# Package 103, Item 1

Type: Issue pack

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**Cowpea production**

1. **Introduction and how to use this issue pack**

This issue pack is designed to give radio broadcasters the information needed to create effective and entertaining radio programs about growing cowpea.

It talks about growing cowpeas in northern Ghana, but you can easily adapt the information to other sub-Saharan African countries where cowpeas are grown.

The issue pack begins with this introduction, then **Section 2** presents background information on the production part of the cowpea value chain. (Please see Resource Pack 95, Item 9 – [*An introduction to value chains*](http://www.farmradio.org/radio-resource-packs/package-95-researching-and-producing-farmer-focused-programs/an-introduction-to-value-chains/) – for a definition of “value chain,” and for a better understanding of why value chains are important to both broadcasters and farmers.)

Finally, in **section 3**, we list sources for further information on growing cowpeas. We include resource organizations, online radio programs, online videos, and online documents.

You could use the information in this issue pack in several ways. For example:

* You could interview farmers who grow cowpeas. You might ask them:
	+ Is growing cowpeas common in your area?
	+ If so, what challenges do farmers face, especially with pests and diseases? Have some farmers devised solutions to these challenges that they could share on your program? What do extension agents and other experts say about these challenges?
	+ Do farmers mostly raise cowpeas for home consumption?
	+ Is growing cowpea a profitable business in your area? What are the economic prospects?
* You can use the information in **section 2** as background material for any program on growing cowpeas.
* You could contact one or more of the organizations listed in **section 3** for further information, or to interview experts.
* You could use the audio and video resources and online documents in **section 3** to help you create programs on growing cowpeas.
1. **Background information on cowpea production in Ghana**

**Introduction**

Farmers grow cowpeas on over 180,000 hectares in Ghana, more than any other legume crop in the country. Annual production in 2011 was estimated at more than 235,000 tonnes. Average yield was about 1.3 metric tonnes per hectare in 2011. Most cowpeas in Ghana are grown in the savannah areas of the north, but farmers can grow cowpeas anywhere in the country.

Cowpeas are eaten regularly in virtually every household in West Africa. Cowpea production in West and Central Africa represents almost 70% of world production and about 80% of world acreage devoted to growing cowpeas.

The demand for cowpeas is increasing in Ghana because of high population growth, mainly in urban areas. In 2010, the average consumption of cowpeas in the country was about five kilos per person per year.

Cowpea is both a food security and a cash crop. Because of its short duration, it can be grown in two months and harvested to give break-even yields even with little rain and then stored and eaten when households run out of other foods. Cowpea is also referred to as the "hungry season crop” because it is the first crop to be harvested before the cereal crops are ready. The dry grain is a daily staple for the majority of the population and the green leaves are eaten as vegetables. Cowpea flour is used to make home meals such as stews, soups, bean cake, and *kose* (cowpea paste fritters). The whole cowpea is also used to prepare *gari* and beans and *wakye* (cooked rice and beans). These foods are often sold in street food markets.

Cowpea is prepared for consumption in grain, split and ground forms. The ground form has traditionally been a favourite of rural households in northern Ghana because cowpea flour is less susceptible to post-harvest pest damage and can be used in many different dishes thus enhancing food security between harvests. Processed products such as cowpea flour, cowpea cake, cowpea fritters, and cowpea chips are sold in village markets. Households can earn a good income by producing two or three crops of cowpeas per year. Ghanaian farmers typically store and sell more than 60% of their cowpeas when prices rise during the off-season.

Although cowpeas are two or three times as expensive as maize, rice, or other cereals, they are relatively cheap compared to other protein sources such as milk, meat or eggs. And because they can be stored, they are an important source of protein for people who do not have access to refrigeration. Indeed, cowpeas have been called "the poor man's meat," because of their high protein content.

The potential yield of cowpea is up to 2.5 tonnes per hectare, but the usual yield in Ghana and other West African countries is less than 1000 kilograms per hectare. Average yield in Ghana was about 1.3 tonnes per hectare in 2010.

Some creeping varieties of cowpea tolerate shade, and so can be grown as an intercrop with maize, millet, and sorghum. This makes cowpeas an important component of traditional intercropping systems, especially in the dry savannah. In these areas, dried stalks of cowpea are a valuable animal feed and are sold to livestock farmers.

Cowpea also benefits farmers because it fixes atmospheric nitrogen in the soil, which improves soil fertility. Cowpeas form root nodules with bacteria that live in the soil and are called rhizobia. The bacteria in the root nodule can fix nitrogen from the air into a form that can be used by the cowpea for growth. Part of this nitrogen is used to produce protein in the grain, and part remains in the leaves and roots and eventually returns into the soil after harvest. The nitrogen that is left behind in the soil improves the fertility of the soil. This reduces the amount of money farmers need to spend on inputs such as chemical fertilizers, resulting in increased income and increased yield for cowpeas and the crops which follow them. Most cowpea varieties form root nodules freely. But recent studies in northern Ghana have shown that cowpea will fix more nitrogen when farmers inoculate the soil with rhizobia.

Cowpeas produce easily picked crops at maturity. The bushy varieties also provide forage for livestock. Vining varieties also provide soil cover, smothering weeds and protecting the soil from erosion.

The major challenge to growing cowpeas in Ghana is insect pests and weeds such as Striga and Alectra. Insects and weeds can cause losses of 15 to 100%, depending on the level of infestation, drought, soil fertility, and the susceptibility or resistance of the variety. A few cowpea varieties are resistant to striga.

**Management practices for growing cowpea**

*Choosing a site and preparing the land*

Cowpeas should be grown in well-drained soils, and do not yield as well on heavy soils. Cowpeas tolerate heat, drought, and acid soils, but not waterlogging. Cowpeas use soil moisture efficiently and are more drought-tolerant than groundnuts, soybeans, or sunflowers. They can grow in areas where rainfall ranges from 400 to 700 mm per year.

Cowpeas can be grown on a wide range of soils but prefer sandy soils, which tend to be less restrictive of root growth. They are more tolerant of infertile and acid soils than many other crops. Cowpeas require a soil pH of between 5.6 and 6.0.

For soils with poor structure, high run-off, and low water infiltration, farmers can improve the soil and increase their yield by hoeing or ploughing the land. The land may be ridged or left as flat seedbeds after preparation.

*Planting*

Cowpea is grown directly from seed. Seeds should be planted 3-4 centimetres deep. For good quality and high yield, seeds must be free of diseases and insects. Seeds must be sorted to ensure they are free from insect damage (without damage holes or wrinkles) or dirt and debris. To ensure good germination, make sure your seed is not more than 12 months old.

Seed varieties vary by country and region. Farmers in northern Ghana grow a number of traditional varieties. Some of the more common ones are Bengpla, Songotura, Apagbaala, and Marfo Tuya. Songotura is high yielding and resistant to striga.

Usually, farmers grow spreading varieties in intercropping systems and grow erect or semi-erect types for sole cropping. Higher yields are available with sole cropping, if early-maturing (60-70 days) erect or semi-erect types are grown.

Ideally, farmers should plant cowpeas so that the crop matures and is harvested during bright, dry weather. Harvesting in cloudy, humid conditions increases the risk of disease. The best sowing time in northern Ghana is between August and mid-September. It can, however, be grown between December and January under irrigation.

It’s usually best to plant early-maturing varieties at the beginning of the rains so that the sensitive stages of the crop avoid the peak populations of insect pests. Early types can be planted in April in northern Ghana. Prostrate varieties can be planted towards the end of July.

If farmers plant two crops a year, the first crop can be planted in April and the second in late July to mid-August. If you plant the same variety for both crops, it’s best to use old seed reserves rather than planting seeds from the earlier harvest because these seeds may not be properly dry.

Seed rate depends on variety and growth habit. When planting erect or semi-erect varieties, the usual recommended spacing is 60 centimetres between rows and 20 centimetres between plants, with two seeds per hill. At this spacing, up to 28 kilos of seeds is needed per hectare. Local prostrate varieties should be planted with wider spacing of 80 cm x 40 cm, which requires about 10 kilograms of seed per hectare.

Planting in rows makes weeding and applying other inputs easier.

*Fertilizer*

Cowpea can fix its own nitrogen and therefore does not need to be fertilized with nitrogen fertilizers such as sulphate of ammonia or urea. But cowpea cannot fix other nutrients such as phosphorus, which is deficient in most savannah soils. Good types of phosphorus-rich fertilizer for cowpea are single super phosphate (SSP), Triple Super Phosphate (TSP), and Di-Ammonium Phosphate (DAP). TSP and SSP also contain calcium. Single Super Phosphate is not available in Ghana. DAP contains 24% nitrogen in addition to the phosphorus.

*Application*

Make furrows along the planting rows of the cowpea about 8-10 cm away from the cowpea plants and 5 cm deep. Place the fertilizer in the furrows and cover them with soil. Do this at planting or soon after planting. Cowpea needs about 30 kilograms of phosphorus per hectare or approximately 150 kilograms of TSP per hectare.

*Weeding*

Weeds damage cowpeas by competing for light, water, and soil nutrients. They may also harbour insect pests. Cowpea suffers most from weeds in the early stages of growth.

Farmers should weed by the second week after germination, depending on the types of weeds and how well the land was prepared. It is important that the second weeding is completed by the end of the fourth or fifth week, when the crop is establishing ground cover. Striga is an important weed, and quite common in the Upper East Region of Ghana. The variety, Songotura, is moderately resistant to striga. Tilling the soil before planting can greatly reduce early weed pressure, as can using cover crops.

**Striga:** Managing Striga can be difficult and time-consuming. Currently, chemical control is not recommended, mainly because research has not found any evidence of benefit. Farmers should try to improve soil fertility where striga is a problem; more fertile soils are less infested with Striga. Using manure and/or small quantities of chemical fertilizer may reduce infestation, when combined with weeding before Striga sets seeds.

Hand-weeding infested areas before Striga sets seeds is the most important control method. Striga should be weeded out as soon as farmers observe any flowering, because it takes only a few weeks for flowering Striga to develop seeds. It may be necessary to weed the area twice per season.

*Disease and pest management*

The following diseases are common in northern Ghana:

**Bacterial diseases** such as bacterial blight and bacterial pustule: *Bacterial blight* is seed-borne and farmers can minimize the disease by using high-quality seed. Because bacterial blight survives on diseased crop residues, growing continuous cowpea may increase the prevalence of disease.

Initial symptoms are tiny dots on the leaves, which then begin to turn yellow. The disease spreads quickly during heavy rainfall, when large areas of the leaves are affected. Bacterial blight can also affect the stem, causing it to crack. Diseased pods appear water-soaked.

The first symptoms of *bacterial pustule* are tiny, dark, water-soaked spots on the undersurface of leaves. With severe infestation, these spots enlarge, becoming dry and sunken in the centre, and water-soaked around the edges. The leaves turn yellow and fall. Like bacterial blight, using clean seed and rotating crops can reduce the incidence of bacterial pustule.

**Fungal diseases:**

*Stem rots*are the most important disease of cowpeas**.** Symptoms are cotton-like growth at the base of the stem. Infected plants wilt and die. The disease is probably not seed-borne. Good field hygiene may control the disease.

*Anthracnose* is a stem disease, but can affect all above-ground parts of the plant. Symptoms are brownish wounds on affected plant parts, which expand to circle the stem and other parts of the plant. The disease is seed-borne and can be managed by using clean seed.

*Web blight:*Symptoms are small, circular, reddish-brown spots on leaves, which can enlarge in humid conditions. Leaves become dry. The disease survives in the soil on crop residues, and crop rotation may control it.

To control diseases:

* Practise crop rotations. Rotate cowpeas with cereals such as maize, sorghum or millet
* Use clean seeds and avoid seeds from diseased plants
* Use disease resistant varieties
* Uproot and destroy infected plants
* Plant in a good seedbed and avoid poorly drained soils

*Insect pests*

Insect pests reduce cowpea yields more than any other problem. The main pests during the growing season are aphids, leafhoppers, thrips, and pod borers. It is almost always necessary to use one or two applications of insecticide. Alternatively, farmers can try intercropping cowpea with non-leguminous crops.

*Pests of pre-flowering cowpeas*

*Aphids:*The cowpea aphid is a major pest of cowpeas. These insects feed on the undersurface of young leaves, on young stem tissue, and on the pods of mature plants. Severe aphid infestations cause premature loss of leaves and death of young seedlings. More importantly, aphids transmit the mosaic virus, which can be recognized as a green vein banding the leaves. A number of improved varieties are resistant to aphids.

It is not usually recommended to take any actions to control aphids, except when there are symptoms of viral infection. There are several pesticides which can control aphids. But deciding whether or not to control aphids depends on visual counts of aphids and the stage of crop development. Consult an extension worker or other expert on this.

If a few plants are seriously affected, uproot and burn or feed to livestock. It`s best to remove old plants that have been harvested from the field, as they often harbour aphids.

*Leafhoppers*can destroy cowpea during the seedling stage. Their feeding causes the veins and edges of leaves to turn yellow, followed by cupping of leaves and stunted plants. Most improved cowpea varieties are resistant to leafhoppers, and insecticides are not usually required.

*Thrips:*In northern Ghana, this pest can destroy a whole cowpea crop. The adults are small, shiny, black insects in flower buds and flowers. With severe infestation, plants do not produce flowers. Open flowers can look distorted and discoloured.

Spraying is recommended only when the number of insects per unit area reaches a certain level—consult extension workers or other experts about this number. If sprays are required, this is done when flower buds start to form, to ensure good production of flowers. For most varieties, this is between 30 to 35 days after sowing. For varieties that produce their flowers in a single flush, a second spray 10-12 days after the first will prevent death of flowers.

*Pests of post-flowering cowpeas*

The *Maruca pod borer*damages pods and seeds. The larvae (caterpillars) feed on tender parts of the stem, flowers, and pods, causing webbing of flowers, pods, and leaves and depositing frass (insect excrement) on pods. Varieties which have pods above the canopy and whose pods are separated from each other (such as Apagbaala) escape serious damage from this pest.

*Pod-sucking bugs:*A number of pod bugs are common in cowpea-growing areas and usually attack cowpea crops at the same time. Typical symptoms are shrivelled pods that dry prematurely, leading to significant yield losses. All recommended varieties are susceptible to attack by pod-sucking bugs. Insecticides are often used to control pod-sucking bugs. Currently, there are no effective alternatives to insecticides with serious infestations.

To control insect pests:

* Plant early.
* Regularly check the field for harmful insects and hand pick and destroy them. Wear gloves when picking them since some of the beetles can release a liquid that burns the skin.
* Clean up crop residues from previous crops that may harbour insects.
* Plant resistant or tolerant varieties.
* Practice crop rotation.
* Spray with insecticides.

The frequency of spraying depends on the severity of insect attack and on the cowpea variety. Late-maturing varieties require more sprays than early-maturing varieties, but generally two or three is sufficient. Consult your local extension officer or other expert for advice on which product to use, and how and when to apply.

**Birds**, especially birds in the parrot family, can be a problem because they may pull up emerging seedlings and feed on developing green pods. Farmers can manage birds by scaring them away by hanging old clothes or stringing cassette tapes around the field.

*Harvesting*

At maturity, leaves will dry but may not drop off completely. Harvesting should coincide with the onset of the dry season at a time when the dry pods can await harvesting for about a week without spoiling. But, in humid weather, any delay in harvesting may cause grain to deteriorate.

Cowpea can be harvested with a harvester or by hand. When cowpeas are grown as a leafy vegetable, young leaves are mainly picked by hand. Older leaves accumulate dust or get spattered with mud from raindrops if not harvested.

After harvest, sun-dry pods immediately and then thresh. It is important to dry cowpeas well before storing in order to avoid seed becoming mouldy. Dry the pods on a clean surface such as a mat, plastic sheet, or tarpaulin.

Thrash the dry pods on a clean surface such as a tarpaulin. Clean the grains by winnowing to remove chaff, dust, and other debris. Remove shrivelled, diseased, or broken grains.

Dry the threshed grain on a clean surface for two sunny days before storage. Place grains in clean bags. Grains can be treated before storage to control storage pests. Ask an extension agent or an agro-input dealer which insecticide to use.

You can also use Purdue Improved Grain Storage triple bags to store grains under airtight conditions and keep insects away from the grains. Place grains in the innermost bag and tie it tightly. Then tie the middle bag, and finally tie the outermost bag. When all the bags are tied, any insects in the grain will die from lack of oxygen. It is not necessary to treat grains against storage pests when using PIGs bags.

Clean the storage room, then stack the grain bags on a raised platform or on wooden pallets away from the wall. Avoid direct contact between storage bags and the ground.

**Consumption and nutrition**

Cowpeas are a common staple food in West Africa. In Ghana, they are eaten with cassava, plantain, cereal-based meals, and yogurt. In Nigeria, cowpea paste is boiled or fried to produce a popular meal known as *moinmoin* that is served with rice during ceremonies, and *akara*, which is served for breakfast.

Cowpeas are eaten both as a leafy vegetable and as a legume. Dried cowpeas can be cooked with vegetables to make a thick soup, or ground into a meal or paste, before preparing in a variety of ways. Fresh, immature pods can be boiled as a vegetable. Fresh leaves and growth points can be picked and eaten like spinach. Dried leaves are preserved and eaten as a meat substitute.

Cowpeas contain about 25% protein and are low in fat. They are rich in potassium with a good amount of calcium, magnesium, and phosphorus, and small amounts of other minerals. Cowpeas are rich in vitamins A and C, have a good amount B vitamins.

**Gender and cowpea**

In West and Central Africa, cowpeas are cultivated by both men and women, but women dominate post-harvest processing and marketing.

Cowpea provides a source of cash for women farmers who make and sell snack foods from cowpeas. In many African countries, women harvest and sell direct to consumers on roadsides because pod prices are higher than dry grain prices. In general, women are retailers who acquire the grains from wholesalers and commission agents to sell smaller quantities in local markets.

**The cowpea value chain**

The value chain for cowpea is highly commercialized in Ghana. Most cowpeas enter commercial trade from the surplus- producing areas in the northern regions to southern urban centres through the Techiman and Tamale markets.

There are four main channels in the value chain for grain legumes such as cowpeas in Ghana:

1. subsistence production and consumption (About one-third of the cowpeas produced by households are eaten by the household itself)
2. dried unprocessed cowpeas sold to local and long-distance markets for direct household consumption
3. dried cowpeas sold for industrial processing
4. manufacture of edible vegetable oil, food and feed products

In West and Central Africa, the majority of cowpeas are sold in bulk. Vendors display large bowls of cowpeas that consumers can inspect before making their purchase. The preferred visual characteristics of cowpeas vary from place to place.

In West Africa, almost all cowpea production occurs between August and December, while consumers eat cowpeas all year round. Typically, prices are lowest during harvest. Prices rise steadily thereafter to a peak in June, July, and August. In addition to consumer preferences, there are other factors that influence cowpea consumption in West Africa. In Nigeria, consumption of cowpea is determined by four factors: consumers `income level, taste, price of cowpea and its close substitutes, and population density in towns.

Farmers sell cowpeas to local traders in village markets. Local traders assemble the small lots into larger volumes, transport them to central markets, and sell to stores and grain merchants in urban markets. These merchants sell wholesale to long-distance trade and local retailers. Also, wholesalers in large urban markets travel to the surplus regions to buy grain directly from farmers in village markets on market days.

There is increasing specialization and farmers are increasingly selling to aggregators and commission agents rather than local traders. Aggregators and commission agents finance farmers, as well as supply services such as tillage, threshing, shelling, assembling, cleaning, sorting and grading, repacking, and storing. Then they sell to long distance traders, poultry farms, and industrial processing companies. Aggregators are increasingly becoming dominated by farmers’ marketing associations. There is also cross-border trade with several countries.

In 2004, the Savanna Farmers Marketing Company was established by a nongovernmental organization, the Association of Church Development Projects (ACDEP), to improve production by small-scale farmers. The organization started marketing in 2008. It improves the capacity of farmers to negotiate, aggregate produce, and sell through structured channels. In 2010, the company had 9,500 farmer-members who marketed over 12,000 tonnes of grains. The company links farmers to value chains by increasing marketed surplus and improving quality by using tarpaulins for threshing cowpeas and soybeans. It operates by establishing close business relationship with farmers through regular meetings, and organizes farmers into formal farmer-based organizations and gets them registered as co-operatives, establishing linkages to rural banks for credit.

1. **Further resources on the cowpea value chain in Ghana and sub-Saharan Africa**

***Resource organizations***

1. Savanna Agricultural Research Institute (SARI), Dr. I.D.K. Atopkle. Phone: 0208164898. Email: idkatopkle@yahoo.com
2. N2 Africa Project under International Institute of Tropical Agriculture (IITA), Prof. Samuel Adjei–Nsiah. Phone: 0208676166/0245395251. Email: s.adjei-nsiah@cgair.org
3. Nu Image–PICS Bag, David Baba Yara. Phone: 0206618556. Email: nuimage2009@yahoo.com

***Audio programs***

Cowpea gives boost to cassava. <http://www.agfax.net/radio/detail.php?i=520>

***Videos***

1. Abdul Latif Jameel Poverty Action Lab, Massachusetts Institute of Technology Economics Department, Women and Development Project (WADEP), undated. *Cowpea cultivation*. <https://www.youtube.com/watch?v=eQd9TE5EnhQ> (Ghana) (in English only)
2. Spencer Phillips, undated. *Cowpea PLS2003*. <https://www.youtube.com/watch?v=YpCTJGsBRsA> (in English only)

***Documents***

1. African Agricultural Technology Foundation, 2012. *Pod-borer resistant cowpea: Potentials and restraints*. <http://www.aatf-africa.org/files/files/publications/Cowpea%20brief.pdf> (1,495 KB) (in English only)
2. Ndiaga Cisse and Anthony E. Hall, undated. *La Culture Traditionnelle du Niébé au Sénégal, Etude de Cas*. <http://www.fao.org/ag/AGP/agpc/doc/publicat/cowpea_cisse/cowpea_cisse_f.htm> (in French only)
3. Conseil Ouest et Centre Africain pour la Recherche et le Developpement Agricole (CORAF), undated. *Enhancing Cowpea Productivity for Sustainable Livelihood of Farmers in West Africa*. <http://www.coraf.org/documents/fiches_projets/Enhancing_Cowpea_Productivity_for_Sustainable_Livelihoods_of_Farmers_in_West_Africa.pdf>(375 KB)
4. I.Y. Dugje, L.O. Omoigui, F. Ekeleme, A.Y. Kamara, and H. Ajeigbe, 2009. Farmers’ Guide to Cowpea Production in West Africa. IITA, Ibadan, Nigeria. <http://www.iita.org/c/document_library/get_file?uuid=dd0fe400-eb90-470c-9dc1-f679c5d66a81&groupId=25357>
5. N2Africa, 2014. *Better cowpeas through good agricultural practice – for farmers in Nigeria*. <http://www.n2africa.org/sites/n2africa.org/files/images/r364%20N2Africa%20Nigeria%20cowpea%20booklet_0.pdf> (1,266 KB) (in English only)
6. Republic of South Africa Department of Agriculture, Forestry, and Fisheries, 2011. *Production guidelines for cowpeas*. <http://www.arc.agric.za/arc-gci/Fact%20Sheets%20Library/Cowpea%20-%20Production%20guidelines%20for%20cowpea.pdf> (3,485 KB)(in English only)
7. J. Rusike, G. van den Brand, S. Boahen, K. Dashiell, S. Kantengwa, J. Ongoma, D. M. Mongane, G. Kasongo, Z. B. Jamagani, R. Aidoo, R. Abaidoo, 2013. *Value chain analyses of grain legumes in N2Africa: Kenya, Rwanda, eastern DRC, Ghana, Nigeria, Mozambique, Malawi and Zimbabwe*. (See chapter 6 for Ghana) <http://www.n2africa.org/sites/n2africa.org/files/images/N2Africa_Value%20chain%20analyses%20of%20grain%20legumes%20in%20N2Africa.pdf> (2,946 KB) (in English only)
8. Savanna Agricultural Research Institute, 2012. *Production Guide on Cowpea*. <https://csirsavannah.wordpress.com/2012/12/04/production-guide-on-cowpea-vigna-unguiculata-l-walp/>(65 KB) (in English only)
9. Cowpea farming in Ghana. *Bulletin of Tropical Legumes*, December 16, 2012. <http://www.n2africa.org/sites/n2africa.org/files/images/BTL16-20122712_0.pdf> (381 KB) (in English only)

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