

# Pack 118

# Type: Backgrounder

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**Backgrounder on the System of Rice Intensification, including marketing and the impact of climate change**

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**Introduction**

Rice is a cereal that originated in Asia and grows in all humid and sunny regions of Africa. Rice grows in water and produces a panicle \* containing 100 to 200 grains. Rice is sown, then transplanted when it is 20 to 30 cm high.

Rice is rich in starch, vitamins, minerals, and fibre, and is an ideal food for those who suffer from gluten intolerance. \*

Rice is consumed everywhere in Africa. According to 2015 data, in Mali, the average consumption of rice is 73.85 kg per person per year. Malian consumers tend to prefer local rice. This trend is important as it increases the success of local rice producers, generates jobs, and helps retain the population in rural areas.

**Why is this topic important to listeners?**

This topic is important because:

* Rice farmers can discover how to improve their standard of living.
* Rice farmers will find timely information on harvesting, nursery techniques, and other activities.
* Rice is the staple food for more than half the world's population, and the livelihood for nearly one billion people in rural areas of developing countries.
* Rice produced in Mali is mostly consumed in Mali.
* Rice demand in Mali is propelled by population growth, rapid urbanization, increased incomes, and consumer preferences. West African imports account for 20% of the rice traded on the world market. Rice demand is outstripping local supply, creating a significant deficit and a need to support rice farmers with all the tools necessary to increase rice production.

**Some key facts**

* Rice is a staple food for more than half the world's population.
* Rice has more than 40,000 varieties (different colours, sizes, tastes, and grains), and more than 100 varieties are commonly grown worldwide.
* Rice is rich in carbohydrates, sugars, and vitamin B. It is one of the main sources of the energy we need for daily activities.
* Rice is typically grown in cool, swampy, or artificially flooded soil in southern regions with intense sunlight.
* Rice seeds are sown in bowls under shade to save time, because germination requires temperatures of at least 14 °C.
* Rice fields should retain water to avoid weed growth during growing periods.
* Rice prices increased significantly in Mali in 2007/2008, driven by world prices and growing demand for local rice.
  + High quality local rice is a new niche market. Thus, the local market in Mali is divided into a niche market for quality local rice and a mass market for various kinds of imported and uncleaned local rice. The niche market for luxury rice attracts a premium of 15-25%.
* Rice producers in Mali sell their production as husked rice, which allows them to capture added value.

The rice production methods practiced in Mali can be classified as follows:

*Submerged rice cultivation (paddy rice)*: Free-flooding or floating rice cultivation is the oldest form of cultivation practiced in Mali. The crop is grown in flooded depressions for three to six months along the Niger River in the Mopti, Timbuktu, and Gao regions. Rice is sown with the first rains, and water is added to the paddy field as the rice grows taller.

*Controlled flooded rice*: Controlled flooding is practiced in Segou in the Office du Riz Segou, and in Mopti at the Office du Riz Mopti. In both cases, the basic system is the same: rice fields are protected by a dike against the early arrival of floods, and water is allowed in and drained at will—hence the partial control of irrigation water.

*Irrigated rice at the Office du Niger \*:* The colonizer (France) established the Office du Niger in 1932. The initial project covered 960,000 ha, of which 450,000 ha were planted with rice. The Office du Niger is now an industrial and commercial establishment that achieves yields of 8-10 t/ha of paddy rice within a few years of planting rice in a specific area.

**Major challenges associated with rice production in Mali**

* Lack of reliable ways to finance rice production.
* Producers’ low purchasing power and the increasingly high price of fertilizer.
* Delays in supplying fertilizer to the areas where it is used.
* Lack of organization of farmers and local suppliers to ensure a timely supply of fertilizer.
* Women farmers own only 10% of the developed land and have limited access to productive resources and services needed by farmers.
* Terrorist activities that prevent farmers from going to their fields.

**Gender dimensions of rice farming**

* Women participate in all phases of rice cultivation: weeding, pest and disease management, harvesting, storage, processing, and marketing.
* Women work together in Malian rice fields. For example, to transplant a field, farmers may hire 30 or more women and pay them about $60 US per hectare. The same arrangement applies to activities such as harvesting. The money received by the women is kept in a group fund from which the members can borrow credit or business funds, then repay without interest.
* Women own only 10% of the developed land in Mali, and women farmers have limited access to productive resources.
* Women do not have an opportunity to express their needs and have little experience with new technologies. In all rice-growing regions in Mali, men are the main beneficiaries of new research on rice production.
* Women sell the rice they produce in the small plots they are assigned by their husbands. The culture in these farming areas consists of large traditional farming families, consisting of 10 to 20 couples. Family household heads do not consult with women when making decisions about selling produce.
* Women are less likely than men to own land, adopt new technologies, have access to credit or other financial services, or receive training or extension services.
* Women do not have equipment to work their farms and are thus dependent on men: they have to wait for men to finish with equipment. Because they have access to equipment last, this reduces rice production, especially when harvests are poor.
* Women own land with poor soil and generally lack training to address this issue.

**Predicted impact of climate change on rice production**

Climate change has a significant impact on rice production.

* Climate change results in a scarcity of rainfall in areas where traditional farming is being practiced, resulting in reduced production.
* Desertification considerably reduces rice farming areas. Reforestation has been organized in rural localities such as the Office du Niger to halt the advance of the desert.
* Climate change affects the frequency of rice diseases and pest problems. Worsening water shortages, irregular rainfall patterns, and related water stresses intensify some diseases. As climate change intensifies, experts expect that the intense droughts experienced in rain-fed rice-producing areas will also occur in water-stressed irrigated regions.
* Flooding has many negative consequences for rice cultivation. It reduces the amount of sunlight rice plants receive, reducing growth. Also, receiving less sunlight weakens plants and increases the risk of lodging. There is also a greater risk of damage from pests such as the yellow stemborer and the ufra nematode in flooded fields.
* Producers are adapting new varieties that can cope with the changing climate, including NERICA, Gamiaka, and BG90-2. These varieties resist and allow farmers to adapt to the impacts of climate change, including decreases in rainfall and increases in temperature. These hybrids have the high yield of their Asian parent and the adaptation to local conditions of their African parent.

**Key information on rice farming**

The following information focuses on the System of Rice Intensification, or SRI. Practicing SRI results in higher yields.

**Preparing the soil and the nursery:**

**1 The nursery: (May 20 to July 15)**

* The nursery bed should be 1.5 metres wide and 7 metres long.
* The bed should contain loose soil with a depth of 15 cm, exceeding the length of the roots (about 10 cm).
* Add a mixture of sand and organic fertilizer if the soil is heavy and/or clayey.
* Use 7-9 kg of rice seeds per hectare after soaking the seeds in warm water for 24 hours. Set aside seeds that float to the surface as empty husks. Divide the seeds into three parts: 1/3 to sow the first half, 1/3 to sow the other half, and 1/3 to fill gaps where seeds do not germinate.
* Cover the seeds with a little sand, and cover the whole nursery with mulch. Water morning and evening.
* During the germination period from the second to fifth day, gradually remove the mulch.
* Start transplanting when the plant is 20-30 cm high about 8 to 10 days after planting.

**2 First irrigation: (May 30)**

Pre-irrigation consists of adding water to a depth of 770 mm per hectare to the nursery and maintaining this level of water until it has evaporated completely. This prevents weed growth and promotes the decomposition of organic manure.

**3 First plowing: (June 10)**

Farmers should conduct the first plowing after the nursery has been drained, about ten days after adding water. Plowing buries the weeds that grew after the pre-irrigation. After first plowing, farmers can use hoes to build bunds around fields. The bunds can be up to 40 to 45 cm high and 25 to 35 cm wide, depending on the field.

**4 Second irrigation: (June 12-15)**

It is done after the first ploughing to allow weeds to emerge. It is worth noting that it takes place immediately after the first plowing which is done in water, so the rice field can be wet until June 15.

**5 Transplanting: (July 15 to August 15)**

To transplant rice, farmers should:

* Uproot seedlings from the nursery after ensuring that the nursery soil is moist.
* Remove seedlings by hand, shovel, or hoe.
* Spread seedlings over the rice field to facilitate the work of the transplanting team. Spreading and transplanting must be done quickly to prevent the roots from drying out.
* Transport seedlings carefully. Transplanting is conducted in muddy and sticky ground without water. Transplant seedlings 25 cm apart in every direction, using ropes marked at 25 cm.
* Transplant seedlings with a clump of soil at the root.
* Gently slide the seedlings into the mud with your thumb. After transplanting, lightly irrigate the plot and keep it moist for two weeks.

**6** **Fertilization: (31 August-25 September)**

* Decisions about fertilization methods must consider the soil conditions and crop history of the land. Conduct a fertility test if possible, because different soils are exactly alike.
* It is worth noting that there is a common rice fertilization program used by a large number of rice farmers, which involves applications of urea and manure.
* Rice farmers are advised to apply 72 kg of urea per hectare.

**7 Using organic fertilizer (manure): (January 1 to June 30)**

Using organic manure (plant and animal fertilizer) can reduce the cost of rice production. It acts as a soil amendment that increases the efficiency of mineral fertilizers and also improves soil texture and water retention. Apply 10 tonnes or 50 200-kg carts per hectare.

**8 Harvesting: (December 20)**

Harvest 40 days after flowering and 130 days after sowing. One or two weeks before the harvest, drain the water from the rice field. Harvest by mowing with a sickle or by cutting the panicles.

**9 Threshing:**

* Place harvested plants in a pile about 10 to 15 metres in diameter and 1 to 1.5 metres high.
* Turn the ears of rice towards the inside of the pile to avoid bird damage and direct sunlight, which increases the rate of breakage.
* Fill bags with rice and then thresh.
* In traditional threshing, farmers beat rice stalks with sticks until the grains are removed. There is also modern threshing with a threshing machine.

**10 Winnowing:**

Recommended winnowing methods:

* Put the grains in a basket.
* Place the basket or mat on the ground below.
* Tilt the basket against the wind.
* Pour the grains into the basket or onto the mat slowly from a height of about one metre.
* Wind will separate the grains from pieces of stalk and other debris.
* Keep only the grains.
* Repeat the operation as needed.

**11 Drying:**

There are two methods of drying: natural and artificial.

* *Natural drying:* Consists of exposing the grains to air, sun, or shade. This method is suitable for small quantities of grain, but not recommended in humid regions or during the rainy season. Also, if drying is insufficient or too slow, it can lead to significant yield losses.
* *Artificial drying:* Dries a greater quantity of grains faster, and does not depend on weather conditions. However, it is more energy-intensive and complex than natural drying, and requires purchasing dryers and fuel.

**12 Rice marketing (year-round):**

Rice marketing involves interactions between producers, collectors, wholesalers or semi‑wholesalers, retailers, and consumers.

* + *Producer co-operatives*: Individuals and organizations (co-operatives, associations, companies) of producers. Individual producers sell paddy \* and/or husked rice to collectors or semi-wholesalers. Transactions between individual producers and semi‑wholesalers take place at the periphery of the farm and in weekly markets.
* *Semi-wholesalers*: Re-sell either to retailers or wholesalers. Because they make little on individual translations, semi-wholesalers must conduct many rapid transactions to survive economically.
* *Wholesale traders:* Large rice merchants based in major regional cities and in the Bamako district. They have an average storage capacity of at least 20 tonnes per season and conduct a variety of activities, receiving rice from networks of collectors that they pre-finance. Wholesale traders control rice imports. The sector is highly concentrated, with a few dominant traders who exercise a monopoly and have the advantage of access to bank credit for imported rice.
* *Retail traders*: Local sales points in rural and urban markets and in neighbourhood stores. They mostly sell rice and dry grains such as millet and sorghum.

**Definitions**

*Gluten intolerance***:** Gluten refers to proteins found in many cereal crops.Individuals with gluten intolerance may experience pain and bloating after eating foods that contain gluten.

*Office du Niger*: A semi-autonomous government agencyresponsible for rice cultivation, land development, and water management in the Ségou region of Mali.

*Paddy***:** Unhulled rice.

*Panicle*: Flower cluster.

**Where can I find more resources on this topic?**

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