

## Rice value chain analysis in Mali

Value chain analyses assist in informing policy dialogue and investment operations. They allow understanding of how agricultural development fits within market dynamics and determine the value chains' impact on smallholders and companies.

The methodological framework for analysis has been developed by the European Commission. It aims to understand to what extent the value chain allows for inclusive growth and whether it is both socially and environmentally sustainable.

The analysis often considers the comparison between different technical and commercial systems.

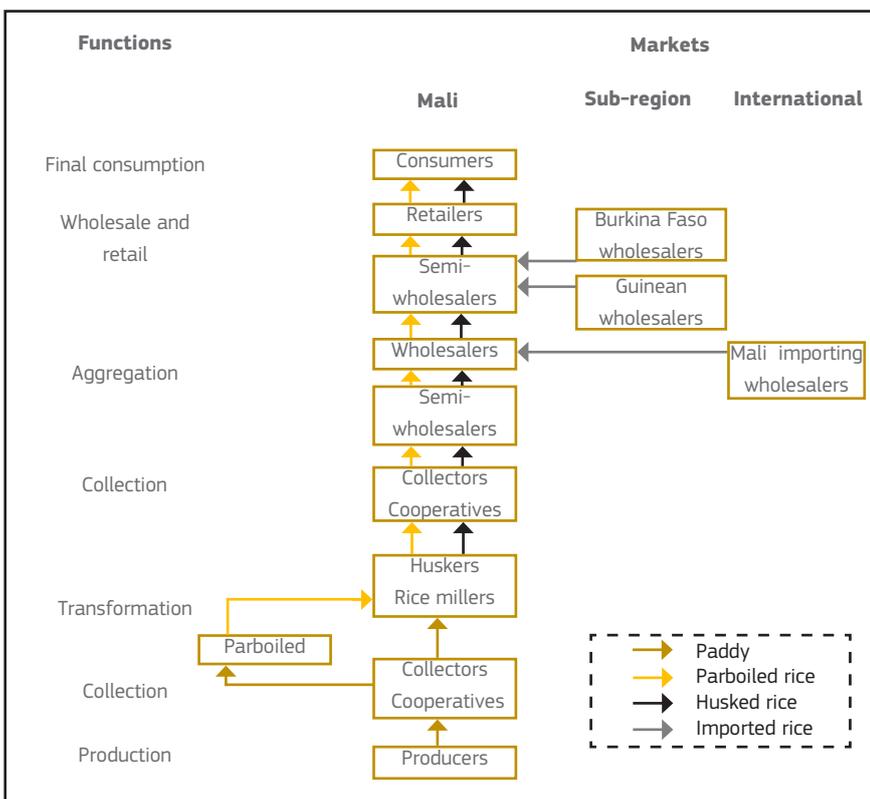
Studies are performed by research teams from Agrinatura members or affiliates.

Within the bilateral cooperation with Mali, the European Union finances a budget support program for the rice sector.

The Malian government intends to develop the production of rice in irrigated areas in order to reduce the country's reliance on imports.

This aim of this analysis is to foster the policy dialogue within the sector. This study may also be supplemented by additional analyses.

The value chain analysis, Rice in Mali, took place at the beginning of 2016.



The yearly production of rice in Mali increased from less than 20.000 t at the beginning of the 1980s to 1 million t at the beginning of 2000, and to more than 2.5 million t from 2010.

However, imports (mainly from Myanmar, Thailand, India and Pakistan) remain necessary to satisfy a demand in steady growth, particularly in urban areas.

Figure 1 : The flows of the value chain

## Functional analysis

### Production systems

Four rice production systems exist in Mali. They are distributed across the territory according to geo-physical and climatic features:

- **partial water control** by controlled flooding and in the lowlands (45% of the rice area);
- **full water control** on large and small irrigated perimeters (25%);
- **rainfed system** (18%);
- **uncontrolled river flooding** (12%).

The regions of Mopti (27% of the rice surface area), Ségou (26%), Sikasso (16%) and Tombouctou (15%) comprise more than 4/5 of the total rice area.

### Agricultural yields

Rice cultivation is dependent on water supply, resulting in a wide variety of productivity levels per hectare.

**Except for the full water control system (8t/ha) yields are low:** 1t/ha in uncontrolled flooding, 1.5t/ha in controlled flooding, 1.5/ha in the lowlands and 3t/ha in rainfed systems (with the variety Nerica).

### Marketing channels

Paddy is collected and transformed into white rice in small rural centres by units, differing by size and techniques used. It is then routed through several intermediaries in the major urban centers. Throughout the country, consumers buy both local and imported white rice.

### Consumption

Today Malians consume more than 80 kg of rice per person per year.

The **share of rice in total cereal consumption is increasing**; currently it is about 35%. This is due to the ease of cooking compared to other cereals, urbanisation and changes in consumption patterns in the country in general and in cities in particular (street food, non-stop working day...).

### Jobs

There are many jobs in the supply of inputs (2,000 suppliers), processing and in particular husking (3,500 hullers), steaming (30,000 women) and marketing.



### Organisation and market dynamics

The **horizontal coordination** between actors in the value chain is **developed at the level of producers**: a large number of farmers' organisations and union cooperatives exist, such as the Plateforme Nationale des Producteurs de Riz du Mali (PNPRM).

**Vertical coordination is embryonic**, revealing a lack of trust between actors in commercial and financial transactions.

The **sector is dynamic**, increasing its productivity and responding positively to market incentives (increase in consumption) and supply (subsidy and supply of inputs, infrastructure subsidy).

Production is dispersed geographically and the **markets are segmented** at the level of production basins (paddy, rice). This situation prevents the free adjustment of prices to supply and demand and favours regional oligopolistic positions that are detrimental to producers.

**A few wholesalers** are in **a dominant position** in the VC. Furthermore they benefit from fiscal advantages on imported rice.

## Economic analysis

The rice value chain in Mali is economically sustainable, competitive and contributes to inclusive growth.

It is however confronted with **several risks to sustainability**, the main one being **linked to water** (competition with other uses particularly during low water level of the Niger river).

It is also subjected to the risk of **price fluctuation** on the international market (that influences the domestic price) and to **phytosanitary risks** (termite attacks...).

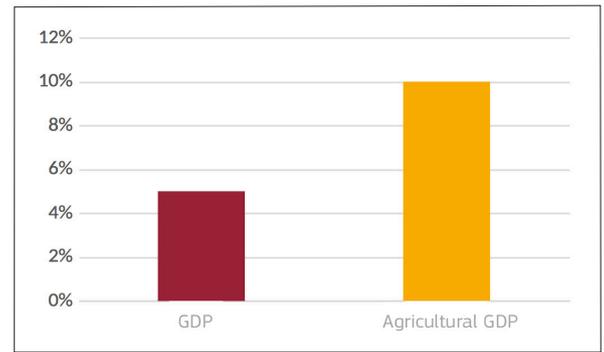


Figure 2: Contribution of the rice value chain to the GDP and Agricultural GDP

### Value added

Value added for producers at farm gate \*

FCFA per kilo

Rainfed 46-47 F/kg

Flooding 12-52 F/kg

Irrigated 47-55 F/kg

FCFA per hectare

Rainfed

89.000 F/ha

Flooding

13.000-62.000 F/ha

Irrigated

197.000-208.000 F/ha

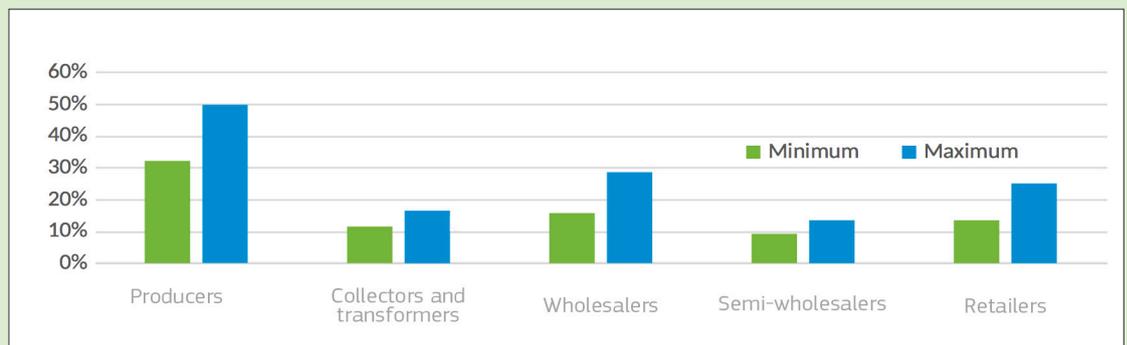


Figure 3: Contribution to the value added at the different stages of the chain

\* Ranges related to the production area (Sikasso, Ségou) and the type of rice (Gambiaka, parboiled)

### Viability in the international economy

The production of rice is highly competitive at international prices (domestic resource costs <1).

### Balance of trade

**Imports accounted on average for 16% of available rice on the national market**, negatively impacting the balance of trade. The exports were marginal but the potential is real.

### Public finances

The production is supported by **public subsidies**. 61% of these funds are allocated to agricultural and rural infrastructure (including hydro-agricultural infrastructure) and 31% is allocated to inputs.

Thus, the public support to the domestic value chain is 15 billion FCFA per year while the tax for the government is 6 billion FCFA per year. That is to say a **net negative balance for public funds of 9 billion FCFA**.

In addition the State exempts importers from taxes and duties to reduce the risk of shortages. However, **given the status of imported rice stocks, these exemption measures seem unjustified**. Moreover they do not even have effects on the rice prices for consumers. They provoke exceptional benefits and favour a few importing wholesalers who therefore constitute an oligopoly.

### WHAT IS THE CONTRIBUTION OF THE VALUE CHAIN TO ECONOMIC GROWTH?

The contribution of this value chain to the GDP and Agricultural GDP is significant and increasing.

Despite some distortions in the market, linked to the position of the oligopoly of the main importing wholesalers and the interventions of the government, the value chain is **economically viable** within the international market. Mali has a **comparative advantage** not only in substituting the total amount of rice imports but also in its ability to export to neighbouring countries in deficit (Guinea, Mauritania).

## Social Analysis

The rice value chain in Mali has contributed significantly to the evolution of many social indicators in recent years.

Rice is a **central component for food security and nutrition**. Progress has been made on social capital, gender and working conditions. By contrast, **access to land and water is still problematic** in the area of the Office du Niger. Globally, efforts are still needed in all the domains studied.

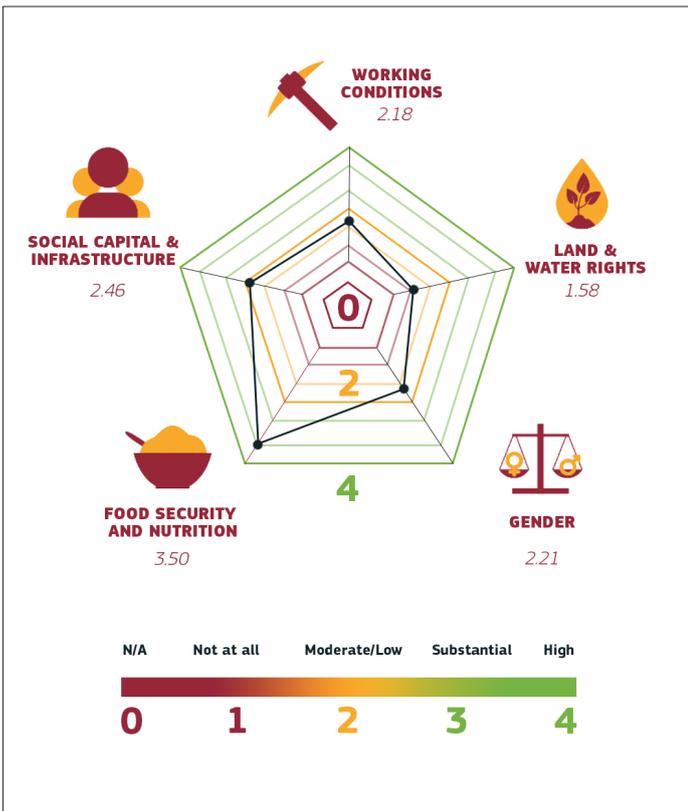


Figure 4: Social profile

### IS THIS ECONOMIC GROWTH INCLUSIVE?

20% of farms practice rice cultivation. More than 5 million Malians, representing about a third of the population, are directly involved in rice production. Thus showing **the capacity of the value chain to provide jobs**.

All actors in the value chain consider that the **distribution of value added** is 'reasonably' fair and balanced.

However, the producers' incomes are hampered by the **absence of vertical coordination** and of a real inter-branch organisation, the strong disconnection between the regional markets and the **oligopolistic positioning** of a few wholesalers coupled with the exemptions from taxes and duties on imports.

<b>Working conditions</b>	Improvements (attractiveness, freedom of association), precariousness (contracts, child labour...).
<b>Land and water rights</b>	Lack of consultation with populations when granting land to foreign investors at the Office du Niger.
<b>Gender</b>	Positive developments in terms of access to inputs and participation in decisions of farmers' organisations.
<b>Food security and nutrition</b>	Strong contribution (availability, diversity, accessibility).
<b>Social capital and infrastructure</b>	Social infrastructure developments in the Niger river valley (school, health, water, energy)

Figure 5 : Principal observations by domains

### IS THE VALUE CHAIN SOCIALLY SUSTAINABLE?

Despite the advances, the **constraints and risks remain numerous** at the social level and **may challenge the sustainability of the value chain**.

**Working conditions:** under-remuneration of wage labour, vulnerability of unprotected workers in the event of illness or accident.

**Access to water:** exclusion of producers from their land by multinational and national private enterprises, exacerbation of conflicts with these companies, disparity between public land policies and the reality on the ground.

**Gender:** exclusion of women from certain activities (transport, marketing), marginalisation for economic decisions (production, marketing), limited autonomy in deciding how to use household resources, persistence of women's poverty.

**Food and nutrition security:** increasing importance of rice in diet, dependence on external finances (rural exodus of the young, mining), deterioration in consumers' purchasing power, malnourishment of the most vulnerable groups of poor and rural households.

**Social capital and infrastructure:** high number of poor households deprived of care, and marginalisation of communities in the decision making processes affecting their livelihoods.

## Environmental analysis

The transformation, transport and marketing phases are not significantly impacting the environment. **Most of the impacts are generated during the production phase.** Rice production in Mali is not highly mechanised, as such the consumption of inputs and direct emissions from rice fields are the main sources of impact: methane emissions (climate change), heavy metal emissions (human and water toxicity), nitrogen and phosphates emissions linked with fertilizers (non-organic respiratory pollutants, acidification and eutrophication).

The impact on **resource depletion** is related to land use, water consumption (river and rain) and the use of fertilisers and herbicides of mineral origins. It can be amplified by low-yielding cropping practices (uncontrolled and controlled flooding).

The use of fertilizers and herbicides also has an impact on the **quality of ecosystems.** Phosphate (PO<sub>4</sub>) emissions from fertilizers use are responsible for 85% of freshwater eutrophication. Emissions of ammonia (NH<sub>3</sub>) can lead to acidification and soil eutrophication. The use of herbicides may lead to freshwater ecotoxicity. Finally direct methane emissions from rice fields have an impact on climate change and the quality of ecosystems.

The production of rice presents a risk for **human health** linked with to the use of herbicides and fertilizers. The use of herbicides generates heavy metal emissions with carcinogenic effects. The use of nitrogen fertilizers generates emissions of NH<sub>3</sub> which can cause respiratory diseases related to non-organic pollutants.

### IS THE VALUE CHAIN ENVIRONMENTALLY SUSTAINABLE?

For each tonne of rice produced, the **total water control system has the lowest impact on the environment** for most of the indicators. This is mainly due to high yields (compared to other systems) and better mastering of water control and crop calendars.

In contrast, **the uncontrolled river flooding system has the highest environmental impacts** due to its low yield.

The rainfed system has environmental scores that are very close to total water control system. The **rainfed system presents a very interesting potential** for addressing the two major environmental deficits of water management and adaption to climate change.

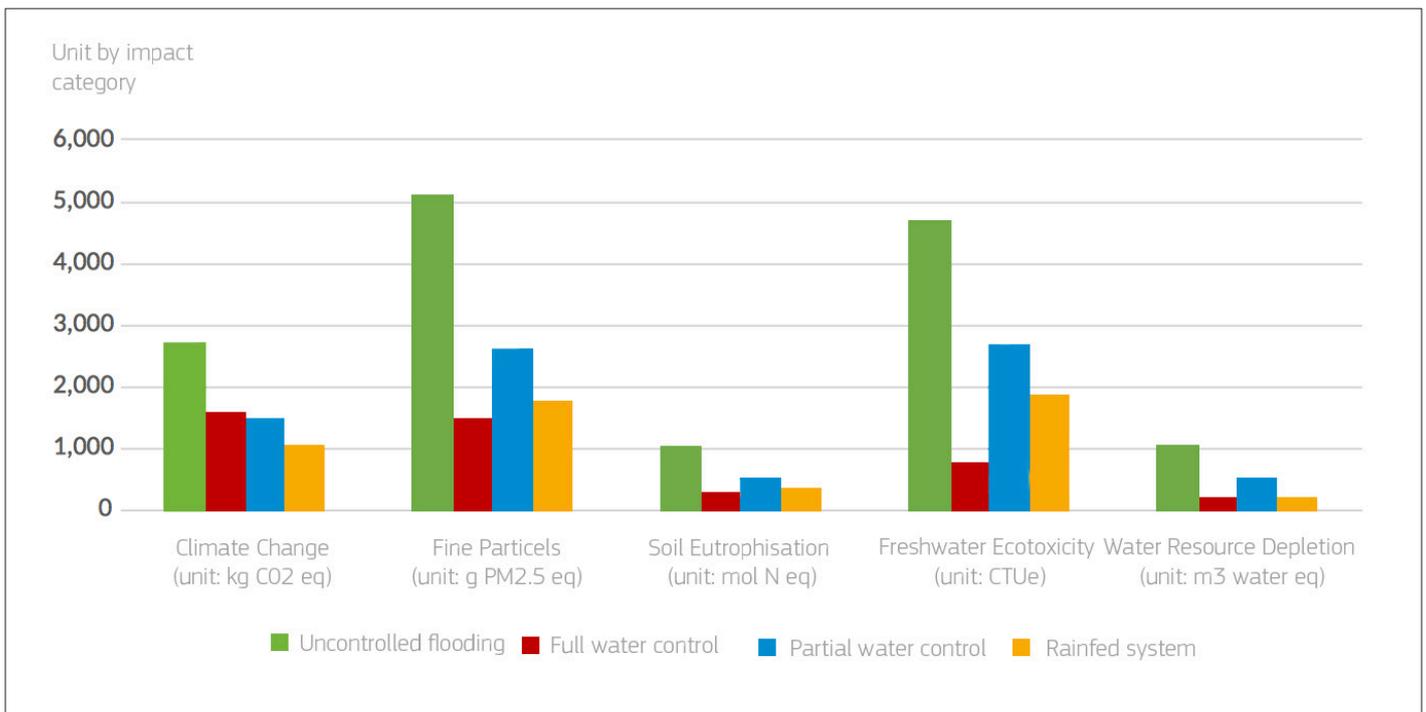


Figure 6 : Indicators of the environmental impacts for the principal production systems (per tonne of rice).

## Main findings

The rice value chain in Mali **contributes significantly to the economic growth and is fairly inclusive**. However, it does face several constraints that limit its sustainability in the economic, social and environmental domains.

The following attention points and recommendations should help address the identified risks and enhance overall sustainability and fairness within the value chain.

To **improve economic sustainability**, the team of experts proposes the following steps and actions:

- **Support the establishment of an inter-branch organisation** to facilitate vertical coordination in the value chain and help open up regional markets, reduce transaction costs and improve producers' incomes.
- **Stop exemptions from import duties and taxes** not justified outside a real emergency or tension in the market, in order to limit the unwarranted earnings of importing wholesalers and allow for better market transparency and fluidity.
- **Rebalance public interventions** in favour of other areas of production than the Office du Niger and in favour of rainfed rice production, thereby improving the overall resilience of the value chain.

In order to **improve social sustainability**, the most critical area on which to act is access to land. Despite the existence of new land legislation, the reality of households/family farmers insecurity remains. The situation of producers remains very fragile with the rules of land management in the area of the Office du Niger.

It is necessary to make the business environment more attractive and favourable to the value chain through public investment and infrastructure. Particular attention should also be paid to the most disadvantaged actors (women and youth) and to raise awareness of schooling opportunities in order to deter child labour.

To **improve environmental sustainability**, negative impacts identified in the production phase can be reduced by purchasing policies of environmentally friendly agricultural inputs and improved water management (drainage and aeration).

Better control of post-harvest operations and adapted processing equipment (mini-rice mills) would reduce losses during the processing stage.



**Value Chain Analysis for Development** is a tool funded by the European Commission / DEVCO and is implemented in partnership with Agrinatura. It uses a systematic methodological framework for analysing value chains in agriculture, livestock, fishery, aquaculture and agroforestry.



**Agrinatura** ([www.agrinatura-eu.eu](http://www.agrinatura-eu.eu)) is the European Alliance of Universities and Research Centers involved in agricultural research and capacity building for development.



The information and knowledge produced through the value chain studies are intended to support **the Delegations of the European Union** and their partners in improving policy dialogue, investing in value chains and better understanding the changes linked to their actions

*The study of the rice value chain in Mali was performed by Baudoin Michel, Fayçal Boureima, Mamadou Goita.*

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