

ARABLE

CROP

PRODUCTION

CRP 311

CEREALS/GRAIN CROPS

- Cereals are grasses grown for their edible seeds in form of grains.
- Examples of cereals include rice, maize, sorghum, wheats, barley, oats, etc

RICE

- Rice is botanically called *Oriza sativa*
- Family Poaceae (Gramineae)

Origin

- *O. sativa* evolved in Asia
- *O. sativa* was brought from Asia to Africa via different routes
- *O. sativa* migrated from Egypt to west Africa about 800-900 AD
- The final penetration to Africa was along the slave trade route 1500 AD
- Other improved varieties of rice are ITA 150, ITA 321, ITA 360 , ITA 257, ITA 128. FARO varieties are also available.

Cultivated varieties

- The new rice for Africa(NERICA) has been spreading rapidly in sub –saharan Africa
- NERICA is obtained by crossing *Oriza sativa* with *Oriza glaberima* to produce high yielding and drought resistant variety(NERICA)
- WARDA named NERICA 1-7 in 2005 and named upland NERICA 8- 18
- Other improved varieties of rice are ITA150,ITA321,ITA360,ITA257,1TA128rietie
- FARO Varieties are also available.

Ecology

- Soil requirements – Rice grows on dry or flooded soil and at elevation ranging from sea level to at least 2400m.
- Temperature – The average temperature during the growing season ranges from 20-38⁰C.
- Night temperature below 15⁰C can cause spikelet sterility.

- Temperature above 21⁰C are needed for anthesis and pollination.
- Upland rice requires an average rainfall of 750mm over a period of 3-4 months and does not tolerate desiccation.
- Lowland rice tends to be concentrated on flat lowland, river basins and deltas.
- The average requirement for irrigated rice is 1200mm per crop or 200mm of rainfall per month an equivalent amount from irrigation
- Traditional cultivars are photoperiod sensitive and flower when day length is short.

Soil

- The soil on which rice grows varies greatly. Textures ranges from sand to clay.
- Organic matter content from 0-50%
- Ph from 3-10
- Salt content 1%
- Nutrient availability from acute deficiency to surplus.

Propagation and planting

- Rice is propagated by seed. 1000 seed weight is 20-35g.
- Seeds may either be broadcast or drilled directly in the field.
- The seeds can be grown in nursery and then transplanted.
- Direct seedling is done in dry or puddle soil.
- In puddle soil ,pre germinated seeds are broadcast.

Propagation contd.

After sowing, the water level is kept at 0-5cm under tropical condition.

Seeds are planted at the onset of rain. In dry season, seeds are sown immediately after land preparation.

Germination occurs after heavy rain

Upland rice which may be sub-divided into

Dry land rice where moisture supply is entirely dependent on rainfall

Propagation contd.

- Hydromorphic rice where the rooting zone is periodically saturated by a fluctuating water table in addition to rainfall.
- Lowland rice including mangrove swamp rice along the coastal region.
- Inland swamp rice with varying degree of flooding.
- Deep water rice-in which the rapid growth of the inter node keep pace with the rising water up to 5m or more starting from 50cm of standing water

Cultural practices.

Upland rice production.

- Land is cleared through slashing and burn practices.
- Soil is ploughed and harrow with appropriate implement.
- The rice is broadcast or dibbled when the rain starts.
- It can be intercropped with other crop such as cassava, maize, cowpea, groundnut and other pulse crop.

Lowland rice production

- In lowland rain fed Riceland is mostly prepared while it is wet and plough to a dept of 10-20cm using plough.
- It can also be ploughed by using hoe preferably when there is little water on the land.
- The broken soil is then puddle with water
- Puddling prevents moisture loss by percolation, enhances better weed control and easy transplanting.

Lowland rice cultivation practices

- Seedlings are mostly raised on wet or dry nursery beds.
- Wet nursery beds are made in puddle or wet field
- 50-60kg rice is normally utilized to plant one hectare.
- Dry nursery beds are prepared near water source before land preparation.

Lowland rice cultivation practices continue

- Seeds are sown and covered with a thin layer of soil and watered until saturation for uniform germination.
- Further watering is applied as needed
- In both cases the seedlings are ready for transplanting 20-30 days after sowing
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Transplanting

- Heavy tillering cultivars in field valley bottoms are wider spaced(30by30cm) than slightly tillering cultivars in upper sandy field soils(20by20cm) with 2-4 plants per hole.
- (500,000- 1,000,000plants/ha)
- Rice is a sole crop under lowland cropping condition.

Management

- Agronomy –Rice is diverse due to differences in cultivation system.
- Weeding is generally not needed in the first two weeks.
- Mechanical and chemical weeding are common practices in upland rice production

Management continue.

- LOWLAND
- In the cultivation of lowland rice, the land is inundated from time of planting till approach of harvest.
- The water is supplied by flooding during the rainy season by growing crop in naturally swampy land or by controlled irrigation.

Mgt contd.

- Field may be drained temporarily to facilitate weeding and fertilizing.
- At flowering water level is gradually reduced until the field is almost dry at harvest.
- The period in which rice is most sensitive to water shortage is from 20 days before and 10days after flowering.

Fertilizer requirement

- The amount of fertilizer used is usually 60-120kgN, 10-20kgP, 0- 30kgk\ha
- Fertilizer is broadcast by hand.
- N fertilizer is ussually top dressed before or at panicle initiation.
- The most common nutrient deficiency in rice are N,P, with K and S in limited areas and sometimes Silicon andZn in peaty soil.

Harvesting

- Grain should be harvested before it is fully matured(around 21 -24% moisture).usually about 30 days after flowering or when 90% of the grains are firm and do not have greenish tint.
- Harvesting are done by hand with the use of sickle and knife.
- Mechanical harvesters are rare in tropical Africa.

Yield

- Average rice yield are 1.4t\ha in tropical Africa,4.1t\ha in Asia.
- The yield of upland rice varies between0.5 and1.5t/ha in tropical Africa
- HANDLING AFTER HARVEST
- Threshing done by beating the bundles on stone or drum
- It can also be done by beating the panicle with wooden stick on a canvas.

Handling contd.

- Winnowing it is achieved by shaking and tossing of the grain on a basket work tray with a narrow rim.
- DRYING
- Drying is necessary to prevent germination and rapid loss of quality.
- STORAGE
- Optimum moisture content for storage is 12.5%. Rice grain is mostly stored in jute bag, sacks after drying.

Parboiling

- This is done before milling to improve the nutrient content as well as reducing breakage during milling.
- MILLING
- The essence of milling is to avoid breaking kernel because whole kernel commands higher price
- The husked or hulled rice is usually called brown rice. milling is done to remove the husk.

DISEASES

- Rice blast(*pyricularia oriza*)
- Bacteria blight (*Xanthomonas oriza*)
- Brown spot (*Cochlobolus myabeanus*)
- PESTS
- White stem borer (*Maliarpha separatella*)
- Pink stem borer(*Sesemia spp*)
- Gall midge maggot (*Oseolia orizyvora*)

» THANKS FOR LISTENING