

Upland Rice

Cropping Calendar



Facilitator's Guide

This guide will help you use the Upland Rice Cropping Calendar. As the facilitator, please read through and familiarize yourself with the entire guide before facilitating any discussion.

Introduction

The Upland Rice Cropping Calendar is meant to be a visual guide for upland rice farmers. It is a quick reference to assist in cultivation of rice through a crop cycle. The calendar is divided into sections to help users understand when to do certain activities, what the stages of a rice plant's crop cycle are and what the plant will look like during the growing process.

The easiest way to explain and understand the calendar is by looking through each column from left to right. These columns indicate successive activities done over the time passing as a rice crop grows. The different stages of a rice plant's crop cycle are listed across the top of the calendar. They are: preparation, vegetative phase, reproductive phase, ripening phase and harvest. Across the bottom of the calendar are illustrations showing what a rice plant will look like as it grows during the various stages.

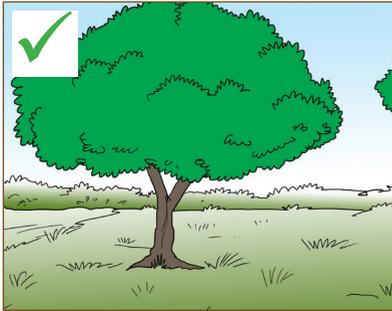
- Show the calendar to the participants.
- Read the title of the calendar.
- Ask participants to explain what they know about the topic.
- Go through each section of the calendar with participants. Look at the activities shown and ask participants to explain what they know about each one.
- As participants share, reinforce accurate information and correct wrong information.
- Tell participants that the total duration of a rice crop varies. Explain how different varieties of rice will take different lengths of time from when they are planted to when they are harvested. It is important to observe rice as it grows to see what stage it is at and to know which activities need to be done.

Now we can look at sections and activities in detail.

**Note: A take-home version of the Upland Rice Cropping Calendar is available. The additional information seen on that handout is presented in the annex section of this facilitator's guide along with additional post harvest activities.*

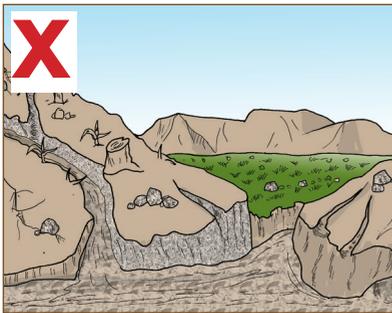
Preparation | Week 0

This is the stage before the rice has been planted, when everything is planned to grow a crop.



Site Selection

Before planting, a suitable location must be chosen.



- Upland rice grows best in soils that are fertile, receive plenty of sunlight and have good drainage. Sandy loamy soils work well.
- Soil should be moist. Between 100 and 200 mm of rainfall per month is needed to keep the soil moist throughout the growing season. The rice plot should not be irrigated to contain water, as lowland rice plots often are.
- Upland rice should be grown in soil that is near pH neutral (6-7). If soil is too acidic, fertiliser containing phosphorus can be added to restore the pH level.
- A field should not have had rice growing in it for the last two seasons. This ensures the fertility of the soil and there will be a lower chance of off types growing in the plot. Crops that can be planted in rotation with rice include: cotton, sweet potatoes, groundnuts, soybeans and bush beans.



Seed Selection

- Good quality seed grows faster, has disease resistance and can produce good yields.
- Using certified seed can increase yield by 5-20%. Germination rates are better, so more seeds will emerge in the field. This results in less re-planting, strong root establishment and a uniform plot growth.
- Rice of the same variety should always be used in the same plot. Seed should not be diseased, cracked or shriveled. If farmers are not sure of the quality of rice seed being used, a germination or float test may be done. (See annex for information on these tests)
- NamChe-1, -2, -3, -4, and -5 are all varieties of rice proven to perform well in upland rice farming.



1st and 2nd Ploughing

- Ploughing depth should be no more than 15-25 cm. Deeper ploughing will turn soil from far down and can move fertile top soil down too far for the rice to grow well.

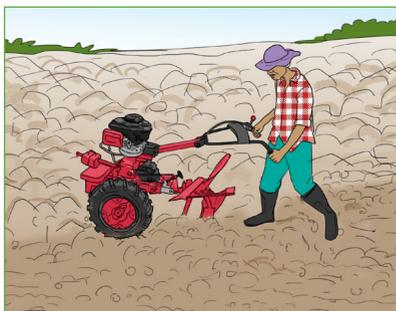
Planting | Week 1

Having good seed and a ploughed plot are not the only things to consider when planting. A healthy foundation will ensure rice plants grow well during their whole life cycle.



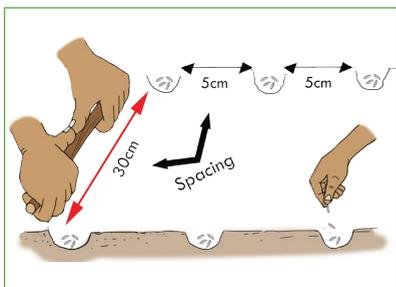
Basal Fertiliser Application

- Applying a basal fertiliser to enrich soil and improve root development. It is important to apply fertiliser in order to improve yields.
- Apply 50 kg of nitrogen and 30 kg each of phosphorus and potassium (50-30-30) per hectare to restore soil fertility level.



Harrowing

- Harrowing should be done after ploughing and applying a basal fertiliser to break up soil clods.
- It makes leveling the field easier and will mix the fertiliser into the soil to prepare for planting.



Planting

- Place 4-6 seeds in holes 5 cm apart. Row spacing should be 30cm apart. Seed depth should be 2-4 cm.
- For upland varieties of rice, dry seed sowing is preferable.
- Rice should be planted at the beginning of a rainy season to ensure enough moisture is available (105–130 days, depending on the variety).

Vegetative Growth | Weeks 2-5

Once a seed germinates, the roots absorb nutrients from the soil as the plant begins to grow. After the main stem emerges from the soil and becomes established, tillering happens. Tillers are the additional stems that begin to grow out and will later become tall and carry rice.



First Weeding

Weed rice fields regularly, especially during the early stages of growth.

- The first weeding should be done 2-3 weeks after planting. It is advised to remove weeds from upland rice by hand-pulling.
- Herbicides can be used in large-scale farms or where labour is a limiting factor.





Thinning and Roguing

Once seeds have germinated and begun to establish roots, extra seedlings should be removed.

- Spacing between growing plants should be 10 cm to prevent overcrowding. This is approximately the length across a hand made into a fist.
- Off-type plants should be removed as soon as they can be identified. (See Roguing topic in the Ripening Phase section)



Top Dressing Fertiliser

- Top dressing with a mixture of fertiliser and urea should be done 2-3 weeks (or 15-20 days) after rice has germinated.
- The most common fertilisers used for rice are urea, DAP and NPK. Urea is very important and should be applied in combination with either DAP or NPK, but not with both at the same time.
- When applying DAP and urea, 20 kg /acre of each should be used.
- When applying NPK and urea, 60 kg /acre of NPK and 12 kg /acre of urea should be used.
- It is best to apply fertiliser when the soil is moist, such as after a heavy rain has fallen.

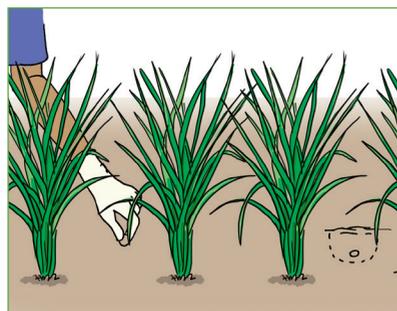
Reproductive Phase | Weeks 6-10

After tillers have grown tall, panicle formation occurs. Panicles are clusters at the head of the stems that grow large throughout the reproductive phase. Towards the end of this phase, the panicles will produce small flowers to signal the rice plant's flowering stage. The time from panicle formation to flowering usually lasts 35 days.



Second Weeding

- Remove weeds again 6 weeks after planting. Depending on the weed level, weeding should be done every three weeks throughout the vegetative growth stage and at the beginning of the reproductive stage.
- Weeding is not advised once rice has flowered, as it may result in a lower yield if flowers are disturbed in the process of removing weeds.



Urea Application

- Urea alone should be applied when panicles form. This typically happens 7-9 weeks (or 55-65 days) after germination.
- Urea should be applied at a rate of 20 kg / acre. Granules of urea may be broadcast or large pellets (also called briquettes) may be planted.
- When planting pellets, one pellet is placed by hand or with a machine 7-10 cm below the soil surface between four growing plants. These large pellets release nitrogen slowly over time, reducing losses when compared to urea granules.



Disease Control

- There are a number of diseases that can affect rice crops. Common examples include rice blast and rice yellow mottle virus.
- It is always good to inspect crops and look for any abnormal growth or colouring on the plant that may be signs of disease.
- Crop rotation, fungicide application and plant removal may be done to help prevent or treat diseased plants.
- Disease prevention can be practiced by planting good quality seeds of rice varieties known to resist disease.

Ripening Phase | Weeks 11-14

After flowers have grown, they will become pollinated and the panicles will develop rice grains. The ripening stage from full flowering to harvest lasts for about 30 days.



Roguing

- Rogues are off-type plants that appear abnormal. They may be shorter or taller than other plants, may begin flowering at different times than other plants or may have leaves that appear different.
- Remove rogues throughout all stages of rice production to keep a uniform plot. This ensures consistent crop quality and harvests.



Potash Application

- Potassium is an important nutrient in rice production. It improves root growth and helps the crop resist pests and diseases.
- When there is a deficiency of potassium in the soil, the tips and edges of mature leaves will begin to turn yellow or brown. These symptoms do not appear until later stages of growth and may be difficult to see at first.
- When plants show signs of potassium deficiency, muriate of potash may be applied to soil to restore potassium levels.
- Potash should be applied at a rate of 15 kg / acre in later stages of growth.



Bird Prevention

- Once rice begins to flower, birds may become a pest to rice farmers.
- Chase birds away by making noise or scaring them off.
- Birds can be chased by placing scarecrows in a field or by hanging tins, cassette tape reels or reflective ribbons in a rice field.
- It may also be helpful to remove trees or hedges where birds may nest near a plot.

Harvest | Weeks 15-18

It is important to harvest rice at the correct time to get the highest yield of quality grain. NamChe varieties of upland rice take between 105 and 130 days to fully mature, from planting to harvest.



When to Harvest

- Rice is ready to harvest when 80-85% of the panicle has turned golden yellow and become hard.
- A helpful test that can be done to check when rice is ready for harvest is to shake the panicle. When shaking the head of a rice shoot, the grains should make a rattling sound.
- Keep track of time. Rice is ready for harvest about 4 weeks (or 30 days) after full flowering.
- Reaping too early results in a large amount of immature grains and lower milling percentages.
- If harvested too late, losses may be significant due to fallen grains, longer exposure to pests and overly mature grains breaking during milling.



Harvesting

- To reduce the moisture content in harvested rice, harvest when excessive moisture from rainfall or morning dew is not present in the plot.
- The length of cut stems depends on the harvesting and threshing methods used.
- When harvesting by hand, stems are usually cut a short distance below the panicles. If harvesting with mechanical equipment, stems are usually cut closer to the ground to prevent grain losses.
- Harvested rice should not be placed in large heaps to prevent moisture and heat from gathering.

Post-Harvest | Additional Activities

After rice has been harvested, the paddy must be processed to prepare the rice for storing, selling or consumption.



Threshing

- Threshing should be done within 4 hours of harvesting to prevent moisture from gathering on the grain and limits access to grain by pests.
- Rice paddy should be threshed on a clean surface. A tarp, concrete floor or hard rock are ideal. Bare ground must be avoided because sand, rocks or other impurities will contaminate the rice.
- When threshing, beat panicles gently on a log or drum to remove grain. Peddles or motorized threshers may also be used.





Drying

- Drying should begin as soon as possible after threshing. If too much moisture remains in the harvested grain, it will begin to rot and mould may develop.
- It is best to dry rice slowly, 2-3 hours per day for 1-3 days. If rice is dried too quickly or too much it may crack during milling and storage.
- Rice should be spread into a layer no more than 5 cm deep. As it is drying, rice should be turned (rakes may be used) every hour.
- Always dry rice on a clean surface such as a tarpaulin, mat or concrete floor to avoid mixing grains with stones.

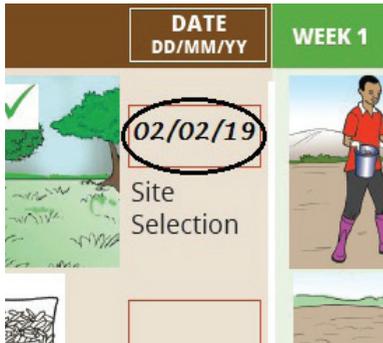


Cleaning

- Rice should be kept clean while drying to maintain quality produce. Do not allow water and dirt to mix with drying rice.
- Keep animals such as birds and livestock away from the rice, as they may eat it or leave droppings in the drying grains.
- Clean dried rice by winnowing or separating stones and chaff from grain before it is stored or packaged.

Annex | Handout Calendar Activities

As mentioned in the introduction, a take-home version of the Upland Rice Cropping Calendar is available. The additional activities presented in it are explained here.



Date Tracking

- Illustrations of the activities on the Rice Cropping Calendar and explained in this guide are seen on the handout calendar. Next to each picture a blank space is provided for farmers to write the date they perform each activity.
- As activities are performed and the rice crop grows, keep track of dates. Refer back to completion dates to find out how long each stage of crop growth takes to make planning for future activities easier.
- The format for keeping track of dates is to write the day, month and year (DD/MM/YY) when each activity is completed. This is a recommended format only; i.e. a farmer does not have to record the year, may indicate multiple days and so on.



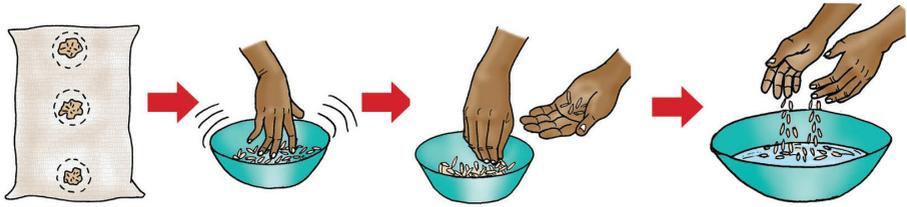
Storage

- Rice grains become less healthy with time. It is important to store any rice that is not sold or consumed to keep it for later use.
- Rice for storing should be dried to no more than 13-14% moisture content to prevent mould or germination.
- Airtight containers preserve rice for a long period of time by protecting it from moisture, light and pests.
- Common airtight storage methods include silos (either plastic or metal) and hermetic storage bags.
- Store containers in a clean facility with ventilation and no moisture or signs of pests such as rodents.
- Rice seeds should be planted within one year of harvesting for best results.

Germination Test

When planting seeds of unknown age and quality, a germination test can be done to test rice seed quality by following the steps below.

1.



Pick SAMPLES from all 3 sample spots Mix the SAMPLES together Pick 100 seeds Soak seeds for 24 hours

2.



Wrap the soaked seeds in a clean cotton cloth

3.



Keep the cloth moist and leave it tied for 48 hours

4.



At least 85% of the seeds should have germinated

- After step 3, leave the seeds in the soaked cloth. After 10 days, check for germination.
- Count the number of fully germinated seeds. Both the shoot and the roots should have emerged from the seed to be germinated.
- At least 85% of seeds should have germinated in good quality seeds. If less than 60% have germinated, the rice tested should probably not be used for seed.

Float Test

Rice seeds that float in water are not good for planting. They are empty or rotten and will not germinate when planted. The float test below can be done to identify seeds for planting.

1.



Pour clean water into a clean container

2.



Soak selected seeds

3.



Remove all the floating seeds after 48 hrs

4.



Good seeds remain on the bottom

- After performing the float test, the seeds that have remained on the bottom should be used for planting in a garden.

Acknowledgements

Contributing authors:

- Jimmy Lamwo - NARO-NaCRRI
- Otim Godfrey A. - NARO-Ngetta ZARDI
- Christine Elong- NARO-Ngetta ZARDI
- Barbra Nambozo-NARO-NaCORI

Farmer representatives:

- Koire Asuman – Butaleja district
- Asimwe Joseph - Kyazanga- Lwengo district
- Wafana Yahaya - Kayunga district
- Acan Eunice – Farmer, Kitgum
- Nakalembe Dorothy – Farmer, Mukono
- Jennifer Opio – Farmer, Dokolo district
- Barisiyoy Jemimah – Wakiso District Farmers association

Extension staff representatives:

- Fredrick Kabango – DAO, Masaka
- Namubiru Sarah – DAO, Luwero
- Alloo Eunice – Senior DAO, Tororo
- Nsubuga Zaccheaeus Mukasa – DAO, Kayunga
- David Kiryabwire – DVO, Mukono
- Khauka Busiku Samuel – DAO, Mbale

Reviewers:

- Christine Alokit – CABI
- Abigael Mchana – CABI
- James Watiti – CABI
- Daniel Karanja – CABI
- Barbara Mugwanya Zawedde – NARO Secretariat
- Imelda N. Kashaija - NARO Secretariat

With support from:



THE WORLD BANK



For more information contact:
National Agricultural Research Organisation (NARO)
P.O. Box 295, Entebbe, Uganda
E-mail: dgnaro@naro.go.ug
www.naro.go.ug
Telephone: +256 414 3201041



Illustrated and designed by

MANGO TREE
communicate · design · educate