IMPROVED PRACTICES FOR LOWLAND RICE PRODUCTION

ADAPTATION-SITE SELECTION

The best soil for rice production:

- ***Clay soil, clay loam and loamy soils are the most ideal for rice production***
- Soil with high water retention capacity
- Free from flood and erosion
- Must be free from shade
- Should be flat or gentle slope
- Soil with high organic matter content

RECOMMENDED VARIETIES

- Choose good quality seed with at least 80% viability
- It should be uniform in both shape, color and size
- ***Always Buy seed from a highly reputable source***

Some of the Recommended Rice Varieties

Variety	Days to maturity	Expected yield Kg/ha	Grain type/other features
FARO 44 (SIPI692033)	100-110	6,000	Long grain
FARO 52 (WITA 4)	125-135	6,000	Tolerant to iron toxicity and drought; long grain
FARO 57	110-125	6,000	Long grain
FARO 60 (NERICA L19)	120-130	6,000	Moderately tolerant to iron toxicity; long grain
FARO 61 (NERICA L 34)	120-130	6,000	Long grain

LAND PREPARATION

Land clearing involves:

- Slashing, cutting and raking
- The importance of land clearing is to avoid proliferation of pests and diseases
- Land clearing can also be by using mixture of non-selective herbicide, e.g. Glyphosate at 3-4ltrs/ha, and diluted into 200ltrs of water, applied on active growing weed; wait for 2 weeks, then harrow

LAND PREPARATION *contd.*

- Proper land preparation is necessary for rice production to minimize competition with weeds and better environment for seed and seedling growth (aeration, moisture penetration and retention)
- Double harrowing provides enough tilth for rice growth
- Make bounds/basin to retain water in the field
- On a flat field construct large basin otherwise field of 5m by 5m is ideal
- Smaller size basins is discouraged; it's a waste of farmland
- Create drainage (outlet) to control flood where applicable
- Ensure all basins are leveled; poorly leveled fields will be difficult to maintain a good depth of water
- While constructing the basins, it should be done in such a way that watering distribution canals is designed for easy irrigation
- ***Please note, it's a bad practice to engage on basin to basin irrigation – it leads to loss of nutrients***

Land Preparation and Effect of Poor Levelling

Poor levelling

NURSERY ESTABLISHMENT

- **Priming or Pre-Germination**
- Site the nursey bed close to the cultivation area
- Select a fertile land for the nursery establishment
- Mark out the area properly, note if you plan to cultivate 1 ha, then you need an area of one tenth of a ha to raise the nursery
- Seed rate of 25kg to 35kg is adequate to transplant 1 ha
- Soak the rice seed in a salt water – 2 milk cans full of salt in 18 liters of water in a bucket for about two minutes; *the kernels that sink to the bottom of the salt solution are heavier and healthier seeds*
- Separate the heavier seeds from the lighter ones and throw away the lighter ones
- Wash the heavier seeds free of salt with clean water
- Pour the seed into a clean container - *be sure the seed is just damp not wet9*
- Its most appropriate to dress your seed with a good seed dressing chemical such as Apron Star, Dress force, etc
- Apply the seed dressing chemical and shake to ensure even coating of the seeds
- Keep the dressed seeds in jute sack in a safe place - *away from human and animals reach*
- Sprinkle water daily on the jute sack for 2 days

NURSERY ESTABLISHMENT *contd.*

- Make drills 15cm apart, on the nursery bed after it was ploughed to fine texture and construct beds of 1.2m wide of any convenient length
- A handful of NPK 15:15:15 fertilizer per square meter should be worked into the soil before drilling
- Sprinkle the seed thinly into the drills and cover with soil lightly. *Its good you cover with mulch*
- Water the bed lightly and regularly
- Safeguard your seedlings against insect damage by spraying with insecticide and fungicide
- ***Transplant seedlings at 4-5 leaves stage i.e. 2 – 3 weeks old***
- Transplanting date after nursery establishment is mid-June to mid-July depending on rainfall in the area

NURSERY ESTABLISHMENT……

TRANSPLANTING METHOD AND SPACING

- Avoid old and overgrown seedlings
- Flood the nursery with water a day to uprooting for ease of work and to avoid damage to the crop
- To ensure good take off and to avoid shock, carefully pull out the seedlings close to the base
- Tie seedlings in bundle after removing and washing the soil
- ***Transplant in rows – line transplanting ensures more seedlings transplanted per unit area, in uniform and clear pattern, ease operations (such as fertilizer and chemical applications, mechanical harvesting, etc.) -*** Line transplanting gives highest plant population and higher yield
- ***Transplant only one seedling per stand at the spacing of 20cm x 20cm or (25cm x 25cm)***
- Irrigate the field gradually and slowly
- Gap fill the areas where there are empty spaces with remnants of seedlings, 7-10 days after transplanting
- Maintain 2-3cm water level one to two weeks after transplanting thereafter raise the level to 4-5cm (about 1st ring of the index finger raise gradually to complete length of the index finger)

Line Transplanting

WATER MANAGEMENT ACCORDING TO CROP DEVELOPMENT

Important stages were you either drain or add water:

- Before transplanting ensure the depth of water is between 2-3cm deep
- Water level should be between 3-5cm in the first 2 -3 days after transplanting
- To ensure better result from first weeding or herbicide application, drain the water 2 days earlier so that the herbicide and first Urea fertilizer application are successful; then 3 to 4 days later, allow rainwater in the plot to 10-15 cm depth
- For the second weeding or second top dressing drain the field 2-3 days before the activity; drain the water to a level of 5-10cm, this is to ensure maximum fertilizer utilization; 3-4 days after, flood the field again to 15cm depth
- For better grain quality and drying, drain water a week before harvesting

Avoid water stress at the following stages

- During ***active tillering and grain filling stages***; at these critical stages ensure there is standing water as water stress at these points will lead to reduction in the expected yield

WEED MANAGEMENT

- Since you have already transplanted, you can choose between pre-emergence and post-emergence herbicides OR both
- Pre-emergence herbicides include Solito, Orizo-Plus, Butachlor, Topstar, etc
- Solito is a pre-emergence and early post emergence herbicide; apply 75mls in 15l sprayer, 7-10 days after transplanting
- Orizo Plus is a post emergence herbicide (Propanil plus 2 4-D) applied 3 - 4 weeks after transplanting, when the weeds are at 3 - 4 leaf stage (4l/ha)

Effect of Solito and Good Water Level

NUTRIENT MANAGEMENT - INORGANIC FERTILIZER APPLICATION

- Block all water outlets to prevent loss of nutrient after application
- Always use good quality fertilizer
- ***Apply 6 bags of NPK fertilizer as basal***
- You can broadcast before transplanting, or immediately after
- ***Flood the field 2-3 days after the NPK application***
- ***First top dressing is done 3 weeks after transplanting with 1.5bags of urea***
- ***Second top dressing is 7-10 weeks after transplanting with 1.5 bags of urea***
- Note you must weed and drain water before top dressing

INTEGRATED PEST MANAGEMENT (IPM)

- IPM is an approach which combines different pest control techniques and integrates them into overall farm work
- It relies on local plants that are strong and can fight against pests and diseases
- Also you can use improved seed varieties from lead farmers and retail outlets
- Cultural and biological controls:
  - Planting resistant varieties
  - Good farm hygiene and sanitation - weed, remove, burn or bury diseased plants
  - Use natural local items such as neem, castor oil, ash
  - Encourage enemies of pests e.g. nets, scarecrows, ladybirds
  - Crop rotation to avoid build up of diseases that attack the roots e.g. vegetables and non vegetable crops
- Major pests of rice include stem borer, true bugs, white flies, Quelea birds, rodents, African rice gall midge and root knot nematodes

COMMON PESTS

Stem Borer

- Damage occurs during active vegetative stage, panicle initiation and milking stage e.g. stem borer:
    - damage caused by the boring activity of the larvae within the stem during the vegetative and reproductive stages of plant growth leads to white head or dead heart in rice
- Spray Karate EC, Cyperdiforce, Furadan 3G, etc

Adult and Larvae of Stem Borers

Symptoms of Stem Borer Attack

DISEASES

Major disease

- Rice blast is one of the major diseases affecting rice; it affects the leaves, neck/collar, panicle and grain
- Also bacteria blight affects the leaves and sheath

Rice blast control measures

- Do not select seed from infested field
- Avoid excessive nitrogen application
- Equipment and farm tools used in infested fields should be cleaned properly
- Remove infected plants at an early stage, burnt and burry
- Use of broad-spectrum seed dress helps in protecting the plant against blast
- Use of Ortiva top as preventive measure; first spray between early tillering and maximum tillering - 37.5mls in 15l then second spray at flowering stage - mix 37.5mls in 15l
- Ridomil Gold - apply 2.5kg/ha (50g in 20l)
- 2-3 applications early - mid season during active growing period @ 7-10 days intervals

Rice Blast

HARVEST AND POST HARVEST HANDLING

Features that indicate your rice plant is matured

- Attention should be on the panicle. The leaves and stalk color could be misleading
  - ***The panicle will droop (bend downwards), and when pressed with your finger, the grain is hard or when bitten by teeth makes a crunching sound***
  - ***Do not allow the rice to be too dry before harvesting in order to avoid shattering of the panicles before or during harvesting which results in grain loss and poor grain quality***
- Harvesting could be done manually, which is very expensive with lots of losses and high chances of mixing the grain with sand, chaffs, etc.
- Mechanical harvesting could involve the use of mini rice reaper; its cheap, fast, with good quality grain at the end
- In order to improve on the quality of manual harvesting, effort should be made to enlighten the farmers, the contact points where the paddy is getting in contact with sand/impurities that compromise its quality
- For example use of blunt sickle will not cut the paddy but uproot the plant with block of soil, or use of small size or perforated tarpaulin or drying your paddy on the ground or by the roadside
- The rice plant is cut close to the ground and left on the field or taken to a drying flat form in small heaps to air dry before threshing; *over drying cause breakage during threshing*

Harvesting and Manual threshing

Mechanical Threshing

- There are several locally fabricated rice or multi crop threshers currently in use
- We commend the good work of these engineers but there is need for improvement
- The Chinese imported threshers are far better in quality and performance
- Mechanical threshing serves better
  - Ensure you calibrate the threshing machine specific for rice to avoid shattering
  - Place a tarpaulin under the thresher to capture the grains and to *prevent dirt and stones mixing with the rice*
  - The paddy is then winnowed to remove chaffs before bagging and storage

Motorized Thresher

DRYING AND BAGGING

- This is the process of reducing excess moisture from the paddy rice
- Can be done by spreading the paddy on tarpaulins under sun for 2-3 days, and turn it at regular interval to ensure complete drying
- Moisture content of about 12 to 13% is ideal for storage
- Store paddy in an airy, dry and cool environment
- Stack your harvest on wooden palettes to avoid contact with bare floor and avoid stores that leaks water during rainfall
- Polythene or jute bags can be used for bagging
- Ensure security against Insects and rodents attack.

FARMERS DELIGHT AND MILLERS PRIDE