



APRA Brief

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A Historical Analysis of Rice Commercialisation in Ethiopia: The Case of the Fogera Plain

Key messages

Following the introduction of rice into Ethiopia in the 1970s, rice commercialisation in the Fogera Plain has been strongly associated with several key factors:

- The existence of suitable agro-ecologies and the quest of successive governments to address food insecurity and improve agricultural production;
- The compatibility of rice with local farming systems and traditional foods, especially *injera* (traditional flat bread);
- The economic incentives for rice production related mainly to higher productivity in relation to better unit prices versus other cereal crops;
- The favourable public policy environment and support of international development partners to promote research and development (R&D) efforts to increase rice production;
- The emergence of processors acting as pull factors for rice commercialisation;
- Government concerns about increasing rice imports to meet rising consumer demand, which has put pressure on scarce foreign currency reserves.

Introduction

This brief, which is based on a longer paper¹, presents a historical analysis of rice commercialisation and its impacts on local livelihoods and rural economies in Ethiopia, drawing insights from the experience of the Fogera Plain in the Amhara Region. Fogera is one of the regions which has experienced the largest expansion of rice production and processing in the country.

The brief presents a review of historical trends in the introduction of rice in different parts of the country, the changing nature of rice farming systems, the observed agrarian changes, and some of the associated initiatives that have enhanced these trends.

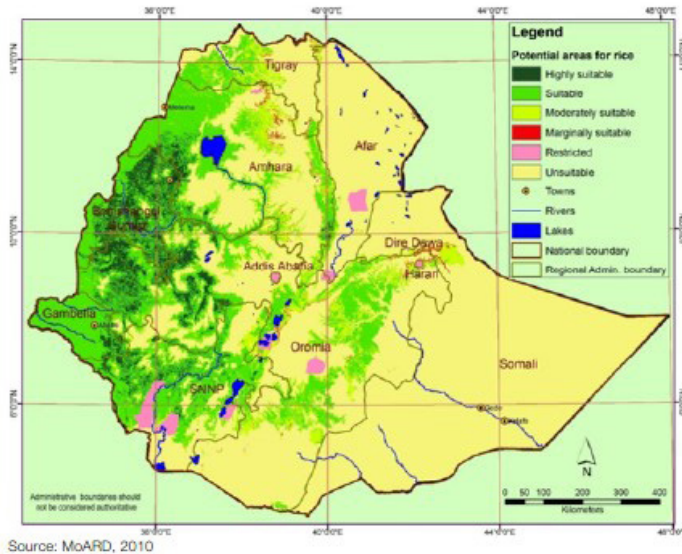
Rice and its linkage with food security

The introduction of rice in Ethiopia was linked to efforts to address food insecurity during the Derg regime. Following the regime's fall in 1987, the expansion of rice after 1991 was driven by the same concerns. During this time, Fogera was well-known for food insecurity, which was linked to long periods of flooding and also low productivity of staple crops (mainly *teff*).

It is estimated that the country has about 30 million ha of land suitable for rain-fed rice production. In addition, with 10 river basins, the country has the potential for a further 3.7 million ha of land where irrigated rice can be produced. The possibility of growing rice in rain-fed and irrigated agro-eco-systems of Ethiopia's lowland and intermediate areas demonstrates the opportunity that rice presents for poverty reduction in these target ecologies.

¹ Alemu, D. et al. (2019) *An Historical Analysis of Rice Commercialisation in Ethiopia: The Case of the Fogera Plain*, APRA Working Paper 18, Future Agricultures Consortium

Figure 1 Agro-ecological suitability map for rain-fed rice production



Rice commercialisation and dynamism in rice-based farming systems

There are two rice production agro-ecologies in the Fogera Plain, which are both cultivated under rain-fed conditions:

- Wetland (or lowland) – known as *Wedek meret* by local farmers
- Upland rice – known as *Goba meret*

These agro-ecologies present different dynamism in terms of changes in farming systems and type and composition of agricultural enterprises, which was assessed based on farmers' perceptions in relation to the importance for the livelihoods of farm households

Farming systems in the wetlands (*Wedek meret*)

Rice was first introduced into the Fogera wetlands. Before rice, the area was characterised by swamps in the rainy season for about three months, after which it was devoted almost exclusively to grazing by the indigenous Fogera cattle breed, which copes with waterlogged conditions, and is one of the best local breeds for both milk and meat.

However, the introduction of a cultivated rice variety resulted in significant changes in the local farming systems, as rice cultivation expanded and grazing land used for Fogera cattle and other crop production (niger seed, chickpea, wheat, and oats) decreased. According to focus group discussions with local farmers, the following trends have been observed:

- **Decline of traditional crops.** Niger seed production in the wetlands ceased by end of the 1990s. *Teff* production also declined, but still exists in pockets, given its traditional importance and the relatively high price it fetches in local markets.
- **Emergence of successor crops.** Grass pea production increased as it serves as a good successor crop to rice, allowing double- or triple-cropping, in addition to its role as a leguminous crop for improving soil fertility.
- **Decline in cattle-rearing.** Expansion of wetland rice production has resulted in declining grazing lands, a shrinking of the cattle population, and the genetic deterioration of the Fogera breed, which has resulted from interbreeding with upland cattle as farmers moved their Fogera cattle to upland areas in search of feed.
- **Emergence of new crops (vegetables and maize).** With increasing income from rice, farmers have started to invest in supplementary irrigation, which has also created the opportunity for production of other crops to further increase household income. Farmers generally use irrigation to supplement rain-fed rice production and to grow onion, tomato, and maize.
- **Emergence of new agricultural practices.** These include double cropping (rice followed by grass pea, chickpea, maize, or oats) and triple cropping systems (where vegetables are grown after double cropping), which were rarely grown before rice was introduced.

Rice research and development

In the Fogera Plain, one of the agricultural interventions during the Derg regime was the promotion of farmers' cooperatives, where certain international experts from different socialist bloc countries were invited to strengthen the capacity and boost the performance of established cooperatives.

Among these experts were a number of North Korean scientists, who supported two established farmers' cooperatives in Fogera, namely the Jigna Agricultural Producers' Cooperative in Dera *woreda* and the Shaga Agricultural Producers' Cooperative in Fogera *woreda*. These experts observed the existence of wild rice growing in the area, which indicated that the region would be suitable for rice cultivation.

In 1984, the team of nine North Korean agricultural experts came to the area with a project entitled the 'Ethio-Jigna Development Project' to promote rice and horticultural crops. The project collected and tested a number of different rice varieties, one of which – *x-Jigna*, brought in from North Korea – was found to be best suited to cultivation in the Fogera Plain. The project's researchers, working with experts at the South Gondar Department of Agriculture in Fogera, then encouraged Fogera farmers to begin rice production with the newly adapted rice variety, which remains in production today.

With the move of Getachew Afework – an agricultural expert from the South Gondar Department of Agriculture – to the Adet Agricultural Research Centre (AdARC) in 1991, formal rice research began in the Fogera Plain. The initial research effort involved the evaluation and multiplication of *x-Jigna*, and the provision of seeds to farmers in Jigna and Shega *kebeles*. AdARC then coordinated Ethiopia's national rice research until the establishment of the Fogera National Rice Research and Training Centre in 2013.

Over time, the number of institutions engaged in rice research has increased. Since the establishment of rice research in Ethiopia, the research system has released 17 varieties for upland, five varieties for lowland and seven varieties for irrigated cultivation. Recognising the importance of rice research, Ethiopia became a formal member of Africa Rice in 2016.

In Fogera's wetlands, although there has been a significant decline in communal grazing land and a measurable drop in teff production, farmers have increased their level of commercialisation through: (1) increased rice production and marketing; (2) engagement in commercial crops such as vegetables; and, (3) diversification of crop production for improved commercial orientation and livelihood options.

Farming systems in the uplands (*Goba meret*)

In the uplands of the Fogera Plain, rice production was established more recently, in 2006, following the introduction of upland rice varieties by the national research system and with the benefits of rice production felt by wetland farmers, who also had plots of land in upland areas. In general, upland areas used to be characterised by mixed crop-livestock farming systems where diverse types of crops were produced. However, with rice expansion in upland areas, the following trends have been observed:

- **Decline in some crops.** With the shift in land allocation to rice, there has been a considerable decline in production of other crops (*teff*, sorghum, niger seed and lentils) due to the relatively high economic returns that rice provides per unit area versus other crops.
- **Increase in successor crops.** Double cropping practices have also been introduced with the increase in production of grass pea, finger millet, maize, and chickpea and the introduction of common beans.
- **Decline in livestock production.** Increase in rice production, linked to the expansion in overall crop production associated with rising population pressure, has resulted in a considerable decline in the importance of livestock.

Rice production practices

In the Fogera Plain, farmers have their own production practices which they have developed over recent decades, and which shows diversity in the adoption of recommended practices and use of rice-related technologies as promoted by government extension services.

- **Varieties grown.** Although there are different varietal options, the popular varieties under production in the Fogera Plain are *x-Jigna* and Gumara.
- **Seed source.** The most common sources of rice seed are the market (88 percent) and direct farmer-to-farmer seed exchange. Research centres and cooperatives are also essential sources of improved rice variety seeds. A study in the Fogera area identified common problems related to access to improved seed varieties, including varietal mixture (74 percent), physical impurity (41 percent), and poor germination (19 percent). In recognition of these challenges, a number of initiatives have been implemented through the public extension programme and different development partners, to ensure availability and access to good quality rice seed varieties.
- **Rice planting.** Farmers practise broadcasting or row planting with direct row seeding or transplanting (80 percent). Pre-germination planting is also common to facilitate growth and early maturity. Transplanting is also practised by a small but growing number of farmers (~5 percent).
- **Weeding.** Weeds are a particular problem in rice cultivation, especially in the wetlands. Weeding is typically done 3–4 times per season and farmers estimate that this alone accounts for about half of total rice production costs. Chemical application is not common (< 10 percent) so nearly half of farmers use simple hand tools (e.g. sickle) for weeding.
- **Productivity.** Although national average rice productivity is estimated at 2.8 t/ha, it is reported to be > 4 t/ha in the Fogera Plain. While the extent of management practices used by farmers (including weeding timeliness/frequency, the use of improved varieties and fertiliser and row planting) impacts productivity over time, the quantity of rice sold at the market is also increasing, mainly driven by rising prices due to growing demand. This has stimulated further farmer investment in rice production in Fogera. The most significant weather-related factors impacting rice production are flooding and frost in the wetlands, and erratic or insufficient rainfall in the uplands.
- **Fertiliser.** Most producers do not apply the recommended quantity of fertiliser, due to the perception that flooding in the uplands brings nutrient-rich silts to the wetlands. Consequently, farmers believe that their rice fields are fertile and that lesser amounts of fertiliser are required, although this is not supported by research findings. Rice producers in Fogera District are reported to use very small amounts of inorganic fertiliser despite its positive impact on productivity.
- **Animal feed.** Many rice producers use rice straw as animal feed even though rice production in the wetlands is reported to be replacing livestock grazing. One tonne of rice straw costs about Br800 and farmers can generate a gross income of more than Br17,000 from 1 ha of land. Rice middling (a rice milling by-product) is also used and is a better quality animal feed than rice straw, with a high market value.



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Rice processing

Prior to the introduction of rice into the Fogera Plain, farmers used traditional processing methods including hand tools and stone grain mills. Although not specifically designed for rice processing, grain-milling machines were gradually introduced by private operators moving into the area to process the paddy rice. However, in 1987, the Ministry of Agriculture introduced an appropriate rice-processing machine through a producers' cooperative, which was the first attempt to demonstrate to local rice producers how paddy rice can be de-husked and milled efficiently.

The rapid growth of rice production has stimulated the emergence of a dynamic processing sector, with linkages in rural and urban areas. In late 2017, there were 119 processors operating with a legal licence in the Fogera Plain. Processors play a dual role by providing processing services to farmers and also acting as processed rice wholesalers. However, farmers report considerable rice breakage by processors in the course of de-husking, which reduces quality and marketability.

Grain breakage

The main reasons for grain breakage and a low recovery percentage of milled rice, which is reported to be 75 percent for de-husked rice (brown rice) and 65 percent for milled rice (white rice), are related to:

- **Machinery quality and efficiency** related to unavailability of standard milling machines to reduce the extent of rice breakage, and the use of old and inefficient machines.
- **Inadequate skills of machine operators due** to lack of formal training, which may result in poor-quality grain processing.
- **Deliberate action by processors in gaining price advantage**, which is where the price of poorly milled rice and better milled rice are more or less the same, as most consumers use milled rice to make flour rice for *injera*.

The processors, who also act as buyers of the milled rice, buy the poorly milled rice at a lower price but later sell it at a higher price as rice flour.

- **Poor quality paddy rice**, which lacks uniformity in grain size and proper moisture content. Processors complain that this creates a challenge to make adequate adjustments of their machines to process the grain consistently, leading to high levels of breakage and loss. In the case of rice, appropriate moisture is around 15 percent, but rice harvested in Fogera seems to have a moisture content of around 10 percent. This is mainly due to late harvesting, and being kept in the field for a long time after it is harvested.

The contribution of processors in facilitating the commercialisation of smallholder rice farmers through the different forms of service provision requires further investigation, especially in relation to which types of farmers are benefiting and which are losing out.

Trends in rice marketing practices

Most farmers sell their rice to local processors. However, farmers report that they are not always satisfied with the arrangement due to the poor quality of the finished product, resulting in lower rice prices. Some farmers also accused processors of manipulating their scales, leading to inaccurate estimates for the volume of rice bought and sold.

The type and number of actors engaged in the rice value chain has increased considerably from when rice was first introduced into the wetlands as a food crop, to become a key cash crop in the Fogera Plain. This has provided diverse options for farmers in terms of value addition and marketing channels.

The marketing practices of smallholder rice farmers are summarised in Table 1. The key issues are: (1) how the different practices benefit farmers; (2) how the different practices are related to the commercial orientation of farmers; and (3) how the provision of market information influences smallholder farmers' marketing practices.

Table 1 Rice producers' marketing practices

Indicator	Common practice
Type of products sold by farmers	<ul style="list-style-type: none"> ● Farmers sell either paddy rice or milled rice. It is estimated that the higher proportion of farmers sell after getting the paddy processed.
Time of sale	<ul style="list-style-type: none"> ● Most rice producers sell rice immediately after harvest, primarily linked to challenges of storage mainly during the months of October, November, and December.
Access to market information	<ul style="list-style-type: none"> ● Price data posted on <i>kebele</i>-level notice boards based on price data collected every Saturday by the District Trade Office. ● Information from processors, traders, and cooperatives can be accessed via telephones or direct visits.
Storage practices	<ul style="list-style-type: none"> ● Very few farmers store rice using locally-made storage structures, such as silos or plastic bags, potentially increasing post-harvest losses.
Price setting	<ul style="list-style-type: none"> ● Processors often offer a flat price, irrespective of the quality of the finished product. ● In general, farmers are 'price takers'; however, better access to mobile phones has increased their bargaining power in negotiating prices with different processors and buyers.

Source: Authors' own, based on data from 2017 survey.

Marketing practices are also related to the various marketing channel options that have developed over the years. Three factors influencing the channels are: (1) the requirement for producers to obtain processing services if they want to sell milled rice; (2) the dual role of processors as millers and traders; and (3) the limited incentives for quality product, which is influencing the product-type options and marketability. The quality of processed rice does not provide price incentives as broken rice is more or less equally priced to higher quality, de-husked rice.

Although most rice farmers sell to local processors, an emerging trend shows that the role of paddy rice collectors and par-boilers has increased over time as alternative marketing options for farmers. Some processors also operate as traders and they channel the processed rice either through brokers or directly to wholesalers and retailers in distant markets, such as Gonder, Dessie, Mekele, and Addis Ababa.

Rice commercialisation and gender perspectives

All household members (men, women, and youth) play important roles in rice production, from land preparation to processing. Even though family labour is engaged in the majority of operations, the involvement of hired labour is also significant, especially for semi-commercial farmers.

Women and girls are involved in seed storage and par-boiling.

Adult men and youths are responsible for tillage, broadcasting, and top dressing of fertiliser, pest control practices, harvesting, irrigation, and drying.

Young children from 7 years old are engaged in various farming operations depending on their physical capacity. At age 14, boys are able to plough land, while girls shoulder considerable responsibilities within the household.

Operations, sales, and control of cash income from the sale of rice largely remains the **domain of men** – despite the substantial contribution of women to rice production. On the positive side, many men have invested profits from rice sales into farm improvements (e.g. irrigation, oxen). On the negative side, some men spend their surplus on unproductive activities, such as drinking alcohol.

Key agrarian changes in the Fogera Plain

With the gradual shift in rice grown initially for food security to rice as a cash crop, several agrarian changes have occurred in a number of key areas, including:

Changes in production systems. Introduction of rice and its commercialisation has changed, especially in the Fogera wetlands, from livestock-dominated to rice-dominated production systems over the last three decades. With the increased capacity of farmers to invest in irrigation, vegetable production has expanded considerably, which is allowing triple-crop production.

Changes in the type and use of agricultural technologies. Increased use of modern agricultural technologies e.g. higher quality seed of preferred varieties, agro-chemicals (chemical fertiliser, herbicides, and pesticides), and irrigation technologies (water wells and water pumps). As a result, farmers have increased yields per unit



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of land and labour. However, this intensification is having a negative impact on soil fertility, leading many farmers to adopt intercropping of leguminous grass pea and others to apply increasing amounts of urea and other inorganic fertilisers to sustain yields.

Changes in type of farmers. Rice farmers in the Fogera Plain can be categorised into three groups: (1) those engaged in rice production with limited change in production practices; (2) those who have intensified rice production to be more commercially oriented; and (3) those who have expanded their business activities, in addition to rice production, to include rice processing, rural transport, trading, rental housing in urban areas, etc.

Emergence of a dynamic rural labour market. Demand for unskilled rural labour for rice production has grown considerably and younger landless family members have found good opportunities in the rural labour market as daily or contract labourers. Labour demand during peak periods (e.g. weeding, harvesting) is so high that migrant labourers are attracted to the region. The rural wage ranges from about Br50 per day during harvesting to Br100 per day during weeding (which is higher as it overlaps with demand for weeding in sesame).

Changes in rural markets and rural–urban linkages. The rural input and output markets in the Fogera Plain have been expanding as rice commercialisation has increased and demand for rice and rice products has grown. A dynamic land market has emerged (mainly related to land rent), as well as rural agricultural product markets, private rural services (input suppliers, transport providers, processors, etc.), and brokerage locally called *Delala*. Although rural land sale is prohibited by law, land rental has become common practice; farmers reported that, in 2017, the average land rent was around Br12,000 per ha (US\$500 per ha). With expansion of rural roads, most farmers are able to sell agricultural produce in nearby urban centres, providing an opportunity to secure better prices compared to spot sales to local brokers and village markets. These increased rural–urban linkages have led to the growth of new transport services to move people and agricultural produce to and from nearby towns, as well as the growth of restaurants, coffee houses, and goods shops.

Image captions:

Cover - Lowland rice field, Fogera Plain

Page 3 - Rice processor at Yifag town, Fogera Plain

Page 5 - Rice field at Woreta in the lower Fogera Plain.

Citation: Alemu, D. (2019) *A Historical Analysis of Rice Commercialisation in Ethiopia: The Case of the Fogera Plain*. APRA brief 16, Future Agricultures Consortium

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