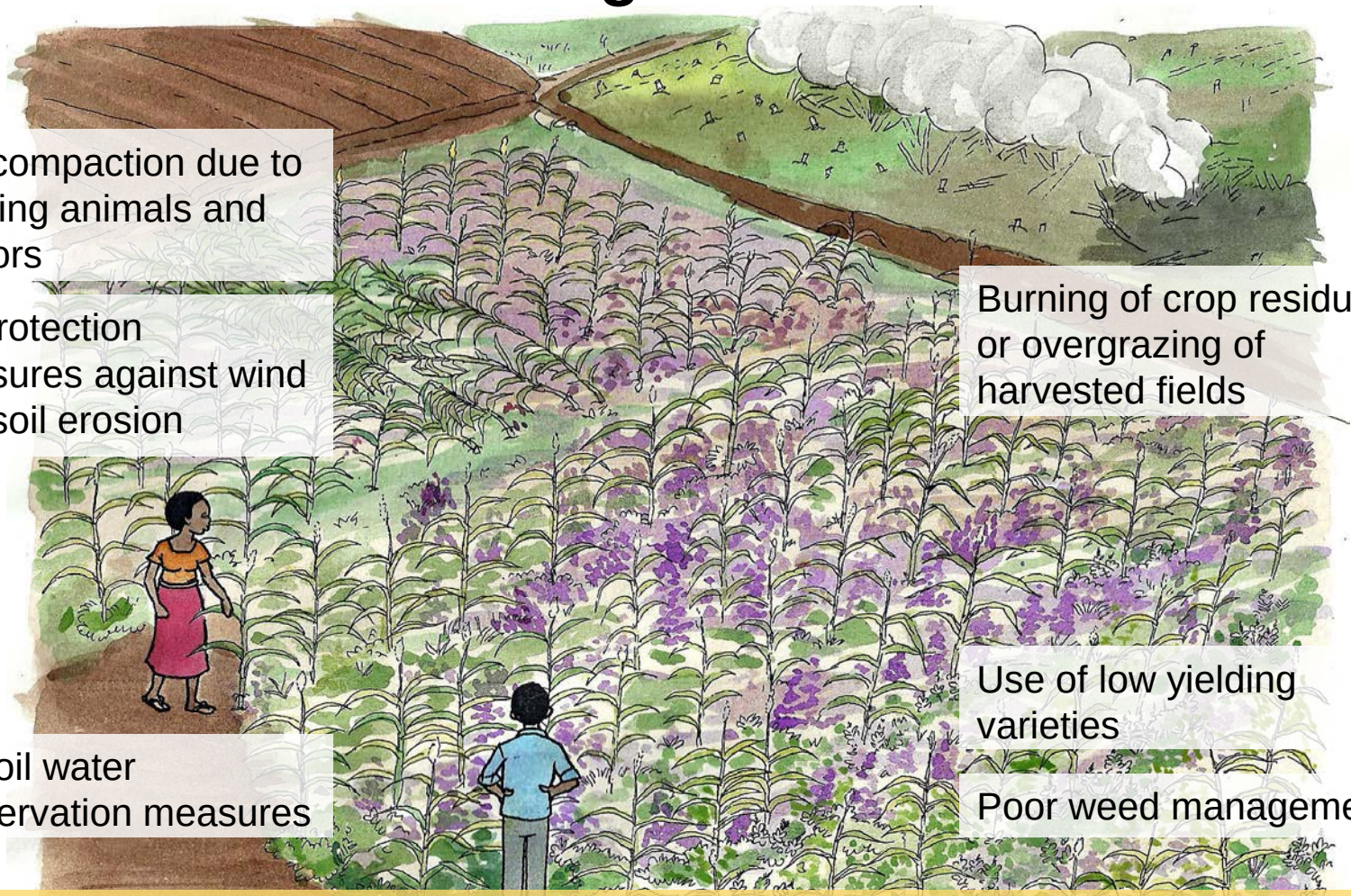
Common millet management



Soil compaction due to tracking animals and tractors

No protection measures against wind and soil erosion

No soil water conservation measures

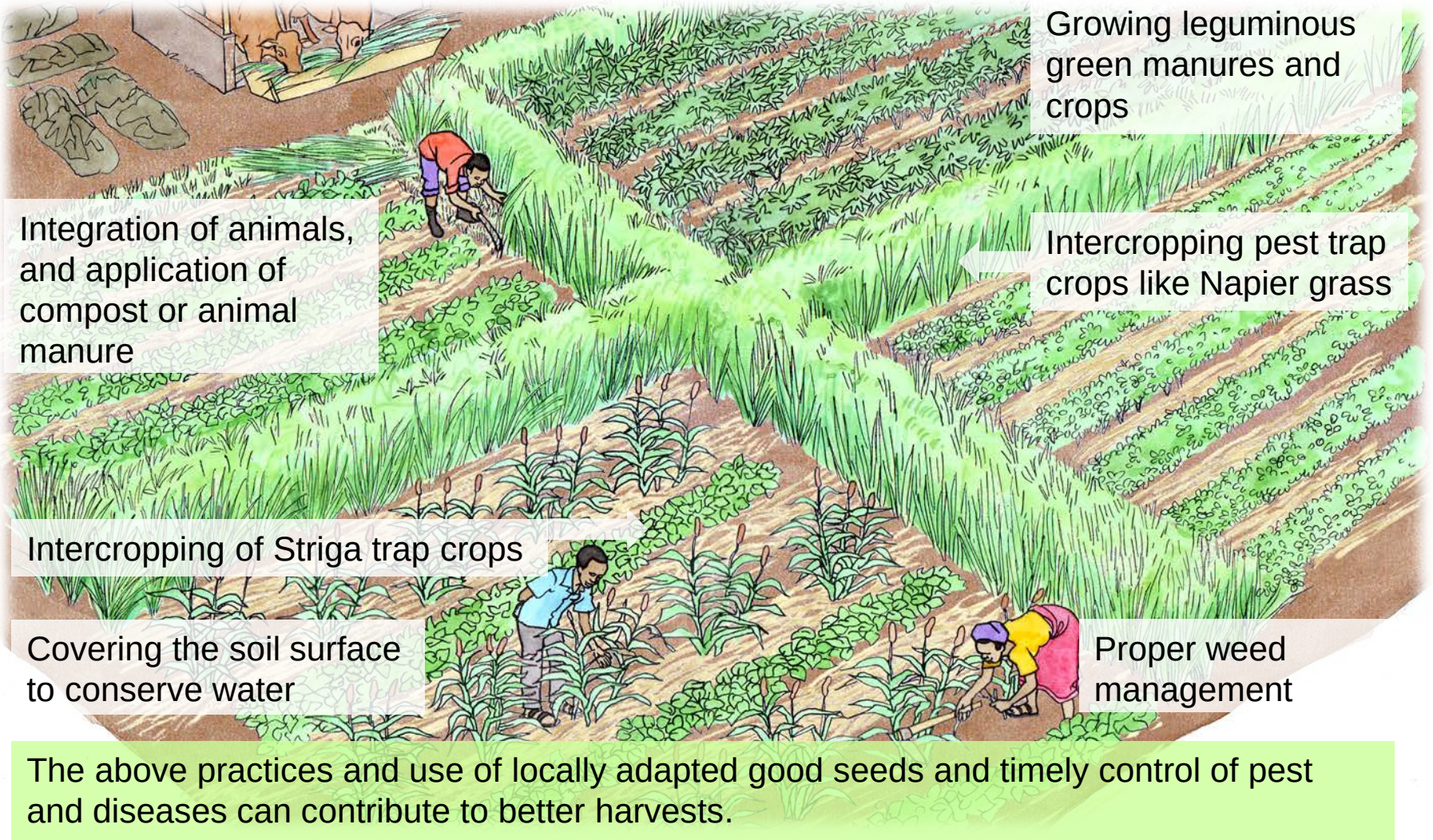
Burning of crop residues or overgrazing of harvested fields

Use of low yielding varieties

Poor weed management

The above practices and continuous planting of millet, as well as poor pest and disease management commonly result in poor harvests.

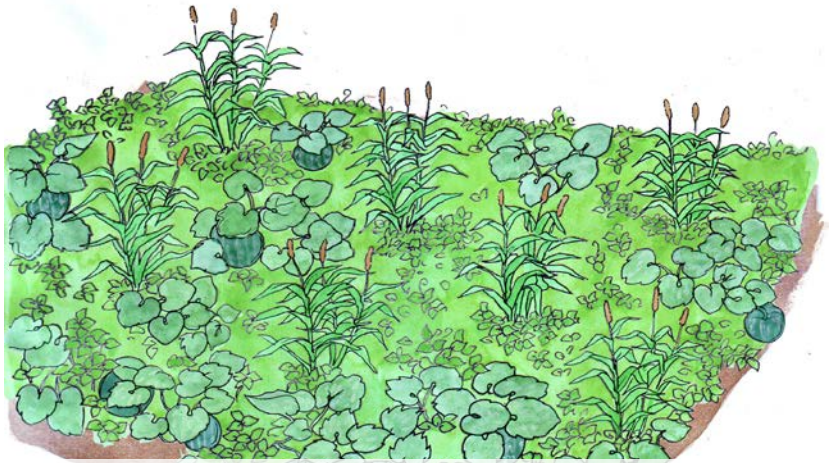
Improved cultivation of millet



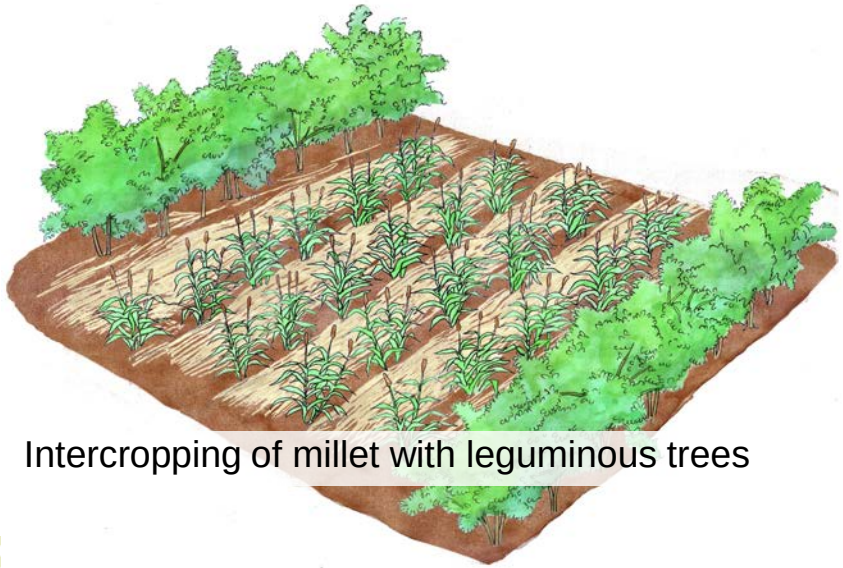
The above practices and use of locally adapted good seeds and timely control of pest and diseases can contribute to better harvests.

Some options for intercropping millet

Intercropping of millet with cowpea sown in rows



Broadcasted millet, cowpeas and pumpkin



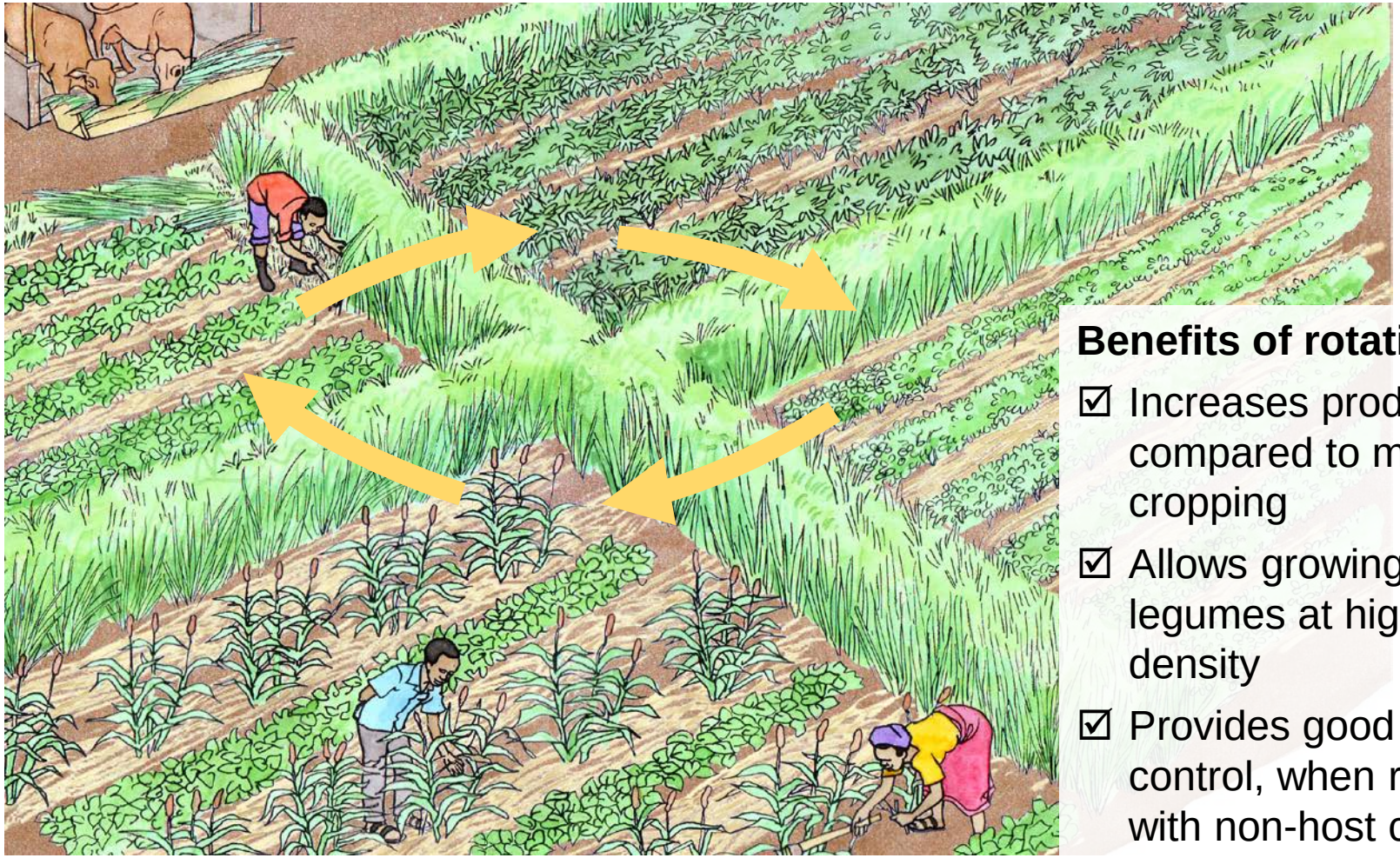
Intercropping of millet with leguminous trees

Benefits of intercropping:

- Increases diversity in the field
- Increases productivity compared to millet alone
- Reduces pest and disease pressure

But intercropping may also increase competition for water among the crops.

Growing millet in rotation with other crops



Benefits of rotation:

- ☑ Increases productivity compared to mono-cropping
- ☑ Allows growing legumes at higher density
- ☑ Provides good Striga control, when rotated with non-host crops

Considerations for variety selection

Selected cultivars ideally …

- mature early and uniform for climates with low rainfall (note: a longer growth period may be appropriate under a different rainfall pattern)
- do well with average rainfall
- show good vigour at emergence
- make abundant tillers
- are resistant or tolerant to downy mildew, smut, earworm and Striga
- may have hairy panicles to prevent the grains from being eaten by birds
- produce good yields
- have grains with required consistency and endosperm with required vitreosity for processing

Seed selection and storage of seeds

1. Before harvest, select productive panicles from plants with uniform, healthy, and disease-free panicles
2. Thresh panicles immediately after harvest
3. Clean the seeds and gradually dry them avoiding the hottest period of the day; check for pests and diseases
4. Set aside 5 to 15 kg of seeds for pearl millet and 8 to 10 kg for finger millet (depending on the sowing density) for planting per hectare
5. Store the seeds in a dry place (in an airtight container)
6. Add natural pest repelling materials to keep away storage pests

Elimination of diseased seed by the salt water floatation method

1

Pour 10 litres of pure water into a bucket of 15 litre capacity, and dissolve 2 kg of salt.

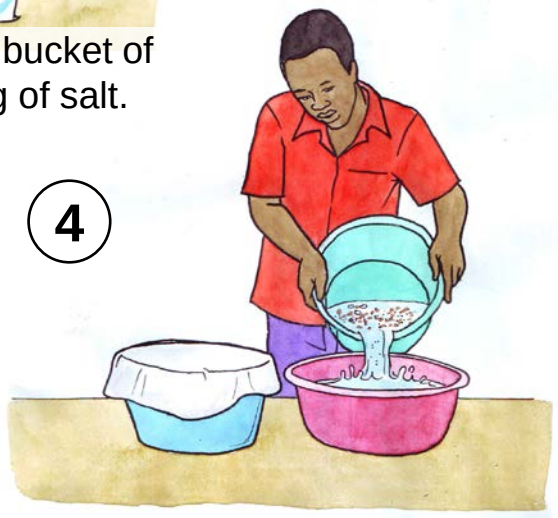
2

Add the millet seed to the solution and stir.

3

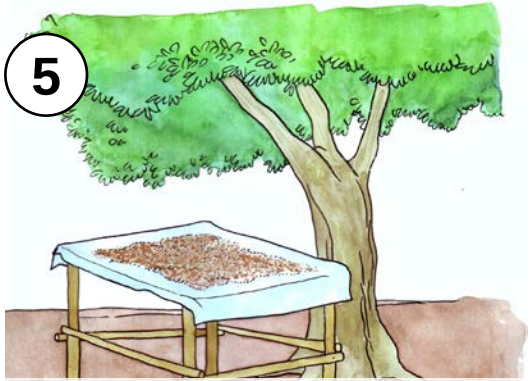
Remove the immature and infected seeds that float over the solution.

4



Wash the sinking good seeds in clean water for 3 to 4 times.

5



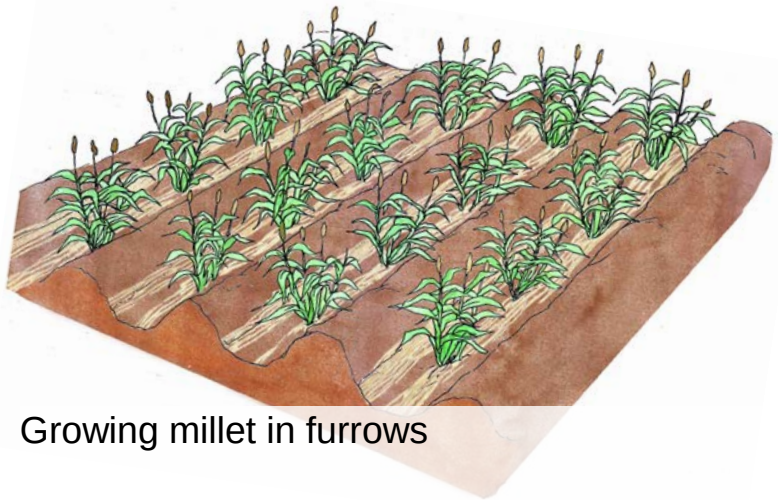
Dry the seeds in shade.

Different ways of growing millet

Growing millet on the flat

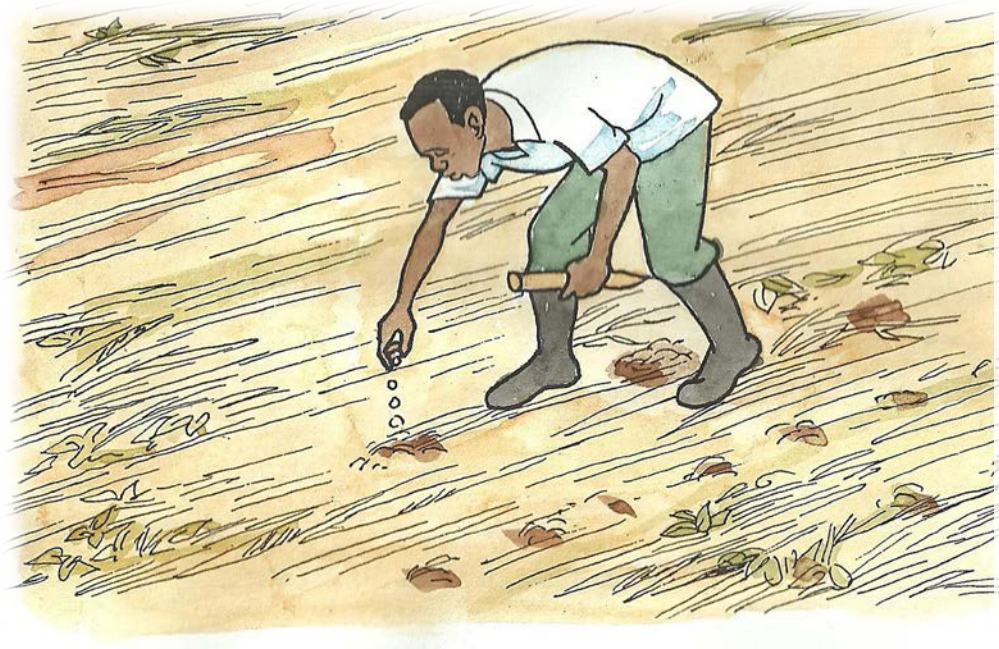
Growing millet on hills

Growing millet on broad beds



Growing millet in furrows

Choosing the right plant density



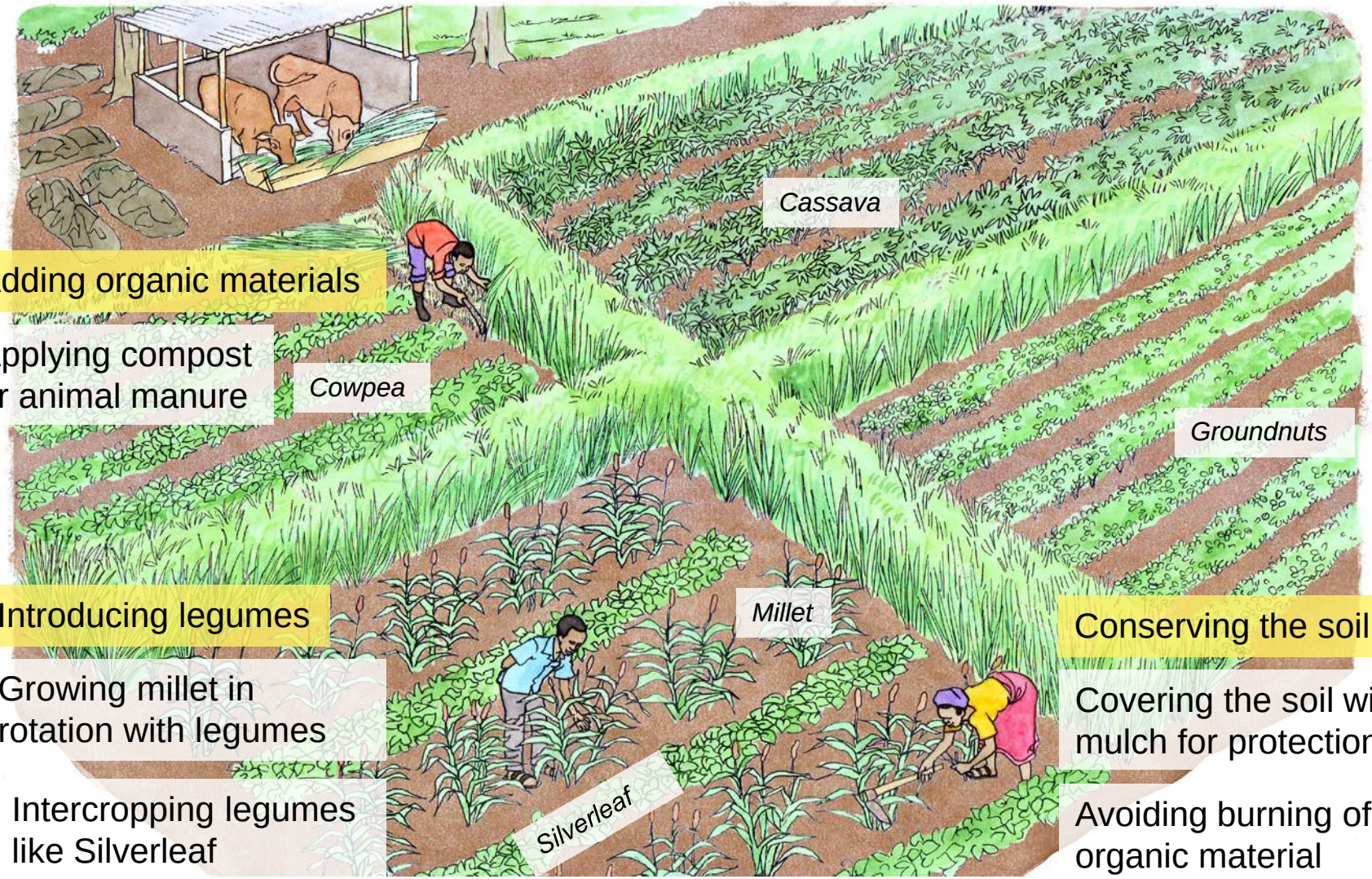
Common plant distances for pearl millet are:
When grown alone: 10 to 45 cm in-row;
45 to 200 cm between rows

When intercropped, spacing varies depending on the intercrops.

Factors to consider:

- **Wide row distance** allows use of machinery or implements for weed control
- **Small row distance** results in better and earlier ground cover and suppresses weeds better
- The better the **growing conditions**, the higher the ideal plant density
- **On sandy soils**, wider row spacing may be better, since it will allow individual plants to develop more lateral roots.

How to ensure good soil fertility and plant nutrition



Adding organic materials

Applying compost or animal manure

Introducing legumes

Growing millet in rotation with legumes

Intercropping legumes like Silverleaf

Conserving the soil

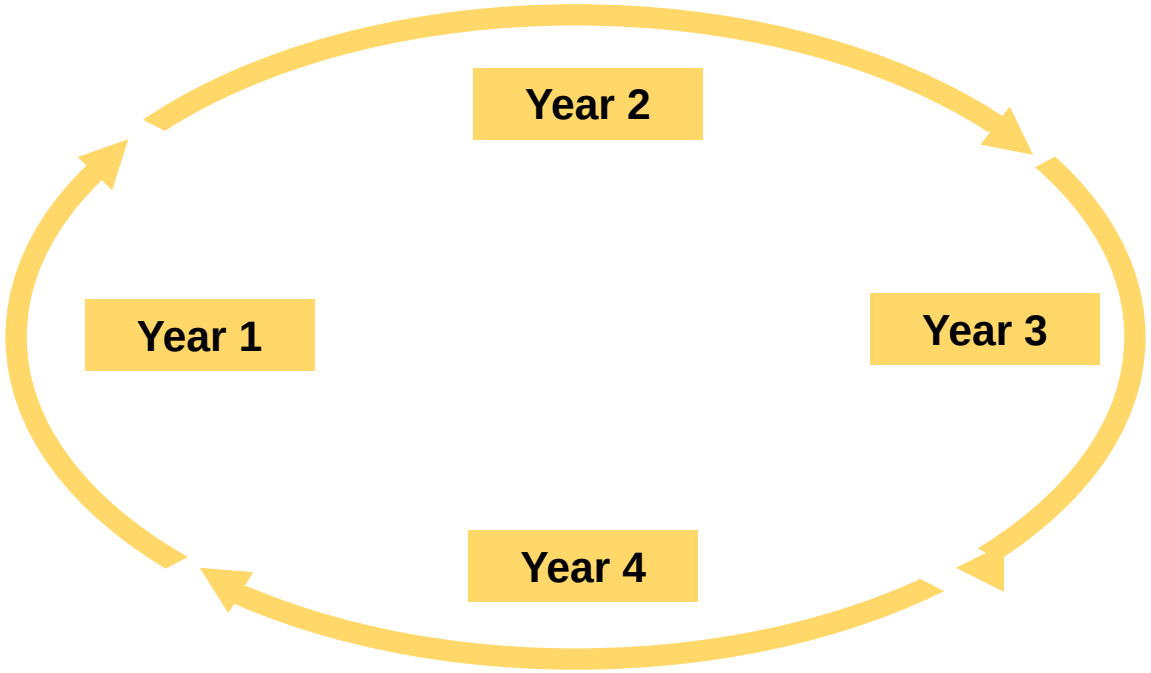
Covering the soil with mulch for protection

Avoiding burning of organic material

Example of a four year rotation with pearl millet

Food legume
(e.g. cowpea, pigeon pea, black gram, green gram, moth bean, groundnuts, soybean, chick pea, bambara nut)

Pearl millet



Cereal crop (sorghum, maize, other millets) *OR* a **cash crop** (e.g. cotton, paprika, sunflower, sesame), *OR* a **root crop** (e.g. cassava, sweet potato)

Drought tolerant **green manure** legume (e.g. velvet beans)

How to prevent weed problems in millet

Practicing a planned crop rotation ✓

Selecting cultivars with good vigour at emergence and strong tillering ✓

Using clean, weed-free seeds ✓

Associating crops with good weed suppressing qualities ✓

Adapting plant spacing for good weed suppression ✓

Controlling weeds along ditch banks, roadsides, and field margins ✓

How to control weeds in the millet field

1. Prepare proper seedbed to remove remaining weeds

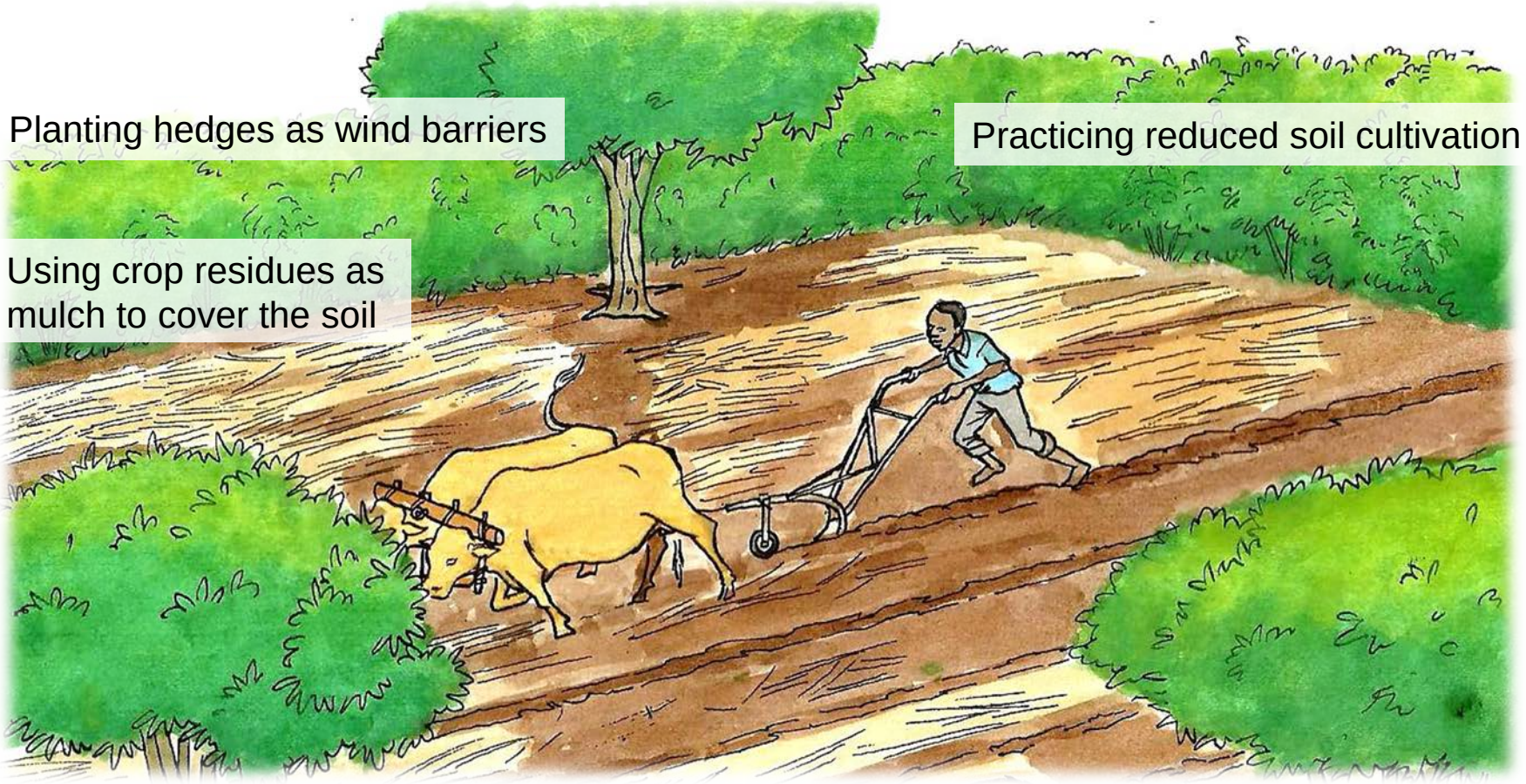
2. In case of high weed pressure, apply 2nd pre-planting tillage operation to reduce the number of weed seeds in the soil

3. First weeding 8 to 15 days after emergence

4. Second weeding 10 to 15 days after the first weeding

5. Additional weedings as needed

How to conserve moisture in millet production

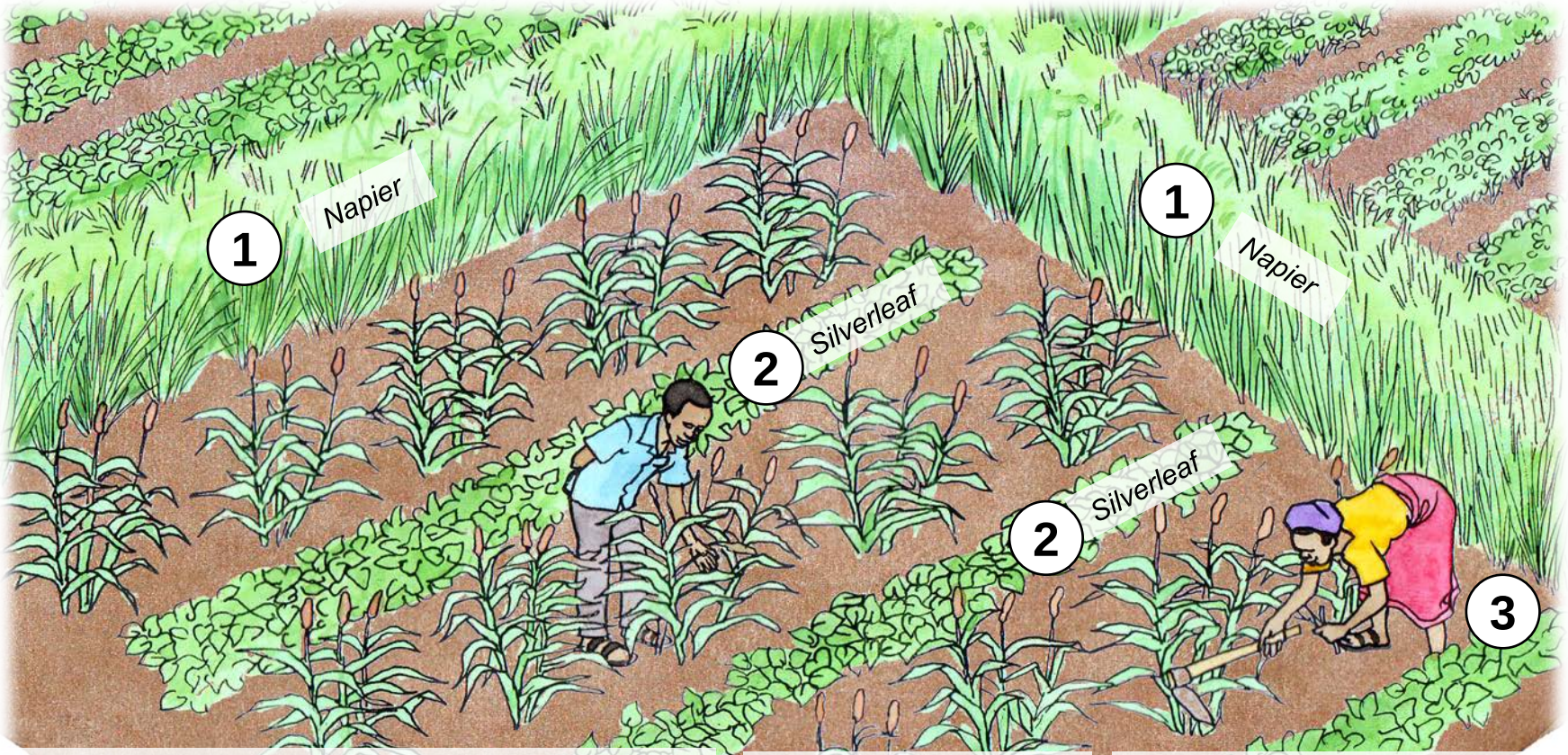


Other measures include timely planting for coincidence of the crop with rainfall, using early maturing and drought tolerant cultivars, and collecting water in trenches or ditches.

Control of major pests of millet

Pests	Preventive and cultural measures	Direct control
Shoot fly	› Use of shoot-fly resistant varieties (for late planting mainly) › Early, non-staggered sowing › Promotion of natural enemies › Incorporation of crop residues into the soil	› Removal and destruction of infested plants › Spraying of Bacillus thuringiensis or neem solution against larvae
Stemborer	› Early sowing and good soil preparation › Rotation with non-host crops › Intercropping of repelling plants like Silverleaf › Promotion of natural enemies › Planting of Napier grass or other trap crops › Incorporation of crop residues into the soil	› Application of a mixture of neem or a fish bean plant extract and sawdust/dry clay into the funnel of young plants › Locally-made pheromone-baited traps
Millet midge	› Early and uniform sowing with high densities › Use of resistant cultivars › Rotation with non-host crops › Removal of host weed species › Incorporation of crop residues into the soil	› Spraying of pyrethrum extract

Controlling stemborer with the push-pull method



1 Plant 2 to 3 rows of healthy Napier on contour ridges and edges of fields before the rain season (at 75 cm between rows and 50 cm within rows)

2 Sow repellent intercrops like Silverleaf together with millet

3 Weed crop and intercrop repeatedly

Control of major diseases of millet

Diseases	Symptoms	Control measures
Downy mildew	› Vivid green and white stripes on the leaves and heads › Inflorescence and glumes become twisted › Heads partially or completely sterile	› Rotation with pulses. At least 3 years between two sorghum or maize crops › Use of resistant cultivars › Use of clean, properly dried seeds › Early sowing › Proper plant spacing › Premature destruction of infested tillers › Incorporation of crop residues into the soil
Long smut	› Green fungal bodies develop on panicles during grain filling › The fungal bodies change to dark brown during maturing of the crop.	› Rotation with non-cereals › Use of resistant varieties › Avoiding of flowering of the crop during the rainy season › Removal of infected panicles for field sanitation
Ergot	› Pink sticky "honeydew" droplets, which ooze out of infected florets on the panicles › Development of dark brown to black fungal fruiting bodies	› Use of resistant cultivars › Rotation with pulses › Removal of infested panicles