Table of Contents

Pictorial examples of operations

1 Land cleaning and first ploughing soon after harvest

Cleaned field

Deep ploughing by using a camel

Operations

- Clean the field soon after harvest
- Distribute / scatter the chopped stalks over the land and under plough soon
- Deep plough **(20-30 cm)** once every **3-5 years**, using mouldboard or disc plough

Purposes

- Minimize weed infestation in the next season
- Improve the soil fertility (organic matter content and moisture holding capacity)
- Disturb the breeding and living sites of insects (seed bugs, termites, ants)
- Bury to decay diseased plant parts
- Expose soil borne fungi, insects and bacteria cells for desiccation.

2 Rotation crops

Sesame

Cowpea

Sorghum

Mungbean (green gram)

Cotton

Operations

- Avoid mono-cropping of sesame. Rotate with sorghum, cotton, teff, maize, soybean, mung bean (green gram), cowpea, finger millet, maize, etc

Purposes

- Crop rotation is very important for pest and disease management (bacterial blight, sesame gall midge and fusarium wilt)
- Improves soil fertility
- Diversification guarantee food security and increases household income
- Crop diversification is important for risk spreading and better guarantees food security and increase household income.

3 Land preparation

Deep ploughing using oxen and tractor

Operations

- For the second time clean remains of weeds and crop residue
- Plough deep when soil is moist by disk harrow or oxen plough for pulverizing the clods and to kill early flushing weeds
- Third ploughing (at planting), using row planter or dixi for broadcasting;
- Apply Broad Bed Making (BBM) and ensure drainage for waterlogged areas.

4 Using treated/dressed seeds

Above cleaned seed; below dressed seed

Operations

- Use seed that is free from weeds and pests and diseases. This is very important for the prevention of insect pests
- Use viable seeds **(>90% germination)**
- Preferably use seeds of known origin or quality declared or certified
- Select seed varieties that are adapted to your climate conditions:

  -Setit-1 (adapted for dry conditions)
  -Humera-1 (medium rainfall)
  -Abasena (high rainfall) or
  -Use well-adapted local varieties

- Select varieties that are known to be resistant to certain diseases (for instance blight resistant varieties)
- Dress seeds with cruiser/Gaucho **300ml/100kg** to reduce risks of pests and diseases in first weeks. The use of dressed seeds is especially important for the control of fusarium wilt, termites, ants and seed bugs.

5 Sowing (method, seed rate and depth in row planting)

Manual and tractor-mounted row planting

Operations

- Seed rate in case of broadcasting: **3-4 kg/ha** (no need of mixing soil or ash)
- Seed rate in case of row planting: **1-2 kg/ha**. Mix the seed with soil and ash at **1:5** ratios **(one kg of seeds to five kg of soil/ash)**
- Sow after rain. Only consider sowing sesame under dry conditions if land is very well prepared (ploughed, harrowed and levelled) and seeds are dressed against insects
- Ensure a seed depth of **3-5 cm** and cover seeds with light soil
- Ensure that the soil is moist enough
- Plant at a distance of **40 x10 cm**, between rows and plants, respectively
- The appropriate plant population is thus **250,000** plants per hectare
- Use a line or rope in case of manual row planting, so as to ensure straight lines
- Use of raw planters is recommended; different row planters (man-driven, animal traction or tractor mounted) are being tested

Purpose of row planting

- Ensures appropriate plant density and seed rate
- Reduces labour costs,
- Eases weeding, pest scouting, fertilizer and insecticide application and harvesting
- Different row planters (man-driven, animal traction or tractor-mounted) are being tested.

6 Fertilizer application

Applying fertilizer during planting

Tractor mounted fertilizer applicator

Applying urea at the start of flowering

DAP

Urea

Operations

- Use recommended dose: **100 kg** DAP **+ 50 kg** Urea
- Apply **100 k**g DAP and **25 kg** urea at planting
- Cover the fertilizer by soil soon after application
- Remaining **25kg** of urea at the start of flowering (**35-45** days after planting)
- Do not apply fertilizer on dry soil
- Cover fertilizer with soil soon after application.

7 Gap filling

Filling gaps by re-sowing seeds

The use of quality seeds is important to avoid gap filling as much as possible

Operations

- If after **5-7 days** there is too much empty space between plants, fill gaps by re-sowing seeds to replace the non-germinated seeds or lost seedlings

8 Weeding

Weeding at different periods

Operations

- Ensure a minimum of three times weeding. This is very important for avoiding competition of sesame plants with weeds and to minimize the weed seed bank

Critical weeding periods:

- First weeding **7-14 days** after emergence
- Second weeding: **30-35 days**
- Third weeding: **55-65 days** after emergence
- Fourth weeding as necessary to remove weeds halting clean harvest.

9 Thinning

Thinning out densely planted sesame plotes

Respecting planting distance and using high quality seeds are important to establish the right spacing right from the onset of the growing season and can avoid thinning labour costs. However, sesame plants need space. If sesame plant density is too high: thinning is advised.

Operations

- Thin out when **2-3** leaves emerge and at the height of **10-15 cm**, or do this during first weeding
- Thin-out to **10 cm** distance between plants
- Remove weak plants.

10 Pest scouting

Checking insect pests at different stages

Operations

- Check field from emergence to harvest, every week or fortnight
- Start inspection for insect pests early in the morning and/or at evening when they are most active
- Move diagonally or in zigzag
- Check minimum of **100 plants/ha** in more than **20 check** points
- Monitor hillas for termites and crickets infestation during drying.

11 Pest control

Spraying

Operations

- Use of integrated pest management methods; pests can be controlled by cultural, biological and chemical methods
- For webworm control: check every week for the presence of webbed leaves; if **5** webbed leaves with larvae inside are found: apply advised insecticides
- For phyllody control: eradicate and destroy diseased plants immediately
- Use specific chemical treatments for different pests and diseases
- Respect the specific recommendations that are given.

12 Maturity and harvesting

Yellow pods ready to be harvested

Harvesting using harvester

Harvesting using sickle

Operations

- Avoid too early harvesting. This may lead to **20%** yield loss
- Harvest when **2/3** of plants and pods turn from green to yellow, this is generally between **90 and 120** days, depending on the variety used
- Do not allow bottom capsules to shatter. This may lead to high losses.

13 Preparation of drying spots

Hillasin a levelled, well-cleaned and high spots

Operations

- Prepare drying site for **> 10** hillas
- If needed threat the site with recommended pesticide before planting the hillas
- Put hillas next to each other to protect from wind damage and reduce seed losses during harvesting and threshing
- Use levelled, well-cleaned, high spots to avoid water logging during drying. This is important for sesame quality and for controlling termites and seed bugs
- Put hillas on permeable (porous) polyethylene sheets (**11x8** m for **10** hillas).

14 Stacking and drying

Hillas planted close to each other

- Stack upright in shocks of **6-8** bundles
- Peg shocks to protect against wind damage by tightening strings around it
- Do this for **10** hillas, which are placed next to each other on the polyethylene sheet
- Plant hillas close to each other, to minimize shattering losses occurring while carrying dried sesame plants to threshing ground
- Do not apply any pesticide on or near drying shocks/hillas as this may cause contamination and reduce quality and marketability
- Monitor frequently for any damage.
- Dry not more than **2** weeks to avoid losses from insect infestation or wind damage; e.g. thresh as early as possible.

15 Threshing

Threshing in a clean canvas

Operations

- Thresh near the hillas on canvas or plastic sheet of enough size; free from soil, gravel, dust, chemical and other inert materials
- Do not carry dry plants long distance as this causes significant seed losses
- Use drying plot as threshing site or thresh next to the hilla. If not possible take the plastic sheet to hillas ready for threshing.

16 Winnowing and cleaning

Winnowing the sesame

Operations

- Repeatedly winnow the seeds until **98-99%** cleanliness is obtained
- Avoid contamination with soil, gravel stone or other inert materials.

17 Bagging

Filling sesame in clean bags

Operations

- Use new and clean bags
- Never use chemical contaminated and/or torn bags
- If possible, use airtight bags
- Avoid over filling(contain only **100 kg** seed).

18 Loading, transporting and unloading

Operations

- Lift and lower bags carefully during loading to minimize tearing of bags
- Transport bagged seed on smooth surfaced trucks, carts or wheel-barrows, that are not contaminated with chemicals or oil
- Lift, lower and pile sacks slowly to avoid injury/split.

19 Storing

Storing

Sesame may be stored at room temperature **< 20°C** for approximately 5 years without loss of viability.

Operations

- Dry seeds before storing to a moisture content of 7% or less
- Do not leave freshly threshed seeds (**> 7%** moisture) on a truck for a long time
- Do not store under very hot temperature as it affects seed viability
- Store sesame in clean well ventilated concrete floored rooms
- Close openings that allow insect/ rodent entrance
- Do not store pesticides or used sprayers in one room with bagged seeds
- Leave **2** meter path between rows for ease of inspection, loading and unloading activities
- Do not spray on bags with sesame
- Fumigate stores when storage pests are observed

20 Monitoring and evaluation

Monitoring field

Operations

Throughout the production season keep a logbook and take notes on:

- Dates of conducting the different field operations
- Number of labourers / labour days
- Cost of operations;
- Results of pest scouting and control measures taken and
- Field visits of development agents and other professionals and their advices given.