



A Guide for Farmers on Good Land Husbandry



Conservation Tillage Option 1 NO-TILL TIED RIDGING

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Conservation Tillage Option 1 NO-TILL TIED RIDGING 1. What is No-Till Tied Ridging?

No- till tied ridging is a conservation tillage system consisting of ridges which are cross-tied at regular intervals with small dams. The basins formed between the ties prevent the water from flowing off the field. Once the ridges are established the land is not ploughed for up to 5 years, that is why this system is called no-till. The only tillage operation to be carried out is re-ridging. The system therefore saves draught power.



2. When to apply tied ridges?

#If you want to harvest all of the water in your field

#If soil erosion is bad

#If you have water logging

#Only on steeply sloping land with other conservation measures #If you have shallow soils and you want to increase your planting depth.

Advantages

Increases yields, particularly when combined with improved soil fertility

- ! Less tillage work required in following season
- ! Reduces soil erosion
- ! Conserves moisture
- Reduces the impact of water logging in wetlands

Disadvantages

- ! Without ties water drains away in dry soils
- ! If ridges not tied erosion can increase in wet years
- Increases yields, particularly when combined with improved soil fertility
- ! Master ridge needs correct pegging at 100:1 grade
- ! Small grains and cotton difficult to establish on ridge top
- Control of weeds, especially Couch grass can be a problem



4. STEP 1 : How to Prepare Land

! Check the field you have chosen for rills and depressions and contours which are overflowing. Water flowing in from outside the field might destroy the ridges. Therefore the contours must be in good condition. If rills and depressions are deep, tied ridging should not be applied and the rills should be reclaimed. Your extension worker will advise you on how to do that. Further information is available in the guide 'Soil and Water Management'.



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The field should be well ploughed before tied ridges are established to:

! enhance deep rooting of crops! control perennial weeds likeCouch grass

! provide enough loose soil to build ridges

\check{z} Remember to plough on the

contour.

! In case there is too much rain, excess water has to drain in order to avoid water logging. Therefore ridges have to be laid out on a gradient 1:100. You can use a line-level or A frame to peg out a master ridge line along the contour in the middle of the field.





Pegging a master ridge with an A-frame

ž See the guide 'Soil and Water Management' on how to make and use an A-frame or a line-level.

ž Or ask your extension worker for advice



! Once the master ridge is pegged, further contours can be pegged and manure can be spread along the line of each ridge, before the ridges are made.

6. Step 2 How to make ridges

Option a

! Using a plough and two to four animals (Oxen or Donkeys), plough a furrow along the master ridge line you pegged with the line level/A-frame. Turn at the end of the field and come back throwing the soil towards the small ridge so that it becomes a big ridge of about 90 cm to 1 metre (3 feet) width at the base and 15 to 20 cm high (6 to 9 inches).

!The top of the ridges should not be pointy but like a V so that the water can infiltrate into the ridge





Opening the master ridge using a plough

!Then continue making more ridges parallel to the master ridge line by throwing the soil from both sides to the centre to form ridges until the whole field is ridged





Option b

!Ridges can also be made with a high-wing ridger. The advantage compared to the plough is that only one operation is required. However, this ridger requires high draft power (4 Oxen)



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Option c

!Ridges can also be made with an ox-drawn cultivator with hilling blades attached. The advantage compared to the plough is that only one operation is required.



7. Step 3 Tieing the ridges

- ! After making the ridges, ties should be made. Ties should be lower then the ridge (2/3 the height of the ridge) and positioned at intervals of about 2 - 3 m along the ridge.
- !Try experimenting to see what distance between ridge ties works best on your land?
- !On flat land try ties every 3 to 4 m

!On steeper land try ties every 2 m



- On anthills, you make ties as close as 1 m on and around the anthill.
- Option a Ties can be made using a hand hoe



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9. Step 4 How to choose planting position?

Planting can be done on top of the ridge, on the ridge flank or on the furrow-bottom, depending on the problem you are facing.

Planting position

90 cm-

Planting position

Planting position

- ! Planting on the ridge top is best for rooting and for fertility. It is easy to weed mechanically and not disturb plants. In wetlands/vleis this is the best position as it keeps the feet of the crops dry. However, the ridge top dries quickly which can cause poor germination, particularly with small grains and cotton. Therefore it is best in areas with higher rainfall (NR I, II and III) and ideal in wetlands.
- Planting on the ridge side is better for crop establishment, but more difficult to plant and difficult to weed mechanically
- ! Planting in the furrow is best in very dry areas (NR IV and V), as the furrow is the wettest point. However, water logging can be very dangerous and it must always be combined with manure or fertiliser as the soil in the furrow is poor. Mechanical weeding is impossible as the crop stands in the way.

10. Some Useful Ideas

- Try out which position is best for your soils and get your own experience.
- In vlei/wet lands some people plant maize on the ridge top and rice in the furrows

Manure



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12. Seed Placement

- #If you plant the seed too deep, the seedling will die before it reaches the surface.
- #If you plant the seed too shallow, the soil may become too dry and the seed may die before it emerges.

13. STEP 6: Seed Soaking

- # If you can not plant straight after a rainstorm, try soaking your seed in water overnight before planting.



This will give the seed moisture and help it germinate and emerge quicker. It is very good for Sorghum and Maize seed and helps young seedlings compete with weeds.

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16. Step 8 - How to weed on Tied Ridges?

Timely weeding is extremely important in tied ridging as crop yield depends strongly on weed control. Experience shows that two weedings give the best yields.

 \check{z} 2 to 4 weeks after crop emergence a first weeding is required.

 \check{z} 5 to 6 weeks after crop emergence a second weeding run is required.

If you can only weed once, a single weeding 4 weeks after emergence will give okay yields, but still less than two weedings.

Try and see which is best for you soils and crops?

There are several different ways you can weed ridges.

Weeding Option 1 - Using a hand hoe



Weeding Option 2 - Plough Weeding with mouldboard

Use a plough with the mouldboard attached to re-ridge and control weeds 2 to 3 weeks after crop emergence.



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Weeding Option 3: Weeding with an ox-cultivator and hilling blades

Step a -2 to 4 weeks after crop emergence the ox-cultivator with hilling blades can be used to weed between the crop rows. The cultivator width and depth should be set so that the tines do not till too deep and damage crop roots.





Pass 1 - Between two crop rows and throw soil with hilling blades towards each crop row, re-making a ridge along both crop rows.

Step b - Move to the next crop row and repeat, making a complete ridge over the crop row, then continue for the whole field.



Step c- When the whole field has been weeded the ridges should be tied to conserve soil moisture and reduce erosion. Any weeds left in the crop row can be removed at this time.

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Weeding Option 4: Weeding with an ox-drawn ridger

Step a = 2 to 4 weeks after crop emergence the ox-drawn ridger can be used to weed between the crop rows. The ridger width and depth should be set so that the ridger does not till too deep and damage crop roots.





Pass 1 - Between two crop rows and throw soil with hilling blades towards each crop row, re-making a ridge along both crop rows, uprooting and covering weeds.

Step b - Move to the next crop row and repeat, making a complete ridge over the crop row, then continue for the whole field.





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17. STEP 8

The weeding operations can be repeated 6 weeks after emergence. This can benefit crop yields. **Try it out yourself and see.**

After re-making the ridges it is very important that ties should be re-made.

18. STEP 9 How to prepare for the next season?

- # During the dry season, or at the latest, just before the onset of the rains, use a plough, ridger etc to re-ridge. This will control the dry season weeds and prepares the soil for the next season.
- **#** Once you have re-ridged you can save time the next season by opening up your planting holes.
- # After the first soaking rain plant as you did in the first year.

19. Some Useful Ideas

- #If you delay planting for more than one day after the rain, check to see if there is enough moisture in the ridge. Take a hoe and dig a hole to see how wet it is. If the ridge is wet enough throughout you can plant. If the topsoil is already dry, DO NOT PLANT, as the seed will not germinate and will rot. If moisture is adequate drop seed in hole and cover with hoe.
- #In sandy soils the hole should be 20 to 25 cm deep. In a clay soil the hole should be 10 to 15 cm deep.
- **#You can try dry planting in furrow bottoms.**
- #Some farmers have also tried successfully to open a rip line on the ridge top using a ripper tine or a plough share, and then planted into the rip line.
- #Planting groundnuts can be done by putting two rows on the top of the ridge and one in the furrow.
- #Why not try out different planting depths, planting spacings and doses of manure, compost or fertiliser, to see which gives the best crop germination and yield on your farm.
- #Compare these changes to what your normal practice is or to the Agritex recommendations.
- # The section at the end of this guide explains how you can carry out your own experiments and compare the results on crop yields.

DO NOT sow seeds during the hot time of day.

It is **BETTER** to plant seeds during the morning or late afternoon.

This will keep **MOISTURE** in the soil and help the seeds germinate.



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21 . Work Rates - days per acre for two people

Operation	By Hand Hoe	By Moulboard Plough	By Ox-drawn Ridger				
Making ridges	4 to 5 days	1/2 day	1/4 day				
Planting by hand	2 to 3 days	2 to 3 days	2 to 3 days				
First weeding	4 to 6 days	1/2 day	1/4 day				
In row weeding and tying of ridges		2 to 3 days	2 to 3 days				
Second weeding	3 to 4 days	1/2 day	1/4 day				
In row weeding and retying of ridges		2 to 3 days	2 to 3 days				
Total Labour	13 to 18 days	8 to 10 days	7 to 9 days				
# The following sections explain how you can carry out your own experiments and compare the results on crop yields.							

How best can farmers experiment and test new ideas?

To see whether one has successfully tried out a new technique one needs to compare it to the usual practice. Without a comparison one does not know whether the new technique is better or worse than the old one.

How to compare?

An easy way to compare a new technique with the usual practice is putting the two side by side in the same field. If possible divide the field exactly in the middle along the contour so that both sides are approximately of equal size. Vetiver grass strips can be used to divide the field



It is important to put the two techniques in one single field because conditions in one field are more comparable than in different fields. However, take care that the field sides are not too different. For example if one side is a wetland and the upper slope is dry, you cannot compare the two.



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What else is to consider when experimenting?

- # If you are concerned how a new technique or idea will perform, try it on a small piece of land only. This will help you to avoid loss of crop if the technique fails. Remember testing not only results in success but also in failure.
- # Use the same seed and the same spacing on both sides (unless you want to compare varieties and spacing)
- # Plant both sides on the same day to ensure that plants on both sides have the same conditions
- # Apply the same amount of fertiliser on both sides unless you want to see how the plants grow with different amount of fertiliser or manure
- **#** Weed on the same day in the same way on both sides unless you want to observe the effect of different types or times of weeding.

How to observe and monitor simple trials?

Observing your trials helps you to identify the reasons why a certain technique performs better or worse than another one. When the crops are grown with two different techniques side by side in the same field you can see the differences with your eyes. For example, on one side the maize might grow faster or be higher than on the other side, or cobs might be bigger on one side. Such observations need to be recorded so that they are not forgotten and can be analysed in more detail in future. It is important to be honest in one's own judgements. Often one is in favour of an improved technique and becomes 'blind' when it is not as promising as it looks.



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Keep a trial record sheet with your observations for each. It will help you to share your experiences with other farmers and the extension worker and you will be able to look at it next year and build on these experiences.

If a technique or idea is successful, you can increase the area on which you apply this technique next season. In case you have a failure, it is very important that you discuss with other farmers and your extension worker why it has failed, and how it can be modified and adapted to improve on it. Never give up if the success does not show immediately. Try to find the reason why the trial failed, otherwise you can not learn from it.

Through recording of your long-term observations on the crops and your fields season by season you can create your own reference material and build up your farming knowledge step by step. The benefit is that you do not repeat mistakes, as you can recall the best ways of doing things, building on experiences of previous years. The record sheet that follows this section might help you in observing and recording:

TRIAL RECORD SHEET/TECHNOLOGY SHEET							
FIELD NAME/NUMBERSOIL TYPE:							
WHAT DID YOU DO?	USUAL PRACTICE	NEW IDEA					
#What did you want to learn?							
#What did you try out?							
# How did you lay out the field?							
# When did you plant?							
# Which variety?							
# When and how did you fertilise?							
# What spacing did you use?							
WHAT DIFFERENCES DID YOU OBSER	VE?						
# Plant height?							
# Vegetative development?							
# Flowering (earler/later)?							
# Weed growth?							
# Soil erosion (rills/sheet erosion)?							
# Earlier or later maturing?							
# Size of cobs?							
# Size of grains							
# Total yields (provided the two sides of the field are uniform and have the same size)?							
# Labour: which side required more work and							
# Draught Power: which side need more animal draught power?							
# What other things did you observe?							
WHAT LESSONS HAVE YOU LEARNT FROM YOUR EXPERIMENT?							
# What are the advantages?							
# What are the disadvantages?							
# What would you do differently next year?							

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FARMER EXPERIMENT ASSESSMENT SHEET				
AT CROP EMERGENCE				
BEFORE FIRST WEEDING				
MID SEASON				
AT HARVEST				

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FARMER EXPERIMENT COST / INCOME RECORD SHEET											
NAME OF FARMER											
FIELD NAME / NUMBER	SOIL TYPE										
CROP VALUE (Z\$)	NEW IDEA		USUAL P								
Crop Yield in Bags	Bags		Bags								
Price Per Bag	Per Bag		Per Bag								
Total Crop Value (A)											
INPUTS USED (Z\$)	Quantity	Value Z\$	Quantity	Value Z\$							
Seed											
Fertiliser at Planting time											
Top Dressing Fertiliser											
Chemicals											
Cost of Grain bags bought											
Total Inputs Value (B)											
LABOUR USED (Z\$)	Number	Value Z\$	Number	Value Z\$							
Number of People used											
Number of Draught Animals Used											
Winter Ploughing											
Spring Ploughing											
Opening Planting Lines											
Planting and covering seed with soil											
First weeding											
Second weeding											
In-Row weeding											
Harvesting											
Total Labour Value (C)											
TOTAL OF INPUTS (B) + LABOUR (C)					₽						
PROFIT = A - (B + C)					+						

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A Guide for Farmers on Good Land Husbandry

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- ·Primary Tillage and Land Preparation
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- ·Planting Option 1 Hand Planting
- ·Planting Option 2 Traditional Third Furrow Planting
- ·Planting Option 3 Open Plough Furrow Planting
- ·Planting Option 4 Ripper Planting
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