KENYA AGRICULTURAL AND LIVESTOCK RESEARCH ORGANIZATION

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FACTSHEET FOR TECHNOLOGY INNOVATORS WORKING WITH SMALL HOLDER FARMERS IN KENYA

RICE

INTRODUCTION

- Rice is the third most important cereal crop in Kenya, after maize and wheat.
- The crop is grown by small-scale farmers for cash and food.
- About 80% of the crop is produced in irrigation schemes while the remaining 20% is produced under rain fed conditions.
- Rice production in Kenya is mainly done by small-scale farmers.
- Most of the rice grown in Kenya is from irrigation schemes established by Government while the remaining is produced under rain-fed conditions.
- Rice per capita consumption increased from 12 kg in 2008 to 25.3 kg in 2021.

SITE SELECTION

Ecological zones

- In Kenya many areas are suitable for rice growing but low moisture and temperatures limit production Rice production systems are classified according to ecology in terms of water as: (1) upland, (2) irrigated, (3) rain fed lowland, and (4) deep water (5) Systems of Rice Intensification, however 80% of rice production in Kenya comes from the irrigation schemes.
- The main schemes are Mwea (Central Kenya), West Kano, Ahero (Nyanza), Bunyala in Western Kenya, Hola and Bura irrigation schemes in Coast province under NIB (GOK, 2003). The remaining 20% is produced under rain fed conditions.

LAND PREPARATION
under irrigation

- This involves clearing the fields of weeds if fallow or stubble from previous harvest and then leveling. Animals are grazed in the harvested fields to trample and aerate the soils.
- Weeds are then slashed or gyro mowed and burned or incorporated in the soil.
- The fields may also be sprayed with non-selective herbicides. After which the weeds and stover from previous harvest are then ploughed in.
- In presence of adequate water, the fields are flooded to a depth of 10 cm and then cultivating them by use of tractor (40 to 75hp) equipped with rotavators.
- It is recommended that land should be tilled and immediately flooded at least 15 days before transplanting or direct sowing.

Burning the stubble in the rice fields at Mwea before flooding

- Apply well decomposed manure before rotavation. Flood for 2-3 days and then dig or rotavate.
- After flooding maintain the water above ground level (2-5cm).

Digging a flooded field at Mwea

- The paddy fields are also puddled and then leveled before transplanting or direct seeding. This involves burying in the uprooted weeds in the wet soils and then leveling by using a tractor or oxdrawn leveler of which timber with spikes can be used.
- Poor and untimely land preparation cause serious weed problems and expose plants to harmful substances such as carbon dioxide and butyric acid, released by decaying organic matter in the soil.

A paddy field at Mwea being puddled

Rain fed rice cultivation

For this system, land is prepared before the onset of rains. The land is ploughed once and harrowed twice.

PLANTING

Recommended rice varieties

Komboka (IR05N221)


- Ecology: Irrigated and favourable rainfed
- Paddy yields: 6.5 to 7 t/ha.
- Medium maturity: 110-120 days
- Plant height: 90-120 cm
- Moderately resistant to Blast, Bacterial Blight and RYMV
- Moderate tolerant to drought stress
- Tillers: 30-35 per plant
- Good ratoon
- Grain type: Medium slender, translucent grains, soft cooking texture
- Semi-aromatic

Mkombozi (08FAN10)


- Ecology: Irrigated and favourable rainfed
- Paddy Yields: 5.5 - 6 tons/ha
- Maturity: 95 – 115 days
- Plant height: 105 – 110 cm and does not lodge
- Tillers: 15-20 per plant
- Good ratoon
- A moderate feeder that responds well to nutrients
- Moderately resistant to blast
- Grain type: Medium slender, translucent grains, soft cooking texture
- Non aromatic

NERICA 1

- Ecology: upland and unfavourable rainfed lowland
- Paddy yield: 4.5 tons/ha
- Plant height: 90-100cm
- Tillers: 15-20 per plant
- Early maturity: 95-100 days.
- Medium resistance to blast and RYMV
- Aromatic

NERICA 4

- Ecology:upland and unfavourable rainfed lowland
- Paddy yield: 5 tons/ha
- Plant height: 120 cm
- Maturity: 95-100 days
- Non-aromatic

NERICA 10

- Ecology: upland and unfavourable rainfed lowland
- Yield: 6 tons/ha
- Plant height: 100 CM
- Days to maturity: 90-100 days
- Non-aromatic

NERICA 11

- Ecology: upland and unfavourable rainfed lowland
- Paddy yield: 7 tons/ha
- Plant height: 105cm
- Maturity: 75-85 days
- Resistant to blast
- Non-aromatic

Planting

Direct seeding/sowing

- Direct seeding ensures that optimum plant population is maintained, allows the rice crop to establish on time and reduces labour input and drudgery.
- However it requires good land preparation and levelling, furrows to drain water, saturated soil for wet direct seeding (WDS) or moist soil for first 7-10 days for dry direct seeding (DDS).
- Suitable varieties are those that have early seedling vigor, fast canopy development and are non-lodging. Quality seed is also required and effective weed control whether cultural, mechanical, or use of herbicides is a must.

Method

- Prepare land the normal way and rotavate and level.
- Drain the field before drilling Pre- soak the seeds the same as for transplanting.
- Drill seed in lines or use a drum seeder.
- Maturity will be earlier in 2-3 weeks.
- Weed regularly and one may use selective herbicides.

Advantages of direct seeding

- Faster and easier crop establishment and reduced costs.
- Less labor need (1-2 vs. 25-30 for TP).
- Earlier crop maturity by 7-10 days.
- More efficient water use and higher tolerance to water stress.
- Less methane emission.

TRANSPLANTING

- Transplant at 5th leaf stage 15 days after sowing Seedlings must be handled carefully to avoid breakage and ensure fast revival and early growth after transplanting.
- Shallow transplanting at 1-2 cm depth is recommended.
- Optimum plant-toplant spacing should be 20 x 20 cm to 25 x 25 cm and the optimum number of seedlings is 1-2 hill-1.
- Avoid over elongated sprouted seeds due to breaking and slowed growth.
- Spacing should be 30cm*15cm for mechanical weeding or 25cm*15cm or 15cm*15cm for low tillering varieties like Basmati 370.
- Irrigate after transplanting at a depth of 2-5cm.
- Clip the top of seedlings before transplanting to reduce the carry-over of stem borer and rice hispa eggs from the nursery to the main rice field.
- Avoid transplanting young seedlings and standing water in rice fields to manage rice caseworm. Plant in lines and use a guide rope during transplanting.

- Planting in lines using a guide rope at Mwea Optimum number of rice plants is obtained in fields where rice has been transplanted in lines and it is also possible to use mechanical weeders.

SOIL FERTILITY REQUIREMENTS AND MANAGEMENT

Fertilizers

- Fertilizers can be applied in organic or inorganic (mineral) forms or both.
- Fertilizer should be applied based on the residual nutrients in the soil from soil test results, the expected yield and the type of fertilizer materials available.
- The farmer should strive to obtain fertilizer recommendations based on analysis of soil.
- Soil analysis is recommended after every 4 years and soil testing can be done at KALRO-Kabete.

General recommendations:

Nitrogenous fertilizer:

The fertilizer used is Sulphate of Ammonia (21%N) and should be applied at 3-4 bags/acre in 2 equal splits, i.e. 1.5-2 bags/acre in the first split and a similar amount in the second split.
The first split should be applied at 21 days after transplanting (DAT) and the second split should be applied at booting stage (45 DAT).
The rates depend on the variety grown and the soil test results.
Generally, basmati requires less Nitrogen fertilizer than BW.

Phosphatic fertilizer:

- Triple superphoshate (TSP with 48% P) is the recommended phosphatic fertilizer for rice.
- It should be applied at planting at a rate of 1-2 bags /acre depending on soil test phosphorus (P) levels.

Potash fertilizer:

- Murriate of potash (60%K2O) should be applied at 1 bag/acre at planting.

Zinc fertilizer:

- Apply Zinc sulphate should be applied at 12 kg/acre by broadcasting before planting.
- This should be repeated after every 2 seasons.

Integrated Nutrient management

- Integrated nutrient sources including organic and inorganic give higher and more sustainable yields than inorganic fertilizers alone.
- It is therefore recommended to integrate the following; ½ the inorganic fertilizer + 2 tons/acre cattle manure.
- Fertilizer full rate + 2 tons/acre Rice husk powder or rice husk charcoal.

Time of application

Apply P, K and Zinc at by broadcasting just before planting.
Apply 1st split N (1 ½ -2 bags SA/acre) at 21 days after sowing.
Apply 2nd split N (1 ½-2 bags SA/acre) at 45 days after sowing.

Use of colour chart to guide Nitrogen Topdressing

- When a leaf colour chart (LCC) is available. It should be used to guide topdressing when N deficiency is observed in the field.
- Use LCC from the beginning of tillering (20 DAT) and take readings once every 7-10 days.
- Use the uppermost fully expanded leaf which best reflects the N status of rice.
- Take readings of 10 leaves randomly selected from hills.
- If colour is ≤ 3, topdressing is necessary.

NB: Always shade the leaf being measured with the body and measurements should be taken roughly same time of the day by the same person.

ROUTINE CROP MANAGEMENT

Weed control methods

Tillage Hand weeding Herbicides Cultural - Crop rotation Burning.

Integrated Weed Management

- Try to avoid weed problems by using weed free seeds at planting.
- Properly manage farm implements and livestock.
- Keeping bunds (levees) and irrigation canals free of weeds prevents seeding of weeds in the field and spread of perennial weeds that reproduce vegetatively.
- Weeding is done manually by hand hoe at least 2 times at 20 & 50 days after sowing (DAS).
- Problematic weeds in irrigated rice include, Echinochloa spp., Black jack, Sedges and Digitaria spp.
- It is important to note that several methods of weed control may not singly and adequately smother weeds. For example hand weeding can be relatively ineffective, particularly in controlling many of the perennial weeds that have underground tubers and rhizomes from which they can rapidly re-establish (e.g. Cyperus spp.).
- The problem of weeds in rice is exacerbated by delayed and poor land preparation as well as inefficient weeding associated with broadcast sowing, random transplanting and inappropriate agricultural implements for mechanical control.
- Various weed types associated with rice require use of a combination of two or even five control methods that kill different types of weeds.
- Integrated management entails application of varied methods among them use tolerant rice cultivars, hand weeding, cultural practices, herbicides and a combination of some or all of these methods sustainably control weeds in rice.
- Towards this end, new broad spectrum herbicides have been tested and found suitable for rice weed management. Additionally, a walk behind rotary weeder has been designed and used in paddy fields and in SRI.
- Plant at spacing that allow mechanization to allow rice weed management.
- Weeding should be done every 2 weeks if a rotary weeder is used or 2-3 times during the season. Where herbicides (e.g. Dicopur, Satonil) are to be used commercial rates should apply.
- Read the label well before use and seek advice from relevant service providers if need be.
- Apply nitrogen in 3 splits – basal, tillering and at panicle initiation and encourage cover of Azolla to control whorl maggots and leaf miners.

SOIL AND WATER CONSERVATION

- Water is applied to the rice field for use by the rice plant and also for suppressing weed growth.
- Water Is the number one rice yield constraints. Therefore, care must be taken to use water wisely and reduce water losses from rice fields. For this reason, it is important to practice appropriate water management throughout the growing period of a rice crop.
- In lowland rice fields, water comes from rainfall and irrigation.
- Water is lost by transpiration, evaporation, seepage and percolation.
- This loss can be avoided through repairing levees to minimize seepage, removal of weeds to avoid competition with rice plants for water and increasing the height of levees to prevent surface runoff water.
- The critical stages when water is required in large quantities are: For a period of three to seven days after transplanting cover the crop up to 80% of its height. This reduces transpiration and gives the plants a chance to re-establish their roots to be able to take up enough water from the soil.
- From the stage of booting to 14 days after heading, more water is required because the shedding of pollen and the process of fertilization requires very high moisture content in the air.
- Low moisture content in the air leads to sterile spikelets. Seven to ten days before harvesting, drain the field to harden the soil for good harvesting and also to hasten the drying and ripening of the rice grains.

WATER REQUIREMENT OF RICE CROP AT DIFFERENT GROWTH STAGES

Stages of growth	Avg. water requirement (mm)	% of total water requirement (approx.)
Nursery	50-60	5
Main field preparation	200-250	20
Planting to Panicle initiation (PI)	400-550	40
P.I to flowering	400-450	30
flowering to maturity	100-150	5
Total	**1200-1460**	**100**

Water management

- Generally, there are two main methods of water management in irrigated rice culture namely: continuous flooding(CF) and alternate wetting and drying (SRI).
- Under continuous flooding (CF), you constantly maintain a water level of 2 to 5 cm in the field. Water is added when the depth 2 cm is reached.Irrigation is stopped at 10-15 days before harvest.
- Under alternate wetting and drying (SRI) – Water is added to a depth of 2-5 cm but only after the fields have been dry for 2-7 days. This method saves about 50% water.
- The two methods give rice yields that are not significantly different. Consequently, SRI can be adopted without any yield compromise. It is can be used where irrigation water is a constraint.

PEST AND DISEASE MANAGEMENT

Protection against pests and diseases in rice is routine and primarily consists of the application of pesticides that are, for the most part, recommended by manufacturers and applied on a calendar based schedule, rather than on a need basis. In most cases they are applied when pest levels do not justify their use.

Stem borers

Rice plants in the vegetative and early reproductive stages and rice fields receiving high rates of nitrogenous fertilizers are preferred for egg oviposition by stem borer moths.

African white head stem borer larvae

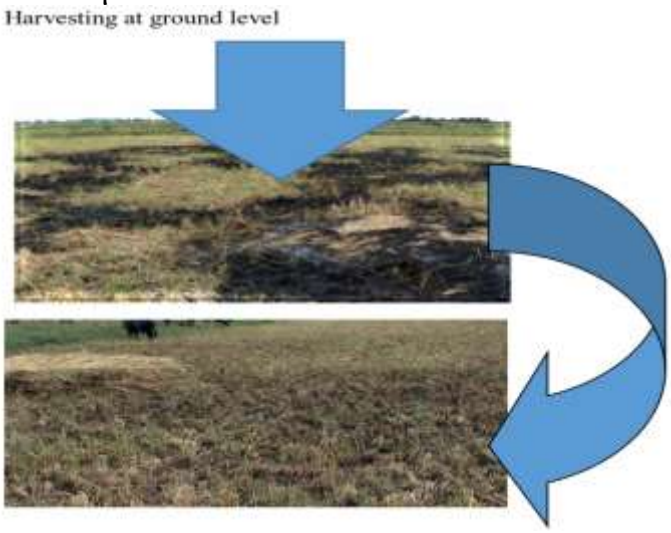
African white head stem borer adult moth

Stalk eyed rice stem borer

Stem borer management

- Synchronized planting over a large area allows the most susceptible stage of rice to escape from stem borer and other pests' damage and also allows a planned non-rice break to occur during the year to interrupt the pest life cycle.
- Apply calcium silicate to strengthen stem tissues and keep bases of stems always under water to control stalk eyed borers.
- Destroy alternative host plants such as rice ratoon crop, volunteers and wild red rice on the bunds to control rice gall midge.
- Combination of growing gall midge tolerant varieties with Paspalum grass management at the edge of rice fields reduces rice gall midge damage.
- Control vectors like Chaeoctna beetles for virus diseases.
- Apply correct amounts of nitrogen in 3 splits – basal, tillering and panicle initiation.
- Carry out direct seeding as opposed to transplanting as transplanted rice has higher stem borer numbers than a direct seeded crop, because the former crop matures later in the season allowing the stem borers to build up on earlier plantings.

- Seedlings of direct seeded rice crop which are grown without standing water during the vegetative stage are less attractive for egg laying by adult moths.
- Use of soil amendments containing organic silica reduces leaf folder, stem borer and gall midge populations and increase rice yields and spraying with synthetic pyrethroids can be an effective control method when stem borer populations are high.
- However use of cultural control methods and the use of resistant varieties is the best management option.



Harvesting at ground level and burning rice stubble

Rice whorl maggots and rice leaf miners (Hydrellia spp)

Rice whorl maggots

Control measures

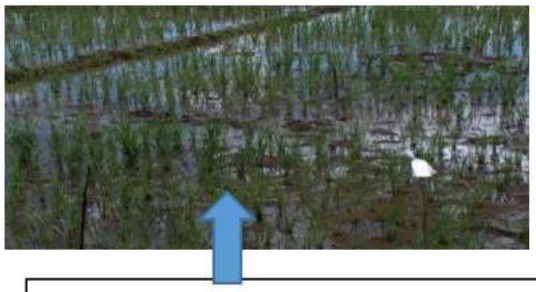
- The rice leaf miner can be controlled by managing the water level.
- Avoid leaf contact with water.
- Drain the water at intervals of 3 to 4 days during the first 30 days after transplanting this reduces egg laying as the adult flies are more attracted to standing water.
- To reduce the potential for damage by the rice leaf miner encourage the rice to emerge quickly and grow erect. Level the field as accurately as possible and start the crop in 7-10 cm of water.
- Increase the water depth slowly after the leaves begin to grow upright.
- Monitor for rice leaf miners to determine the need to lower the water level.

- Begin monitoring two to four weeks after planting, just after most of the rice plants have emerged from beneath the water and the leaves are lying on the water surface.
- During vegetative phase pests such as whorl maggots, root feeding midges, water weevils, caseworms, and others are suppressed when fields are drained for 1 or 2 days.

Leaf miner damage Whorl maggots

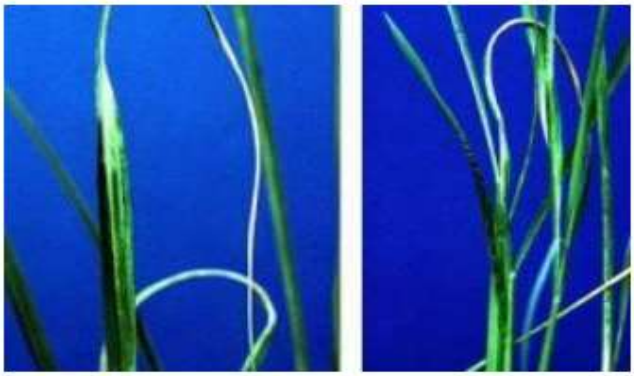
Leaf miners case worms and whorl maggots

Azolla cover controls leafminers and case worms



Flooded conditions encourage leaf miners and case worms

White tip nematode (Aphelenchoides besseyi)



Control measures

- Plant nematode-free seeds in nematode-free areas.
- Plant resistant rice varieties if available.

Rice diseases

The most serious diseases of rice are: Rice blast disease (Magnaporthe grisea), Rice Yellow Mottle Virus (Sobemovirus), Bacterial leaf blight (Xanthomonas oryzae pv. oryzae), brown spot (Bipolaris oryzae) and sheath and leaf blights (Rhizoctonia solani)

Rice Blast (Pyricularia oryzae)

Blast on the neck

Blast on nodes

Blast on panicles

Rice blast symptoms

Symptoms

- Blast is identified particularly by characteristic spindle-shaped lesions.
- The disease starts as pin point lesions and can kill the entire leaf or plant in a favourable environment if it is a susceptible variety.
- The most serious stage of the disease is leaf blast, or neck rot seen as a blackish coated area at the base of the panicle. The rachis or rachilla becomes infected causing varying degrees of grain sterility.

Management

- Plant resistant varieties.
- Apply recommended Nitrogen fertilizer rates. Heavy fertilization favours disease development.
- Avoid rate planting especially if heading is to coincide with wet weather and overcast skies In heavy infections fungicides like Topsin can be applied.

Brown Spot (Helminthosporium oryzae)

- It occurs primarily in rice suffering from potassium imbalance or grown on soils low in fertility, particularly those deficient in nitrogen, or on saline soils.
- Shading also aggravates the disease in intercropped rice fields.

Brown spots symptoms

Rice yellow mottle virus

- RYMV causes severe infections mainly in irrigated rice and is transmitted by beetles (Sesselia pusilla, Chaetocnema pulla, Trichispa sericea and Dicladispa viridicyanea) and mechanically.
- It is not seed transmitted.
- Major symptoms of the disease are yellowing of leaves, stunting of affected plants, reduced tillering of the affected plants and sterility of the seed/grain.
- There are various modes of transmission which include mechanical transmission, by vector, seed and soil transmission. RYMV infection the influences the number of panicles, number of spikelets and seed yield. When a score of Rice Yellow Mottle Virus reaches 3, it means a 6-10% field infestation.

Damping-off diseases

Damping-off on rice

Control measures:

Use certified disease-free seeds for planting.

Bacterial leaf blight (Xanthomonas oryza pv. oryza)

- The first symptom of the disease is a water soaked lesion on the edges of the leaf blades near the leaf tip.
- The lesions expand and turn yellowish and eventually greyish-white and the leaf dries up.
- High rainfall with strong winds provides conditions for the bacteria to multiply and enter the leaf through injured tissue.

Symptoms of Bacterial leaf blight (Xanthomonas oryzae pv. oryzae)

Control measures:

- Plant resistant varieties if available and use certified disease-free seeds.
- Practice rotation and good field sanitation.
- Plough or roll the stubble to hasten decay of the rice debris; this helps to manage the disease by destroying the tissue in which the bacterium is maintained.

Brown leaf spot (Bipolaris oryzae)

Brown leaf spot on rice with symptoms on leaves

Control measures:

- Plant resistant varieties.
- Use certified high quality disease-free seeds.
- Ensure balanced fertilization.
- Practice crop rotation.

HARVESING

- Harvesting Paddy crop should be harvested when physiologically mature. The leaves turn yellow, the grains become hard and contain about 20-22 percent moisture.
- Losses are greater, especially if harvesting is delayed with respect to the crop maturity date.
- Harvesting before maturity means a low milling recovery and also a higher proportion of immature seeds, high percentage of broken rice, poor grain quality and more chances of disease attack during storage of grain.
- Cyclone bran or empty pods is as a result of early harvesting.
- Delay in harvesting results in grain shattering and cracking of rice in the husk and exposing the attack by insects, rodents and birds as well as lodging.
- Avoid harvesting during wet weather conditions.
- Drain out the water from paddy field about a week or 10 days before the expected harvesting,
- Harvesting can be manual by use of a sickle either by harvesting single panicles which results in low losses, but is tedious or hill harvesting which is much faster but results in skipping of secondary tiller panicles.
- Protect the harvested paddy from rain and excessive dew by covering with tarpaulins.
- Fast drying may lead to more broken grains lowering milled rice quality.

POST HARVEST HANDLING

Threshing

- During threshing the paddy kernel is detached from the panicle, an operation which can be carried out either by “rubbing”, “impact” or “stripping”.
- Rubbing may be done with trampling by humans, animals, trucks or tractor; however, the grain becomes damaged.

- Mechanical threshers adopt mainly the impact principle, but there is also a built-in stripping action. With a paddy thresher, the unthreshed paddy may be either held or thrown in. In the "hold-on" type, the paddy is held still in the cylinder while spikes or wire loops perform impact threshing.
- In a "throw-in" machine, whole paddy stalks are fed into the machine and a major portion of the grain is threshed by the initial impact caused by bars or spikes on the cylinder.
- Most common impact threshing is by hitting with a stick or against a log or a rock.
- All the panicles should be kept in one direction in order to ensure efficient threshing.
- Keep the harvested paddy separately for each variety, to get true to type variety (grains).
- The grain is separated from the straw by hand and then cleaned by winnowing.
- Losses may occur during threshing for various reasons: In manual threshing by beating, some grains remain in the bundle panicles and a repeat threshing is required.
- Grain is scattered when the bundles are lifted just before threshing.
- Grain can stick in the mud floor. Birds and domestic fowls feed on the grain. Therefore need to use covered floors.

Threshing

Paddy can also be threshed by mechanical threshers. These include human power (Tredle or pedal driven) and motor or P.T.O driven threshers.

P.T.O. driven thresher (left) and motorized drum thresher fabricated at KALRO-Mwea

Drying

- The main cause of loss during drying is the cracking of grain kernels, some grains may also be lost during the drying process.
- Failure to dry crops adequately can lead to much higher levels of loss than poor-quality drying, and may result in the entire harvest becoming inedible.
- Avoid direct sun drying, which leads to an increase in breakage of the grains during milling.
- In some places, the practice is to windrow the cut paddy in the field to dry for 3 to 7 days, depending upon the weather conditions.
- If the threshing is delayed keep the harvested paddy stalk bundles in a dry well ventilated shady place, which facilitates air circulation and prevents excessive heating. Ideally, most grains should be dried to acceptable levels within 2-3 days of harvest.

Milling

There are many ways of processing rice but mostly rice is milled and polished into white rice.
White rice is used as a staple food almost over the entire world.

Hullers/ rice mills

- Cleaned paddy on average yields 72 percent rice, 22 percent husk and 6 percent bran.
- Main milling methods are by rice hullers, shellers and modern rice mills. Hullers give milling recovery of about 65 percent total yields with 20-30 percent brokens. It does not give completely cleaned rice. This is the most common method of rice milling in Kenya
- The most modern rice mills (single Pass) are available in 2-4 tons per hour capacity.
- The mini modern rice mills are available with capacity of 150-550 kg per hour and yields higher recovery.
- The modern rice mills give yield recovery of 70 percent with a grain breakage of 10 percent only.

Grading

- Grading is the process of sorting of a given product according to the grades or classes.
- In grading of paddy, mainly thickness or length of grain is considered and graded accordingly.
- Grading of paddy/rice is usually done through mechanical devices such as: rotating graders, plansifier, trieurs, circular purifier, colour grader/sorter.
- Paddy grains having the same length but different thickness are graded by rotating graders; whereas, grains with the same thickness but different lengths, are separated by trieurs.
- Sometimes both the rotating graders and the trieurs are used.
- In the market, the sale of paddy/rice is generally done on the basis of visual inspection of available sample and with local commercial name.
- Buyers offer price on the visual examination of whole lot considering the quality factors like size and colour of the grains, moisture content, aroma, broken grains, foreign matter and admixture of other varieties.

Processing

Rice crackies

Ingredients

Ground rice (2-3 cups), wheat flour (1 cup), sugar (3tablespoons),Boiled water Chilli/hot pepper (optional).

Equipment Extruder, Draining paper, Tray Packaging papers, Jiko/stove, Strainer, Deep frying saucepan, Wooden spoon, Knife, spoons (Teaspoon and tablespoon) and a cup.

Method

- Measure all the ingredients.
- Sieve the dry ingredients into a mixing bowl.
- Add water a little at a time and mix until the dough gets sticky but wet.
- Put a little dough in the extruding equipment and test the dough. If the dough needs a lot of pressure to extrude then make it a little wet. If too wet add a little flour to make the right consistency.
- Heat the oil in a saucepan until hot enough.
- Extrude the dough into the hot oil. Cut with a knife to make them short.
- Fry until golden brown. Remove from the oil with a strainer and put on a tray to cool and then pack.

Rice crackies

Whole rice cookies

Ingredients Sticky rice (500g), Cooking oil (500ml), Table salt (1tbs).

Method

- Soak the sticky rice for 3 hrs.
- Steam for 30 minutes (Boil in the ratio of 1:2).
- Spread sticky rice to a flat surface.
- Dry the spread sticky rice for about 700C for about 2 hours.
- Deep fry until slightly brown.
- Season with table salt.
- Pack.

Whole rice cookies

Rice cake

Ingredients: Rice flour(1 cup), wheat flour(1 cup), sugar (½ cup), margarine (½ cup), baking powder (2 teaspoons), eggs (2), vanilla(1 teaspoon), milk(1 cup), salt(a pinch)

Equipment Oven, Digital weighing scale, Baking tin/cups, Cooling racks, Mixing bowls, Measuring cups, Wooden spoon, Mixer.

Method

- Cream sugar and margarine till light.
- Sieve the flour baking powder and salt together.
- Add in the eggs with a little flour in to the sugar margarine mixture.
- Gradually add in the flour and milk mixing to a drop batter consistency.
- Pour the mixture into a lightly greased tin and bake at 180 oC till done.
- Put on a wire rack to cool.
- Apply icing if required before packaging.

Ready rice cakes

MARKETS

https://www.mkulimayoung.com/market

KAMIS is the source of market data (prices and volumes) in the Kenyan region

AMIS

Kilimo Call Centre 0800 724 891

Sauti Trade and Market Information Platform Dial *384*35#
National Agricultural Commodities Market Information (NAFIS)
http://www.nafis.go.ke/category/market-info/
TruTrade Venture Labs East Africa
http://www.trutradeafrica.net/
Tel: +254 (0)725 850 906

REFERENCE

Rice-Cultivation-Manual.pdf

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