Weed control

Weeds may be controlled by mulching, weeding or using herbicides. If properly mulched, hand weeding is sufficient. However, if weeds are not effectively suppressed by the mulch, a hand hoe can be used. Maize should be weeded at least twice, with the first weeding done 3 weeks after planting and the second, 8 weeks after planting.

Weeds can be controlled using herbicides such as glyphosate. Spray the entire field with the herbicide before planting or between rows within two days of sowing the seed. Apply at a rate of 5 to 7.5 litres per hectare; applied as 400 ml of herbicide per 20 litres of water.

Applying fertilizer and manure

After opening the riplines, evenly apply fertilizer and/ or manure within the riplines. This helps in precision nutrient management. Do this at the time of planting or just before planting to speed up the planting exercise.

Manure: evenly apply 2-3 t/ha^{-1} within the riplines.

Fertilizer: DAP (diammonium phosphate) evenly apply 50 – 100 kg/ha^{-1} within the riplines at the time of planting. Use a hand hoe to cover the fertilizer and manure and then sow the seed. As a rule of thumb, always cover the manure and fertilizer completely with soil to avoid contact with the seed.

Urea: apply urea just like DAP. For maize the best time to apply urea is about 1½ months after planting or when the maize crop has reached knee-height. This is best done when the soil is moist and/ or in the evenings.

Required tools and implements

A ripper: is a chisel-shaped implement pulled by animals or a tractor. It is best to do ripping when the soil is dry. This prevents compacting the soil further and ensures that the hardpan is broken.

A wing: is a small implement attached to the ripper when the soil is wet to widen the planting furrow.

A planting tool: some rippers have a planter attached that can do both ripping and planting in a single pass. If you don't have a ripper-planter, you can sow the seed in the ripped furrow by hand or using a planting stick.

Draught animals or a tractor: for smooth and effective ripping one may need two strong oxen. On heavy soils and extensive areas or for deep ripping (sub soiling) one may need a tractor.



Ripper planter (with planter and fertilizer attachments)



Knapsack sprayer – this is used to apply herbicides

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RIPLINES

EGGING YOU ON TO FOOD SECURITY



STEP-BY-STEP GUIDE TO

CONSERVATION FARMING

NARL-KAWANDA

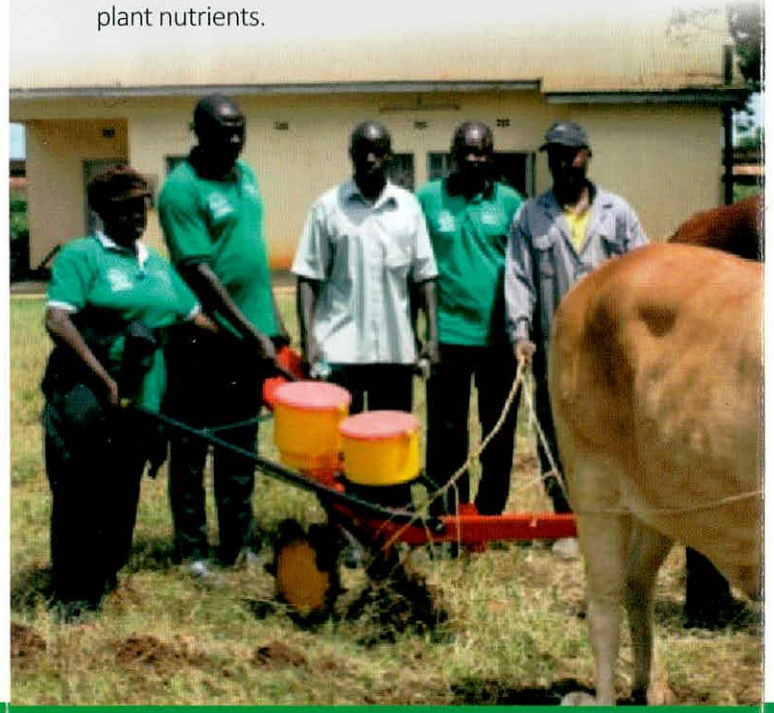
RIPLINES
EGGING YOU ON TO FOOD SECURITY

Newly introduced conservation farming technologies/ practices such as soil ripping have consistently increased average grain yields by 50% to 200%. Farmers using riplines in combination with improved seeds and fertilizer and/ or manure have seen their bean grain yields increase from as low as 300 kg/ha^{-1} to 1,000 kg/ha^{-1} and maize grain yields from an average of 3,000 kg/ha^{-1} to 6,000 kg/ha^{-1}.

In soil ripping, narrow slits or furrows also known as riplines, 15 – 20cm deep, are opened in the soil surface using a ripper. This breaks up a surface crust or a shallow hardpan.

How to make riplines

A ripper is a chisel-shaped implement pulled by animals or a tractor. Riplines enhance the harvesting and storage of rainwater and allow precision application and utilization of limited plant nutrients.



Instead of digging or ploughing the whole field, rip only where the crops are going to be planted and cover the space between the rows with crop residues. Prepare riplines during the dry season, so they are ready for planting at the beginning of the rainy season. This also helps to break through hardpans.

Riplines are commonly established at a spacing of 75cm X 30cm with one seed per hill for maize and 75cm X 10cm with two seeds per hill for beans.

As soon as you have ripped, evenly apply fertilizer and/ or manure within the riplines. After applica- tion, cover the manure and fertilizer completely with soil to avoid contact with the seed. Sow the seed in the ripped opening with either a planting stick or hand hoe for rippers without planter attachment. Sow one maize seed every after 30cm within the ripline or two bean seeds every after 10cm.

The method is widely used to reduce risk of crop failure due to unreliable rainfall. This strategy is a good option for smallholder farmers with animal draught power, intending to grow annual crops such as cereals and legumes.

Conservation farming is a combined technology that entails four basic principles

1. **Minimum soil disturbance – use of riplines which enhance the harvesting and storage of rainwater and allow precision application and efficient utilization of limited plant nutrients;**
2. **Combination of improved fertility with improved seed for higher productivity;**
3. **Use of available crop residues to create a mulch cover that reduces evaporation losses and weed growth.**
4. **Mixing and rotating crops.**