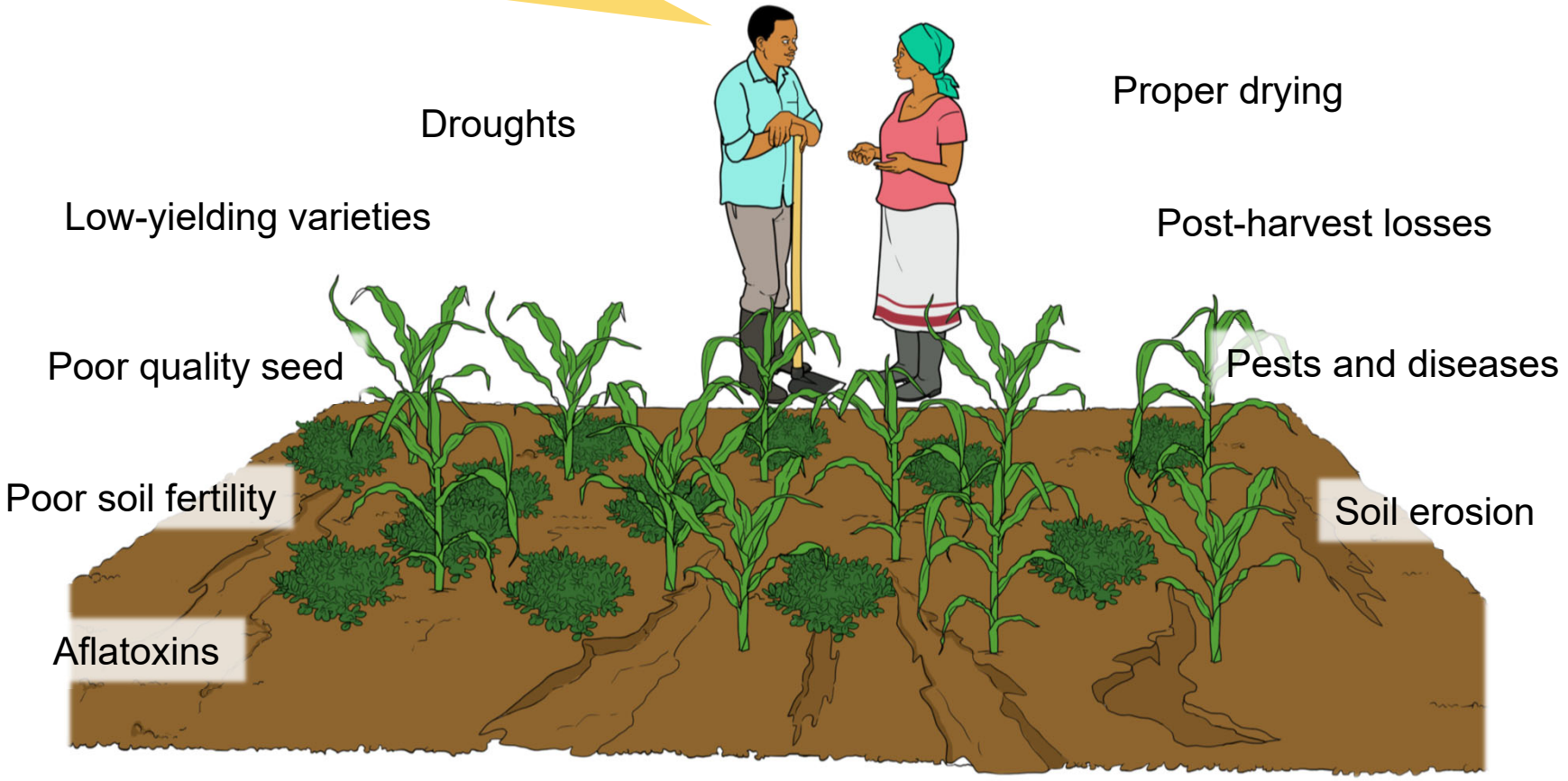
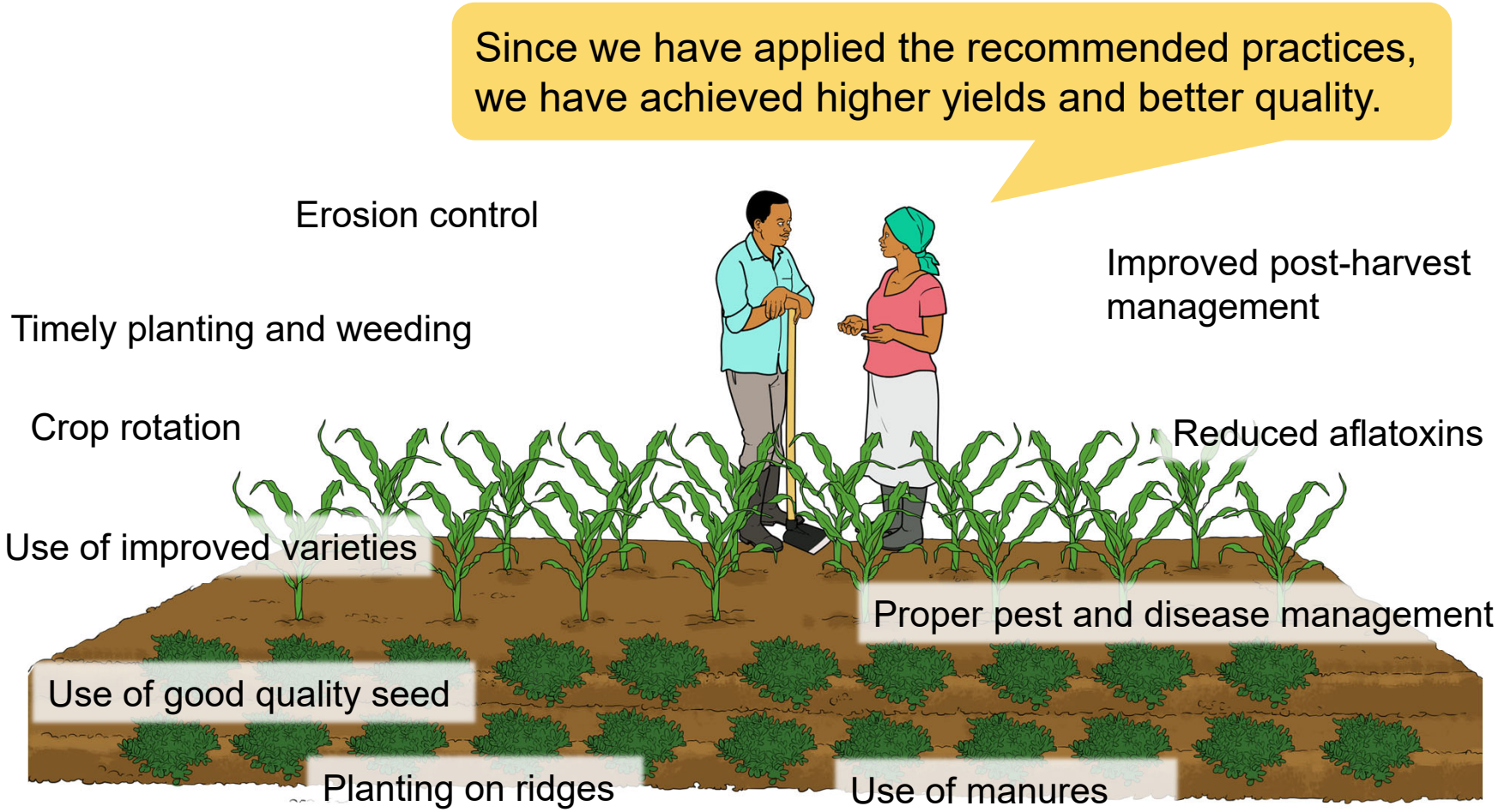
Challenges in groundnut production

We are facing many challenges with groundnut production. Let's improve our production to obtain higher yields and better quality.



Improved management of groundnut production



How to determine the soil texture (1)

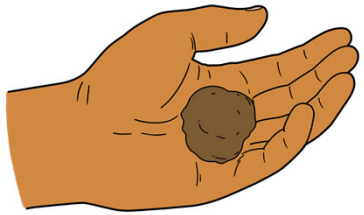
1

Take a tablespoon of soil into the hand palm.

2

Break it down into small pieces. Add a little water at a time. Knead the soil to break down the aggregates.

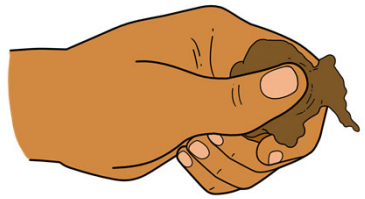
3



Sand

Does the soil form a ball when squeezed and rolled in the hand? → Soil that does not form a ball is **sand**.

4



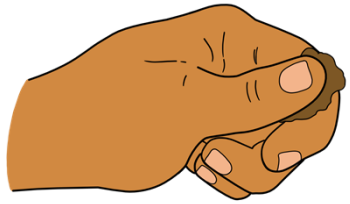
Loamy sand

Squeeze the soil that formed a ball upward between the thumb and the forefinger. → Soil that does not form a ribbon is **loamy sand**.

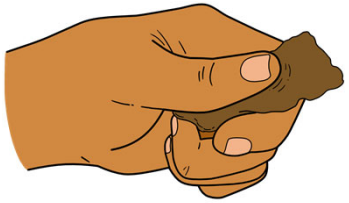
How to determine the soil texture (2)

5

Excessively wet a small pinch of soil in the palm of the hand and rub it with the forefinger. How long are the ribbons? Does the soil feel gritty or smooth?

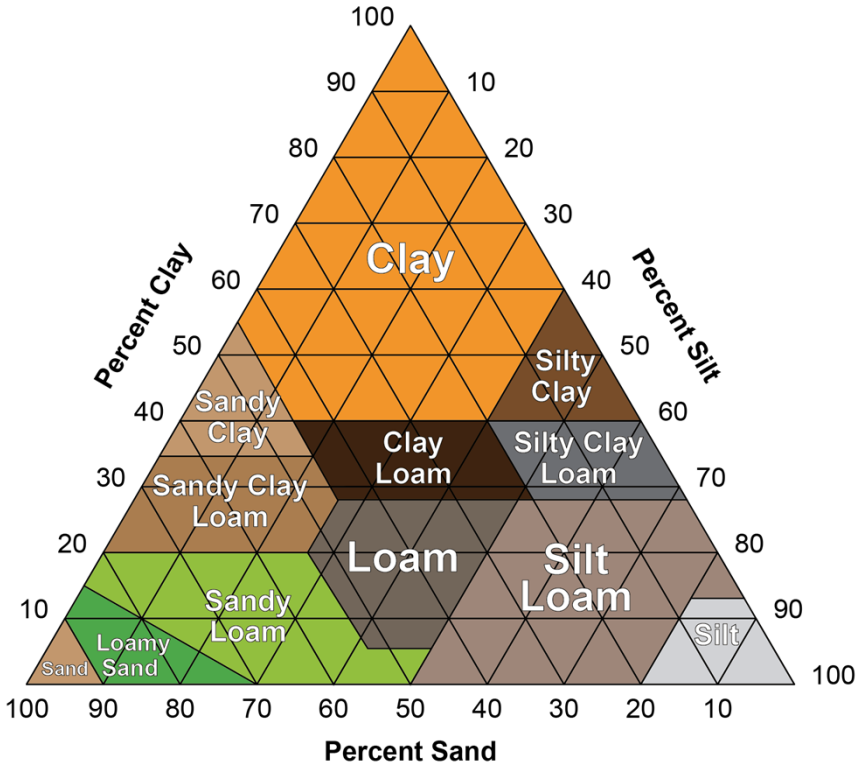


Ribbon length <2.5 cm



Ribbon length 2.5-5 cm

Ribbon length >5 cm

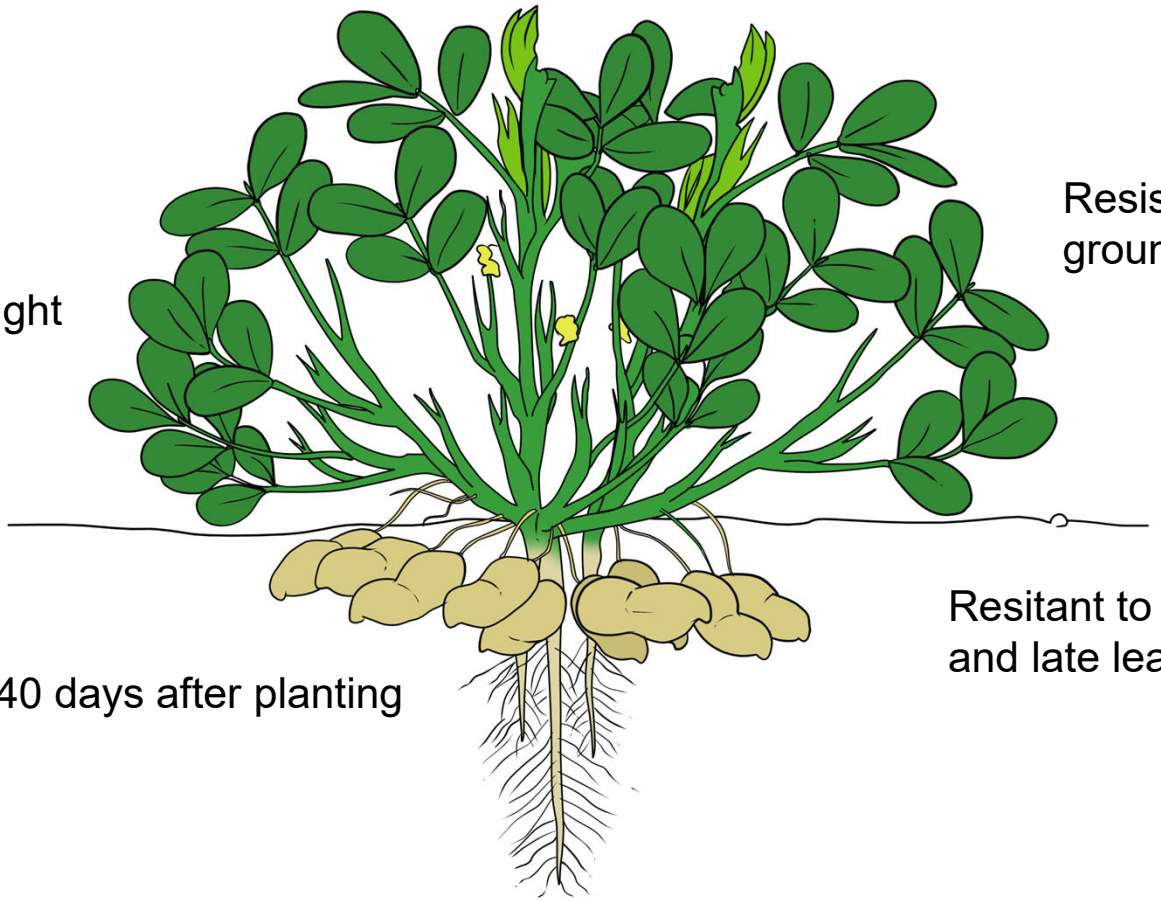


	Ribbon length <2.5 cm	Ribbon length 2.5-5 cm	Ribbon length >5 cm
Very gritty feeling	Sandy loam	Sandy clay loam	Sandy clay
Very smooth feeling	Silt loam	Silt clay loam	Silty clay
Neither gritty nor smooth	Loam	Clay loam	Clay

Criteria for selecting groundnut varieties

Erect bunch (not runner) growth habit

Preference by the target market



Resistant to groundnut Rosette

Tolerant to drought

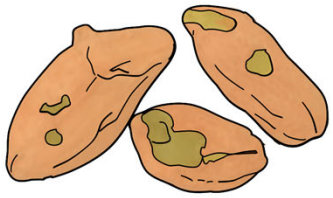
Resitant to early and late leaf spots

Maturity within 140 days after planting

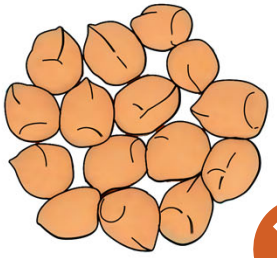
Recommended groundnut varieties

Variety	Seed colour	Type	Characteristics	Special attribute
CG7 (ICGV-SM 83708)	Uniform red	Virginia bunch	• Medium seed size nut • Maturity in 130–150 days • Yield potential: 2,500 kg per ha	• For all growing areas from 1000 to 1500 masl • Drought tolerant
Kakoma (JL 24)	Pale tan	Spanish bunch	• Small seed size nut • Maturity in 90–120 days • No seed dormancy • Yield potential: 1,500 kg per ha	• For low-lying areas from 200 to 500 masl • Off-season (dimba) cultivation possible
Baka (ICG12991)	Pale tan	Spanish bunch	• Slightly smaller nuts than Kakoma • Maturity in 90–120 days • No seed dormancy	• For low-lying areas • Off-season cultivation like Kakoma • Tolerant to rosette disease
Chitala (ICGV-SM 995689)	Tan	Spanish bunch	• Medium-sized nut • Maturity in 90–100 days • Yield potential: 1,500 kg per ha • No seed dormancy	• For low-lying areas • Off-season cultivation like Kakoma • Tolerant to rosette disease
Nsinjiro (ICGV-SM 90704)	Tan	Virginia bunch	• Maturity in 120–140 days • Yield potential: 2,000 kg per ha	• For all plateau areas from 1,000 to 1,500 masl • Tolerant to rosette disease
Chalimbana 2005 (CML851/7)	Tan	Virginia bunch	• Maturity in 130–140 days • Yield potential: 2,000 to 2,500 kg per ha	• For all plateau areas from 1,000 to 1,500 masl • Moderate resistance to rosette and early leaf spot diseases

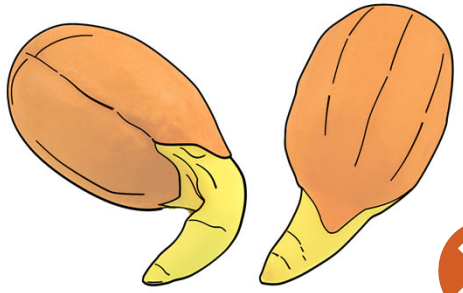
Sorting of groundnut seed for planting



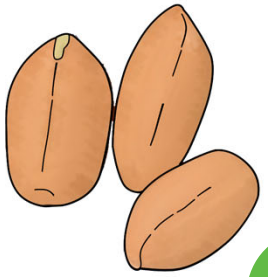
Seed damaged by pests



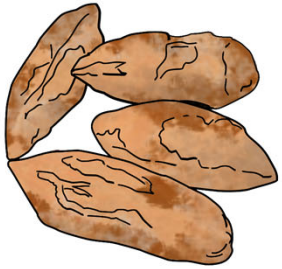
Small seed



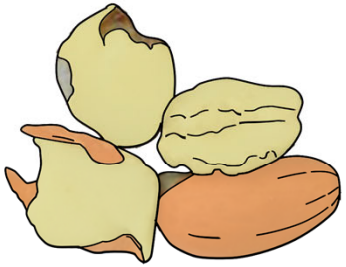
Germinated seed



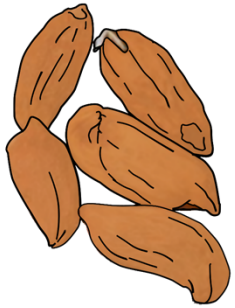
Good seed



Mouldy seed



Broken seed



Shrivelled seed

Indoor seed germination test without soil

1

Wash the hands. Then mix the seeds thoroughly to obtain a larger sample. Count 50 or 100 seeds for the germination test without selecting them. Divide the seeds into batches of 25 or 50 seeds.

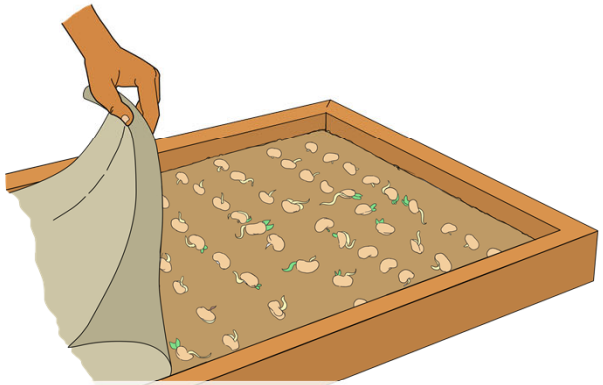
2

Place the seeds from each batch on a moist cloth, paper towel or newspaper. Make sure the seeds are spaced apart. Cover the seeds with another moist piece of the same material.

3

Keep the seeds moist (but not wet) by sprinkling water. Allow the seeds to germinate over the optimum germination period.

4



At the end of the germination period count and record the number of germinated seeds with a healthy radical and shoot in each tray.

Outdoor seed germination test directly on the soil

1

Wash the hands. Mix the seeds thoroughly. Count 100 seeds randomly for the germination test. Divide the seeds into batches of 25 seeds for each of the 4 sections of the bed.

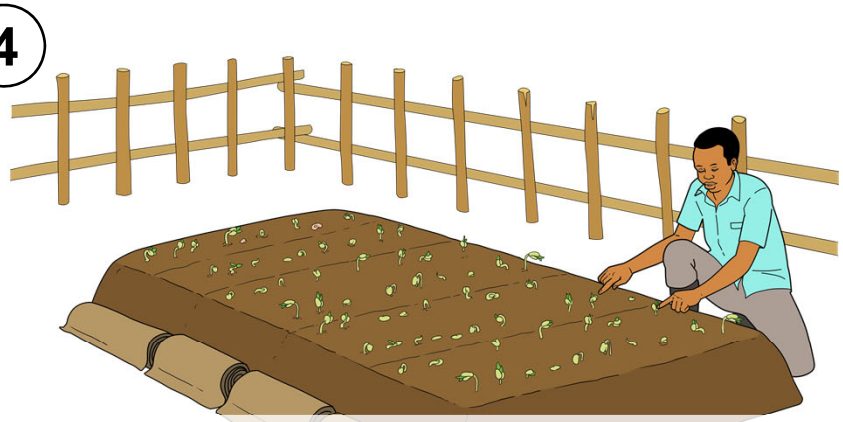
2

Make a raised fine seedbed in a secure place where birds, poultry or other livestock cannot access. Divide the bed into four sections.

3

Place the seeds on top of the moist soil. Cover the seeds with a moist gunny sisal bag. Peg the covering material. Keep the bed moist by sprinkling water. Routinely check on the germinating seeds.

4



At the end of the germination period count and record the number of germinated seeds with a healthy radical and shoot in each of the sections of the bed.

Adaptation of sowing density

How to calculate the germination rate:

(B / A) x 100

B = number of successfully germinated seeds (after 7 days)
A = number of seeds sown for the test

Germination rate	Adjustments to seeding rate
0-50 %	**Discard the seed batch** and obtain good quality seeds
51-60 %	Discard the seed batch and obtain good quality seeds *or* **plant 3 seeds per hole/planting station** (tripple the amount of seed)
61-70 %	Discard the seed batch and obtain good quality seeds *or* **plant 2 seeds per hole/planting station** (double the amount of seed)
71-90 %	**Increase amount of seed by 20 %** (e.g. use 6 kg instead of 5 kg)
91-100 %	**Use the normal seed quantity** for sowing.

Inoculation of groundnut seeds with rhizobia

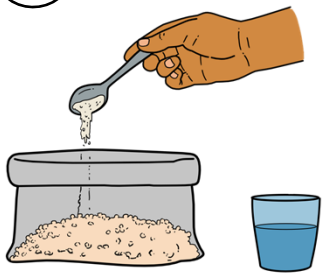
1

Put 1 kilo of seed in a plastic bag

2

Mix 2 spoons of sugar into a half glass of water

3

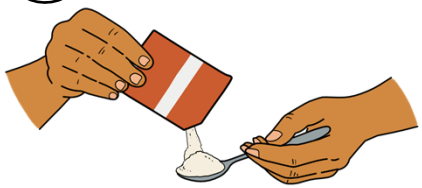


Put 3 spoons of sugar water in the bag

4

Shake the bag well

5

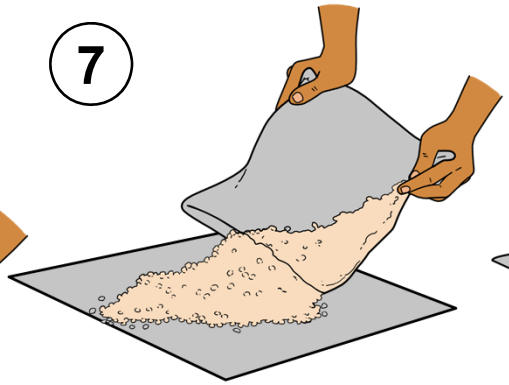


Put 4 spoons of inoculant in the bag with the seed and water

6

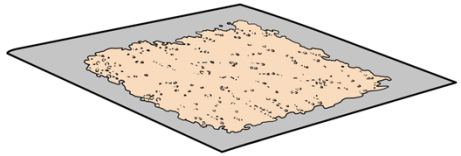
Shake the bag well again

7



Pour out the seeds on a sheet

8



Dry the seeds on a sheet

Crop rotation with groundnut

	Field 1	Field 2	Field 3	Field 4
Year 1	Cereals (maize, sorghum, or millet)	Groundnut	Root tuber crops (cassava or sweet potato) or vegetable (paprika, tomato)	Legumes (soybean, beans)
Year 2	Legumes	Cereals	Groundnut	Root tuber crops or vegetable
Year 3	Root tuber crops or vegetables	Legumes	Cereals	Groundnut
Year 4	Groundnut	Root tuber crops or vegetables	Legumes	Cereals

Advantages of intercropping groundnuts

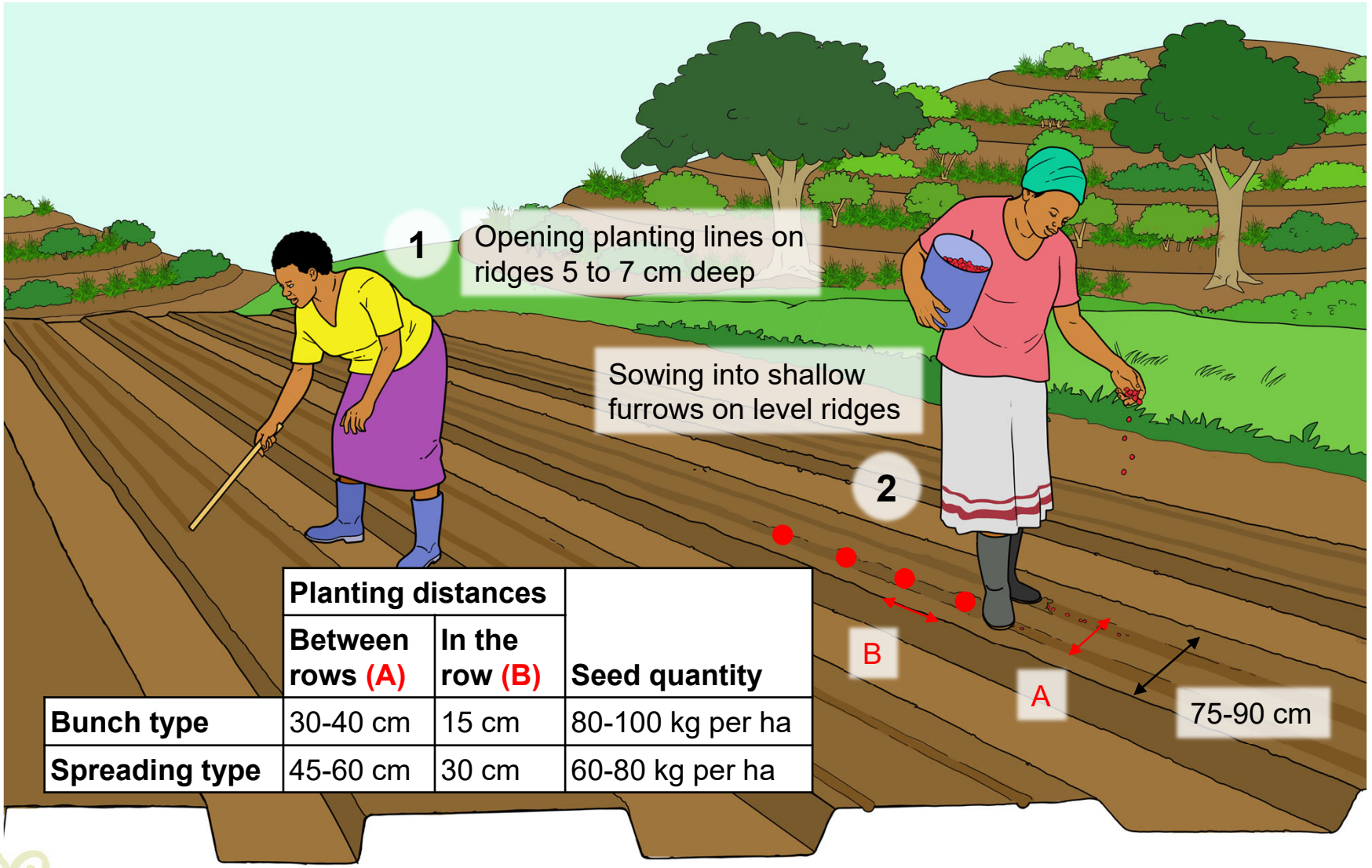
Intercropping of groundnuts …

- enables diversification in small land holdings;
- can result in overall yield benefits;
- provides a diversity of foods to the family;
- can provide nitrogen to the intercrop or the subsequent crop;
- can offer complementary use of nutrients with long season crops such as cassava with late nutrient demand;
- can help to reduce pest and disease infestations and weed pressure;
- can reduce the risk of total crop failure.

Disadvantages or precautions of intercropping groundnuts

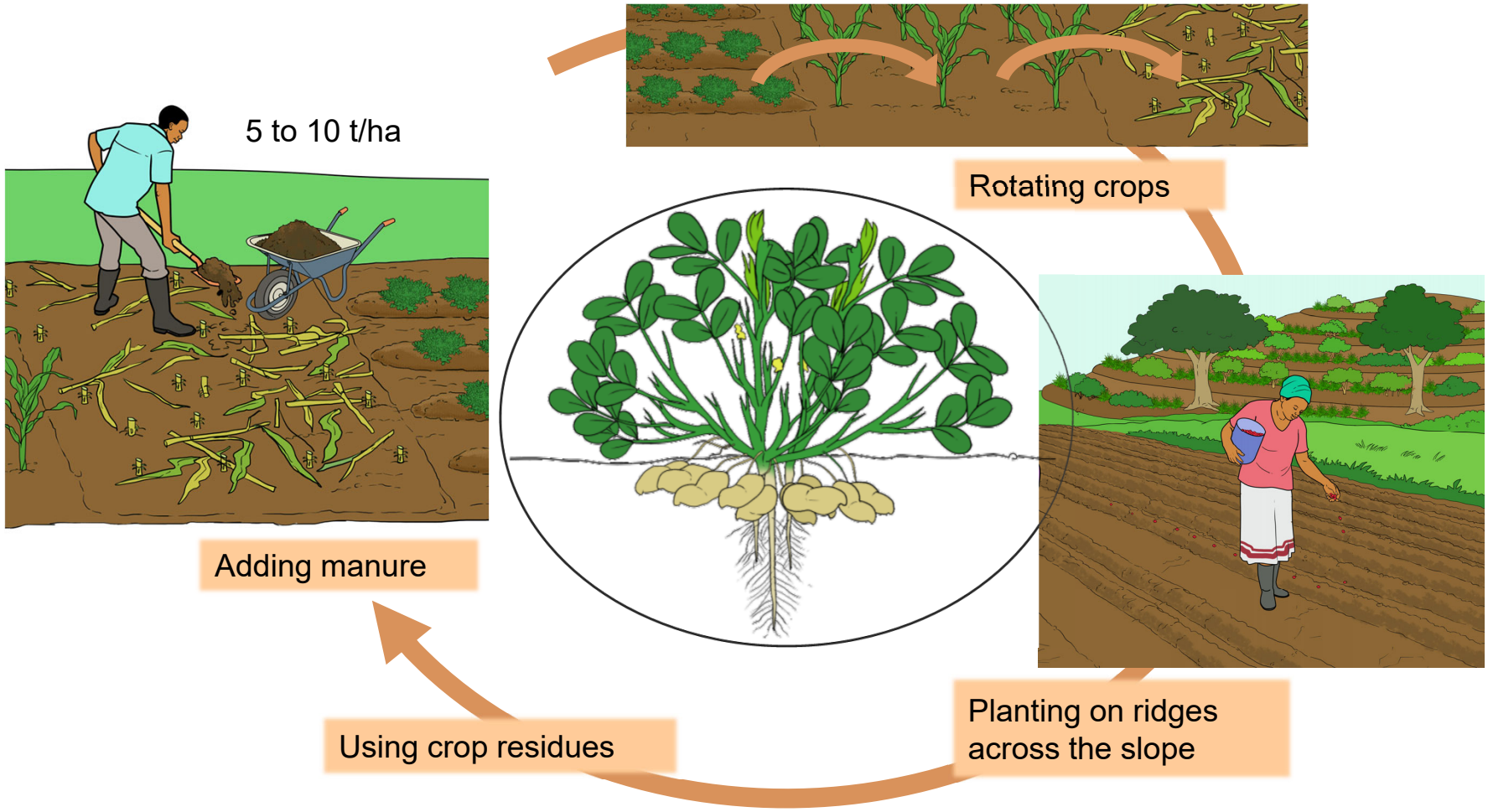
- Selection of appropriate crop species (and/or varieties) for good compatibility with the groundnuts
- Risk of yield reductions in poorly implemented intercropping systems (e.g. poor timing of planting, close spacing, insufficient water, etc.)
- Hindered weed control
- Additional work for land preparation
- Too much vegetative growth at the expense of groundnut pod production due to excess nitrogen supply after early groundnut growth
- Higher management levels required to ensure appropriate crop husbandry of the different crops
- More time and work for harvesting the intercrops

Planting groundnuts



	Planting distances		
	Between rows (A)	In the row (B)	Seed quantity
Bunch type	30-40 cm	15 cm	80-100 kg per ha
Spreading type	45-60 cm	30 cm	60-80 kg per ha

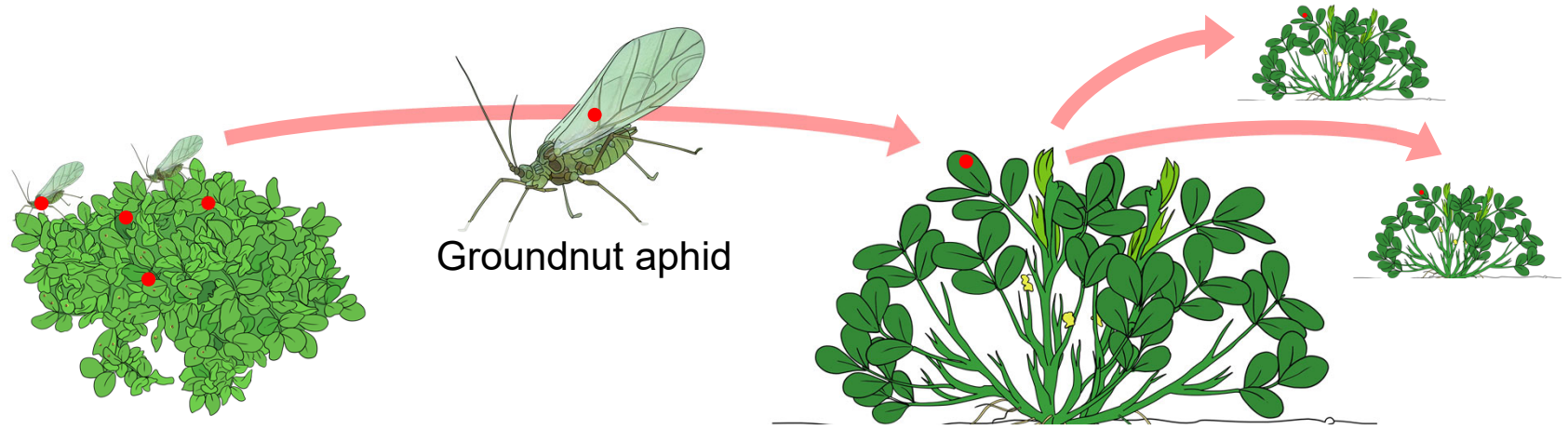
How to manage soil fertility in groundnuts

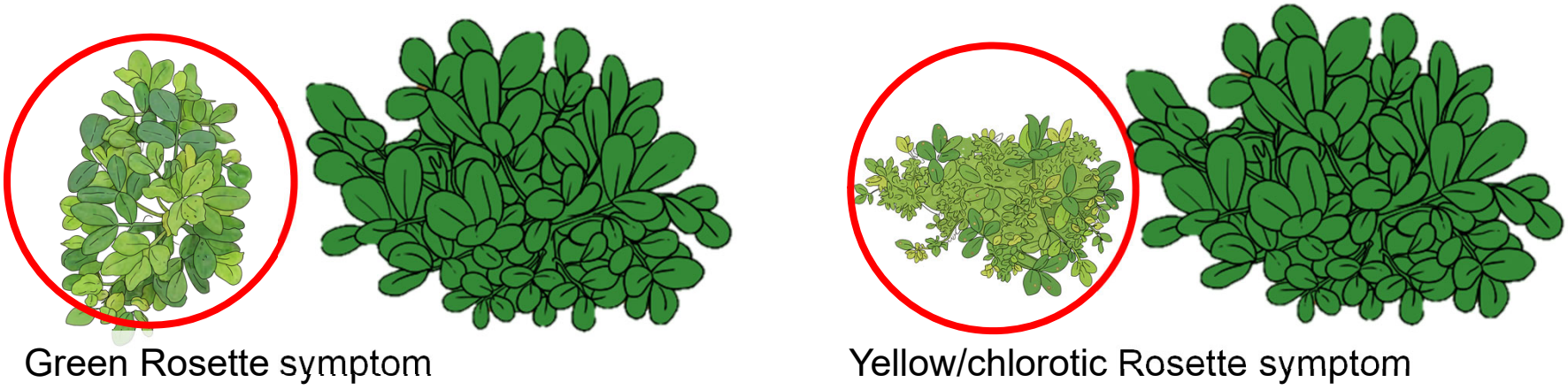


Natural fertilisers for use in organic farming

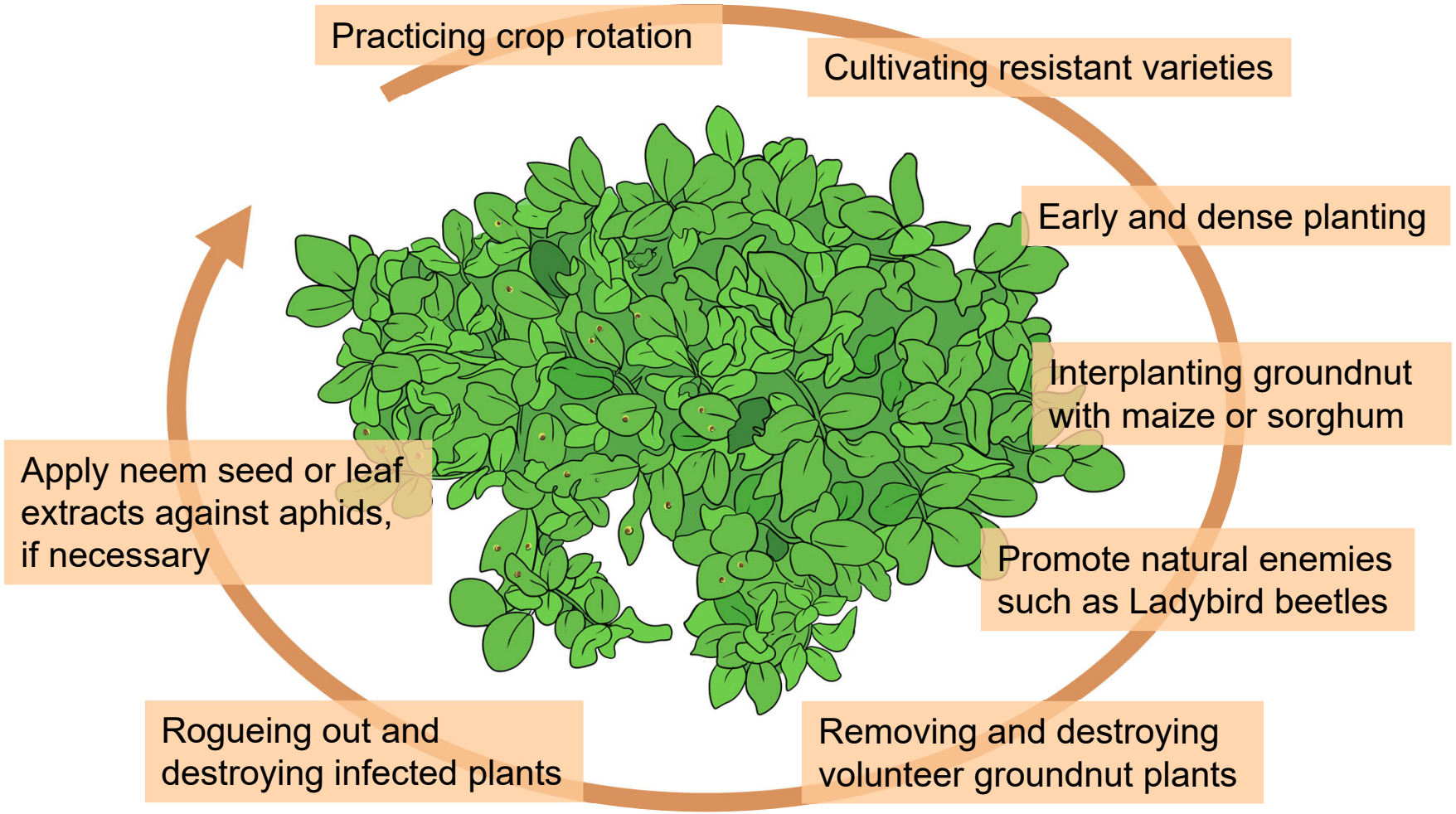
Fertiliser	Origin	Characteristics	Applications
Plant or wood ash	Burnt organic material	Rich in potassium (K) and calcium (Ca)	Add to compost (best) or around the base of the plants
Lime	Ground limestone	Buffers low pH	Apply every 2 to 3 years when soil pH is low, but avoid excessive use
Stone/ rock powder	Pulverised rock phosphate	P and trace elements (depending on the composition of the source)	Add to farmyard manure or organic waste material for composting. Mainly effective in acidic soils. For better P effectiveness, it is best to first dissolve the rock phosphate in an acidic solution such as juice from waste fruits before mixing it with the manure.

Groundnut Rosette disease: propagation and symptoms

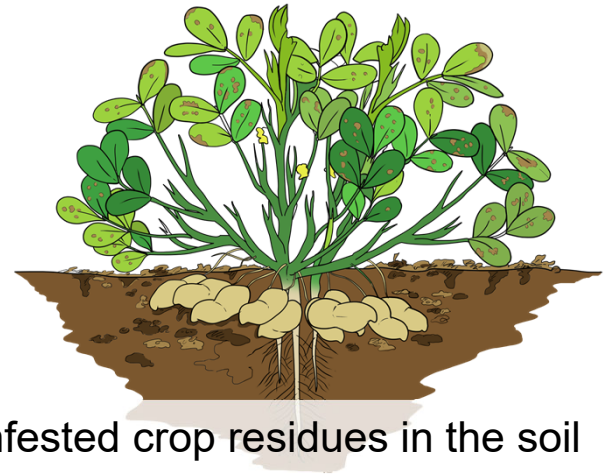




Control of groundnut Rosette

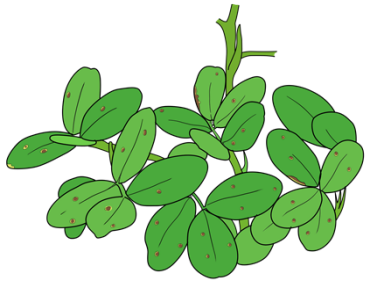


Early and late leaf spots: propagation and symptoms

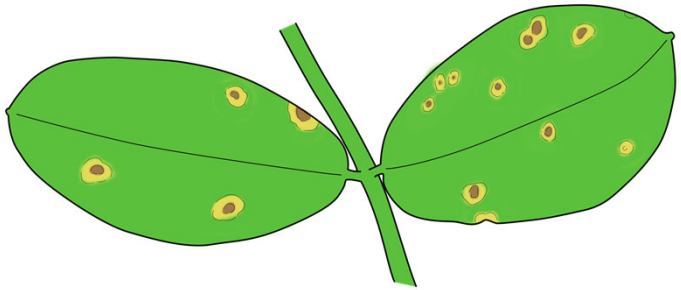


Infested crop residues in the soil

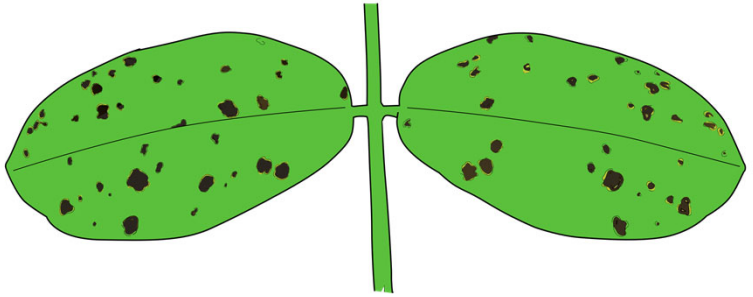
Transmission of the disease to new fields



Infested volunteer plants from the previous season

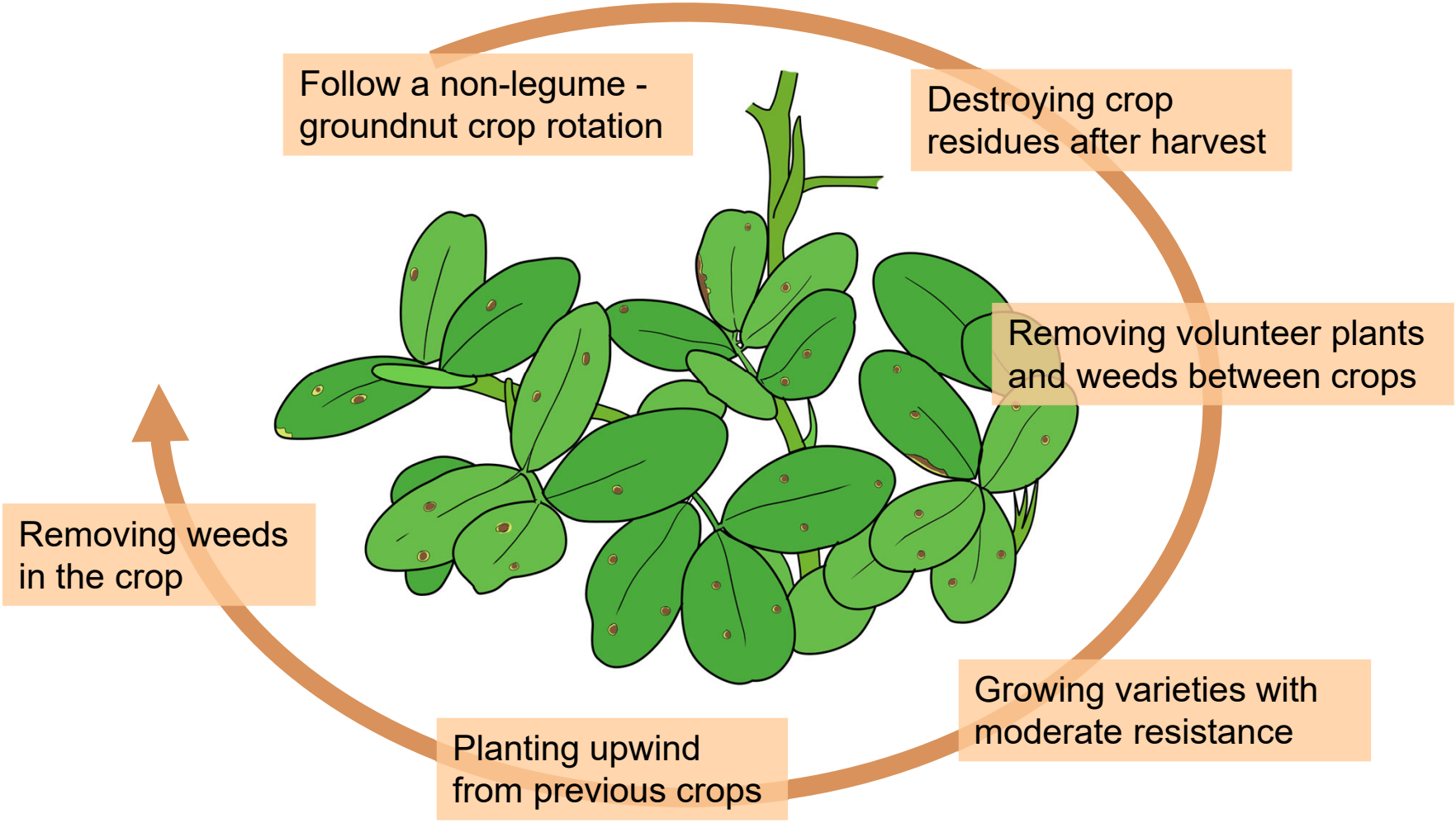


Early leafspots: small spots with yellow halos on the upper side of older leaves at about 1 month after planting

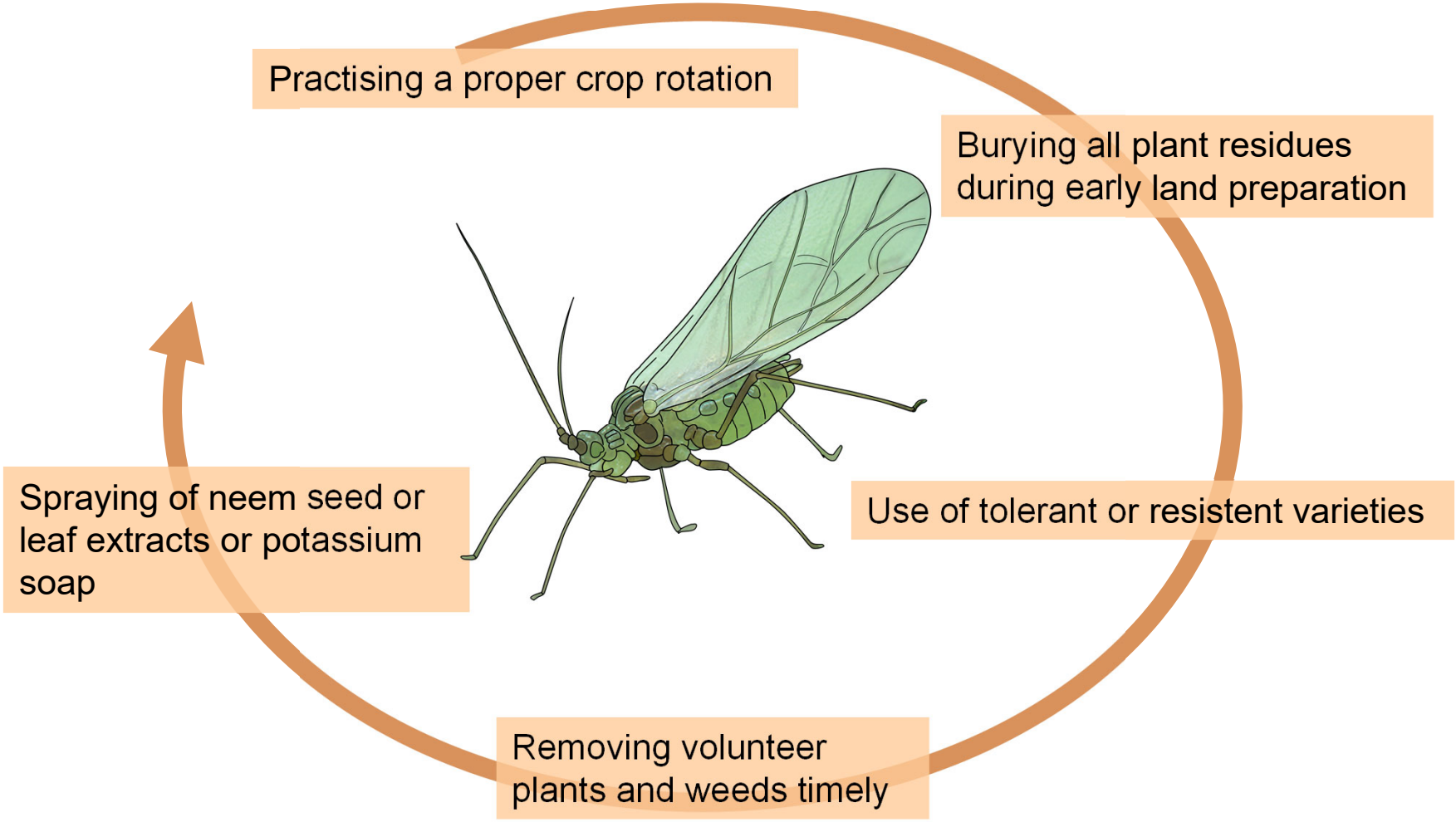


Late leafspots: 6 to 8 weeks after sowing, larger, circular black spots on leaves, stems and petioles

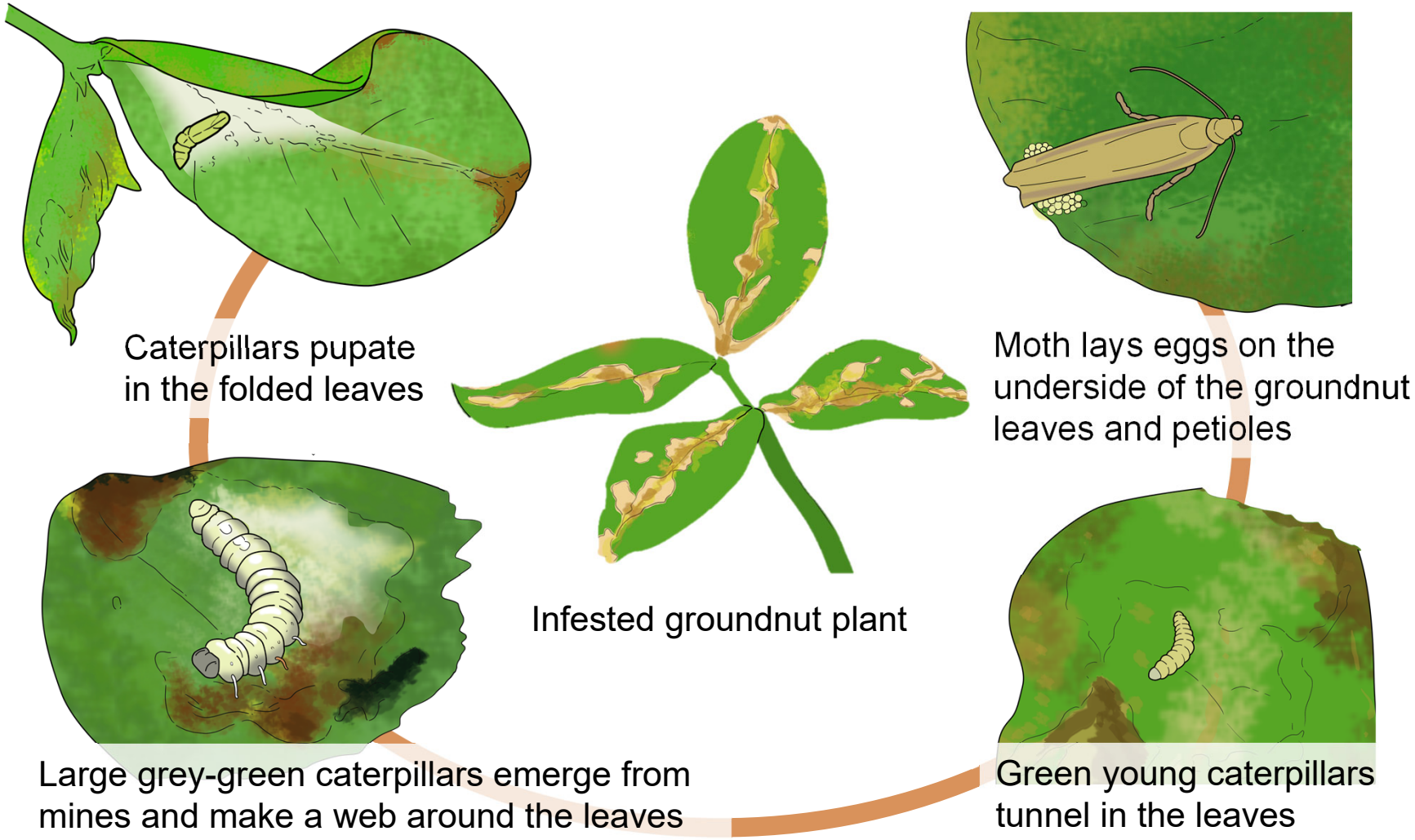
Control of early and late leaf spots



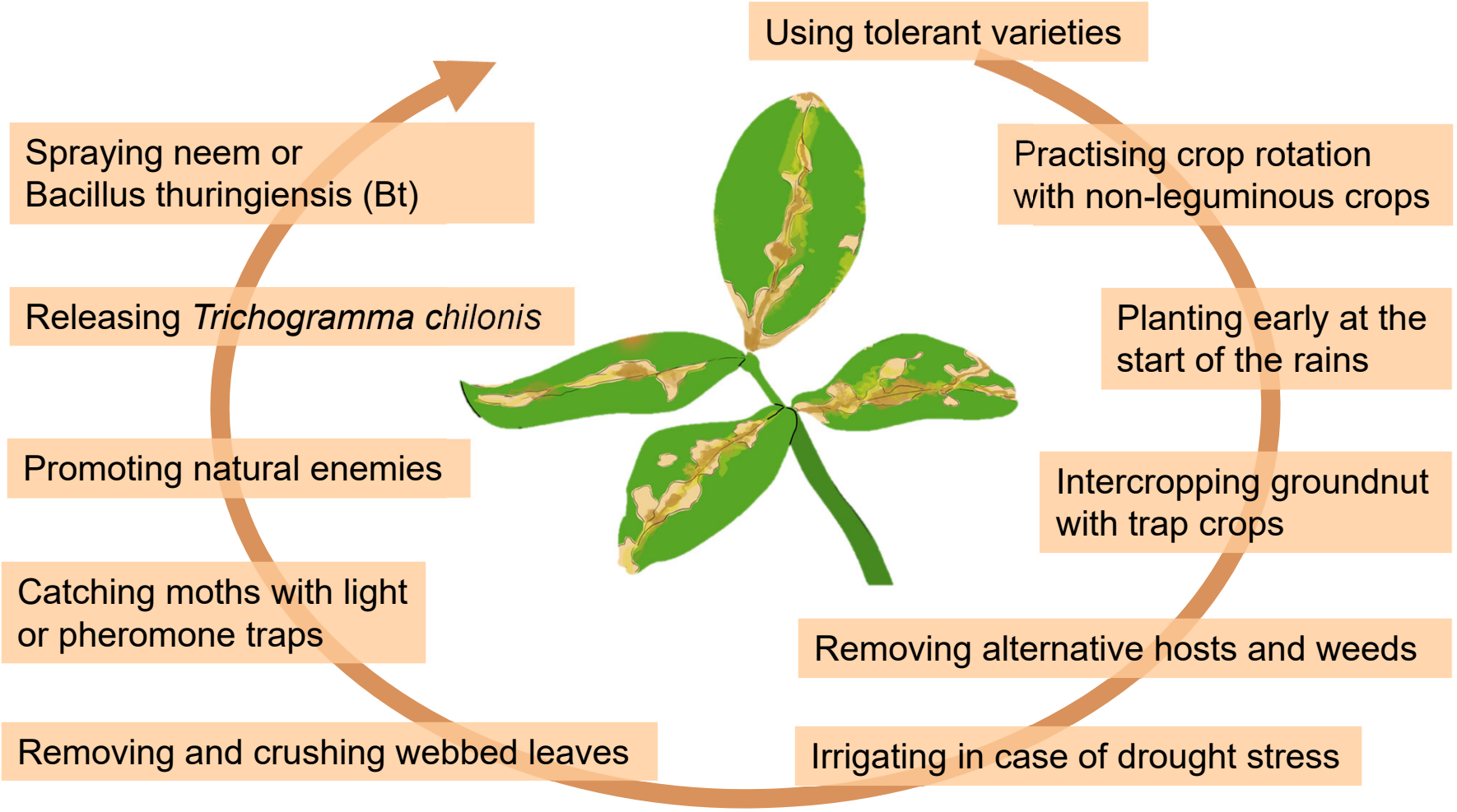
Control of groundnut aphids



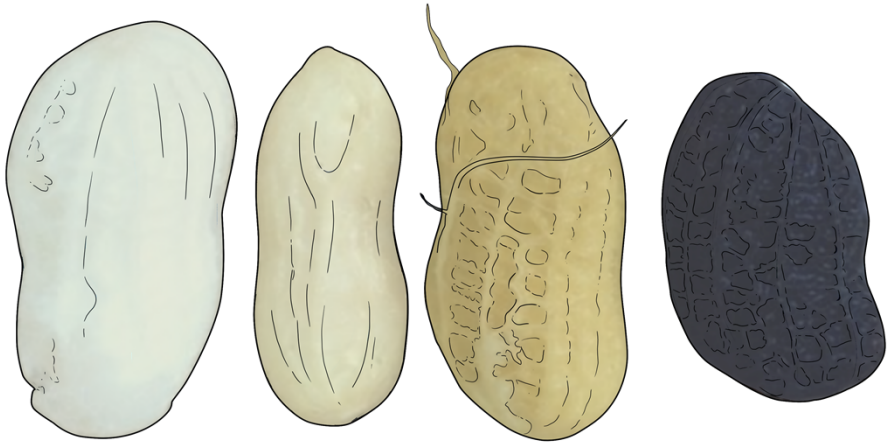
Groundnut leafminer



Control of groundnut leafminer



Defining harvest maturity of groundnut



Pods after scraping the outer layer with a knife

Immature pod

- **Inner cell layer of the pod:** white, when scraped
- **Colour of the seed:** white

Mature pod

- **Inner wall of the pod:** 75 % with dark discolouration
- **Inner cell layer of the pod:** yellow, orange, light brown, brown to black, when scraped
- **Colour of the seed:** light pink

Harvesting of groundnuts

Minimise damages to the pods

… when harvesting manually

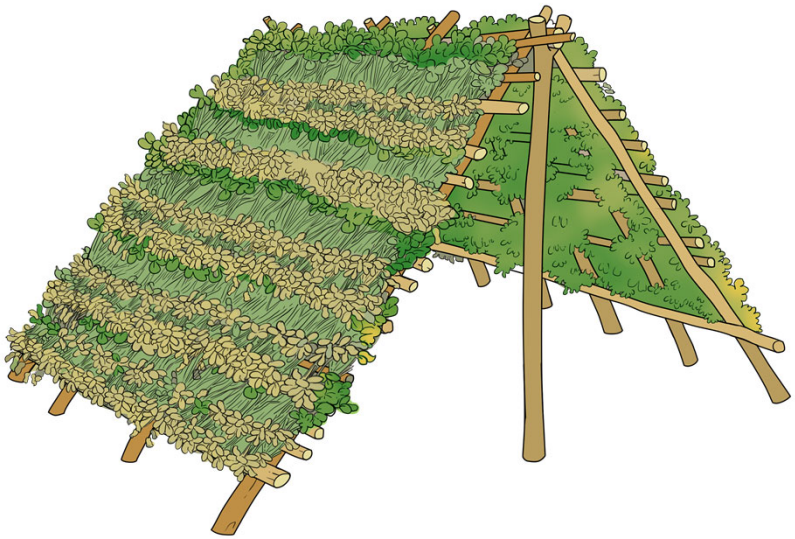
… when harvesting mechanically

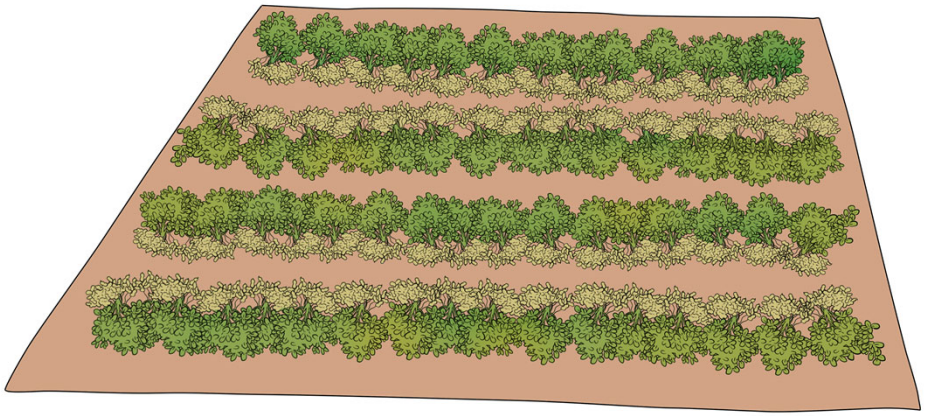
Proper drying of groundnut

1A

1B

Dry the entire plants on raised racks or on a tarp





When drying groundnut on a tarpaulin the pods must be turned frequently to ensure quick drying

Proper handling of groundnut after drying

2

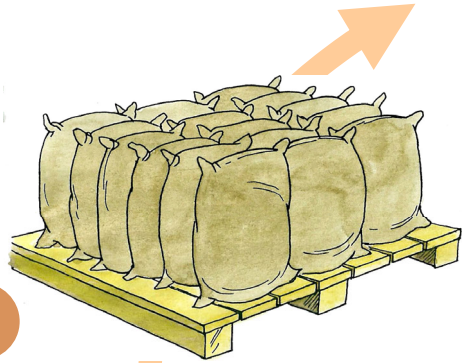
Remove the dried pods from the plants

3

Dry the pods a second time to a moisture content of 6 to 8 %

4

Package for storage



5

Store on pallets in clean and well-ventilated stores

How to manage aflatoxins in groundnuts

1

If available, purchase varieties with low aflatoxin risk

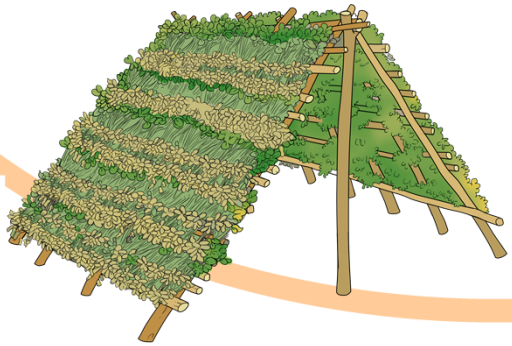
2

Ensure optimum growing conditions (avoid moisture stress, effective weeding, pest control etc.)

Harvest in dry weather conditions

3

Avoid damaging of the pods during harvesting

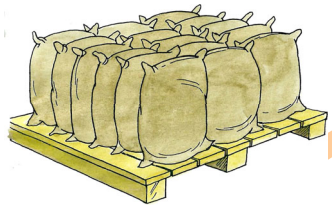


4

Ensure well-ventilated and dry conditions for drying

5

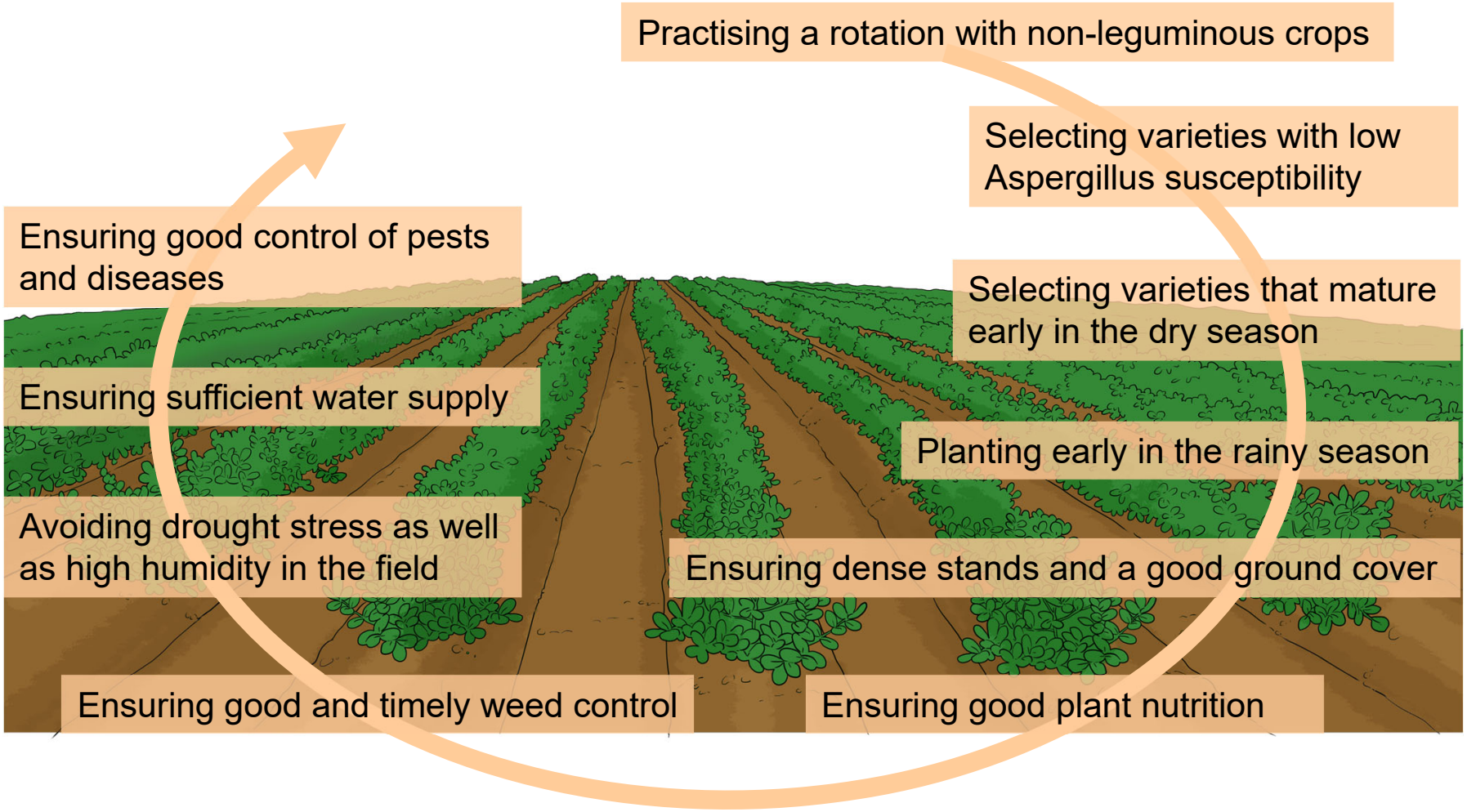
Pack well-dried pods only



6

Store the pods in dry conditions and avoid any type of damage during storage

Preventing aflatoxin in groundnut before harvest



Preventing aflatoxin in groundnut during harvest

Ensuring timely harvest of the pods

Removing soil adhering to the pods

Avoiding any damage to the pods and nuts

Preventing aflatoxin in groundnut after harvest

Drying the pods slowly in ventilated stacks or on tarpaulins

Ensuring gentle transport

Using storage containers that protect the pods and/or kernels from moisture and pests

Avoiding over-drying of the pods

Avoiding re-humidification of the pods

Avoiding high temperatures and humidity in the storage structures

Removing all broken, cracked, infested and shriveled grains before storage

Putting only nuts with a moisture content of less than 9 % into storage