

# A GUIDE TO EFFECTIVE LAND PREPARATION AND WATER MANAGEMENT IN LOWLAND RICE.



**AfricaRice**

**Small Holders Agricultural  
Productivity Enhancement And  
Commercialization (SAPEC) Project.**

## LAND PREPARATION

Basic processes or steps to good land preparation include the following:

### (a) Brushing/Slashing:

- ★ Brush/slash site to get rid of thick vegetation/weeds (Fig. 1)
- ★ Slash on time for it to get dry on time before rain set in.
- ★ Burn off the slashed vegetation (partial burning preferred)
- ★ When burning is not possible, manually remove thrush (Fig. 2)



Fig. 1: Brushing or slashing



Fig. 2: Collect thrush when burning is not possible

### b. De-stumping

- ✿ Remove all standing trees (where possible)
- ✿ Remove the roots of all trees and shrubs to a depth of 100cm (Fig. 3)
- ✿ Completely burn such trees, shrubs/roots on the field
- ✿ Where burning is not possible, try and remove them completely from the field (Fig. 4)
- ✿ This will create more land for cultivation and machinery operation easier.



Fig. 3: Remove tree roots and stumps



Fig. 4: Where possible remove stumps from field

### (c). Construction Of Bunds

- ✿ Demarcate field into manageable size plots based on topography of land through the construction of bunds (Fig. 5)
- ✿ Bunds should be constructed across the direction of water flow
- ✿ Bunds should be strong enough to contain water and wide enough to walk on.
- ✿ Major bunds can measure up to 100cm wide depending on slope and 50cm high
- ✿ Minor (interlocking bunds may be smaller depending on slope also)



Fig. 5: A bund under construction





Fig. 13; Reproductive growth stage. Put in enough water but not in excess

**(v) At Ripening Stage:**

- ✿ Very little water is needed at this stage
- ✿ Maintaining higher water depth leads to lodging (falling to ground) during ripening stages (figure 14)
- ✿ Fields should remain moist but not necessarily covered with water.
- ✿ When grains begin to turn yellow, no more water is required.
- ✿ Field should be completely drained of water about 10-14 days before harvest (fig. 15).



Fig. 14: Lodging due to excess water



Fig 15: field ready for harvest needs no water

**(vi) Fertilizer Application And Water Management**

- ✿ Incorporate basal fertilizer just before transplanting
- ✿ Reduce the water level to a minimum before top-dressing at 3 weeks after transplanting

#### (d) Ploughing

- ★ Plough the field using a hoe (fig. 6) or machinery (fig. 7) where possible
- ★ Where the soil is not moist flood the field before ploughing
- ★ Plough slightly deeper (20cm) and turn over soil to allow for easy puddling
- ★ After ploughing put in enough water to cover field completely (flood)
- ★ Allow ploughed field to stand for some time (7 days) to allow for the decomposition of any buried organic matter or re-growth of weed seeds



Fig. 6; Manual ploughing



Fig. 7: Machinery (power tiller) ploughing

#### (e) Puddling And Leveling

- ✿ Where machinery is available, break the large soil clods created during ploughing into finer clods(Fig. 8)
- ✿ Where machinery is not available, break down soil clods manually (hoe, feet, etc.)
- ✿ This creates a fine soil medium for easy soil movement during leveling.
- ✿ After this, try leveling field by moving soil from higher to lower levels (macro-leveling).
- ✿ Drain water gradually and use water level to determine higher places to cut and lower places to fill (Fig. 9)
- ✿ When machinery is available, attach a wooden plank to the machine and drag it on soil surface to create a finer medium (Fig. 10)
- ✿ This creates a relatively flat soil surface for easy water and nutrient distribution
- ✿ After field is leveled, put in more water to get it flooded and leave it in that condition until ready to transplant





Fig. 8. Power tiller puddling



Fig. 9: Manual levelling



Fig. 10. Power tiller leveling

### **WATER MANAGEMENT**

Water management essentially starts from land preparation as outline below:

#### **(i) Before Transplanting:**

- ★ Flood fields to allow organic matter decomposition before ploughing
- ★ Partially drain field during ploughing operation
- ★ Pond field after ploughing to allow for the re-growth of any weed seeds.
- ★ After sometime, increase water level before starting puddling

#### **(ii) During Transplanting.**

- ★ Drain the field of any excess water to barest minimum (Fig. 11)
- ★ Preferable water depth on field should be less than 5cm (thin layer of water)
- ★ Maintain such water level until transplanting is completed
- ★ Never allow field to run completely dry during transplanting.



Fig. 11. Maintain minimum water level during transplanting

### **(iii). After Transplanting:**

- ✿ When transplanting is completed, do not immediately increase water level on field
- ✿ Maintain such water level for up to 2 weeks (fig. 12)
- ✿ This allows for faster root penetration and growth
- ✿ It consequently allows for easier tiller formation and faster plant establishment
- ✿ About a week after basal fertilizer application, reduce water levels to near zero. (minimum)
- ✿ This promotes higher and faster tiller production
- ✿ Increase slightly water levels again after 7-10 days



Fig. 12. Continue to maintain low water levels even after transplanting

### **(iv) At Reproductive Growth Stage**

- ✿ Reproductive growth starts when maximum tiller production is completed.
- ✿ The plant should not be subjected to any water stress at such stage (Fig. 13)
- ✿ Hence maintain 10-20cm level of water at these stages
- ✿ Note that ponding the field (higher water level) does not necessarily increase yield
- ✿ At no point in time after transplanting, should you put too much water on the field.
- ✿ It negatively affect growth and consequently grain yield.

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