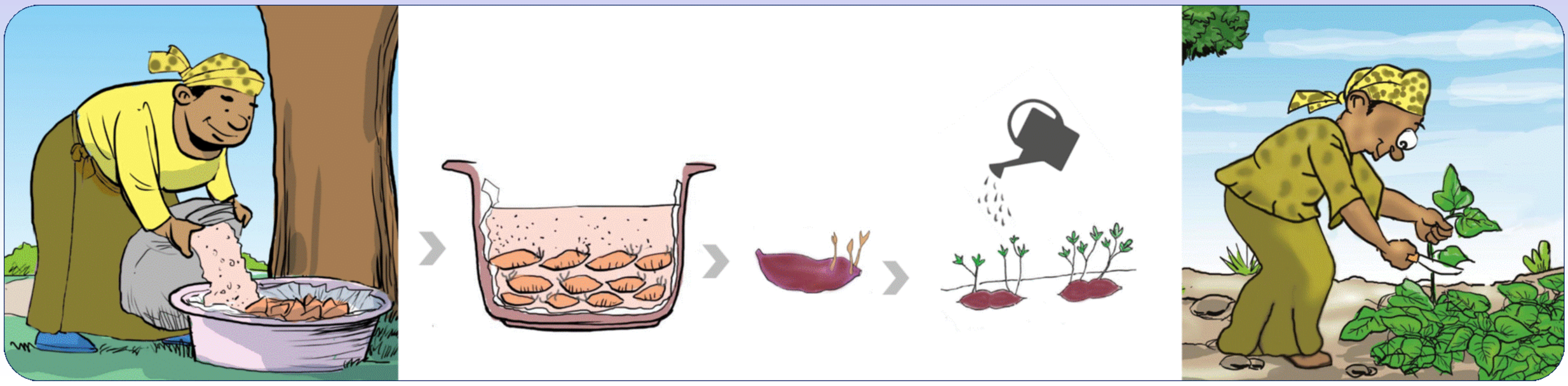
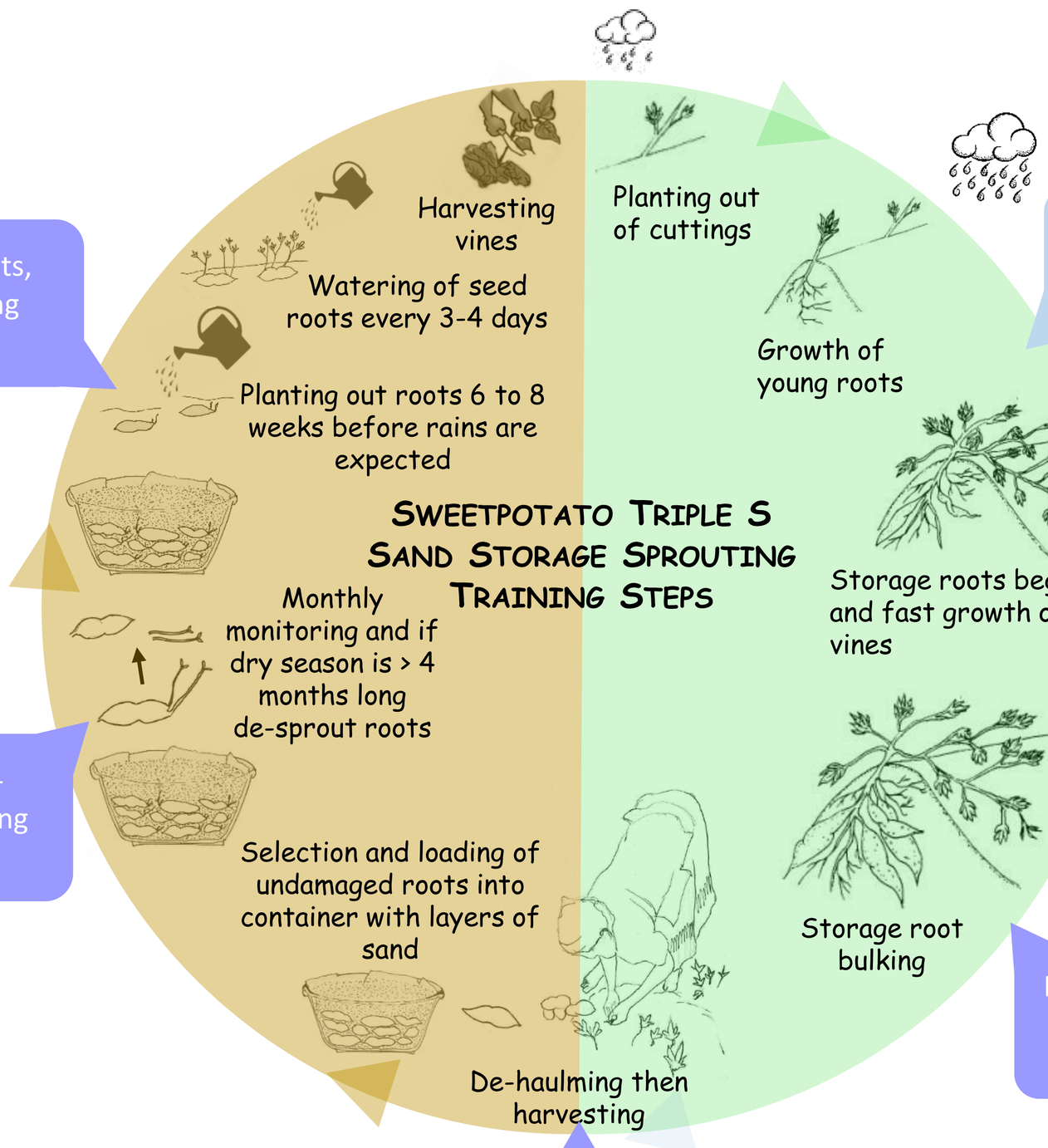
Storing in Sand and Sprouting Sweetpotato Triple S Training Charts





IV. Planting out roots, and vine harvesting preparations

III. Monitoring, de-sprouting and planting out preparations

II. Root selection and loading of Triple S container

I. Advanced preparations and pegging of healthy plants in field

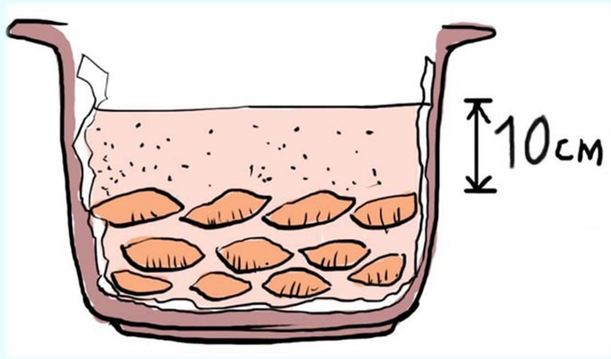
Triple S awareness raising, and training plans and preparations

These training materials were developed by a team from the Natural Resources Institute (NRI), University of Greenwich, UK and the International Potato Centre (CIP)
Tanya Stathers, Sam Namanda, Sammy Agili, Mihiretu Cherinet, Jude Njoku, Margaret McEwan - 2017

Sand, Storage, Sprouting Sweetpotato Triple S system

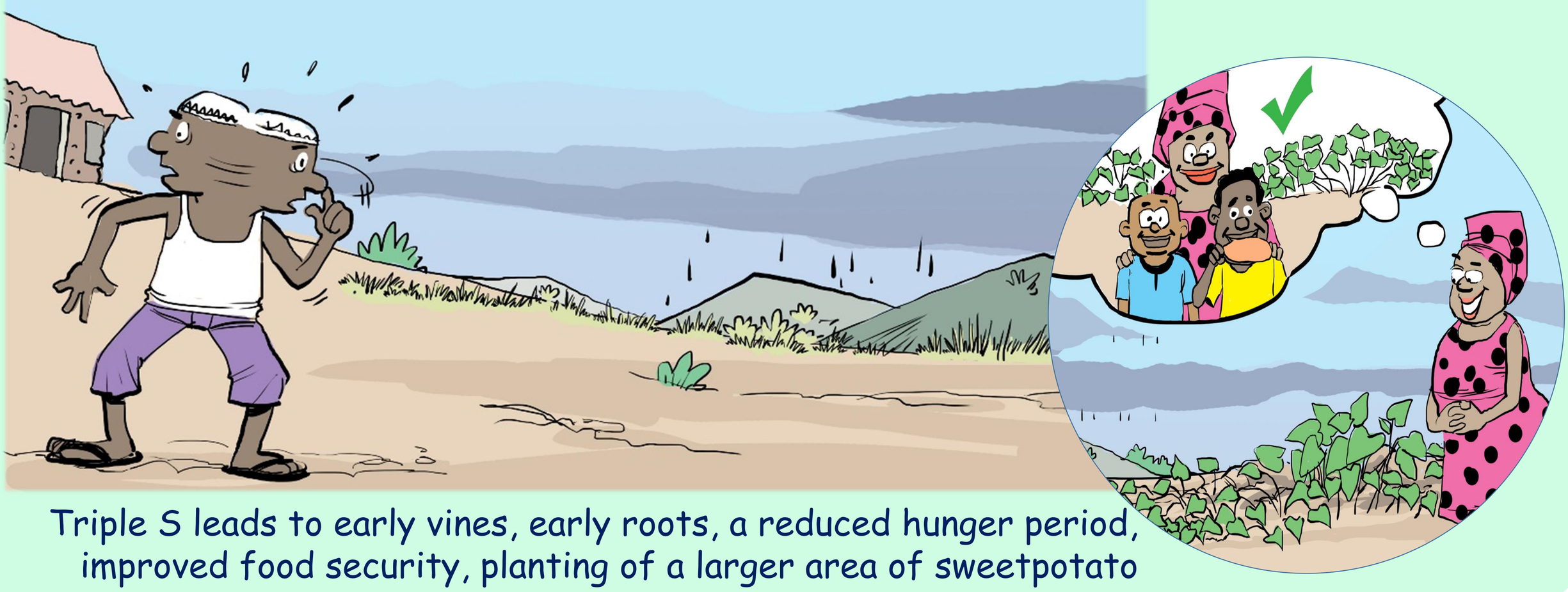
What is Triple S?

Sand, Storage and Sprouting are the initial steps for producing sweetpotato planting materials in time for the start of the rains, using seed roots stored during the dry season.



What constraints does Triple S address?

Lack of sweetpotato planting materials at the start of the rains



Triple S leads to early vines, early roots, a reduced hunger period, improved food security, planting of a larger area of sweetpotato

What does Triple S involve?

- Storing roots in dry sand
- Planting the sprouted roots out 6-8 weeks before the rains, and watering them
- Harvesting planting materials at the start of the rains

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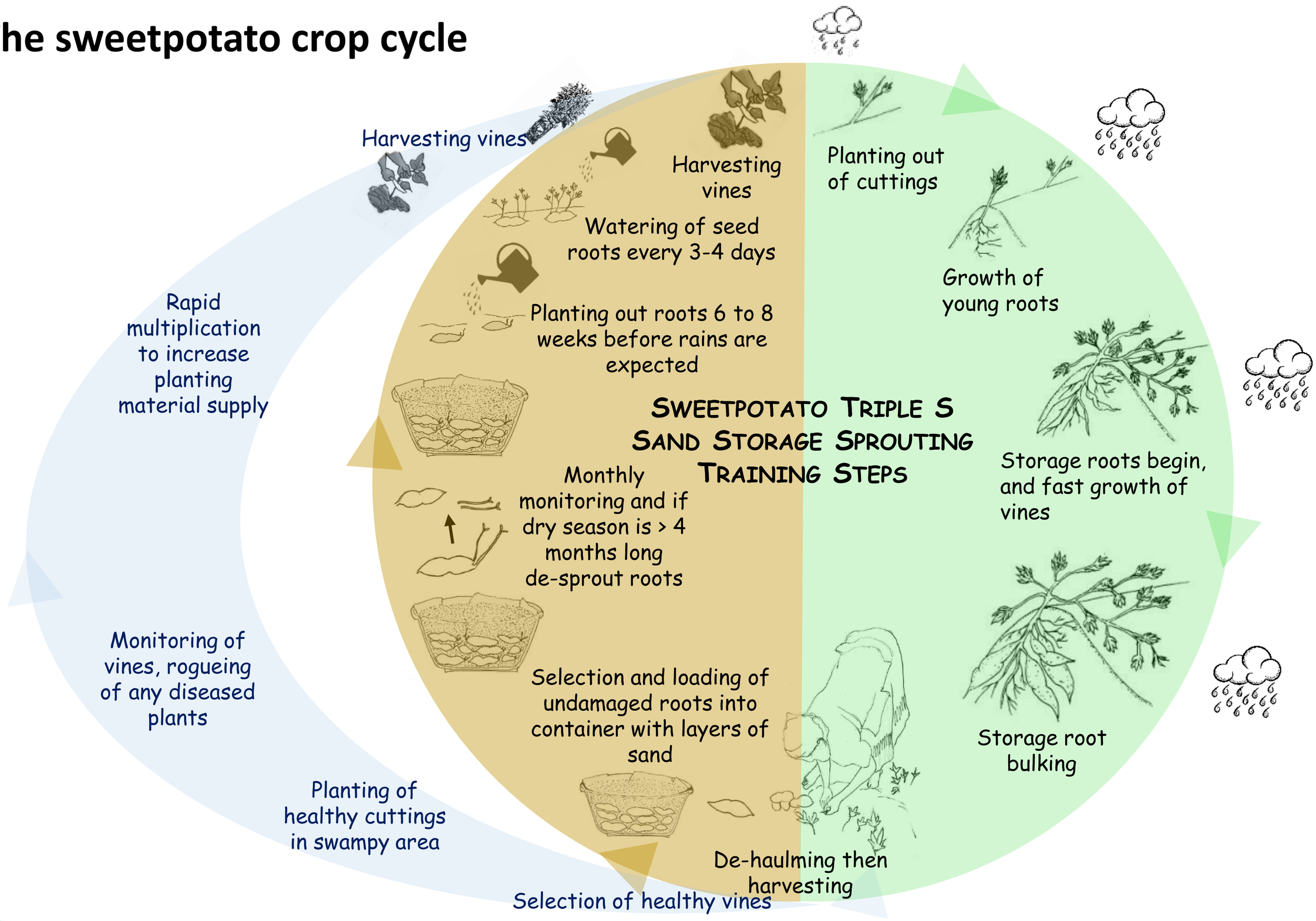
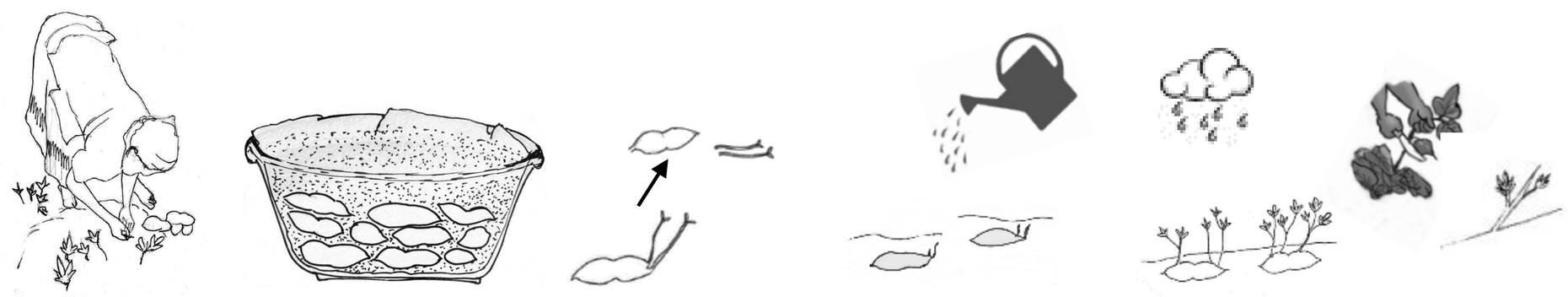
Planning for Triple S

The sweetpotato crop cycle



Timing of Triple S activities

Remember Triple S timing is driven by the rains, not by calendar dates.



Location *[add your timings]*	Harvesting, root selection & storage of Triple S roots	Dry-season period *[months]*, monitoring	De-sprout roots	Planting out in root bed & water every 3-4 days *(6-8 weeks before rains)*	Start of rains. Vine harvesting & planting of cuttings *every 4 weeks from:*
Mozambique	Apr/ May	Jun to Sept *[3]*	No need	Oct to Nov	Jan/ Feb
Kenya *-Western*	July/ August	Sept to Jan *[5]*	Oct/Nov	Feb/March	April
Uganda *-Northern*	Nov/Dec	mid Nov to Mar *[4]*	No need	mid Jan/ Feb	mid Mar/Apr
Ethiopia *-Tigray*	Oct/Nov	Oct to Jun *[9]*	Jan and Apr	May/ June	Jun/Jul
-SNNPR - Belg	Oct/Nov	Oct to Feb *[4]*	No need	February	Mar/April
-SNNPR - Meher	Oct	Oct to Apr *[9]*	Jan/Feb	March	Apr/May
Nigeria *-Derived savannah*	Oct/ Nov	Nov to Apr *[6]*	No need	February	Apr/May
Burkina Faso *-Western*	Oct - Dec	Nov to Mar *[5]*	Dec/Jan	April	June/ July

Planning for Triple S

Equipment needed

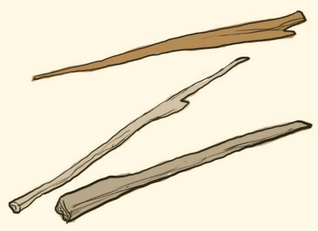
Basin or similar container

Newspaper

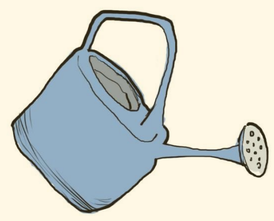
Coarse, dry sand

50 undamaged medium-small sized roots

Fork hoe



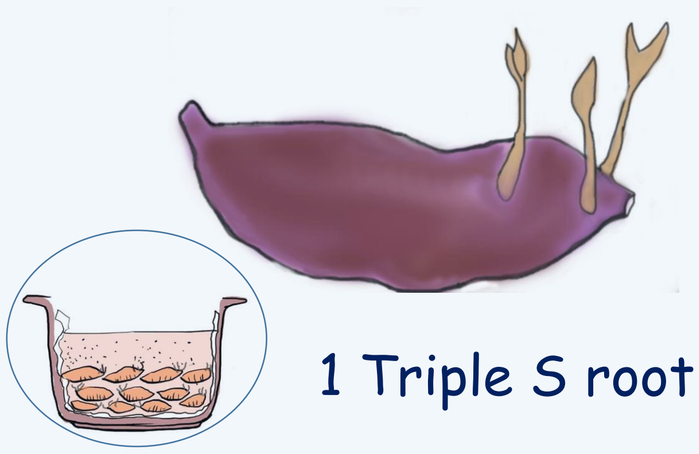
Sticks for pegging healthy plants



Watering can

Triple S calculations

How much planting material from how many roots

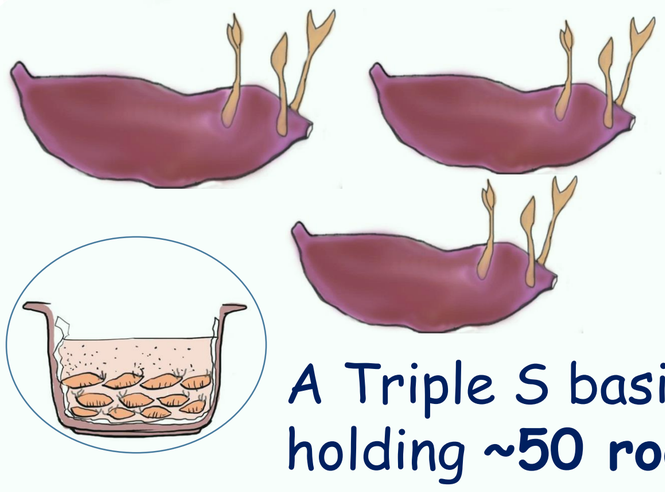


1 Triple S root

planted out and watered for 6-8 weeks

x 40

will generate ~40 cuttings



A Triple S basin holding **~50 roots**

planted out and watered for 6-8 weeks

x 2,000

will generate **~2,000 cuttings** *(50 x 40 = 2,000)*

Three cuttings are planted per square metre. So, 2,000 cuttings are sufficient to plant an area of ~650 m^2 (~0.15 of an acre).

So 1 Triple S basin provides enough cuttings to plant at least 0.3 acre (0.15 + 0.15 acres), or some of the cuttings can be sold.

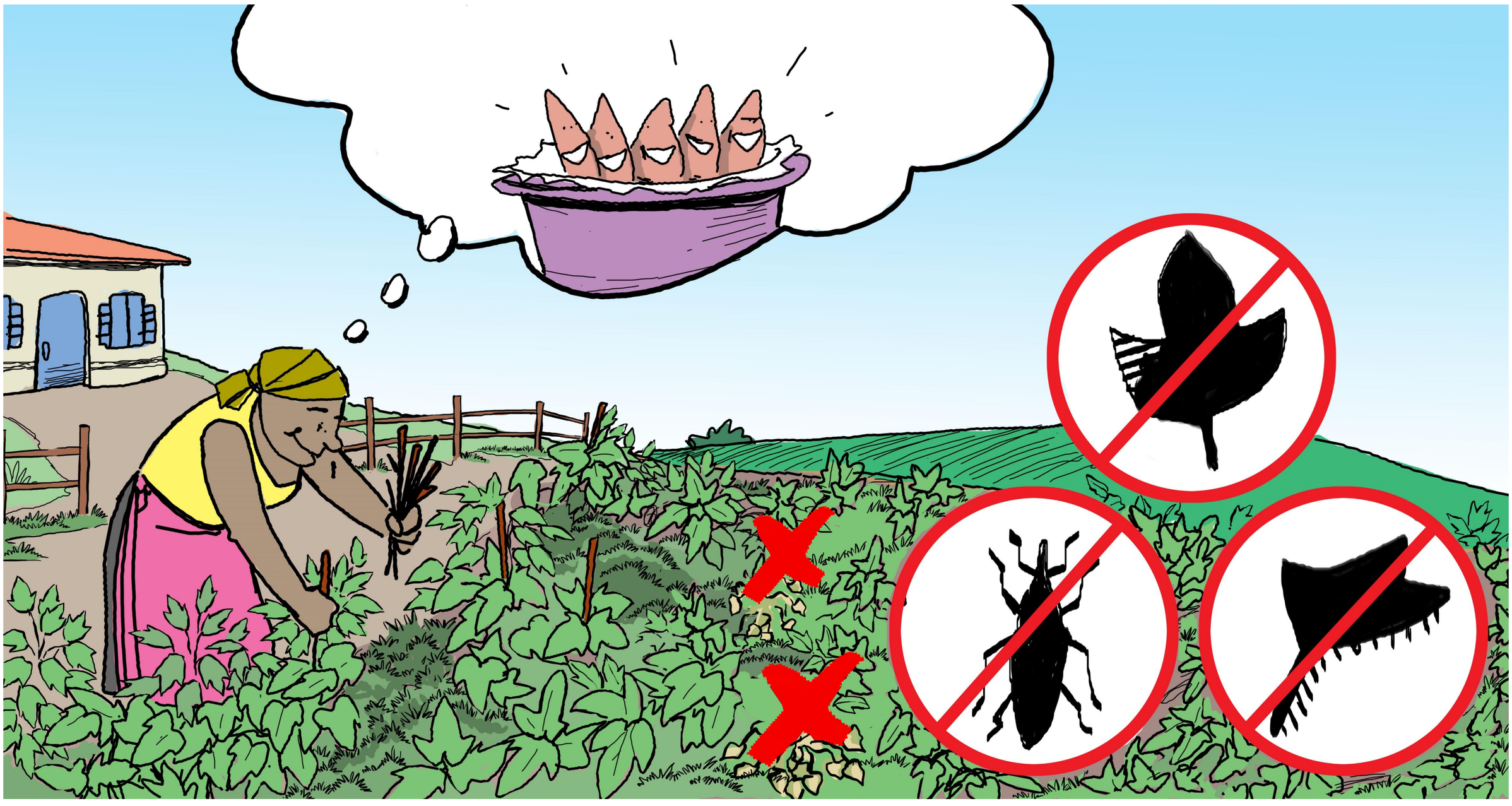
One month later the vines can be harvested again (second vine harvest) generating another **>2,000 cuttings**

x >2,000

will again generate **>2,000 cuttings**

Using healthy roots for Triple S

Selecting healthy plants in the field from which to harvest roots for Triple S
(Positive selection)

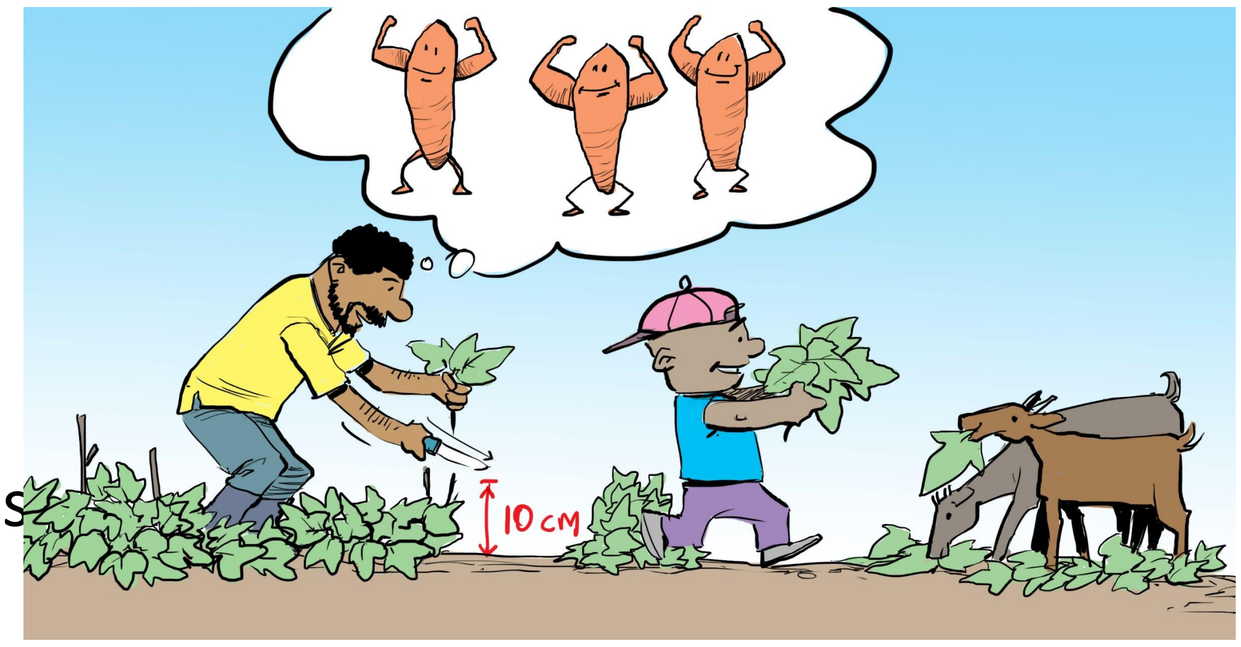


One month before harvest, walk through your field and peg healthy sweetpotato plants.

Two weeks later, re-check the pegged plants to make sure they are still healthy.

Only use roots from healthy plants for Triple S. This helps avoid weevil, virus and hairiness problems which reduce sprout vigour and vine yield.

De-haulming: At 3 – 5 days before harvest, cut the foliage off your pegged plants leaving 10 cm of stem. This de-haulming causes changes in the root which will protect it during storage, and will also enable you to check if any stems have weevil tunnels in them.



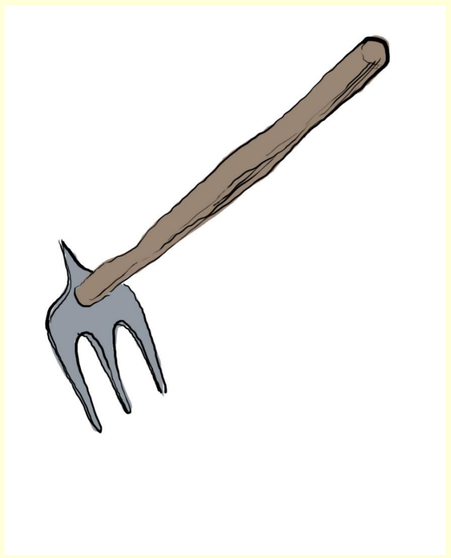
Careful harvesting

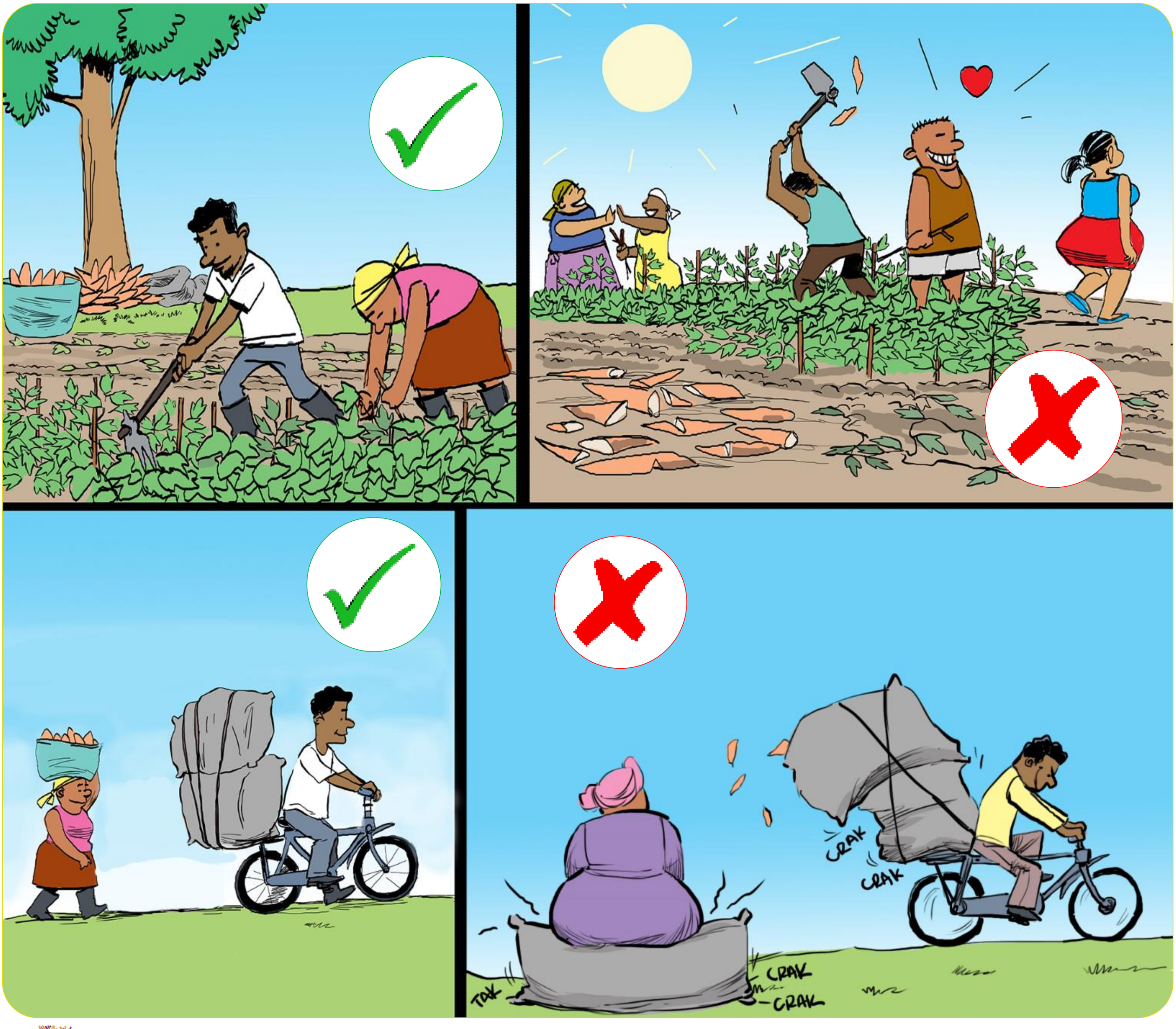
Careful harvesting

Damaged roots will rot during storage.

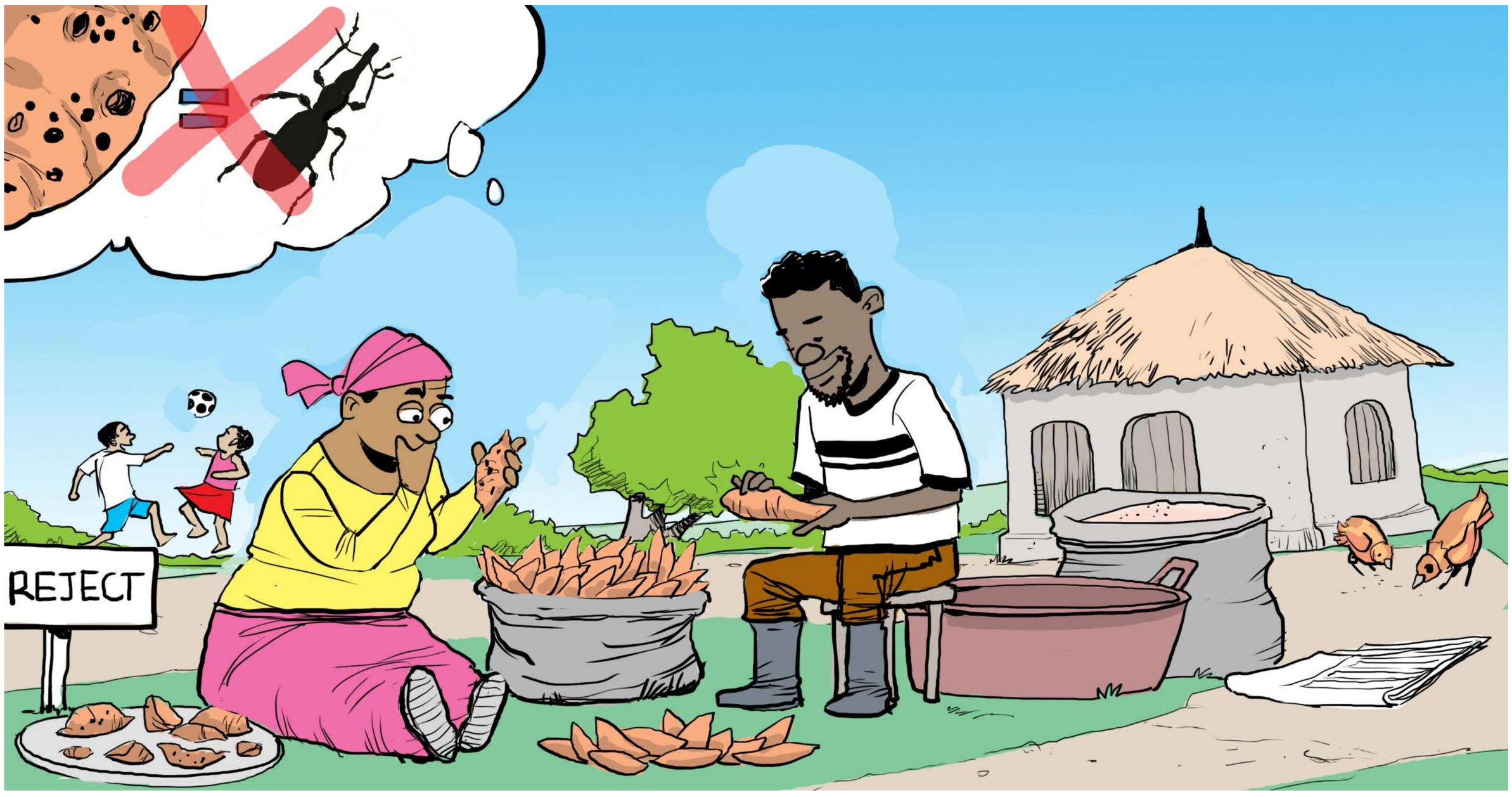
Harvest roots for Triple S carefully, use a fork hoe and work slowly. Place roots in shade, do not wash them.

Transport the roots home carefully, do not overload, drop or sit on the sack.





Root selection



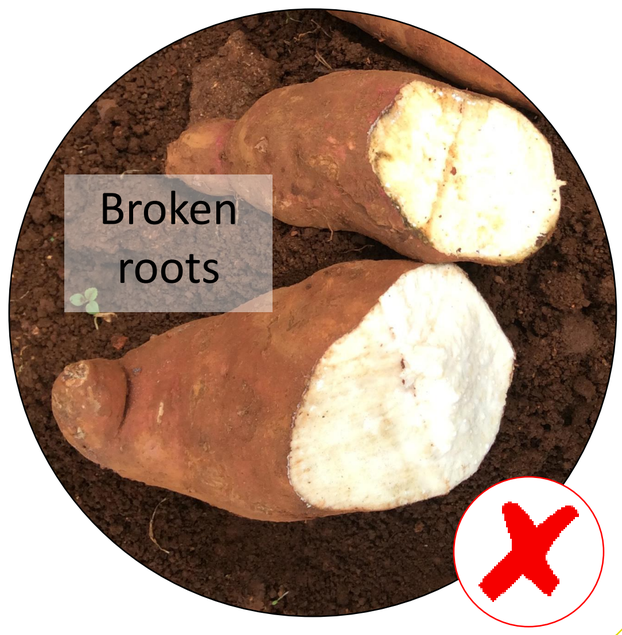
Select undamaged healthy roots

Your Triple S roots will be stored for several months, so only store undamaged roots.

Discard weevil damaged roots. Check very carefully, as weevils lay eggs in tiny holes on the root, the eggs then hatch into larvae which feed and form tunnels in the roots.

Discard broken or damaged roots. As they are more likely to rot during storage.

Do not use roots from virus infected plants.



What size roots to store?

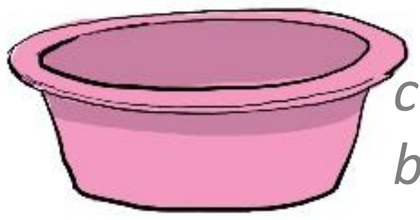
Small sweetpotato roots will dry out and shrivel during storage, while only a few large roots will fit in the basin.

Choose small to medium sized undamaged roots, that are about as thick/ wide as the handle of your hoe (~2-5 cm diameter) for use in Triple S. Note: in areas where the dry season is > 7 months, medium to large roots are preferred.

Preparing and loading your Triple S container

1 Once you have selected your healthy, undamaged, small to medium-sized roots. Gather all your equipment.

Plan where you will store your Triple S during the dry season, so that it can remain dry, and cool.



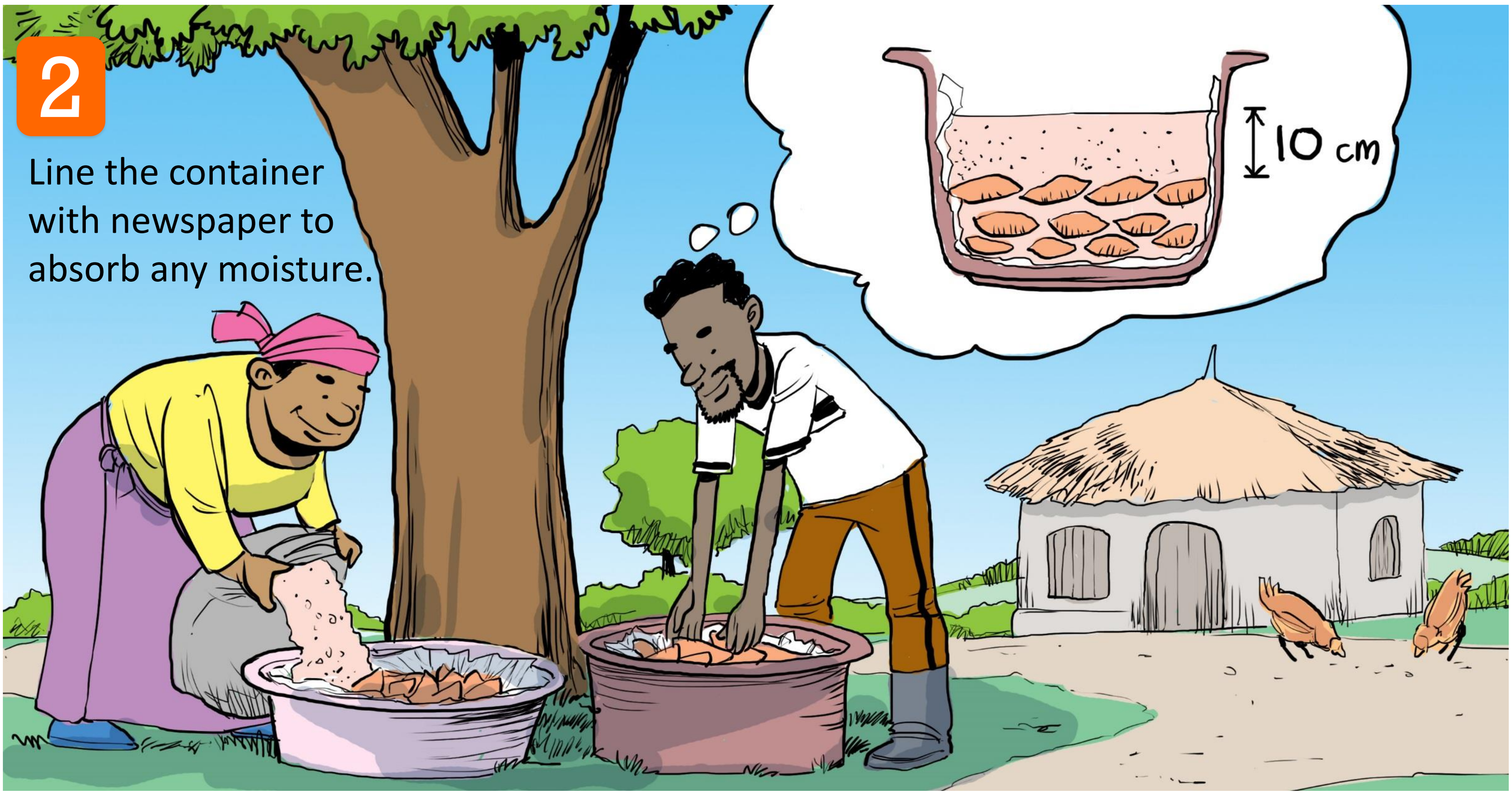
clean basin

old newspaper

dry, coarse sand

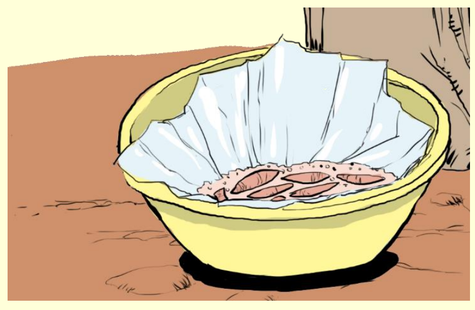
undamaged small to medium size roots

2 Line the container with newspaper to absorb any moisture.



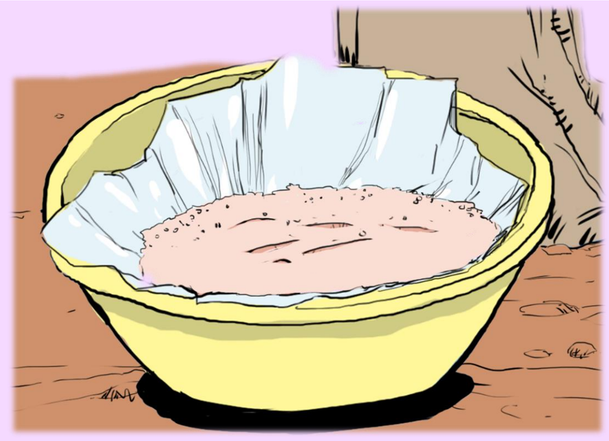
3 Add a layer of cool, dry, coarse sand. You can sweep this sand from around your yard, but make sure it is cool before using it, and free from soil.

4 Next add a layer of roots, make sure the roots do NOT touch each other.



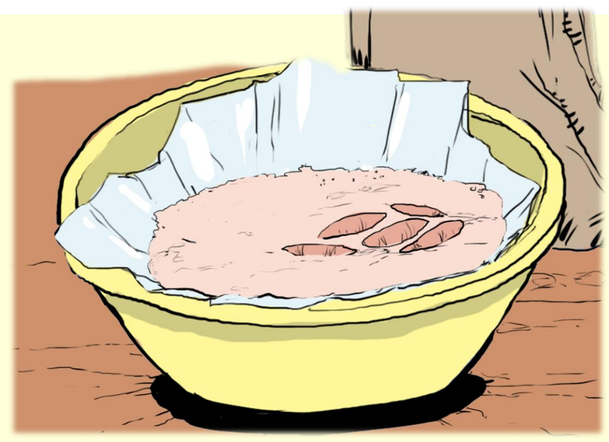
Loading your Triple S container
continued

5 Then cover the roots with a layer of cool, dry, relatively coarse sand.

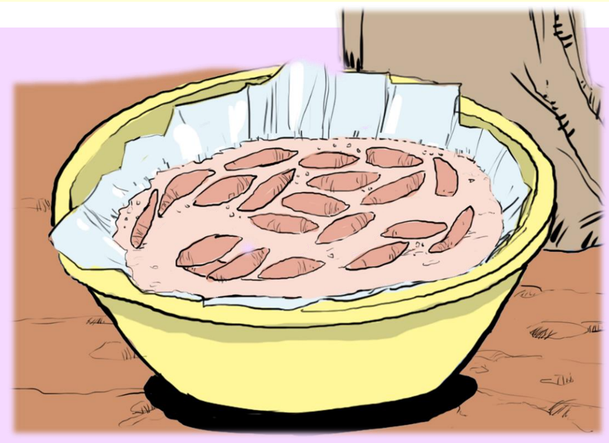


6 Add another layer of roots, making sure they do not touch each other or the edge of the basin.

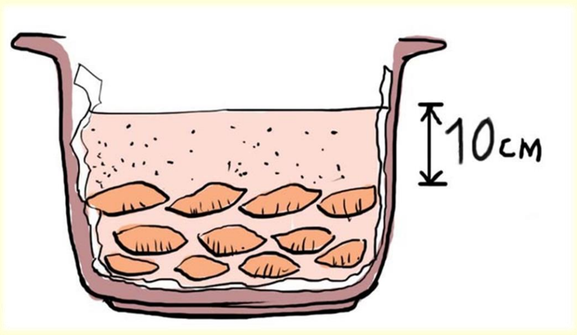
Cover them with a layer of cool, dry, coarse sand.

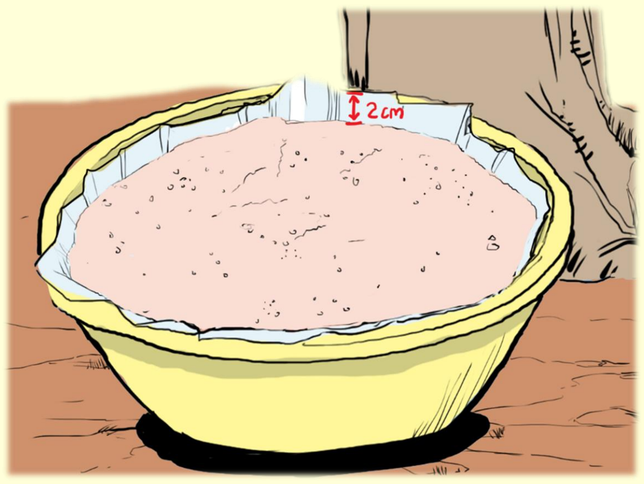


7 If there is space, add a third layer of roots.



8 Always finish with a deep layer of sand (~10 cm thick). This will help prevent the roots from drying out during storage, and stop weevils or rats from finding and damaging them.

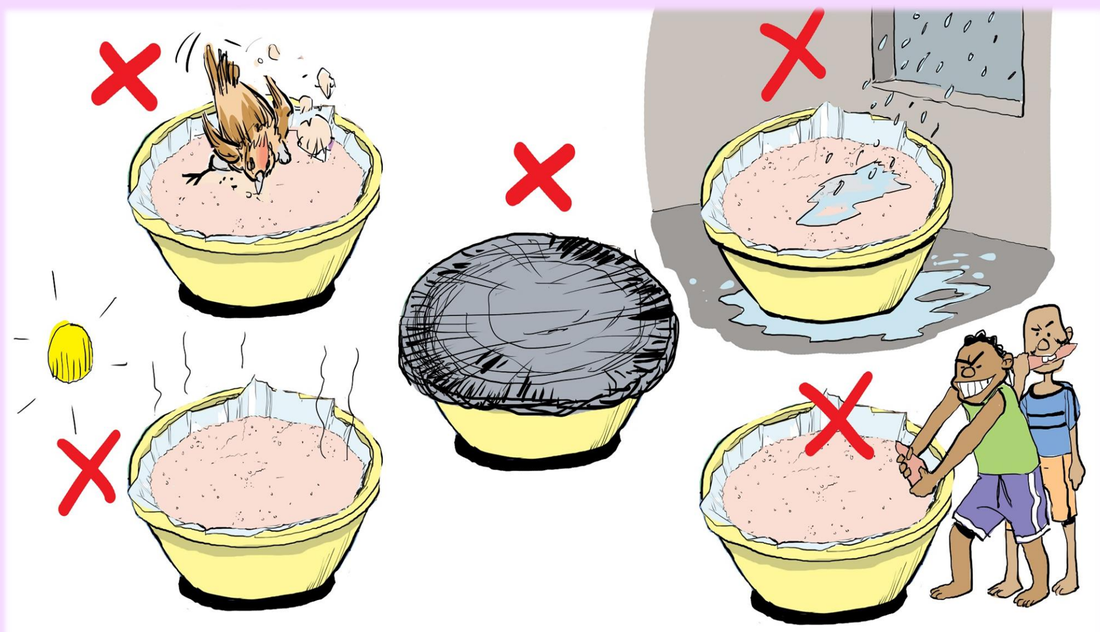




9 Take care of your Triple S, ensure:

- chickens cannot dig in the sand
- top layer of sand is thick to avoid rats
- it will not get rained on, or too hot
- the family know about the Triple S, so that no one eats the roots, as they are the link to next year's food

Check your Triple S regularly.



Monitoring your Triple S

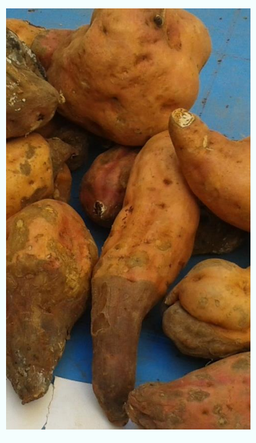
When: Check your stored Triple S roots every month, and keep records of any problems

Why: To check the roots:

- are storing well and will be fine for planting out,
- have not rotted, dried or shrivelled, or been interfered with by weevils, rats, chickens or people.

Note: it is normal for some of the roots to start sprouting during storage.

How: Carefully unload the roots one-by-one. Inspect each of them for rotting or weevil damage. Discard any rotting or weevil damaged roots, as these problems will spread to the other roots and destroy them. Remove any rat damaged roots.



After monitoring, carefully reload the Triple S basin using the same process as at set-up. If the newspaper layer has started disintegrating it should be replaced.

De-sprouting your Triple S stored roots

Why

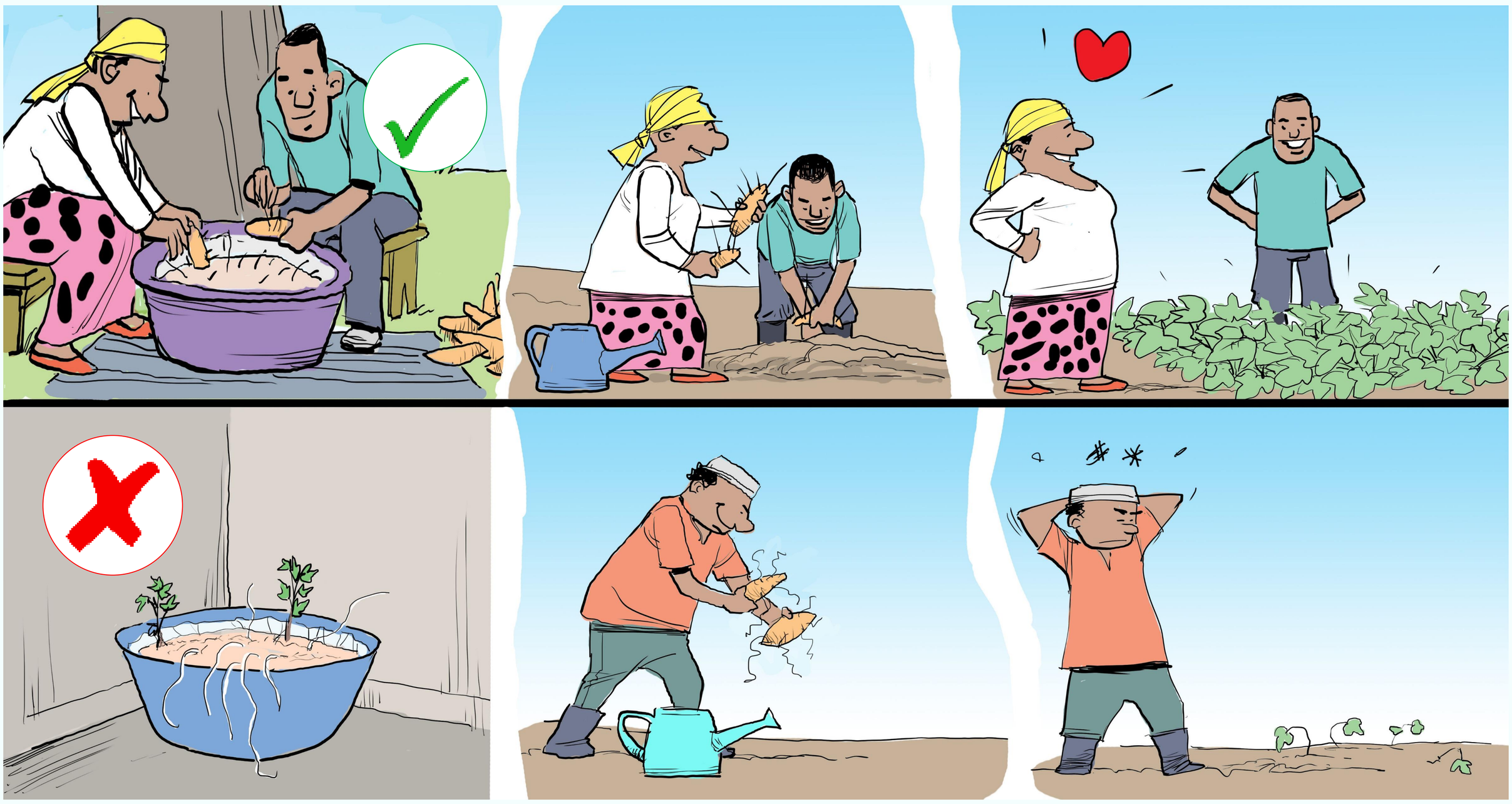
If your dry season is > 4 months long, you need to de-sprout your roots, so they do not become too weak to produce healthy vines.

When

If the intended root storage period is 5 months, then de-sprout once after 2 months.

If the intended storage period is 6 months, then de-sprout once after 3 months.

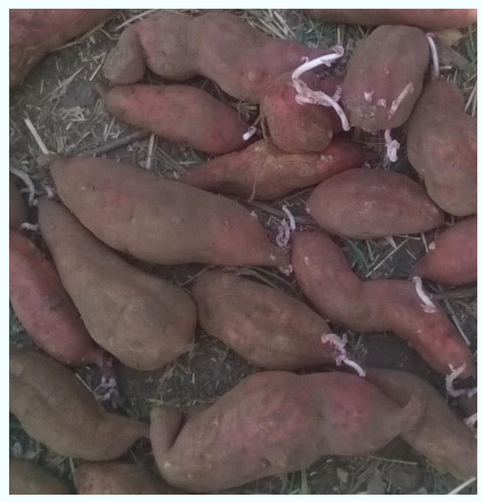
If your dry season is less than 4 months long, do NOT de-sprout your stored roots.



How

DO

- ✓ Do monitor your Triple S stored roots every month to check on sprouting
- ✓ After 4 months remove sprouts that are longer than your small finger (5 cm)
- ✓ Pull the sprout gently from the root, so as not to wound the root
- ✓ De-sprout it in a cool place
- ✓ Stop de-sprouting 2 months before planting in root seed bed



DON'T

- ✗ Don't use a knife to de-sprout, as it might damage the root
- ✗ Don't de-sprout in the hot sun

Preparing the root bed, planting out and watering your Triple S roots

Steps:

1. ***Planning***: Decide on the location of your root bed, it needs to be close to a source of water, fertile and fenced to protect it from livestock grazing. Open the soil at harvest time before it gets too hard.
2. ***Preparing***: About 8 weeks before the rains start, prepare the root bed – this may be a raised bed or on the flat.
3. ***Planting***: About 6-8 weeks before the rains start, unload the Triple S roots, select the healthy roots with sprouts.

   Plant roots at a spacing of 60 cm x 60 cm (~2ft by 2ft), and at a depth of 5-10 cm to protect them from heat and pests. Plant roots with sprouts pointing upwards.
4. ***Watering***: Make a depression in the soil above the root to help retain water.

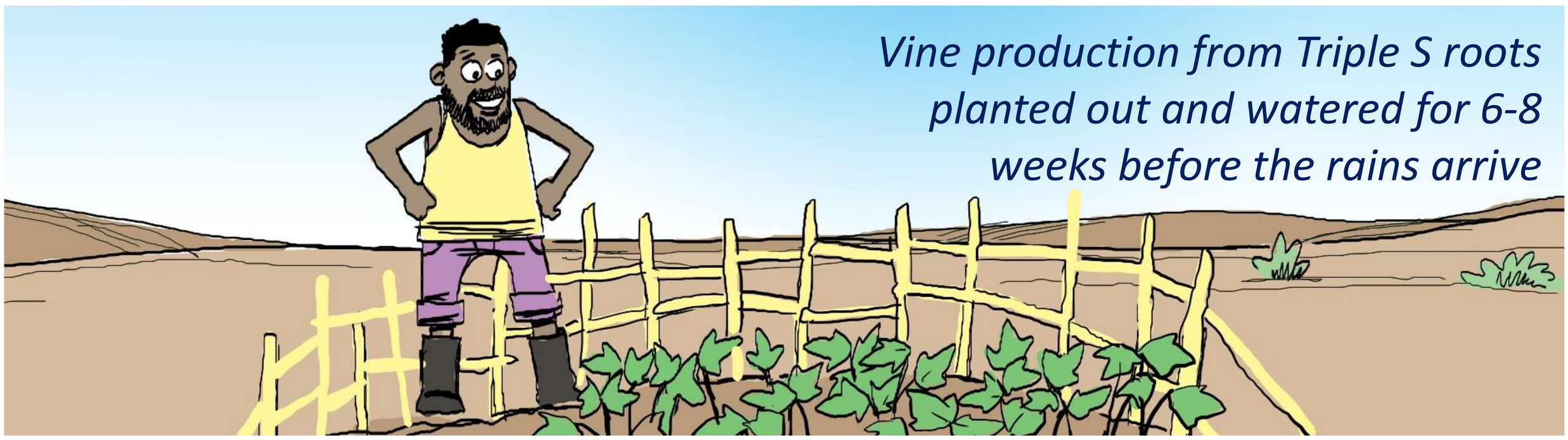
   Water at planting, and then twice per week for 2 weeks. Then reduce watering to once per week, until the rains are just 1 to 2 weeks away.

   Water around the planted root to help its feeder roots and shoots develop.

   Use 1 watering can (~10 litres) to water every 10-15 plants. The shoots will become visible within 7-10 days. Note: If water is extremely scarce, plant roots closer together to minimise water needs.

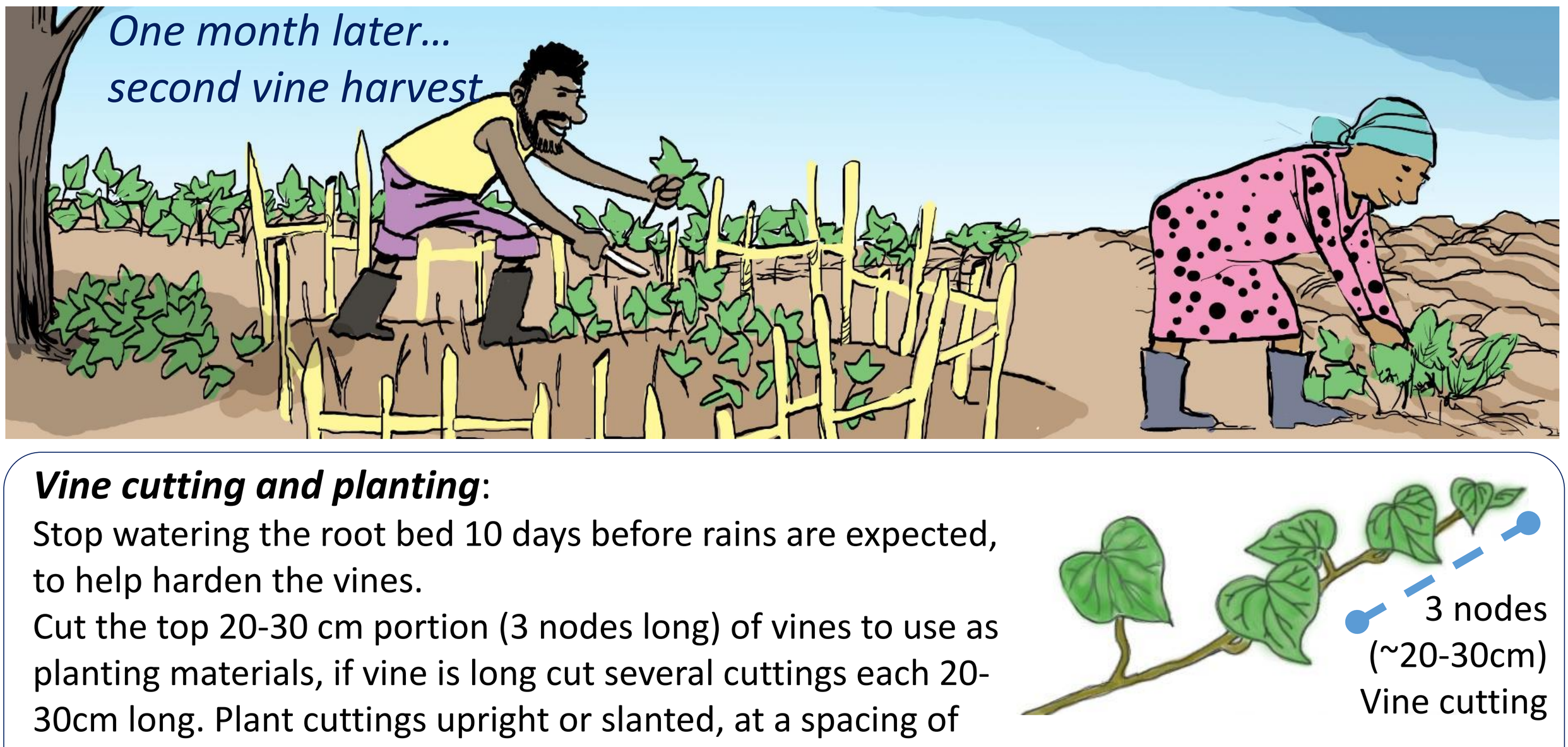
   To help harden and prepare the vines, do not water them for the last 10 days before the rains arrive.

Vine production from your planted Triple S roots



Vine production from Triple S roots planted out and watered for 6-8 weeks before the rains arrive

First vine harvest, as soon as rains establish. Leave 15 cm of stem to encourage re-growth Place cuttings in shade and plant as soon as possible



One month later… second vine harvest

Vine cutting and planting:

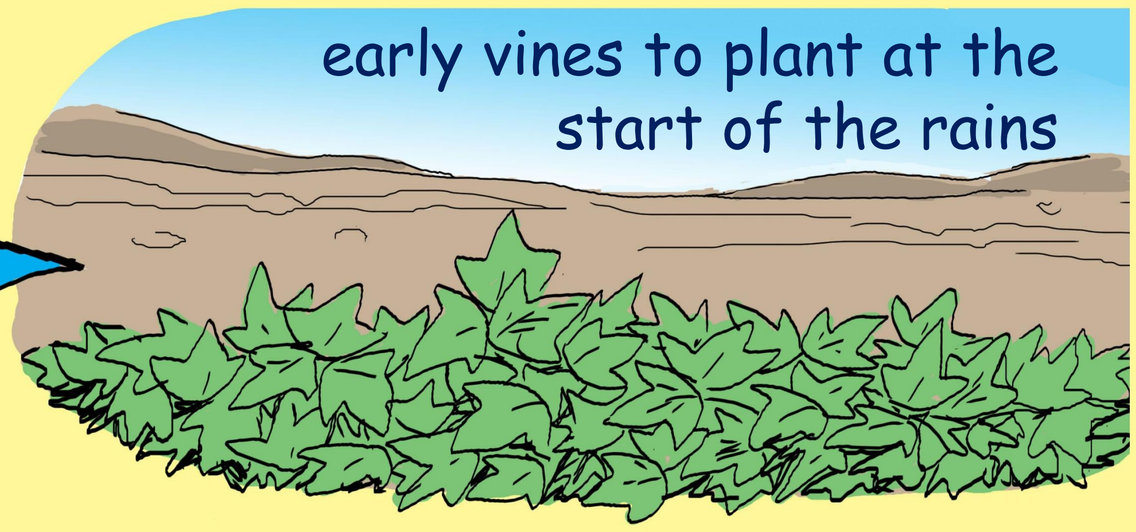
Stop watering the root bed 10 days before rains are expected, to help harden the vines.

Cut the top 20-30 cm portion (3 nodes long) of vines to use as planting materials, if vine is long cut several cuttings each 20-30cm long. Plant cuttings upright or slanted, at a spacing of 3 cuttings per square metre with 2 nodes buried below soil.

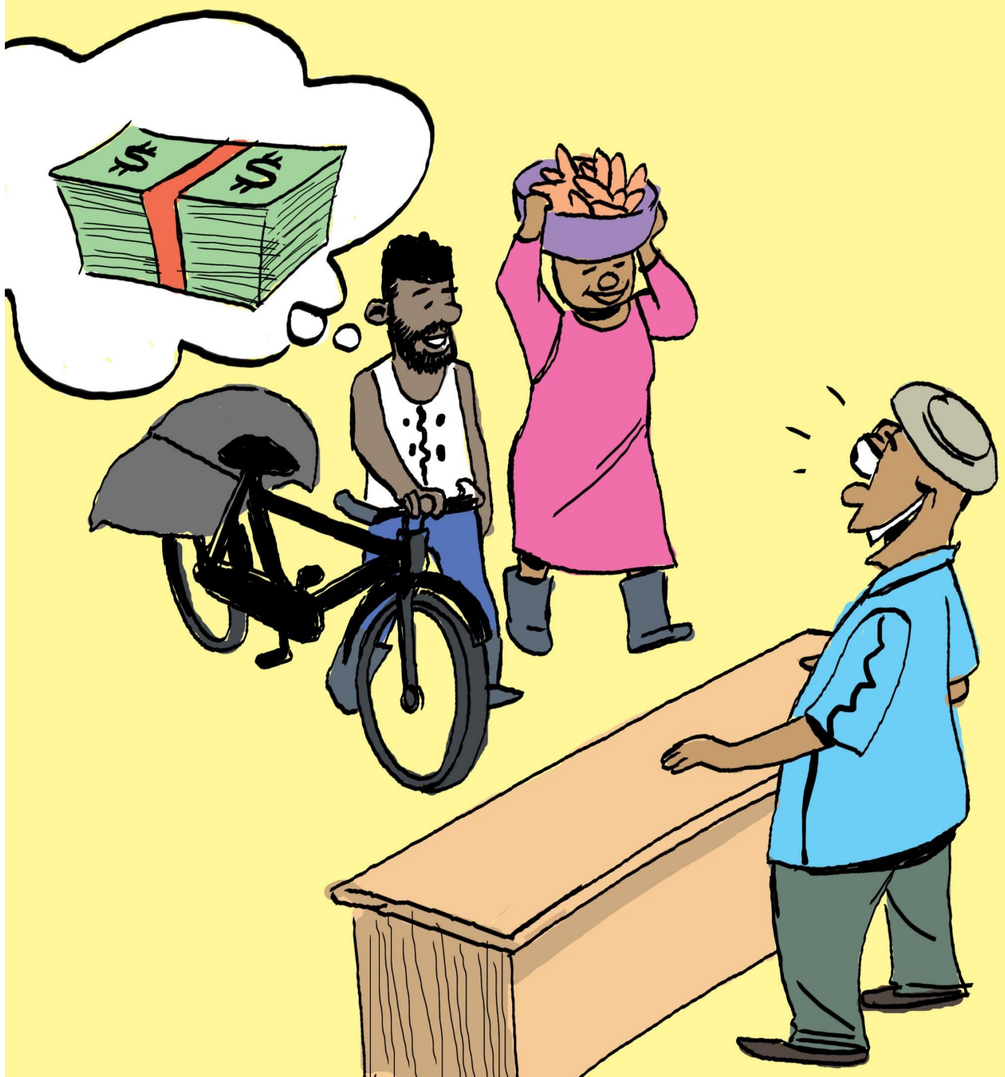
3 nodes (~20-30cm) Vine cutting

Benefits of Triple S

Triple S



early roots provide food during the hungry period, and staggered planting can extend the piecemeal harvesting period



sale of early roots at high prices, when food is limited

greater resilience to an increasingly variable climate

Triple S
Frequently Asked Questions

Q1. Which is the best container to use to store the roots in?

A: Whatever is available locally at low cost. Old plastic wash basins are popular for Triple S. They are sturdy, but not too big and heavy to carry. Clay pots have also worked well in some areas.

Q2. Other than coarse sand, are there other materials which we can use for storing Triple S roots in?

A: Ash… will desiccate (dry out) the roots, so should not be used. Soil…. is too moist, and will encourage rotting. Sawdust…. may decompose during storage and encourage rotting and sprouting. Remember, though that there is a difference between fine and coarse sand. Coarse sand is better, as any water will drain through. Fine sand, will "cake" if it becomes moist and roots will be more likely to rot.

Q3. Why do we need to de-sprout the roots?

A: Roots intended for storage for longer than 4 months should be de-sprouted. Otherwise the food reserves in the root become depleted, and when planted out in the root seed bed, the vines will be weak.

Q4. Can I put different varieties in the same container?

A: If using Triple S for production of planting material for the household, and two varieties are stored in the same container, it is better if the roots can be distinguished by skin colour.

If Triple S is being used to produce planting materials for sale, it is important to keep each variety in a separate container and to keep the root seed beds separate. This way you can easily tell the customer the correct name of the variety, and when harvesting cuttings will help ensure the varieties do not get mixed up.

Q5. What happens if after 8 weeks when the vines are ready for harvesting, the rains have not come?

A: Keep on watering the vines until the rains start and only then plant them out.

Q6. Why does the last layer of sand in the Triple S bucket have to be 10 cm deep?

A: To cover the top layer of roots well, so they do not sprout too soon, or dry out and shrivel, and so weevils and rats can't find them.

Q7. Do all varieties store and then sprout well using Triple S?

A: Varieties can differ in the time it takes for them to start sprouting. Higher dry matter varieties sprout quicker. Longer maturing varieties – may take longer to sprout (due to having to break their dormancy)

Q8. Why do we stake the vines of some sweetpotato varieties in the root bed?

A: Trailing the vines of spreading varieties up sticks encourages more lateral branches and so more cuttings are produced and can be harvested.

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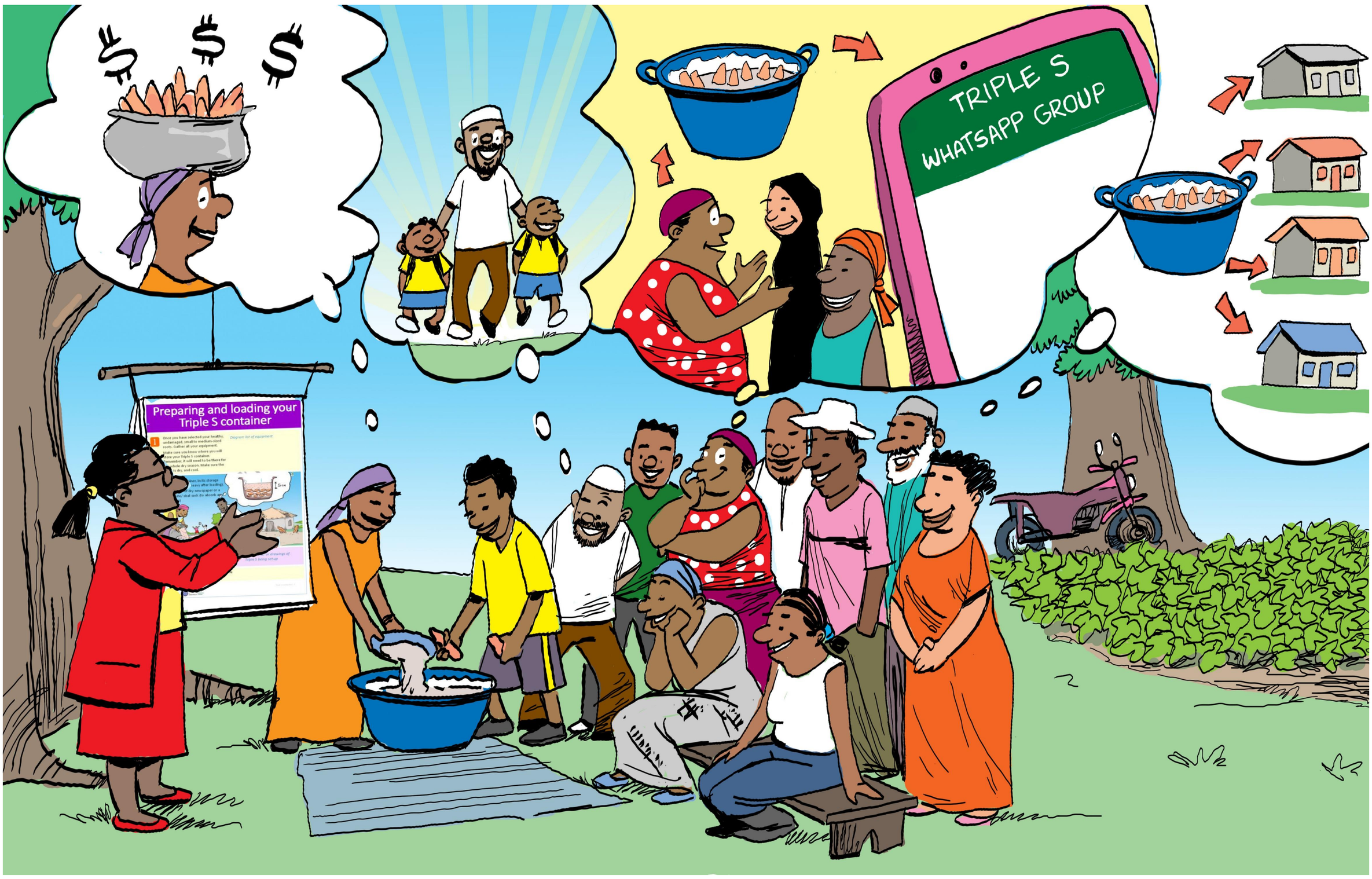
Training other farmers

- All training is an investment. We need to plan how to optimise the impact of that investment by sharing what we have learnt with others.
- Which 10 other farmers do you know who could benefit from practising Triple S?
- If, they in turn each train 10 other farmers, you will have helped 100 families.



- Select a range of farmers to share your Triple S learning with *(some women, men, youth, elders, resource-poor etc.)*
- Plan where and when to meet, and what the participants should bring
- Keep records and follow up to find out how their Triple S is going and who they will train
- Become a Triple S Champion, improve the food security and well-being of your community