation to climate change, there is a need to build capacity of farmers and other actors in the food value chain through community seed banking. The capacity building and related activities have been implemented collaboratively by the NUS Network, Alliance of Bioversity International and CIAT, the District MoFA office (MoFA), the Agricultural Extension Service, and scientist of the Council for Scientific and Industrial Research-Plant Genetic Resources Research Institute (CSIR-PGRRI), the Biotechnology and Nuclear Agriculture Research Institute (BNARI) and the University of Energy and Natural Resources (UENR).

## **STAKEHOLDER SENSITIZATION**

Several visits were made by Daniel Nyadanu to introduce the concept and practice of community seed bank to stakeholders in Adawso and the Mangoase community in particular. The idea was well-received by the local staff of the Ministry of Food and Agriculture (MoFA) and by the Agriculture Extension Agents (AEA), who agreed to provide technical support from the start of the activities; and by the leaders of the community who expressed interest to become part of a community seed bank. The director of the Agricultural College in Mangoase expressed full support, engagement of teachers and students, and a piece of land on the school premises to construct a new storage facility. On the field day, about 70 agricultural students (about 60% female) actively participated in the activities and expressed interest in the (proposal for a) local community seed bank.

## **COMMUNITY SEED BANKING INTRODUCTORY ACTIVITIES**

Two related activities were organized: a one-day conceptual and practical orientation in Koforidua about community seed banks facilitated by Ronnie Vernooy of the Alliance of Bioversity International and CIAT, for agricultural scientists, researchers, technical staff and lead farmers (see photos on next page); and a seed fair and five-cell analysis exercise with farmers in Mangoase community, facilitated by the group that participated in the day one activities, with the guidance of Ronnie Vernooy (see Annex for an evaluation of the activities by the participants).

The group of agricultural professionals was introduced to the following topics: What is a community seed bank? Why establish it? How does it operate? How to establish a community seed bank and maintain it? How to manage a community seed bank effectively? What is the potential of a community seed bank? What are proper storage techniques? What can a community seed bank do to contribute to climate change adaptation? What are good seed multiplication practices? How can we scale community seed banking?

The following functions of a community seed bank were identified, relevant in the Ghanaian agricultural context: 1) Conserve local crops; 2) As a back-up facility of the national genebank; 3) Provide farmers access to crop and varietal diversity; 4) Conserve and promote neglected and underutilized crops; 5) Provide farmers the benefits of crop diversity.

The group reflected on the challenge of sustainability of a community seed bank and identified the following factors that contribute to it, and which will be taken into account in the pilot project:

- Regular seed fairs to create awareness and circulate seeds; Continuous seed collection and regeneration; Field demonstrations
- Collective ownership; Good leadership; Organize groups to oversee seed fields
- Have bylaws; Have Standard Operational Procedures
- Safe facility
- Regular workshop and seminars about effective management
- Produce large amounts of seed to sell and generate income
- External support (technical, organizational, policy/legal)
- Regular monitoring and evaluation
- Address emerging challenges on time



Photo top: Ronnie Vernooy facilitating discussions on community seed banking. Photo below: Participants of the orientation workshop discuss the result of a group exercises. Credit: NUS Network, Ghana/D. Nyadanu

### **DIVERSITY OF CROPS IN FARMERS' FIELDS AT ADAWSO**

A field survey was carried out to understand the diversity of crops in the agricultural landscape of Adawso and its environs, where Mangoase is situated. A large diversity of crops was observed including cereals, root and tuber crops, legumes, vegetables and fruits. Interestingly, most of the crops are local varieties known to farmers and conserved over the years. Farmer's fields with a large number of local varieties of crops such as cassava, plantain and taro, were selected as field gene banks to ensure their sustainable conservation and to avoid genetic erosion. Farmers maintain several varieties of the banana, root and tuber crops (it could be possible that some of these varieties are having different names but are actually the same). For example, popular plantain varieties are: Ahurutia, Apentu, Apem, Nnyeretia, Oniaba, Sawmienu, Sosoboaso. Popular cassava varieties include: Abontem, Afram plains, Ahwerew pa, Akosua Sifoe, Ankra, Busumusia, Gbeze, Katamanso, Mulato, Soadzede, Train Wusiew, Tuka. Popular

yam varieties are: Afaswe, Bayere fitaa, Chamacho, Cocoase Bayere (cat), Cut, Fboobi, Nkeni. Some of the varietal names given by farmers suggest that the local varieties are stable and likely could be cultivated in many environments. An example is the 'Afisiafi' local variety of cassava. Some names of the local varieties indicate that they are early maturing and bearing. For example, the 'Abontem' local variety of cassava. These local varieties could be of interest as sources of crop improvement activities with farmers, e.g., through participatory variety selection and/or plant breeding. Table in Annex presents the crop and varietal diversity by farm/household.

## **THE CROPS OF MANGOASE AND THEIR STATUS**

Farmers in Mangoase cultivate more than 30 crop and tree species and many more varieties, with important roles of vegetatively propagated crops such as banana species (desert banana, cooking banana and plantain), roots (ginger, onion, sweet potato) and tubers (cassava, coco-yam, taro, yellow yam); traditional African and modern vegetables (African eggplant, bitter leaf, cabbage, chilli, gboma eggplant, okra, tomato, white jute); and tree crops (breadfruit, cocoa, coconut, oil palm, orange, papaya); complemented by common bean, cowpea, and maize. Some farmers maintain a considerable diversity of crops, e.g., one farmer household maintains five varieties of cassava, three of plantain, six vegetables and four of yam; another household maintains four varieties of cassava, six of plantain, 13 vegetables and seven of yam (see the table in Annex 2).

Through the 5-cell analysis carried out with farmers and agricultural students in Mangoase, it became evident that crop and varietal diversity in the area are under pressure. The table below presents the results of the 5-cell analysis, with special attention to be paid to the 'Few households-Small area' (orange shaded) and the 'Varieties that are under threat of disappearance' (yellow shaded) cells. Eleven varieties were grouped in the latter. The reasons given by farmers for the crops/varieties with poor diversity status are: lack of economic incentives (no market), lack of or inadequate planting materials, delayed maturity, poor crop management, lack of knowledge about the crop/variety, low yielding, not preferred for consumption.

Table 1. Results of the 5-cell analysis in Mangoase

<p style="text-align: center;"><b>Few Households - Small Area</b></p> <ul style="list-style-type: none"> <li>- Aboma (African eggplant): Not much consumed in the area</li> <li>- Atuyogya okro (okra): Delayed maturity; low yield</li> <li>- Black beauty (eggplant): Lack of economic value</li> <li>- Bitter leaf (ndoleh): Has a bitter taste; is associated with a northern tribe (cultural value)</li> <li>- Cassava (Ankra): Late maturity; high economic value</li> <li>- Enoifo mpe (maize): Needs lot of grain to fill a bag</li> <li>- Nnyerita (plantain): Does not give large bunches</li> <li>- Fadee begyee (wild tomato): Low market price</li> <li>- Ginger: Grows wild in the area</li> <li>- Local banana: Very invasive</li> <li>- Moatia kwadu/Knoadu Kekee (plantains): No market</li> <li>- Soursap: Little knowledge about its nutritional value</li> <li>- Sugarcane: Limited area available for cultivation; hard to cultivate (water requirement)</li> <li>- Taro: Limited appropriate land available</li> <li>- Water yam: Inadequate planting material</li> </ul>	<p style="text-align: center;"><b>Many Households - Small Area</b></p> <ul style="list-style-type: none"> <li>- Abudru (Turkey berry): Not deliberately cultivated</li> <li>- Cocoase bayere (Fitaa) (yam): Lack of planting materials; short shelf life</li> </ul>
<p style="text-align: center;"><b>Few Households - Large Area</b></p> <ul style="list-style-type: none"> <li>- Yobge (Aponkye shuwa) (eggplant): Good market</li> </ul>	<p style="text-align: center;"><b>Many Households - Large Area</b></p> <ul style="list-style-type: none"> <li>- Coco yam: high economic value</li> <li>- Cassava (Mena yaa): Early maturity; high economic value</li> </ul>
<p style="text-align: center;"><b>Under threat of disappearance</b></p> <ul style="list-style-type: none"> <li>- Asedua (legume): Unavailable planting materials; few people consume it; poor agricultural practices</li> <li>- Apatram (legume): No economic value</li> <li>- Atropo (yellow) (eggplant): No market available</li> <li>- Atropo (white) (eggplant): No market available</li> <li>- Bjsorobjtem (maize): No economic value</li> <li>- Breadfruit: Causes flatulence</li> <li>- Trawisee (cassava): Contains high saline content</li> <li>- Cocoase bayere (yellow) (yellow yam): Poor planting materials; no economic value</li> <li>- Local ntronia (eggplant): Bitter taste</li> <li>- Mesoase (eggplant): Difficult to harvest; low economic value</li> <li>- Prekese (<i>Tetrapleura tetraptera</i>) (a tree species): Delayed maturity; no economic value</li> </ul>	





Photo left: Mangoose crop diversity at display. Photo right: 5-cell analysis of Mangoose crops. Credit: Bioversity International/R.Vernooy

## TRAINING OF FARMERS

Farmers were introduced to the concept and practice of community seed banking during the interactive sessions organized in the community based on the learning content of the methodology developed by Bioversity International, now the Alliance of Bioversity International and CIAT (Vernooy et al. 2020a, b, c; see below). Additional training will be given to the farmers in 2023.

Vernooy, R., Bessette, G., Sthapit, B. Gupta, A. 2020a. How to develop and manage your own community seed bank Farmers' handbook (updated version). Technical issues: Booklet 2 of 3. Bioversity International, Rome, Italy. <https://hdl.handle.net/10568/92001>

Vernooy, R., Bessette, G., Sthapit, B., Porcuna Ferrer, A. 2020b. How to develop and manage your own community seed bank: Farmers' handbook (updated version). Management, networking, policies and a final checklist: Booklet 3 of 3. Bioversity International, Rome, Italy. <https://hdl.handle.net/10568/92002>

Vernooy, R., Sthapit, B. and Bessette, G. 2020c. Community seed banks: concept and practice. Facilitator handbook (updated version). Rome (Italy): Bioversity International; Department of Agriculture, Forestry and Fisheries, Pretoria. Available: <https://cgspace.cgiar.org/handle/10568/81286>

## NEW STORAGE FACILITY



Photos: (Left) Digging the foundation of the new community seed bank in Mangoase. (Right) The new storage facility (almost finalized). Credits: Daniel Nyadanu

Based on the agreement of the director of the Mangoase Agricultural school and considering access and security, construction of a brand-new facility was started with project funds. The facility was modelled after other community seed banks constructed by partners around the world, of medium size, with multiple spaces and well-ventilated. Construction has almost been completed and the inauguration will be organized soon.

## CONSERVATION IN THE STORAGE FACILITY AND FIELD

Most community seed banks around the world conserve seed of cereals, herbs, legumes, spices and vegetables (which are all crops that are propagated by seed). Some conserve tree seeds. In Mangoase and large parts of Ghana, given the agro-ecological and climatic conditions that have led to the predominance of bananas, roots and tubers (which are vegetatively propagated by roots, shoots, suckers or tubers), the pilot project is experimenting with seed fields, which are dedicated fields maintained by farmers on their farms for the production of seeds that can be shared by all community seed/field bank members. The photos below are two examples of such seed fields already identified: for taro and banana. Such seed fields can be maintained for several years. Through regular crop and field maintenance, they will continue producing new seeds in large quantities, which can be shared with members of the community seed bank and beyond. Ghana will be a guiding example for others around the world as there are very few examples of such field banks.



Photos: Two field banks for taro (left) and banana (right). Credit: R. Vernooy

In the newly constructed seed storage facility in Mangoase, small amounts of the non-vegetatively propagated crops will be stored after the facility has been completed and the necessary furniture has been installed (shelves).

### **SEED MULTIPLICATION**

Seed multiplication activities will start later in 2023.

### **EXPLORATION OF VALUE ADDITION TO SELECTED CROPS**

Experiences from community seed banks around the world led to the insight that an incentive can be created for the community seed banking efforts through value addition of one or more crops conserved. Examples include the marketing of particular local millet and rice varieties in India, organically produced vegetables in China, millet and sorghum in Kenya, and sale of bean seed in Uganda. To make a start with value addition activities in Mangoase, farmers in Mangoase, in particular the female farmers, were introduced to the steps (cooking protocol) to prepare yoghurt and ice cream from local taro. Capacity building of farmers to add value to taro through yoghurt and ice cream production is envisioned to generate income, enhance their livelihood and serve as an incentive for conservation. In the coming months, other value addition opportunities will be explored, e.g., for cassava (production of flour known as gari) and plantain (production of chips).



## RECOMMENDATIONS

- Extend the period of technical and financial support to the Mangoase community seed bank, in particular regarding the management of the seed field banks (in farmer fields), to build the local capacity of farmers, teachers and students to manage the community seed/field bank and work towards its sustainability. Continue the technical and organizational training activities with the support of the community seed bank handbook for farmers.
- Monitor the yield quantities and qualities of the seed field banks, the distribution and use of the seeds harvested, and the impact on households (production, consumption, income generation).
- Develop value addition activities of local crops to increase the socio-economic recognition and economic value, and contribute to improved nutrition and health, income generation, conservation and sustainable livelihoods.
- Organize regular training in storage and conservation knowledge and skills, combining traditional and modern approaches and practices (e.g., use of hygrometer, airtight containers, zeolite beads; germination testing; seed registration; seed multiplication), based on the methodology developed by the Alliance of Bioversity International and CIAT, and partners. [See: Vernooy, R., Aluso, L., Adokorach, J., Gupta, A., John, R., Mohamed, M.D., Mugisha, J., Nyabasha, S., Otieno, G. 2022. Make them dry; keep them dry. Traditional and modern techniques and practices to store and conserve seeds safely. Bioversity International, Rome, Italy. <https://cgspace.cgiar.org/handle/10568/124987>]
- Develop a curriculum module about community seed banking for the Mangoase agricultural school in collaboration with the teachers and students of agriculture, which covers conceptual and practical aspects (e.g., the importance of agrobiodiversity; in situ and ex situ conservation; characterization of local crop varieties; identification of additional varieties to be conserved; principles of safe seed storage; seed management knowledge and skills; culture, crops and food), with special attention paid to NUS.
- Develop outreach activities to make the work of the Mangoase community seed bank better known and generate more interest and support for community seed banking in Ghana.
- Develop a follow-up proposal to scale the Mangoase pilot community seed bank to other regions of Ghana in collaboration with key national institutions, including the PGRRI, universities and other seed sector stakeholders. Analyze the community seed banking experiences of countries that have a longer history and draw lessons from results and challenges (e.g., Mali, South Africa, Uganda, Zimbabwe).
- Include in the proposal networking activities of the community seed banks for exchange of knowledge and seeds.

## REFERENCES

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## Annex 1. Evaluation of the introduction to community seed banking by the participants

### Insights gained

- The importance of conserving our seeds and to adapt seeds to climate change.
- How to conserve neglected crops.
- The concept, rationale and functioning of a community seed bank and the challenges related to its sustainability.
- How to establish a community seed bank.
- The technologies used in a community seed bank.
- The practical exercise also taught me about teamwork and unity, which will help to sustain the seed bank in the community. I also learnt that seeds and legumes can be stored in containers and plastics while tubers are stored and maintained in the field.
- The evidence of community seed banks in other countries, their challenges and success stories
- I learnt crops in few households and small area of cultivation are about being eroded from the community. Efforts are to be taken to restore such crops back to landscapes in the community to ensure continuous presence of crop diversification for food and nutrition security and for adaptation to climate change.
- The status of crop diversity in the community: crops that are still there, others that are disappearing
- The importance of the economic value of crops; and the risk of losing crops of low economic value
- The reasons why some are totally lost due to the use of chemicals and bad agricultural practices

### Using the new knowledge and skills in practice

- I will be able to store crops for the short and medium terms.
- I will be able to link farmers to the community seed bank.
- I will promote community seed banking.
- I am competent to use and disseminate the knowledge acquired.
- The knowledge acquired will help me diversify the crops I cultivate, and I can also recommend it to other farmers.
- I will use it to train my students on the establishment of community seed banks.
- I am going to include community seed bank establishments in the seed science curriculum for my students
- I will get some students to work on community seed banks in Ghana.

### Recommendations

- Extending it to other communities will help farmers know the importance of conserving their seeds and extend the benefits of community seed banking to be able to establish the diversification of crop species across Ghana and make efforts to conserve them to ensure crop diversification in Ghana as whole to promote food security.
- There must be constant education and training on how important it is to establish and manage a community seed bank.

**Annex 2. Table 1. Diversity of crops and their local varieties in farmers' fields at Adawso**

Farm #	Location	Crops and their local varieties
1.	Teiko	Plantain: Apentu, Apem, Oniaba, Sosoboaso, Sawmienu, Abomienu; Cassava: Abontem, Menayaa, Ankra; Maize: Abontem; Vegetables: Meko tootoo, Meko Shito, Nkruma, Ntose navorongo; Bean: Eniwa tuntum
2.	Teiko	Cassava: Menayaa; Vegetables: Meko Shito, Ntose yoduwe; Maize: Abontem; Yam: Cocoase Bayere
3.	Teiko	Maize: Abontem; Cassava: Menayaa; Plantain: Apentu, Apem, Oniaba, Sawmienu; Vegetables: Meko tootoo, Ntose
4.	Teiko	Vegetables: Meko tootoo; Cassava: Menayaa; Plantain: Apentu, Apem; Cocoyam: Mankeni fita
5.	Teiko	Cassava: Menayaa, Abontem; Plantain: Apem, Apentu; Maize: Okronfo Mpe
6.	Teiko	Maize: Abontem; Cassava: Menayaa, Abontem; Plantain: Apem, Apentu, Oniaba
7.	Teiko	Cocoyam: Mankeni korkor; Yam: Cocoase Bayere (cat), Afasew, Chamacho, Nkeni; Plantain: Nnyeretia, Apentu, Apem, Asosoboaso; Cassava: Menayaa, Abontem; Vegetables: Nyera, Meko Pa
8.	Teiko	Cocoyam: Mankeni fita; Plantain: Apem, Apentu, Oniaba, Nnyeretia, Sawmienu; Banana: Kwadu Pa, Odocho; Cassava: Menayaa, Abontem
9.	Teiko	Cassava: Menayaa, Abontem; Yam: Cocoase bayere, Bayere fita, Chomacho, Bayere yellow; Plantain: Oniaba, Apem, Apentu, Sawmienu, Sosoboaso
10.	Teiko	Vegetable: Meko Ogyembga, Ntrowa, Nkruma; Cassava: Menayaa; Maize: Abontem
11.	Aboabo	Taro: Brube fita; Vegetables: Ntrowa, Meko shito, Meko Ogyembga, Nsusua
12.	Teiko	Cassava: Menayaa, Abontem, Afisiafi; Plantain: Oniaba, Apem, Apentu; Maize: Okronfo mpe, Abontem
13.	Teiko	Maize: Okronfo mpe, Abontem; Cassava: Abontem, Menayaa, Afram plains, Obahemaa; Plantain: Apem, Apentu, Sawmienu
14.	Teiko	Cassava: Menayaa; Plantain: Apentu, Apem, Sawmienu
15.	Teiko	Cassava: Menayaa
16.	Teiko	Cassava: Menayaa; Plantain: Apentu, Apem, Sawmienu; Vegetables: Ntose navorongo, Meko tootoo, Nkruma nteatea; Plantain: Apentu, Oniaba, Sawmienu, Apem
17.	Teiko	Plantain: Apentu, Apem, Oniaba; Cocoyam: Mankeni korkor
18.	teiko	Maize: Abontem; Cassava: Menayaa, Afram; Plantain: Abontem
19.	Teiko	Maize: Okronfo mpe, Abontem; Vegetables: Meko tootoo, Meko Atenten; Cassava: Ankra, Abontem; Plantain: Apentu, Apem
20.	Teiko	Plantain: Apem, Apentu, Oniaba
21.	Teiko	Maize: Okronfo mpe, Abontem; Cassava: Menayaa, Abontem; Plantain: Apem, Apentu; Vegetables: Ntose yoduwe, Ntose navorongo
22.	Teiko	Cassava: Menayaa; Plantain: Oniaba, Apentu, Apem; Maize: Abontem
23.	Teiko	Cassava: Abontem, Menayaa, Akatamanso; Maize: Okronfo mpe, Abontem; Plantain: Apentu, Apem, Oniaba, Sawmienu, Ososoboaso, Nnyeretia; Yam: Nkeni, Chamacho; Groundnut: Nkatie pa, Oboshie; Mango: local mango
24.	Teiko	Cassava: Abontem, Menayaa; Maize: Abontem; Plantain: Apentu, Apem, Oniaba, Sawmienu; Yam: Nkeni
25.	Teiko	Cassava: Menayaa, Abontem; Plantain: Apem, Apentu, Oniaba; Cocoyam: Mankeni fita, Mankeni fufro; Maize: Abontem
26.	Teiko	Cassava: Menayaa; Plantain: Apem, Apentu, Oniaba

27.	Teiko	Yam: Cooase bayere; Cassava: Menayaa, Cocoyam: Mankeni fita; Vegetables: Nkruma, Meko ogyemgba
28.	Teiko	Plantain: Apem Apentu, Oniaba, Nnyeretia; Banana: Kwadu Pa; Cassava: Menayaa, Abontem; Maize: Abontem
29.	Teiko	Maize: Okronfo Mpe; Cassava: Menayaa; Plantain: Oniaba, Ososoboaso, Sawmienu, Brode hene
30.	Teiko	Cassava: Menayaa, Annkra, Dabo; Plantain: Apeem, Apentu; Cocoyam: Mankeni fita, Mankeni korkor
31.	Teiko	Cassava: Menayaa; Plantain: Apem, Apentu; Vegetables: Meko tootoo; Maize: Okronfo Mpe
32.	Teiko	Cassava: Menayaa; Plantain: Apem, Apentu
33.	Teiko	Cassava: Menayaa, Maize: Okronfo Mpe
34.	Teiko	Cassava: Menayaa; Maize: Okronfo Mpe
35.	Teiko	Cassava: Menayaa; Vegetables: Meko ogyamgba
36.	Teiko	Cassava: Menayaa; Plantain: Apentu, Sawmienu; Cocoyam: Mankeni fita; Vegetables: Nkruma; Yam: Cooase bayere, Chomacho
37.	Aboabo 2	Cassava: Ankra; Turkey berry: Katonse; Yam: Afasew
38.	Paakro Junction	Cassava: Tuaka, Afram plains, Akosua Sifoe
39.	Paakro Junction	Cassava: Tuaka, Afram plains, Akosua Sifoe
40.	Paakro Junction	Cassava: Tuanka, Afram plains, Akosua Sifoe
41.	Paakro Junction	Cassava: Akosua Sifoe
42.	Paakro Junction	Cassava: Akosua Sifoe, Afram Plains
43.	Tetteh Kofi	Vegetables: Meko tootoo, Meko ogyemgba, Meko shito, Meko Bimbila, Ntombo fitaa, Ntombo yellow, Ntombo kokoo, Ntrowa fitaa, Nkruma Atenten, Mkruma Ayibge, Nkruma Afede, Ntrowa atropo, Yobwee; Plantain: Oniaba, Sosoboaso, Apem, Apentu, Nnyeretia, Sawmienu; Cassava: Menayaa, Afram plains, Ankra, Abontem; Yam: Fboobi, Nkeni, Bayere yellow, Fitaa, Oboobi, Nkeni; Vegetables: Ntombo fitaa ,Ntombo yellow, Ntombo koko, Ntrowa fitaa.
44.	Paakro Junction	Cassava: Afram plains, Ankra, Menayaa, Tuaka, Akosua Sifoe. Maize: Okronfo mpe; Plantain: Apem, Apentu
45.	Teiko	Taro: Brube korkor; Cassava: Menayaa, Ankra, Gbeze, Duafra, Abontem, Train Wusiew; Maize: Fitaa, Abotem; Vegetables: Ntose raster, Ntose power, Ntose raster, Ntose fadebegye; Meko nyera, Meko tootoo, Meko shito, Meko nsatea, Meko ogyemgba; Plantain: Apem, Apentu, Sawmienu, Sawbaako, Oniaba, Sosoboaso
46.	Aboabo	Cassava: Santom, Ankra; Plantain: Sawmienu; Maize: Aburow ahuma, Okrofompe; Yam: nkani
47.	Torkwaba	Yam: Bayere prako; Maize: Aburow ne nkate, Agbe kwajo; Vegetables: Nsherawa, Nkruma, Meko tootoo
48.	old Mangoase	Plantain: Aabnonan, Nnyeretia, Oniaba, Sawmienu; Vegetables: Ntowa atropo, Meko nnyerawa, Tootoo, Ogyemgba
49.	Mangoase	Plantain: Sawmienu, Oniaba;
50.	Mangoase	Maize: local Yellow; Yam: Afasew, Nkanfo, Nkeni, Chomacho
51.	old Mangoase	Yam: Cut, Chomacho, Oboobi, Nkanfo
52.	sukwenya	Yam: Cut, Otem, Oboobi, Nkanfo
53.	Mangoase old town	Bean: Apatram
54.	Mangoase old town	Bean: Apatram



55.	Mangoase	Beans: Apatram
56.	Mangoase old town	Plantain: Oniaba, Sawmienu; Maize: local Yellow, local White
57.	Mangoase	Maize: local White
58.	Mangoase Zongo	Plantain: Nnyeretia, Sosoboaso; Vegetables: Meko nyera
59.	Mangoase	Yam: Chomacho; Maize: local Yellow
60.	Mangose	Cassava: Ankra, Soadzedede, Busumusia
61.	Mangoase-Adabraka	Yam: Afasew, Cut; Plantain: Oniaba, Sosoboaso, Nyeretia; Cassava: Afram plains
62.	Gbolu kofi	Maize: local Yellow; Plantain: sawmienu
63.	Gbolu kofi	Maize: Aburow kokoo, Bankye, Ankra
64.	Gbolu kofi	Maize: local Yellow, Fita; Cassava: Ankra; Yam: Cut; Plantain: Apem
65.	Gbolu kofi	Maize: local Yellow; Yam: Cut, Nkanfo
66.	old mangoase	Plantain: Oniaba, Sawmienu; Vegetables: Meko nyera; Gboma, Aayoyo
67.	Torkwaba	Vegetables: Ntose lorry tyre, Meko shito, Nyera; Maize: Okronfo Mpe; Yam: Cut
68.	Tetteh Kofi	Cassava: Train Wusiew, Duafra
69.	Paakro Junction	Cassava: Tuaka, Akosua Sifoe, Molato, Afram plains; Plantain: Apem, Apentu, Oniaba, Sawmienu, Sawbaako.; Vegetables: Nkruma atenten, Nkruma Atenten; Maize: local Yellow
70.	Paakro Junction	Cassava: Menayaa, Afram plains, Tuaka, Katamanso
71.	Paakro Junction	Yam: Cocoase bayere, Chomacho; Cocoyam: Mankeni fitaa, Mankeni kokoo; Plantain: Apem, Oniaba, Apentu, Sosoboase; Cassava: Menayaa, Akosua Sifoe; Maize: Aburow yellow Local
72.	Paakro Junction	Cassava: Menayaa, Tuaka, Katamanso, Afram Plains; Plantain: Oniaba, Apem, Sawmienu; Vegetables: Abedru, Nkrumah, Mmeko tootoo, Meko shito, Meko ogyemgba; Yam: Nkanfo, Chomacho, Cocoase bayere, Afasew fitaa
73.	Teiko	Vegetables; Nkruma asowntem, Nkruma afede; Cocoyam: Menkeni fita
74.	Gbolu kofi	Plantain: Apem, Apentu, Oniaba; Maize: local yellow; Vegetables: Nkruma afede; Cassava: Menayaa
75.	Teiko	Pawpaw: Solo, Brazil, local; Plantain: Apem, Apentu, Sawmienu
76.	Adawso	Vegetables: Ntrowa, nkrumah asowtem, Ayibge nkruma, Meko tootoo, Meko ogyemgba
77.	old Mangoase	Plantain: Nyeretia, Sosoboaso, Oniaba; Yam: Chomacho, Bayere Cat, Afasew; Vegetables: Pepper Nyera, Meko Shito; Maize: Okronfo Mpe; Pawpaw: local; Vegetables: Meko Ahenema satea
78.	old mangoase	Yam: Chomacho, Afasew, Osuaba; Cassava: Ankra, Abontem
79.	Aboabo	Plantain: Oniaba, Abomienu
80.	Aboabo	Maize: Agbe Kwajoe; Yam: Obobi, Bayere cat.; Cocoyam: Mankeni korkor; Vegetables: Ntrowa atropo
81.	Aboabo	Maize: local Yellow; Vegetables: Meko tootoo, Meko ogyemgba; Cassava: Ankra; Yam: Cocoase bayere, Bayere cat; Cassava: Ankra
82.	Aboabo	Maize: Aburow ahuma; Cassava: Ankra; Vegetables: Meko tootoo, Meko ogyemgba
83.	Ababio	Cassava: Anakra, Tuakwa, Akatamanso; Plantain: Abomienu; Oil palm: local; Maize: Aburow ahoma
84.	Gbolu kofi	Yam: Afasew, Cat, Chomacho
85.	Aboabo	Plantain: Abomienu; Vegetables: Meko Shito, Turkey berry, Abedru

86.	Gbolu kofi	Vegetables: Meko shito, Meko tootoo, Meko ogyembga, Nyera
87.	Tetteh Kofi	Vegetables: Nkrumah, Meko tootoo, Meko shito; Plantain: Apentu, Apem, Sawmienu, Sosoboaso; Cassava: Menayaa, Afram plains, Ankra, Abontem
88.	Gbolu kofi	Maize: Obaatanpa; Vegetables: Nkruma nteatea, Ntose navorongo; Plantain: Apem, Apentu
89.	Gbolu kofi	Maize: sugar Corn, Obaatanpa, Okronfo mpe
90.	Gbolu kofi	Cassava: Menayaa; Oil palm: Abe pa; Cassava: Menayaa
91.	Ankwansu	Vegetables: Okro ayibge, Meko shito, Ntose local; Plantain: Apem, Apentu; Oil palm: Abe pa
92.	Gbolu kofi	Cassava: Abontem, Menayaa, Ankra
93.	Gbolu kofi	Plantain: Oniaba, Sawmienu, Apem, Apentu, Sosoboaso, Ahurutia; Vegetables: Nkruma ayibge, Nkruma akyem, Ntrowa ebgo; Jute mallow: Ademe; Gboma eggplant: Gboma
94.	Gbolu kofi	Cassava: Menayaa, Tuaka; Maize: Fitaa obaatanpa; Maize: local Yellow, Fitaa sugar corn
95.	Gbolu kofi	Vegetables: Ntose local, Nkruma ayibge; Plantain: Sawmienu, Apentu, Apem; Cassava: Menayaa; Maize: local Yellow
96.	Gbolu kofi	Cassava: Abontem, Menayaa; Maize: Abontem; Plantain: Apentu, Apem, Oniaba, Sawmienu; Yam: Nkeni; Yam: Cocoase bayere; Vegetables: Nkruma nteatea, Ntrowa tie nkomo, Ntose local, Meko shito; Maize: local Yellow
97.	Gbolu kofi	Cassava: Tuaka, Ankra; Plantain: Apem, Sawmienu; Yam: Afasew; Maize: Okronfo Mpe
98.	Gbolu kofi	Cassava: Ankra, Abontem, Menayaa; Plantain: Apentu, Apem, Oniaba, Sosoboaso, Sawmienu, Vegetables: Meko Shito; Cassava: Menayaa, Abontem
99.	Gbolo Kofi	Maize: local Yellow, Fitaa obaatanpa, Abontem; Plantain: Apem, Apentu, Oniaba; Cassava: Menayaa, Abontem
100.	Gbolo Kofi	Plantain: Apem, Apentu, Sawmienu, Sosoboaso; Maize: Okronfo Mpe, local Yellow; Yam: Afasew, Cocoase Bayere, Nkanfo; Cocoyam: Mankeni fita
101.	Gbolo Kofi	Cassava: Menayaa; Maize: Obaatanpa fitaa, local Yellow, Sugar corn
102.	Gbolo Kofi	Plantain: Apentu, Apem, Sawmienu, Oniaba, Nyeretia, Abomienu; Cassava: Abontem, Ankra; Cocoyam: Mankeni kokoo
103.	Gbolo Kofi	Cassava: Menayaa; Plantain: Apentu, Maize: Okronfo Mpe
104.	Mangoase Zongo	Yam: Nkeni, Sayo, Cat; Vegetables: Ntose lorry tyre, Rasta
105.	Mangoase Zongo	Cassava: Abontem, Ankra
106.	Teiko	Plantain: Sosoboaso, Nyeretia; Maize: local Fitaa; Cassava: Ankra, Abontem
107.	Teiko	Plantain: Sawmienu; Maize: local fitaa
108.	Gbolo Kofi	Vegetables: Ntose yoduwe
109.	Gbolo Kofi	Cassava: Ankra, Abontem
110.	Gbolo Kofi	Plantain: Oniaba, Apem, Nyeretia; Maize: local Yellow; Vegetables: Nkruma tietia; Yam: Nkani, Cat
111.	Aboabo	Plantain: Apem, Abomienu; Vegetables: Meko shito; Plantain: Abomienu
112.	Aboabo	Cassava: Ankra; Avocado pear: Paya nku; Cassava : Train wusiew, Duafra
113.	Tetteh Kofi	Cassava: Ahwerew pa
114.	Teiko	Cassava: Menayaa, Ahwerew pa, Asikere Ahwerew
115.	Teiko	Plantain: Apem, Apentu; Taro: Brube fita
116.	Tete kofi	Vegetables: Ntrowa atropo

117.	Tetteh Kofi	Yam: Cocoase bayere, Chomacho, Afasew; Maize: Okronfo Mpe; Vegetables: Nkruma, Meko shito, Meko tootoo
118.	Tetteh Kofi	Cassava: Ankra, Menayaa; Plantain: Apentu, Apem, Oniaba, Sawmienu; Ase dua
119.	Tetteh Kofi	Maize: Okronfo mpe
120.	Tetteh Kofi	Vegetables: Nkruma atenten; Yam: Bayere fita; Plantain: Apem, Apentu, Oniaba
121.	Paakro Junction	Cassava: Menayaa, Tuaka; Plantain: Apentu, Apem
122.	Teiko	Cassava: Menayaa, Abontem, Ankra; Yam: Nkeni, bayere pa
123.	Gbolo Kofi	Maize: local Yellow; Yam: Bayere pa; Cocoyam: Mankeni fita; Vegetables: Meko atenten, Meko shito, Nyera; Maize: local Yellow
124.	Gbolo Kofi	Plantain: Apem, Apentu, Sawmienu, Oniaba, Nyeretia; Yam: Afasew, Bayere pa, Cocoase bayere; Cassava: Menayaa, Abontem, Ankra; Cocoyam: Mankesi Kokoo fita; Maize: local Yellow, Sugar corn
125.	Gbolo Kofi	Cassava: Ankra, Tuaka, Menayaa; Plantain: Sawmienu, Apem, Apentu, Oniaba; Oil palm: Abe pa
126.	Gbolo Kofi	Cassava: Ankra, Abontem, Menayaa; Maize: local Yellow; Banana: Kwadu Pa; Yam: Cocoase bayere, Bayere cat; Cocoyam: Mankeni kokoo fita; Vegetables: Nkruma ayibge, Nkruma nteatea; Bean: Apotromo