

# Ghana Aflatoxin Management Photo-Aid

SPRING/Ghana



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## **ABOUT SPRING**

The Strengthening Partnerships, Results, and Innovations in Nutrition Globally (SPRING) project is a seven-year USAID-funded Cooperative Agreement to strengthen global and country efforts to scale up high-impact nutrition practices and policies and improve maternal and child nutrition outcomes. The project is managed by JSI Research & Training Institute, Inc., with partners Helen Keller International, The Manoff Group, Save the Children, and the International Food Policy Research Institute.

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## **DISCLAIMER**

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**COVER PHOTO:** SPRING/Ghana

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# How to Use the Photo-Aid

## BACKGROUND

Aflatoxins are a group of toxins produced by certain fungi known as *Aspergillus flavus* and *Aspergillus parasiticus*. They are more predominant in warm and humid regions of the world and can contaminate crops such as groundnuts, maize, millet, rice, cassava and pepper. Aflatoxins can contaminate crops in the field, during harvest or at home during storage.

Long term consumption of aflatoxins is known to lead to certain diseases such as liver cancer. Children are particularly more affected by long term consumption of aflatoxins as it is linked to stunting.

In an effort to support reductions in aflatoxin, Spring/Ghana has developed a training curriculum (Farmer Field School curriculum) for Agricultural Extension Agents (AEAs). This photo aid was designed by SPRING/Ghana and MoFA to be used as a visual aid to augment the information in the Farmer Field School curriculum. It is intended to support AEAs help farmers practice optimum groundnut handling practices. The aid covers processes from pre-harvest, harvest and post-harvest periods. The objective is to improve yield and quality of groundnuts by minimizing the presence of aflatoxins.

## INSTRUCTIONS TO THE USER

For each session, choose the cards that correspond to the stage of peanut farming you wish to cover. This will allow you time for in-depth discussion. You will not cover all the cards at once.

- Before showing the picture, first ask the startup question. This helps you assess participant's knowledge gaps and generates further discussion on the topic.
- Show the front of the card (pictures) and probe to find farmers understanding of the picture.
- Lead a discussion using the questions and answers on the back of the card.
- The information will cover:
  - Good and bad agronomic practices in groundnut cultivation.
  - Role of farmers in aflatoxin reduction.
  - Good and bad post-harvest practices.
  - Benefits of aflatoxin reduction to the farmer and household.
- Close the session by re-enforcing the key messages





1.



# 1. Healthy groundnuts

**Start-up question: What are the qualities of healthy groundnuts?**

## **Unshelled**

- Pods look bright and unwrinkled.
- No molds are seen on the pods.
- There are no cracks on the pods.

## **Shelled (Seeds)**

- Seeds look bright and unwrinkled.
- No molds are seen on the seeds.
- Skin (outer covering) on seeds is intact.

## **What are the uses of groundnuts in this community?**

1. Eaten as a snack or as an ingredient in other food.
2. Processed into groundnut paste, oil or “dawadawa” to enrich food for children below two years.
3. Sold to make money for the family.
4. Used in preparing animal feed.

## **What hygiene practices should you follow when preparing groundnuts as food?**

- Always wash your hands with water and soap.
- Be sure to use containers and tools that are clean and dry.

## **Key message:**

**Healthy groundnuts are valuable as food and income generation for farmers.**

2.



## 2. Unhealthy groundnuts and aflatoxins

### Startup question: What do bad groundnuts look like?

#### Unhealthy groundnuts have the following characteristics:

- Nuts or seeds are covered in mold or have a fungus
- Nuts or seeds have holes, are broken, or cracked
- Infested by insects

Groundnuts with any of the above qualities are likely to contain aflatoxins.

#### What are aflatoxins?

Aflatoxins are produced by certain fungi and are more predominant in warm and humid places. They can contaminate crops such as groundnuts, maize, millet, sorghum, and rice. Aflatoxins can contaminate crops in the field, during harvest, or at home during storage.

#### What are the negative effects of aflatoxins?

When people eat food containing aflatoxin—

- Small intestines cannot absorb all the food nutrients in the food that a person eats.
- Long term consumption of aflatoxins can cause sicknesses such as liver cancer.
- Long-term consumption of aflatoxins can cause stunting in children younger than two years old.

#### If a farmers crop is infected with aflatoxins

- Crop yield will decrease
- Product quality decreases, leading to poor pricing

### Key message:

**Aflatoxins can cause sickness and stunting.**



### 3. Benefits of aflatoxin reduction

#### Start-Up Question: What are the benefits of aflatoxin reduction?

##### Consumption

- Improved nutrition which contributes to enhanced cognitive development and better school performance
- Improved growth of children
- Safe food for households
- Better long-term health

##### Production

- Improved yield for farmers
- Reduced post-harvest losses
- May attract better pricing

#### Key message:

Farmers have an important role in providing safe food for children and households because they are food producers.



## 4. Site selection and land preparation

**Start-Up Question: What type of land do you have available for groundnut cultivation?**

**What are the qualities of a good site?**

- Level or gently sloping land
- Well drained, loose, and well aerated soil
- **Avoid** low lying water logged areas

**How do you prepare land for cultivation?**

- Land should be prepared at the early onset of rains.
- Do not burn your field to clear weeds.
- To remove weeds, turn over your soil, with a tractor, animal drawn plow or hoe. Let weeds sit for a week and die. Cultivate again, and pull out clumps of weeds. Pile dead weeds out of the way to dry. Once dry, incorporate back in soil.
- Deeply plough fields if you have a plow.
- Plough across slopes to prevent run off.

**What are the benefits of proper land preparation?**

- Maximum water retention
- Fast and uniform seed germination
- Better weed and disease control

**Key message:**

**Good land preparation is critical for maximum water retention, fast and uniform seed germination as well as better weed and disease control.**



5.



## 5. Selecting quality seed

**Start-Up Question: How does a farmer ensure maximum yield when planting?**

**What are the visual qualities of good seeds?**

- be a normal shape and not deformed.
- be smooth and not wrinkled.
- be clean and not show signs of mold.
- be covered by skin and not cracked.

**What is a germination test?**

Because one cannot determine the viability of seed by physical observation, it is important to test its ability to sprout. Test your seed 8-10 days before planting. Ensuring you use good seed at the recommended spacing will help you achieve good germination and an optimum plant population.

**How is a germination test performed?**

- Randomly select 20 seeds from the seed stock.
- Evenly place selected seeds in a trench of 1-2m long and cover with 3-5cm of soil.
- Water the seeds, keeping the soil damp, and observe for 5-7 days.
- The number of seeds that sprout after 7 days shows the viability of the seeds.

If you count	Then plant...
17 or more plants	1 seed per hole
14-16 plants	2 seeds per hole
Less than 14 plants	3 seeds per hole, or update your seed

Keep your best seed for planting.

Obtain new seed from recognized seed dealers every 2-3 years.

**Key message:**

**Testing your seed before planting is a practice that farmers can obtain optimum plant population for maximum yield per unit area.**

6.



## 6. Planting groundnuts

### Start-Up Question: How is groundnut planting done in this area?

#### When should planting be done?

- Plant as soon as there is adequate and consistent moisture in the soil to ensure good germination.
- Take advantage of periods of higher rainfall.
- Consult your AEW.

#### What is the best way to plant groundnuts?

1. Use a cutlass, hoe, dibbler or planter (a labor and time saving device that opens the ground, drops the seed, covers and firms the ground) to make holes in prepared soil and put the seeds in them.
2. Use a garden line to plant in rows.
3. Plant seeds to a depth of 4-5cm, cover seed with soil and firm with your foot.
4. Use 30-50cm between rows and 15-20cm between seeds in rows depending on the variety of seeds.

Variety	Type	Planting distances (cm)
Chinese	Semi-erect	40 x 15
Samnut 22	Erect bunch	40 x 15
Samnut 23	Semi-erect	40 x 15
Mani pinta	Erect	40 x 15 50 x 10
Nkatiesari	Erect bunch	30 x 15 40 x 15
Yenyawoso	Semi-erect	40 x 15

#### Key message:

Planting groundnut seeds on time and following recommended spacing will help ensure a healthy crop and good yield.



## 7. Weeding and pest control

### Start-Up Question: How do you control pests and disease?

#### What pests and diseases affect groundnuts?

- Termites, millipedes, white grubs, wire worms and nematodes attack and damage groundnuts in the field.
- Diseases groundnuts can get include fungus, viruses, and bacterial diseases such as early leaf spot, late leaf spot, rust, rosette, mold, stem and pod rot.
- The presence of pests and disease increase the chances of an aflatoxin infection and lead to a reduced yield.

#### How can these pests/disease be controlled?

- Keep farm and its immediate environs free of weeds.
- Use disease tolerant varieties as well as disease free seeds.
- Practice crop rotation with cereals (maize and sorghum)
- If you use chemicals follow manufacturer's instructions and safety precautions like hand washing and cleaning of equipment. Weeding and pest control.
- Consult your agriculture extension agent before using any chemical agents for controlling weeds or pests.

#### When/How should weeding be done?

- Weed at least twice: 1-2 weeks after planting, and 5-6 weeks after planting.
- Weeding is done before initiation of pegging.
- Weeding is done by hand-pulling or use of a hoe.

### Key message:

**Weeding and pest control are important in the reduction of aflatoxin infection and increase in crop yield.**



## 8. Harvesting

### **Start-Up Question: When do you harvest your groundnuts?**

#### **What are the signs groundnuts are mature and ready to harvest?**

- The leaves are yellow and shedding.
- The seeds become hard.
- The inner portions of pods turn brown.
- To test, pull 3-5 plants, shell and examine insides of the shells. If majority have dark markings inside the shells, harvest your crop.
- Delayed harvesting can result in an aflatoxin infection.

#### **How are groundnuts harvested?**

- Harvesting can be done with a hoe or by hand.
- Harvest erect varieties of groundnuts by hand, when the soil is moist and loose. Hold the entire plant close to the base, and pull it from the soil.
- Harvest spreading varieties with a hoe. Be careful to avoid damaging pods or losing some of the nuts.
- Shake off soil after harvesting. Expose the nuts to sunlight by turning the crop upside down.

#### **Strip nuts after harvesting.**

- Separating pods from the plants is known as stripping or plucking.
- It can be done manually by farmers or through the use of mechanical strippers.

### **Key message:**

**Immediately harvest mature nuts to decrease chances of an aflatoxin infection.**





## 9. Post-Harvest: Drying

### **Start-Up Question: What are the best ways of drying groundnuts to avoid risk of aflatoxin infection??**

- Strip groundnuts from plants before drying. Do NOT dry groundnuts with their vines attached as they will be slower to dry, increasing risk of aflatoxin infection.
- Dry groundnuts on dry cemented floors or on tarpaulins, if available.
- Spread nuts evenly on drying surface and make sure to turn twice a day to ensure even and faster drying.
- Use a rake or another tool with a long pole to turn groundnuts to avoid stepping on and crushing nuts.
- Dry groundnuts for 6-7 days before storage.
- To check if groundnuts are dry, take a sample, shake and listen for a rattling sound. Also, shell and bite on a few nuts. If they stick to your teeth then they are not properly dried.

### **What are practices to avoid?**

- Do not dry groundnuts with the vines. This causes groundnuts to retain moisture leading to mold formation and aflatoxin growth.
- Do not dry groundnuts by the roadside. This exposes the nuts to vehicles and pedestrians who can step on and destroy nuts. It also endangers road users and the farmers.
- Do not dry groundnuts on a bare, un-cemented floor. This practice retains moisture in the pods and can lead to mold formation.

### **Key message:**

**Fully dried nuts face less risk of an aflatoxin infection.**

10.



## 10. Separate bad nuts from good nuts

### **Start-Up Question: Why is it necessary to separate bad nuts from good nuts?**

- Separating out diseased pods prevents them from infecting the non-diseased ones, reducing aflatoxin infection.
- Seed you save for planting will have better germination.
- Your harvest yield will be better.

### **Which nuts are classified as bad nuts?**

Bad nuts are nuts that have the following features:

- Mold
- Holes
- Fungus
- Infested by insects.

### **Protecting the quality of your nuts has many benefits.**

- You will have better quality groundnuts and possibly attract better prices.
- Your groundnuts will keep longer.
- You will improve your family's nutrition and protect their health with reduced risk of aflatoxin toxicity.
- Seed you save for planting will have better germination and better yield.

### **Key message:**

**Bad nuts can contaminate the good nuts they are in contact with. Remove bad nuts.**



## 11. Burn or bury bad groundnuts

### **Start-Up Question: Why is it necessary to destroy the bad nuts?**

Both bad groundnuts and vines can be infected with aflatoxin. We do not want people, livestock, or chickens to eat them. Destroying protects animal and human health.

### **What are the best ways to destroy bad nuts?**

#### **BURNING is the most effective method**

- Heap bad groundnuts and dried vines in one location, preferably an area not used for farming, and where risk of fire spreading is low.
- Add dry twigs to the heaped groundnuts to ensure the nuts burn.
- Set fire to the heap and tend the fire.
- Ensure all nuts are completely burnt, and fire has gone out entirely before leaving.
- Spread the ashes.

#### **BURYING when you can ensure animals will not dig it up**

- Dig a hole in an area where farming activity does not take place and children, livestock and chickens do not have access.
- Ensure the hole is deep enough to prevent fowl and other animals from digging up buried groundnuts.
- Pour bad groundnuts into the hole and cover with soil. Compact the soil to prevent animals from digging it up.

### **Key message:**

**Burn or bury deep infected groundnuts in an area where crops are not cultivated; do not eat them as they have harmful effects on your health.**



## 12. Bag groundnuts in sacks

### Start-Up Question: What should groundnuts be stored in?

#### What type of sacks are good for groundnut storage?

- To keep nuts safe and in good condition, store them in sacks.
- Jute and nylon sacks are best for storing groundnuts, since they allow for air to pass through, keeping nuts in a good condition.
- Plastic bags are not recommended for storing groundnuts as they do not allow for air to pass through.
- When air passes through, it keeps groundnuts dry, preventing mold growth and aflatoxin development.

#### Use sacks that are in good condition

- Sacks should be clean and without holes.
- Do **NOT** use torn or worn out sacks for storing groundnuts as this will lead to losses.
- Do not use damp sacks as this can lead to mold growth and aflatoxin development
- Re-use clean sacks that are still in good condition, only after sun-drying.

### Key message:

**Sun-dry used sacks before re-using for storage.**



13.



## 13. Storage practices

**Start-Up Question: Once bagged, how are groundnuts stored in this community?**

### **What are good storage practices?**

- Keep bagged groundnuts on pallets to protect them from ground moisture.
- Keep bags away from wall to ensure there is adequate circulation of air.
- Ensure storage rooms are well protected from rodents and other pests.
- Regularly monitor stored groundnuts for quality.

### **What are bad storage practices?**

- Heaping groundnuts on the bare ground or cement floor.
- Storing groundnuts in rooms with poor ventilation or air-flow.
- Using torn or worn sacks to store groundnuts.

### **Monitor stored groundnuts and prevent the spread of an aflatoxin infection**

- After 3 months of storage, pull a sample of ground nut sacks, open and check for any signs of problems (mold, fungus, holes, insects).
- If any sign of infestation or mold growth is detected, open up other sacks.
- Remove bad groundnuts or seed, and destroy.
- Bag in clean sacks and return to storage

### **Key message:**

**Good storage practices protects quality, prevents physical damage and disease, ensuring longer shelf-life for your groundnuts.**



## 14. Transporting groundnuts

**Start-Up Question: How are groundnuts transported in this community?**

**What are the best ways of transporting groundnuts?**

- Use tarpaulins to protect groundnuts from bad weather conditions during transportation.
- Do not stack the sacks so high that they crush the ones on the bottom or are at risk of falling out of the truck.
- Vehicles for transporting groundnuts should have clean pallets or other raised platforms to protect groundnuts.
- Do not use open trucks to transport groundnuts.
- Do not let people ride on top of groundnut sacks. They can damage the groundnuts, reducing their quality.

**Key message:**

**Use covered trucks with pallets to protect nuts from risk during bad weather.**



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