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# Understanding the Rice Value Chain in Sri Lanka:

Defining the Way Forward for Rice Fortification

December 2022



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#### Contact

WFP.Bangkok@wfp.org

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## Executive Summary

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Sri Lanka, with a population of 22 million, grapples with the persistent problem of micronutrient deficiencies (MNDs). The country is self-sufficient in rice production, which is the most widely consumed staple. This is visible by looking at per capita rice consumption, which is 130 kg per year. Therefore, rice is increasingly seen as an important fortification vehicle. The current economic and agrarian crisis is expected to have an impact on the food fortification campaign in Sri Lanka. It is expected that it will take time to solve the crisis and the Government will initially focus on reducing the inflationary pressure on essential food items such as rice.

To facilitate local production and improve the nutritional health of the population, the Government is putting immense efforts into the scale-up of rice, as elaborated below:

1. Rice fortification was introduced in Sri Lanka through an acceptability trial. It was carried out in October 2016, across 60 representative schools in Monaragala and Kandy districts. The trial was implemented by the World Food Programme (WFP) along with the Ministry of Health (MoH), Ministry of Education (MoE) and the National Food Promotion Board (NFPB) (Ministry of Agriculture, MoA). After the trial, the Sri Lankan Government along with development partners took steps to scale up the programme.
2. A pilot study on introducing fortified rice through the school meal programme was conducted in 2019–2020 and, based on that success, the Cabinet has given its approval for the use of fortified rice in the school meal programme.

Currently, the supply chain ecosystem for rice fortification is not developed. There are no food safety standards for fortified rice and fortified rice kernels (FRK) in Sri Lanka. At present, there is no private sector participation, hindering the scalability of fortified rice. However, one of the large rice mills, Hiru Rice, is planning to introduce fortified rice in the local market.

In order to understand the potential of rice fortification in improving the nutritional health of the population of Sri Lanka, detailed discussions were held with important stakeholders in the rice value chain. Based on discussions with the government stakeholders, it was evident that they are interested in scaling up rice fortification processes in the country, and are aware of the health benefits of consuming fortified rice. A summary of key inputs received during these discussions is as follows:

1. There is need for government involvement for successful implementation and expansion of the pilot programme. An additional budget is essential to facilitate it.
2. For successful implementation, there is a requirement for better coordination between the various government entities.
3. The price of fortified rice should be such that it is affordable to low-income groups.
4. There is a need to increase awareness about the costs and expected profits to encourage the millers to start producing fortified rice.
5. For the consumers, it is necessary to improve awareness levels to eliminate the misconceptions

around consumption of fortified rice and increase the acceptance of fortified rice.

The discussion with all the millers tended to centre on understanding two key variables: the expected demand for fortified rice and the profits. A summary of key inputs received during these discussions is as follows:

1. Fortified rice needs to be provided under the existing government feeding programmes, as there is no consumer demand. Once the initial demand is created, open market sale can be introduced by the millers.
2. Support is required from WFP to help the millers gain the technical know-how and understand the market.

The millers will also need funding for the required investments.

3. Awareness programmes need to be conducted from the ground level of the administration areas. This can be coupled with distribution of samples of fortified rice among the consumers.
4. Currently, there is a lack of standards needed to provide quality products to end-users of fortified rice.

The table below provides a summary of the barriers in rice fortification scale-up and their corresponding recommendations:

SN	Barriers	Recommendations
1	Inadequate budgets for expansion of rice fortification	<p><b>Advocacy with government decision makers</b></p> <p>Conduct meetings with the government entities to put rice fortification as a priority in the budgetary allocation process.</p>
2	Lack of comprehensive food safety standards for fortified rice and FRK	<p><b>Advocacy with standard setting authorities</b></p> <p>WFP must persuade the Food Advisory Committee (FAC) and Sri Lanka Standards Institute (SLSI) to develop comprehensive standards for rice fortification.</p>
3	Limited awareness among millers about the production techniques, costs involved, and suppliers of raw materials and machinery required for rice fortification	<p><b>Advocacy with private sector stakeholders</b></p> <p>Conduct periodic workshops and individual meetings with the leading rice millers to educate them about rice fortification and economic benefits and the technical processes involved.</p>
4	Perceived low return on investment in fortified rice production due to lack of awareness of various costs of production and lack of consumer demand	<p><b>Business model return on investment</b></p> <p>Create and disseminate a technical document for millers entailing the health benefits, the technical know-how of rice fortification processes, the costs involved and the economic returns in selling fortified rice.</p>
5	Lack of funds to invest in machinery and capacity expansion	<p><b>Interact with potential funding partners</b></p> <p>Potential funding from development partners for procuring FRK and machinery, which will help to support and reduce the onus of investment on millers.</p>
6	Lack of awareness among the population about fortified rice and its benefits leading to negligible demand	<p><b>Demand creation through school feeding programmes</b></p> <p>Creation of institutional and/or consumer demand for fortified rice to incentivize millers to invest in rice fortification.</p> <hr/> <p><b>Awareness creation campaigns</b></p> <p>Campaign to generate awareness about the benefits of consuming fortified rice among the population and conduct surveys to understand their perceptions.</p>

Though Sri Lanka's well-developed domestic rice industry would otherwise have provided room for optimism, the current crisis is likely to set back existing initiatives and slow down progress. A greater amount of external funding will be required. However, at the same time, it is important to step up efforts, so as to minimize the impact of the current crisis, and work towards better nutrition for Sri Lanka's population.



## Introduction

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### Background

South Asian countries are weighed down by the triple burden of malnutrition: high stunting and wasting rates, growing incidence of obesity and widespread micronutrient deficiencies (MNDs). Sri Lanka had a population of 22 million in 2019 (1). The country grapples with the persistent problem of MNDs. Anaemia, vitamin A, folic acid, zinc and iodine deficiencies disproportionately affect women and children. These MNDs are contributors to poor growth, cognitive impairments and increased risk of morbidity and mortality (2).

According to 2019 World Bank data, 25 percent of children (6–59 months) and 35 percent of women of reproductive age (WRA) were anaemic (3) (4). Based on the World Health Organization's (WHO) cut-off values for public health significance, anaemia emerged as a “moderate” public health problem among children and women, with over 35 percent prevalence (5). The Medical Research Institute Report (MRI) (2014) indicated that anaemia due to iron deficiency affected approximately 8 percent of children under 5. According to the MRI 2019 report, anaemia also affected 32 percent of girls aged 10 to 18 years. Vitamin D affected 13 percent of children. Vitamin A deficiency (VAD) affected 13 percent of children (6).

The food consumption patterns of the Sri Lankan population reveal that the food intake is not ideal. It predominantly comprises carbohydrates, with insufficient consumption of fruits and vegetables. According to the 2018 Fill the Nutrient Gap report, the daily intake of rice accounts for 75 percent of total energy intake while WHO

recommends 50 percent. The daily intake of fruits is only 230 g which is below the WHO recommendation of 400 g. Fresh foods are available and consumed but generally not in sufficient quantities to provide the necessary benefits. The consumption of sugar and salt is above the recommended levels. In Sri Lanka, a nutritious diet is potentially affordable for many households, which makes it important to inform consumer choice and ensure an adequate supply of nutritious food (7).

Food diversification and intake of a balanced diet are the best ways to tackle MNDs. However, adoption of a nutritious diet is difficult for social, economic and food security reasons in the country. This results in an absolute necessity for large-scale nutrition intervention programmes. The Government of Sri Lanka is implementing multiple strategies such as supplementation, fortification and diet diversification among its different population groups. The existing interventions target the vulnerable population groups (8).

Among the basket of interventions being implemented to address MNDs, Large Scale Food Fortification (LSFF) initiatives can play a crucial role. These interventions reduce the cost of healthy diets and complement the gaps in the supplementation programmes. The Government of Sri Lanka's current food fortification initiatives focus primarily on salt and staples.

Sri Lanka has already approved mandatory legislation on salt iodization. To further tackle the MNDs, wheat flour fortification was started; however, it is not mandatory. The private wheat flour millers in Sri Lanka have started

offering fortified wheat flour to tackle iron, folic acid, vitamin D and calcium deficiencies. But consumers continue to purchase non-fortified wheat flour from the market (9).

As awareness emerged as a key challenge, food authorities have now prioritized the dissemination of information on benefits, through various campaigns.

The current economic and agrarian crisis is expected to have an impact on the food fortification campaign in Sri Lanka. The Sri Lankan Government has banned the import of chemical fertilizers since April 2021. This has negatively affected the production and yield per hectare and the country is now relying on imports. Unfortunately imports cannot make up for the production gap due to a dearth of foreign exchange. As an effect of this gap, Sri Lanka is now facing severe food shortage and retail food prices increased by 29.5 percent in March 2022 (10). It is expected that it will take time to solve the crisis and the Government will initially focus on reducing the inflationary pressure on essential food items such as rice.

The WFP, together with the Ministry of Health and the Ministry of Education, are working on a variety of funding arrangements to provide iron and folate fortified rice to schoolchildren under the ongoing school meals programme. Additional funding for the use of fortified rice is expected only after the present financial crisis is resolved (11). In addition, the WFP is exploring avenues for introducing fortified rice to garment factory workers from the private sector.

The country's total paddy production was 5.1 million metric tons (million MT) in 2021 (of this, the milled production was 65–68 percent). The country is self-sufficient in rice production, which is the most widely consumed staple (12). This is visible by looking at per capita rice consumption, which is 130 kg per year. Therefore rice is increasingly seen as an important fortification vehicle.

For more than a decade, the United Nations World Food Programme (WFP) has been working with governments, the private sector and technical partners across countries in Asia and Pacific (Pakistan, India, Bangladesh, Nepal, Sri Lanka, Myanmar, Cambodia, Indonesia, Laos, Timor Leste, Bhutan and the Philippines) to make rice more nutritious through post-harvest fortification. Primarily, WFP provides technical assistance on policy and regulatory frameworks, advocacy, analysis and evidence generation, programming, and consumer awareness.

To explore the prospects for rice fortification, WFP conducted a landscape analysis study in 2017 on rice fortification in Sri Lanka through which the challenges and opportunities in initiating rice fortification in the country were laid out (8). Sri Lanka is currently in the process of laying down the standards for rice fortification

to scale up fortified rice and there is a need to generate greater awareness on rice fortification as a strategy to address MNDs among the Government and private sector stakeholders (13).

Fortified rice needs to be widely available and accessible through two main platforms, the social safety net programmes and the commercial retail channels. These two platforms will help reach populations that are nutritionally vulnerable and in urgent need of micronutrient interventions. Ultimately, this will help to ensure that rice fortification is adequately scaled up in a sustainable manner.

Therefore, to effectively introduce fortified rice through social safety net programmes and commercial retail channels, it is important to gain deeper insight into the rice milling landscape along with key stakeholders.

## Objectives of the Study

The study 'Understanding the Rice Value Chain in Sri Lanka: Defining the Way Forward for Rice Fortification' aims to understand the potential of rice fortification in the country.

The overall objectives of this study are as follows:

1. Undertake a detailed landscape analysis to identify and map the key players across the rice value chain in Sri Lanka.
2. Identify and analyse the demand and supply challenges across the rice value chain in Sri Lanka and identify opportunities for introducing fortified rice through commercial channels and government social safety nets.

Specific objectives: Landscape analysis

- Identify, map and document the key players across the rice value chain that include the rice milling industry; blending and extrusion equipment manufacturers; FRK manufacturers and suppliers of vitamins and minerals/multi-micronutrient premixes; private food safety and quality testing laboratories; and retail organizations (including cooperatives, where these exist) in Sri Lanka.
- Map all the rice value chain players and identify the rice value chain players that follow good manufacturing practices and are adhering to national/international food safety and quality standards for processed foods in those countries.
- Study and illustrate the rice value chain and identify value chain engagement points/opportunities for potential rice fortification programme support.

- Identify and document the demand and supply challenges faced by the key players across the rice value chain (infrastructural, capital availability, regulatory, supply chain, import/export regulations/policy, taxation, policy and political environment) and identify opportunities for introduction and scale-up of fortified rice through commercial channels and government social safety nets.
- Map the supply chain and trading of rice (including cost mark-ups along the chain).
- Study and recommend potential options for strengthening the supply side for scaling up rice fortification through commercial channels at the regional level including the feasibility of a regional hub of suppliers to cater to the fortified rice demand of the region and beyond.
- Collect and document information on opportunities and challenges for a range of rice fortification options.
- Review and hold consultations with relevant government and private sector stakeholders to identify potential private sector players that can be engaged to introduce fortified rice through commercial channels and government social safety nets.
- Based on the consultation and analysis of the private sector players, identify selected private sector players in each country for potential partnership with WFP to introduce and scale up fortified rice through commercial channels and government social safety nets.
- Identify key factors that could enable and contribute to the scaling-up of fortified rice through commercial markets and government social safety nets.

WFP has engaged with ValueNotes Strategic Intelligence, India to conduct this study.

The next section talks about the research methodology used for this study.

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## Research Methodology

This study followed a structured research process, as described below:

### 1. Project Setup and Plan

- Project kick-off and discussions with WFP stakeholders to better understand context, objectives and expectations.
- Knowledge share by WFP based on prior research and experience in rice fortification initiatives in various countries.
- Preparation of project plan.

### 2. Secondary Research and Primary Research Design

- Intensive desk research on several topics, including:
  - Nutrition deficiencies in Sri Lanka's population
  - Past experience in food fortification
  - The rice industry in Sri Lanka: size, exports, domestic consumption, etc.
  - The supply chain for rice in Sri Lanka
  - Key stakeholders in the supply chain, from a fortification perspective
  - Status of rice fortification initiatives and barriers to adoption and scale-up
- Sources used include the following:
  - Available literature comprising research papers, development partners' reports, and project reports from previous pilots such as those from WFP and MRI
  - Reports and statistics such as those from the Government of Sri Lanka, United States Department of Agriculture (USDA) and the Food and Agriculture Organization of the United Nations (FAO)
  - A complete list of publications is provided in the References section
- The initial secondary research helped to identify information gaps and key stakeholders that could provide valuable inputs.
- For each type of respondent, whether industry stakeholders or government/regulatory bodies, an appropriate discussion guide was developed.
- During this process, the ValueNotes team had several discussions with WFP stakeholders to fine-tune the list of likely respondents and discussion points/focus information relevant to each of them.

### 3. Primary Research

- The list of entities and the respondents were identified by an iterative process.
  - The reports and available literature used in secondary research helped to identify the important stakeholders in the Government as well as the rice industry in Sri Lanka.
  - The websites of multiple millers were mined to find important details such as their milling capacity and their production levels. Accordingly, the millers were classified based on their production capacities.
  - After the development of a list of relevant stakeholders, the names of the relevant people in these organizations were found through additional desk research.
  - Then, appointments were made with these important stakeholders and detailed discussions were held. To obtain a diversity of opinions, stakeholders from the Government as well as the private sector were contacted. This ensured equitable representation of views.
  - Additionally, a few experts were referred by respondents of the initial interviews. Accordingly, these people were also contacted.
  - Some of the stakeholders were contacted a second time to get more clarity on some of the points discussed.

- The WFP team is gratefully acknowledged for facilitating interviews with key decision makers in government entities and regulatory bodies.

- The discussions helped to:
  - » Identify and analyse the gaps in understanding of the industry and ecosystem, along with the level of consolidation in the market
  - » Get on-the-ground inputs from stakeholders on barriers to large-scale rice fortifications
  - » Understand the constraints of different stakeholders and possible future actions that might help reduce or remove some of the barriers

A list of respondents is provided below.

### 4. Analysis and Report Writing

- All the above inputs were collated, analysed and distilled to create this report.
- In some cases, clarification of certain points was required from the respondents.
- The analysis and report were discussed with the WFP team (including in Cambodia) and their inputs and feedback were incorporated in subsequent versions.

Type of entity	Name of entities	Designation
Large rice millers and traders	Isuru Rice Mill	Owner
	Sewmini Rice Mill	Sales Manager
	Nawani Rice Mill	Owner
	Wee Hena Rice Products	Production Manager
Rice associations	Small and Medium-scale Rice Millers Association	President
Government entities	Ministry of Health (MoH)	Consultant, Nutrition Division
	Paddy Marketing Board (PMB)	Former Director
	National Food Promotion Board (NFPB)	Director
	Sri Lanka Nutrition Society (SLNS)	Joint Secretary
Traders and wholesalers	NAT Stores	Owner
	Bandara Stores	Owner



## Report Structure

The report is divided into seven chapters, each focused on a particular aspect, as discussed below:

Chapter	Title	Details
1	Nutrition Profile of Sri Lanka	The first chapter focuses on the diet composition, the current undernourishment levels and the MNDs in the Sri Lankan population. <i>Helps understand the scale of the problem, and the need and urgency for improving nutrition inputs in Sri Lanka.</i>
2	Food Fortification in Sri Lanka	This chapter gives a background of the existing food fortification programmes in Sri Lanka. The chapter also assesses past experience in fortification, difficulties faced while scaling up, and success stories of food fortification (if any). <i>Provides an understanding of institutional experience, and lessons learnt from earlier initiatives with other food items.</i>
3	Overview of Sri Lanka Rice Ecosystem	The third chapter elaborates on the rice industry details (historical trend of production, consumption, export-import, production clusters, millers' capacities, rice varieties in demand, etc.). <i>This data improves our understanding of the size and scale of the rice ecosystem in Sri Lanka, and its implications for rice fortification scale-up.</i>
4	Rice Supply Chain	This section details the existing rice supply chain in the country. <i>Provides an initial understanding of the key stakeholders who need to be involved in rice fortification initiatives.</i>
5	Key Stakeholders in Rice Fortification	This chapter provides further details of critical stakeholders and their respective roles. <i>Improves our understanding of which government entities, regulatory bodies, non-government and private players are important in order to scale up rice fortification in Sri Lanka.</i>
6	Discussion and Analyses	This chapter focuses on the barriers faced by various stakeholders, when scaling up rice fortification efforts. <i>Helps to understand which government entities, regulatory bodies, and non-government and private players, are important to scale up rice fortification in Sri Lanka.</i>
7	Recommendations for Scaling up Rice Fortification	The last chapter synthesizes the findings from earlier chapters and suggests specific recommendations to address or mitigate the barriers to scale-up. It also identifies the key stakeholders that need to be brought on board to address different issues. <i>It provides a detailed roadmap for the successful implementation of scaling up rice fortification in a measured and comprehensive manner. There is also a concluding segment which presents a possible roadmap to successfully commercialise rice fortification.</i>
8	Annex	Supplementary information and relevant statistics This section provides essential information to support the analyses throughout the report, including: <ul style="list-style-type: none"> <li>- Steps Taken to Reduce the Prevalence of Anaemia</li> <li>- Government's Fortification Policies and Strategies</li> <li>- School Feeding Programme</li> <li>- Distribution of Fortified Rice through MPCs</li> <li>- Key Seasons for Production and Harvest</li> <li>- Rice Importing Countries</li> <li>- Varieties of Rice Produced</li> <li>- Key Rice Brands Operating in Sri Lanka</li> <li>- Role of Different Entities in the Rice Supply Chain</li> <li>- Value Addition of Rice across the Rice Value Chain</li> <li>- Technologies for Rice Fortification</li> </ul>

# 1. Nutrition Profile of Sri Lanka



Sri Lanka has developed economically, increasing overall wealth and food expenditure. According to the Global Nutrition Report, the country is on track to meet the targets for:

- Maternal, infant and young child nutrition (MIYCN)
- Stunting rate, but 17.3 percent of children under 5 years of age still remain affected

However there is no progress towards achieving the targets for:

- Wasting, with 15.1 percent of children under 5 years of age affected (higher than the average for the Asia region (8.9 percent))
- Reducing anaemia among women of reproductive age, with 34.6 percent of women now affected<sup>1</sup> (14)

There has been some progress in improving food security and nutrition in Sri Lanka. However, the progress has been derailed by the onset of the current economic and agrarian crisis. Food inflation increased to 29.5 percent in March 2022 and there is a shortage of food (including staple food items such as rice) (10). This is expected to affect the overall food consumption pattern and the health of the vulnerable segments of the population.

Even before the onset of the current crisis, Sri Lanka was burdened with micronutrient deficiencies, undernourishment, overnourishment and stunting. It is expected that the burden might increase as a result of the agrarian crisis. Increasing and diversifying food production is essential to support nutritional improvement towards more balanced diets. To understand how fortification of food items (particularly rice) can aid in meeting the dietary guidelines for better nutrition in the population of Sri Lanka, it is essential to understand the micronutrient deficiencies (MNDs) in the country and their effects.

<sup>1</sup> The Global Nutrition Report was created following the first Nutrition for Growth Initiative Summit in 2013 as a mechanism for tracking the commitments made by stakeholders spanning governments, aid donors, civil society, the UN and businesses.

## 1.1 Micronutrient Deficiencies

The Sri Lankan population faces high levels of stunting, wasting and micronutrient malnutrition. The widespread prevalence of MNDs has resulted in the following effects in the most vulnerable groups in the population of Sri Lanka:

- Anaemia was highly prevalent in WRA (15–49 years) at 35 percent, in pregnant women at 35 percent, and among children at 25 percent. It is categorized as a “moderate” public health problem according to WHO estimates (3) (4).
- The prevalence of stunting and severe stunting was 17.3 percent and 4 percent, respectively, among children aged 0–60 months; 11.5 percent of children aged 6–12 years suffered from stunting.
- 15.1 percent of children aged 0–60 months suffered from wasting and 39.9 percent of children aged 6–12 years suffered from wasting.
- Undernutrition remains a critical issue in Sri Lanka, partly due to the increasing challenges on the food system from repeated natural disasters, which have led people to consume less nutritious meals (15).

According to the MRI 2014 Report, iron, zinc, calcium, folate and vitamin A deficiencies are the crucial MNDs present among women, children and adolescents in Sri Lanka (6).

During 2015 to 2019, the prevalence of undernourishment has stayed above 6 percent (15). Numerous programmes, involving partnerships of international and local organizations with the Sri Lankan Government, have tried to address different aspects of malnutrition in the country.

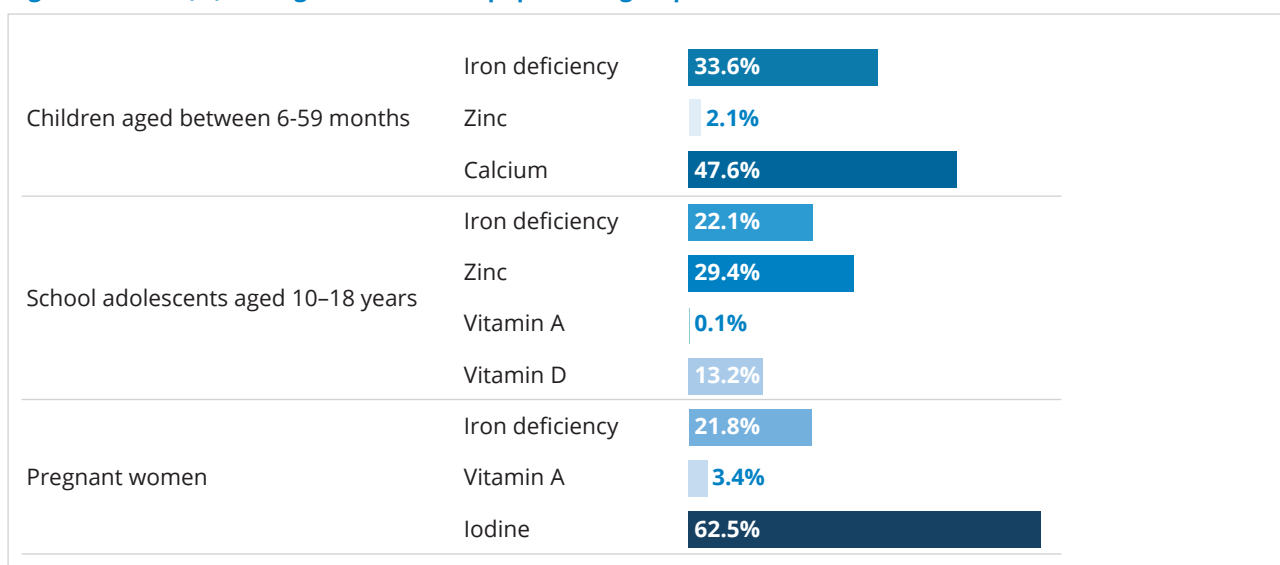
Some of the strategies adopted by the Sri Lankan Government are mentioned below:

- The Government introduced Weekly Iron Folate Supplementation (WIFS) for all schoolchildren to prevent anaemia. The students are given weekly treatment with iron and vitamin C for a period of six months. The Medical Research Institute’s (MRI) research in 2017 indicated a marked reduction in incidence of anaemia over the last 10 years because of this programme (16).
- Iron, vitamin C, calcium and folic acid supplementation is provided for non-pregnant women, pregnant and lactating women.
- Vitamin A supplementation is available for children aged 6–59 months and lactating women.
- Targeted fortification of Thriposha (an extruded fortified blended food) is provided to pregnant women and children aged 6–59 months who are underweight (17).
- Deworming tablets are distributed among children aged 6–59 months, and pregnant and lactating women (18).
- As part of its fortification initiative, Sri Lanka has approved mandatory legislation on salt iodization.

Although the Government efforts have reduced the prevalence of MNDs, there is still a lot that needs to be done to improve the overall nutritional status of the country. The effects of these MNDs have resulted in high levels of anaemia, haemoglobin disorders and stunting.

A more detailed review of current food fortification initiatives is presented in the next chapter.

**Figure 1: MNDs (%) among the vulnerable population groups in Sri Lanka**



Source: WHO (2014–2018)

## 2. Food Fortification in Sri Lanka

Fortification was introduced in Sri Lanka in the late 1980s. It was made mandatory for salt by gazette regulations in 1995, as provided for under the Food Act No. 26 of 1980. The Food Labelling and Advertising Regulations (2005) set up a legal framework for food fortification to operate. Voluntary wheat fortification started in 2008.

Fortified rice was introduced to schoolchildren of one district in 2019. This was part of a 12-month pilot project to study the operational feasibility of manufacturing fortified rice locally and distributing it for the school meal programme (19).

However due to the lack of funding, the programme was not scaled up in 2021 (11).

### Legislation –

The Food Advisory Committee works on preparing legal requirements related to food fortification in Sri Lanka. The Environmental, Occupational Health and Food Safety (ENOH) department under the Ministry of Health (MoH) is involved in setting the standards for fortified food items<sup>2</sup>(8).

Table 2 outlines the presence of legislation on the fortification of food items in Sri Lanka.

### Salt fortification –

Universal Salt Iodization (USI) was introduced nationwide by the Government in 1995 by statutory regulation under the Food Act. This legislation banned the sale of non-iodized salt for human consumption. The national reference laboratory for monitoring USI was established at the MRI in 2000 with the aid of UNICEF. The laboratory has the dual role of monitoring USI and of assessing its clinical impact by performing periodic national iodine surveys (NISs) (20). The Global Nutrition Report of 2016 found that 95 percent of households were adequately consuming iodized salt.

### Thripasha –

Thripasha is a precooked food supplement containing a vitamin mineral premix. The programme was initiated in Sri Lanka in 1973 with the assistance of CARE, a Canadian organization. The management of the project has changed hands several times. From CARE to Ministry of Health in 1976, to the Ceylon Tobacco Company in the 1980s, and finally back to a government-owned company in 2011.

Initially, the complete food was imported in bulk from the United States and packed and distributed in Sri Lanka, but in the 1980s local manufacturing started, though some ingredients continued to be imported.

**Table 1: Fortification of food items in Cambodia**

Food Item	Mandatory Legislation	Micronutrients added
Salt	✓	Iron and folic acid
Wheat flour	×	Iron, folic acid, vitamin D and calcium
Rice	×	Vitamin A, zinc, iron and folic acid

Source: National Food Fortification Workshop

Note: The mandatory legislation for wheat flour is under process.

<sup>2</sup> [Government Fortification Policies and Strategies](#)

The objective of the Thriposha project was to provide additional nutritious food to mothers and children with nutrition deficiencies. The packets are produced by mixing maize, soya beans, full cream milk powder, vitamin and minerals. Thriposha supplement is provided to all pregnant and lactating women and to underweight children aged 6–59 months. The programme has been carried out in Sri Lanka for the last 50 years.

Distribution of the supplement is effective in all nine provinces through 1,196 distribution centres including health centres, hospitals, probation and child care centres and estates. It is distributed in master bags to Divisional Offices of the Department of Health Services (DOHS) directed by the MoH (21).

Thriposha is distributed to over 1.2 million beneficiaries in the country annually. In 2018, the national coverage of Thriposha was 81 percent. However, there was relatively wide variation between provinces, ranging from 96.4 percent in Northern Province to 64.3 percent in North Western Province.

Although the supplement has been available for many years, awareness levels are still low. According to the MRI 2013 study, 91 percent of pregnant mothers had received Thriposha, but only 11 percent of them had consumed it as prescribed. Further, studies conducted by WFP in 2016 and 2017 indicated that the consumption of Thriposha has not led to positive changes in the prevalence of acute malnutrition. The reason for this is that the product is not consumed by 100 percent of the target customers. According to the 2019 “Evaluating the Performance of the Thriposha Program” report by the National Audit Office, the level of malnourishment in children aged below 5 years increased from 13 percent in 2006–2010 to 21 percent in 2012–2016 (22).

Since there was no visible improvement in the nourishment levels, in 2019, WFP proposed to align the Thriposha with global standards stipulated by the WHO. WFP and MoH agreed to improve product composition, to increase its energy density and nutrient profile.

In March 2021, the Government of Sri Lanka received funding from WFP and Republic of Korea to help supply Thriposha. The funding was used to procure maize for the production of Thriposha (23).

Despite these multi-pronged efforts, there has not been much improvement in reduction of the prevalence of MNDs. This made it essential to have a holistic strategy wherein fortified staples such as rice and wheat flour are offered along with targeted supplementation (Thriposha).

### **Wheat fortification–**

Wheat flour as a fortification vehicle is extremely feasible given the centralization of milling and distribution and

the rising consumption in urban areas. All of the wheat consumed in Sri Lanka is imported.

There are only two wheat flour mills in the country (Prima and Serendib). In 2008, Serendib began to voluntarily fortify flour with iron and folic acid. The ENOH and Food Safety Unit (under MoH) are currently working on the preparation of standards related to wheat fortification with the help of the Sri Lanka Standards Institute (SLSI) (8).

### **Rice fortification–**

In March 2017, the MoH held a National Food Fortification Workshop for Rice and Wheat Flour along with the World Food Programme (WFP) and Food Fortification Initiative (FFI).

The broad conclusions of the workshop were as follows:

- Clearance is required from Government to introduce food fortification of staples.
- A Technical Advisory Group (TAG) should be established under the MoH to steer the next steps on the pathway of food fortification.
- Voluntary fortification under existing social safety net programmes was the best way to introduce fortified rice.
- Wheat flour fortification could be made mandatory as wheat flour is only handled by two producers.
- Consumer acceptance of fortified foods is low because misconceptions about toxicity still exist.
- Sustained political will is also required to ensure the programme’s success in providing public awareness of the nutritional benefits and monitoring and enforcing implementation (9).

A pilot study on introducing fortified rice through the school meal programme was conducted in 2019–2020 and, based on that success, the Cabinet has given its approval for the use of fortified rice in the school meal programme (19).

However, the programme has to be rolled out in a phased manner as:

- There is a need to find donors who can fund the entire programme (the funding partners can be government entities or external funding partners)
- It will help in gradually building the required production capacity of fortified rice. It will aid in acquiring technical and financial capabilities as well
- The food safety standards which are currently under development can be finalized

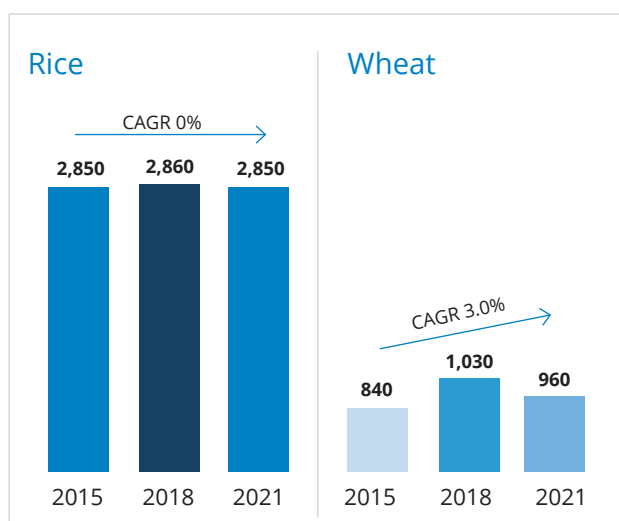
The current status of rice fortification is discussed in detail in section 2.2.

## 2.1 Consumption of Key Cereals in Sri Lanka

Rice is the most consumed cereal in Sri Lanka. The daily rice consumption is 360 g/person (130 kg per person annually, while wheat consumption is 43 kg per person annually).<sup>3</sup>

The consumption of rice is three times that of wheat. However, individuals in urban areas are increasingly including wheat in their diet, and this is driving higher growth rates for wheat.

**Figure 2: Consumption of key cereals in Sri Lanka ('000 MT)**



Source: USDA

Note: CAGR stands for compound annual growth rate over a given period

Rice consumption had been stagnant over the last 6 years, indicating a fall in per capita consumption, as wheat gains share. However, rice remains the primary staple and is, therefore, an optimal food vehicle for fortification. Given its wide consumption, it has the potential to improve the nutrition status across all strata of the population.



<sup>3</sup> The annual consumption figures have been calculated by dividing total rice/wheat grain consumption (source: USDA Grain and Feed Report) by the total population (source: World Bank).

## 2.2 Rice Fortification Status in Sri Lanka

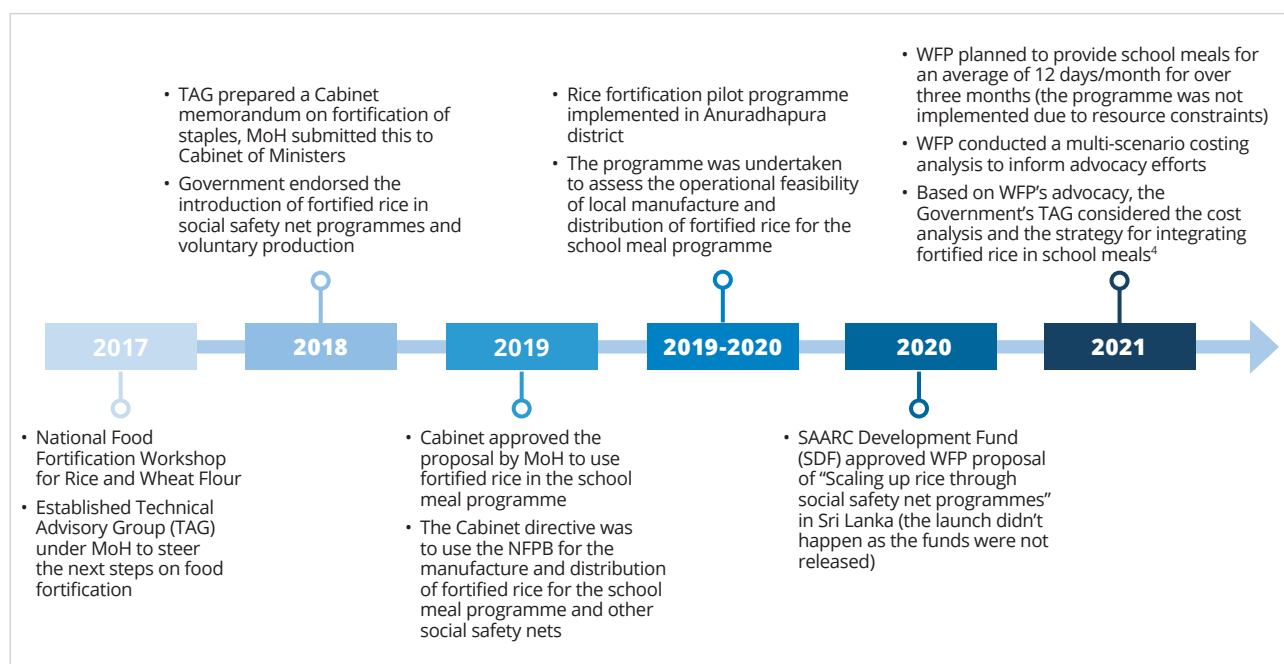
Rice fortification was introduced in Sri Lanka through an acceptability trial. It was carried out in October 2016, across 60 representative schools in Monaragala and Kandy districts. The trial was implemented by WFP along with MoH, MoE and NFPB (MoA) (19).

After the trial, the Sri Lankan Government along with development partners took steps to scale up the programme. Table 3 details the chronology of events:

Current status (2022): The MoE and the NFPB are expected to use the 2021 report to advocate for national funding from the Ministry of Finance (MoF) to include fortified rice in school meals, thereby paving the way for its sustainability (11).

This is expected to garner future government allocations, thereby ensuring its continuity. However, the current economic crisis in Sri Lanka is likely to delay progress.

**Table 3: Timeline for rice fortification in Sri Lanka**



Source: WFP Sri Lanka Country Brief (2019, 2020)

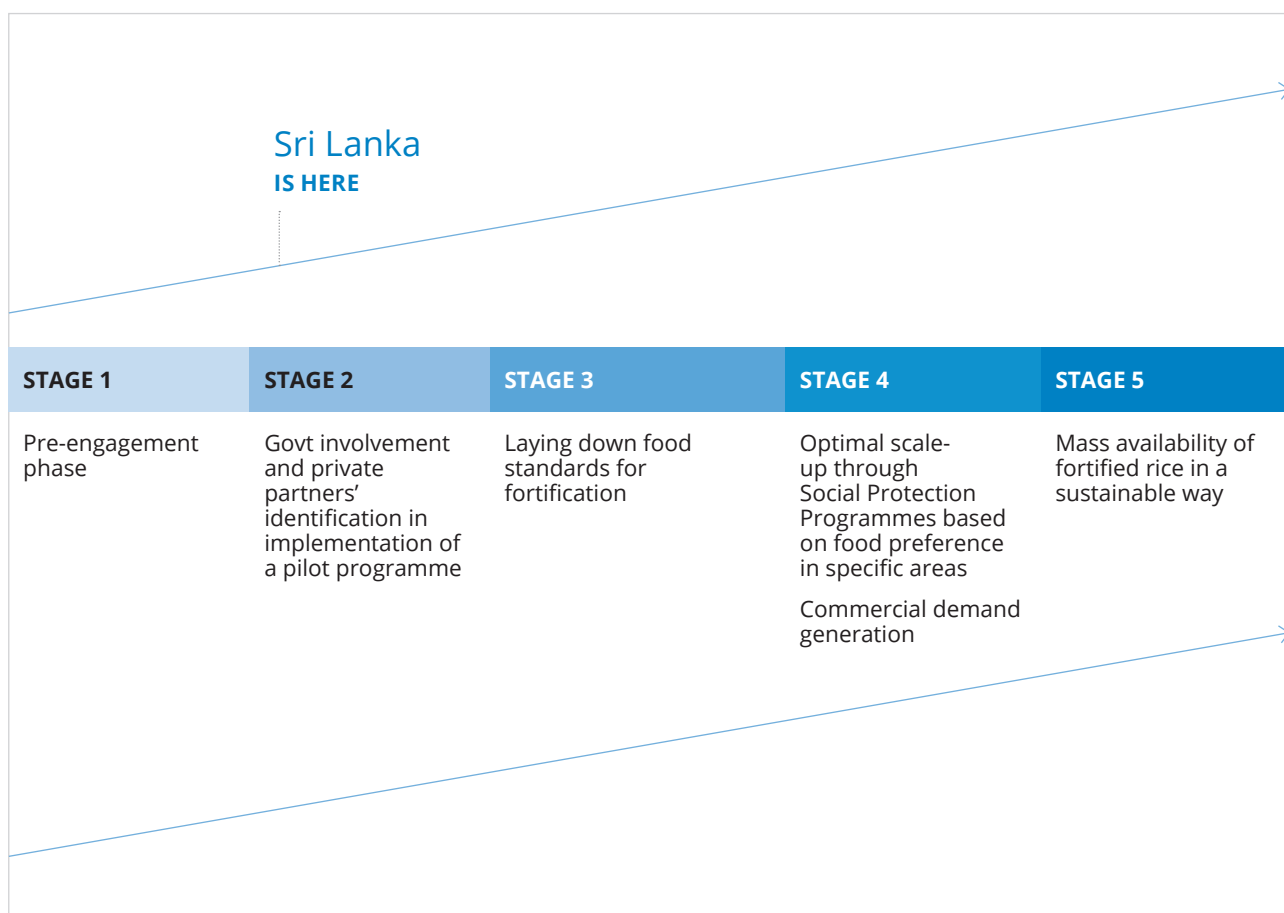
As depicted in figure 2, there are no food safety standards for fortified rice and fortified rice kernels (FRK) in Sri Lanka. To scale up the rice fortification programmes, there is a need to develop a proper monitoring and enforcement environment for rice fortification.

To make rice fortification a success, collective effort of both the private sector and the Government is required. Currently, there is no private sector participation,

hindering the scalability of fortified rice. However, one of the large rice mills, Hiru Rice, is planning to introduce fortified rice in the local market (24).

To enable mass fortification of rice in Sri Lanka, it is crucial to understand in detail the rice industry, the rice processing capacity, roles of the various stakeholders, the supply chain and barriers faced in fortification. The next chapter talks about the size and scale of rice production, consumption and exports in Sri Lanka.

**Figure 2: Sri Lanka in the stages of fortification scale-up**



Source: ValueNotes analysis



# 3. Overview of Sri Lanka Rice Ecosystem

This chapter elaborates on the production and consumption of rice, rice mills, the supply chain and the market segmented by rice varieties and distribution channels.

## 3.1 Rice Producing Clusters

There are two cultivation seasons in Sri Lanka, Maha and Yala, which are synonymous with two monsoons. Maha season falls during the North-east monsoon from September to March in the following year. Yala season is effective during the period from May to the end of August (8).

Rice is cultivated in nine provinces of Sri Lanka. The Eastern, North Central and North Western Provinces are the major rice producing regions in both Maha and Yala seasons.<sup>5</sup> (8)

Out of a total of 25 districts in Sri Lanka, six districts together produce more than 60 percent of the annual

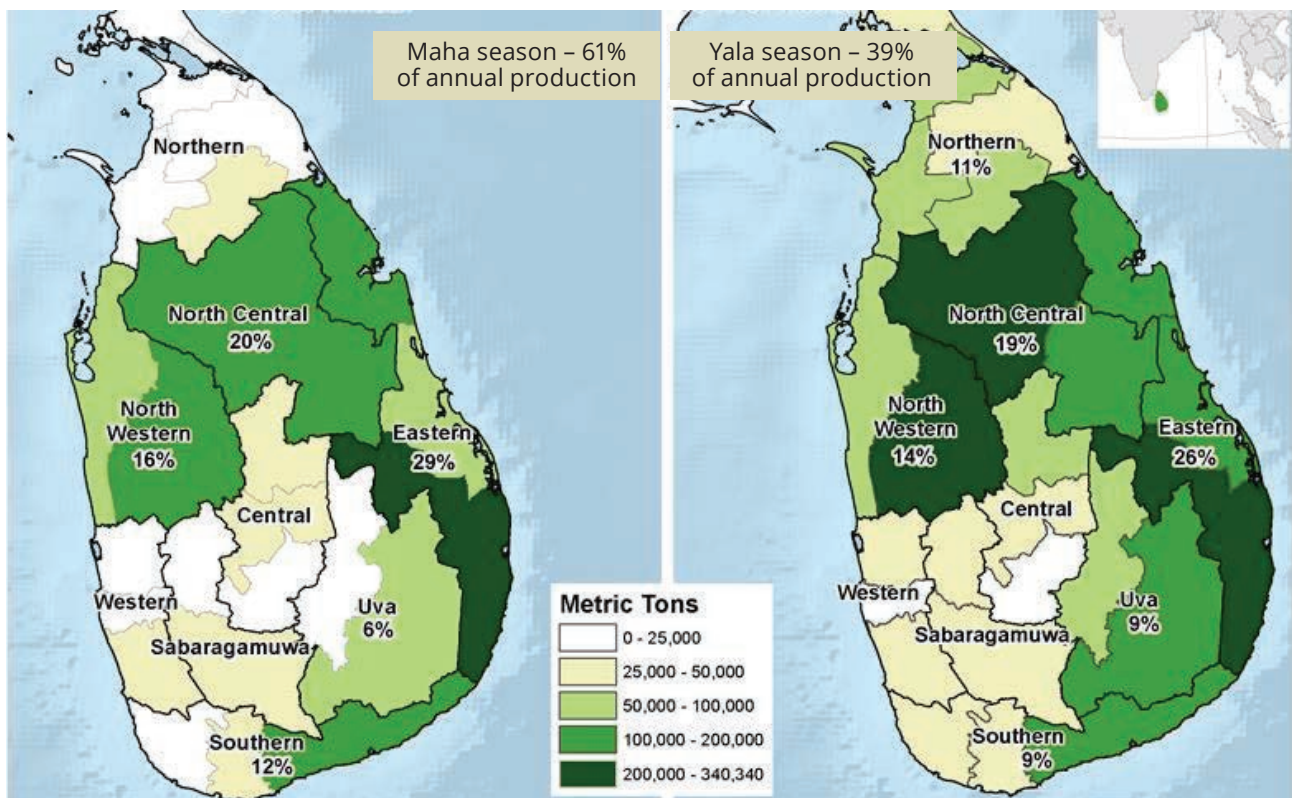
paddy production. These districts are Anuradhapura, Polonnaruwa, Ampara, Batticaloa, Kurunegala and Hambantota. Rice millers operating in these districts will be critical in developing the fortified rice supply chain (8)

## 3.2 Classification of Rice Mills

Rice millers are the most critical link in the supply chain for rice fortification. There are about 7,100 rice mills in Sri Lanka. They can be classified as leading, large, mid, and small and custom-scale based on their tonnage capacity per hour (8).

While small millers in the country are predominantly involved in producing small-grained rice, mid- and large-scale millers produce all rice varieties. The various rice varieties produced by these millers are discussed in the subsequent section.

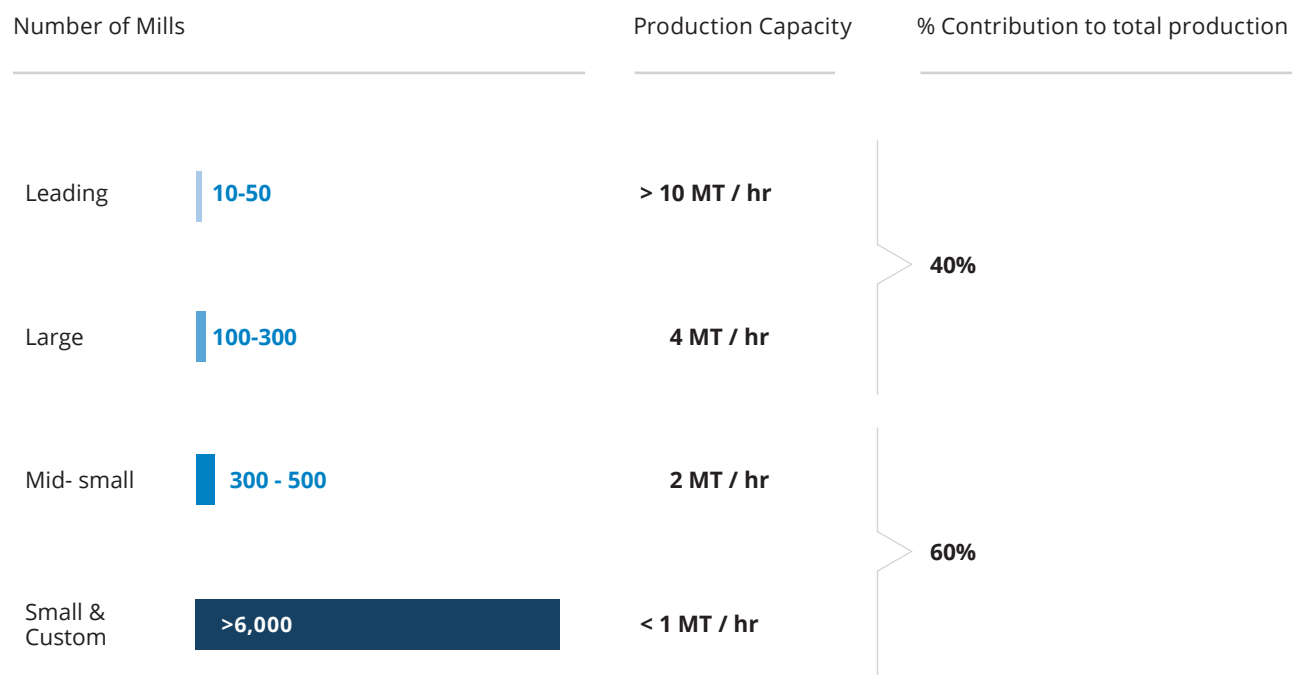
**Figure 3: Rice producing zones by season and share of rice production in Sri Lanka (2021)**



Source: USDA

<sup>5</sup> [Key Seasons for Rice Production and Harvest](#)

**Figure 4: Classification of rice mills by production capacity**



Source: ValueNotes Analysis

Large and leading millers are well positioned to be the pioneers in rice fortification given their higher production capacity and availability of financial resources to invest. To develop an efficient fortified rice supply chain, however, millers will need technical and financial support from the Government and development sector partners.

It is imperative to understand that the leading and large millers have the capacity to invest in rice fortification. Some of them, for example Hiru Rice Mills, have also considered launching a fortified rice brand. However, most of them are not willing to invest due to lack of clarity on the available market for fortified rice (elaborated in section 6.4). Consequently, millers are hesitant to invest in this initiative. At present, they expect a guaranteed demand from the Government to consider venturing into rice fortification.

To develop an efficient fortified rice supply chain, however, millers will need technical and financial support from the Government and development sector partners.

### 3.3 Varieties of Rice Produced

The Sri Lankan rice varieties are typically classified based on the process used, as explained below:

Kekulu – Produced by the process of milling raw paddy:

1. Long/big grain – Mostly referred to as “Kekulu” Based on the variety of paddy the grains may be white or brown and usually termed “White Kekulu” or “Red Kekulu”
2. Small grain (which is known as Samba rice) – “Kekulu Samba”

Nadu – Produced by the process of par-boiling:

1. Long/big grain – mostly called “Nadu” Based on the variety of paddy the grains may be white or brown and referred to as “White Nadu” or “Red Nadu”
2. Small grain (which is known as Samba rice) – “Nadu Samba”

There is another premium small grain variety called Keeri Samba, which is a shorter and harder grain than plain Samba.<sup>6</sup>

In one of the interviews conducted, it was mentioned that white Nadu, white Kekulu and red Kekulu rice are the most popular variants in Sri Lanka. These varieties are relatively cheap (36 percent cheaper than the most expensive variety, Keeri Samba) and are priced in the range of LKR 135–150 per kg. They are consumed by middle to low income groups; hence the price of fortified rice needs to be affordable. This would mean that the pricing needs to be similar to that of normal rice. Further studies need to be conducted to understand the acceptability of fortified rice, price acceptance and price elasticity.

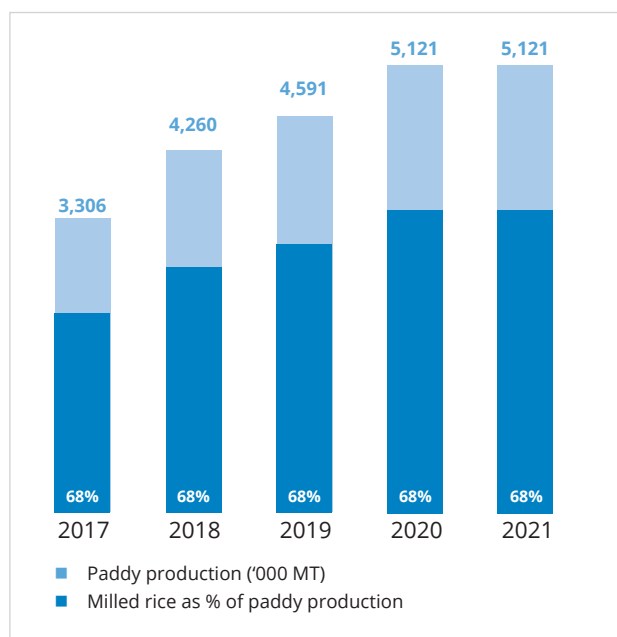
<sup>6</sup> [Varieties of Rice Produced](#)

### 3.4 Rice Production, Imports and Exports

In the past five years (2017-2021), milled rice production in Sri Lanka has increased by 12 percent to 3.5 million MT. The average yield on an area of 1.2 million hectares under rice production is 3.9 tons/hectare (12).

In 2021, 68 percent of the total paddy production was milled during rice processing.

**Figure 5: Share of milled rice out of total paddy production ('000 MT) (2017-2021)**



Source: USDA

Industrial milling of domestically grown rice is rising. Small- and mid-scale mills process the bulk of rice in Sri Lanka, but the small scale hinders operating efficiency. The Institute of Post-Harvest Technology (IPHT) attributes higher production costs to the milling industry's low productivity (8).

#### Domestic consumption and imports -

Over the years, domestic production has increased because of favourable weather conditions combined with the expansion of government-backed irrigation initiatives aimed at increasing domestic rice production. This has led to reduced dependence on imports (12).

However, domestic production of rice is vulnerable to droughts. As a result, imports rose to 17 percent in 2017. Apart from such exceptional years, imports are usually less than 1 percent of domestic consumption as seen during 2018 to 2020 (12).

In April 2021, the Government banned the import of chemical fertilizers to Sri Lanka. This has affected the rice production and yield per hectare. Production fell by 13.9 percent from March 2021 to April 2022 and average yield per hectare reduced by 14.4 percent in the same time period.

The ban led to an increase in rice imports which shot up to 23 percent of total consumption (0.3 percent in 2020). The ban affected the Maha paddy, which accounts for 60 percent of the country's paddy production (25).

Given that almost all rice produced is consumed in the domestic market, fortification efforts can have a substantial impact. In order to scale up, it will be necessary to choose the most appropriate distribution channels and programmes for supplying fortified rice to different segments of consumers. The next section provides relevant inputs, by analysing rice market segments in more detail.

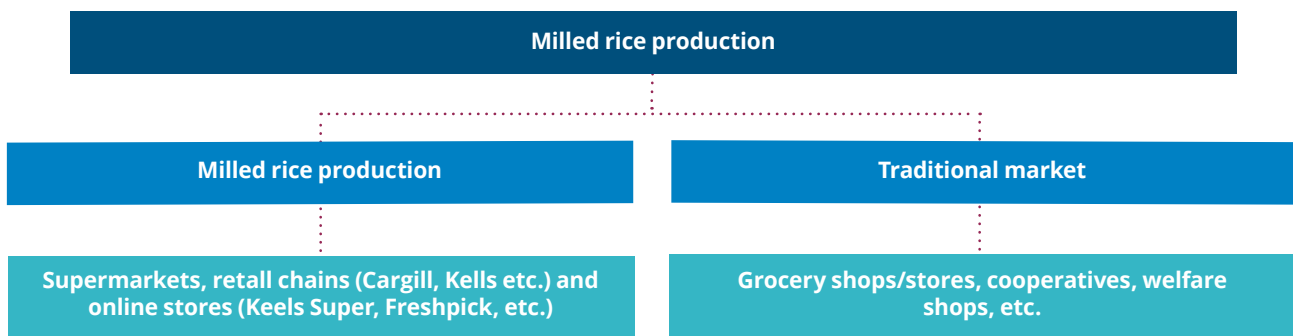


### 3.5 Rice Market Segmentation

Rice is typically sold through the traditional and modern market in Sri Lanka. Most of the rice is sold through the traditional market. Urban households have recently started purchasing rice through modern retail channels.<sup>7</sup>

The next section explains the existing rice supply chain and the important stakeholders needed to develop the fortified rice supply chain in the domestic market.

**Figure 6: Rice sold in traditional vs. modern retail in Sri Lanka**



## 4. Rice Supply Chain

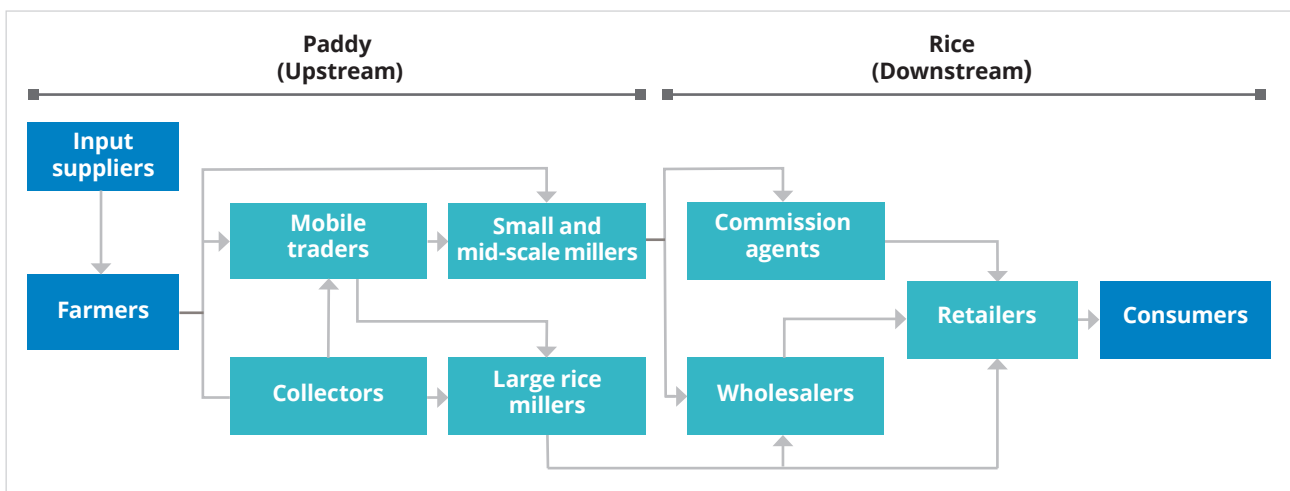
In Sri Lanka, there are separate supply chains for the distribution of rice by private millers and by the Government network. The private sector is estimated to constitute over 90 percent of the rice industry's market share. The public sector, represented by PMB and Multi-purpose Cooperative Societies (MPCS), handles the remainder (8) (27).

The rice value chain for the private sector in Sri Lanka is explained in figure 7.

The rice value chain for the Government in Sri Lanka is explained in figure 8.

Currently, a fortified rice supply chain doesn't exist in Sri Lanka. There are no domestic suppliers of FRK. There are companies in Sri Lanka that are capable of producing (fabricated) blenders but there are no domestic suppliers for producing extrusion machinery. Initially, FRK and machinery may need to be imported from other countries. For the development of a sustainable ecosystem for rice fortification, a robust domestic supply chain is essential. This supply chain must feed into the value chains described above. Naturally, this will involve collaboration with a variety of important stakeholders, whose roles are discussed in detail in the following chapter.

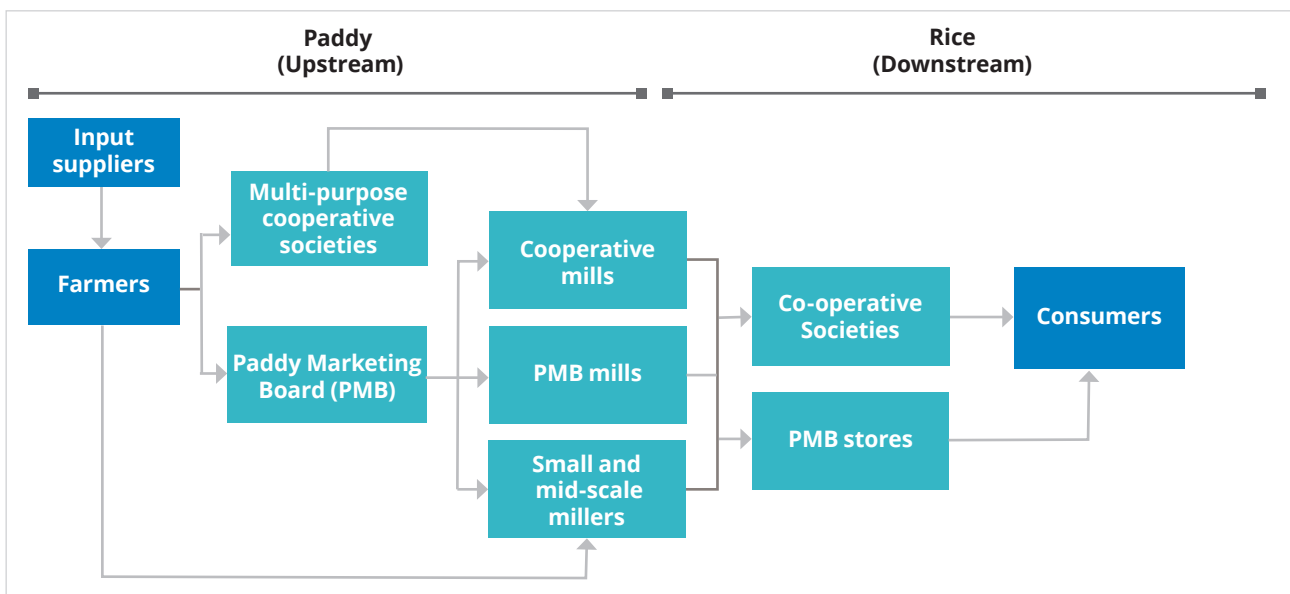
**Figure 7: Private millers' rice value chain in Sri Lanka**



Source: ValueNotes analysis

Note: Mobile traders are the traders who come in lorries or trucks to the producing areas from distant places to purchase paddy.

**Figure 8: Government rice value chain in Sri Lanka**



(For more details: [Role of Different Entities in the Rice Supply Chain](#); [Value Addition of Rice across the Rice Value Chain](#))

Source: ValueNotes analysis

## 5. Key Stakeholders in Rice Fortification

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There are multiple stakeholders involved in rice fortification in Cambodia:

1. Current fortified rice manufacturers
2. Government entities/ministries
3. Other stakeholders

### 5.1 Current Fortified Rice Manufacturers

There are no millers (private or government) that currently offer fortified rice in the market.

However, one of the leading rice millers, Hiru Rice Mills, announced in 2022 that they will start producing fortified rice, complying with WFP standards (24).



## 5.2 Government Entities

Multiple government entities are involved across functions such as production, standardization, regulation, sale and distribution of fortified rice. The scale-up of rice fortification will require efficient coordination among them and with the private sector.

The roles of such entities are detailed in table 4.

In addition to the above-mentioned government entities, the private sector has an essential role in developing the fortified rice supply chain in the country. The raw materials (FRK) and machinery (blending machine, extruder) suppliers, as well as rice associations, are significant stakeholders in rice fortification.

**Table 4: Government entities involved in scaling up rice fortification in Sri Lanka**

Authority	Role
Ministry of Health (MoH)	<ul style="list-style-type: none"> <li>- Develops the policy guidelines on food fortification and monitors its implementation in the country</li> <li>- MoH submitted a memorandum for consideration by the Cabinet of Ministers. In 2019, the Cabinet approved the proposal to use fortified rice in the school meals programme</li> </ul>
Ministry of Planning	<ul style="list-style-type: none"> <li>- Serves as the focal point of the Government for all WFP work and activities</li> </ul>
Food Advisory Committee (FAC)	<ul style="list-style-type: none"> <li>- An inter-ministry committee under Food Administration Unit (MoH), chaired by the Director General of Health</li> <li>- Responsible for developing mandatory food fortification regulations that fall under the Food Act No 26 (1980)</li> <li>- Currently, FAC is developing a legal framework for wheat flour fortification</li> </ul>
Sri Lanka Standards Institution (SLSI)	<ul style="list-style-type: none"> <li>- Responsible for formulation of standards and general national standards for consumer and industrial products including fortified food items</li> <li>- SLSI works with FAC to develop standards for fortified rice</li> </ul>
Ministry of Agriculture (MoA)	<ul style="list-style-type: none"> <li>- The key government organization responsible for introducing new rice production techniques</li> </ul>
Ministry of Local Government	<ul style="list-style-type: none"> <li>- Responsible for general food safety and implementation of food standards in the different regions/provinces of Sri Lanka</li> </ul>
Food Control Administration Unit (FCAU)	<ul style="list-style-type: none"> <li>- This unit operates under the MoH, and enforces fortification standards, through regular inspection</li> <li>- Responsible for inspecting imported and domestic fortified rice</li> </ul>
Ministry of Industries and Commerce	<ul style="list-style-type: none"> <li>- Responsible for issuing certificates for production and granting registration approvals to the millers</li> </ul>
Ministry of Education (MoE)	<ul style="list-style-type: none"> <li>- Acted as a catalyst in the success of the school feeding programme by implementing the required policies in the schools and providing the necessary information to the central Government and international organizations</li> </ul>
Paddy Marketing Board (PMB)	<ul style="list-style-type: none"> <li>- Responsible for purchasing paddy from the farmers to ensure food security when there is limited supply in the market</li> </ul>
National Food Promotion Board (NFPB)	<ul style="list-style-type: none"> <li>- NFPB comes under MoA and is responsible for organizing awareness programmes for rice fortification</li> <li>- They are also responsible for organizing advocacy forums to engage with the private sector to identify opportunities in commercializing fortified rice</li> <li>- NFPB has a blending facility that has been used for making fortified rice for the pilot study. NFPB expects this facility to be the national reference point for rice fortification standards</li> </ul>
Consumer Affairs Authority (CAA)	<ul style="list-style-type: none"> <li>- CAA falls under the purview of Ministry of Industries and Commerce and is responsible for inspecting the rice available in the market and issuing penalties to retailers</li> <li>- They conduct the inspections with the help of Public Health Inspectors and check whether the food items are prepared in accordance with the rules laid down by SLSI</li> <li>- CAA and FCAU are both responsible for enforcing regulation and charging penalties</li> <li>- In addition, they are in charge of creating consumer awareness about the nutrition content in rice</li> </ul>
National Nutrition Secretariat of Sri Lanka (NNSL)	<ul style="list-style-type: none"> <li>- MoH and NNSL need to create an enabling environment for voluntary fortification, by facilitating import of fortification equipment and fortificants</li> <li>- They also need to undertake market analysis to check the production and delivery of fortified rice</li> </ul>

## 5.3 Other Stakeholders

Rice fortification through the process of extrusion requires FRK, blending machinery and extrusion machinery (if FRK is produced by the millers themselves). Additionally, the role of rice associations is critical in disseminating information to millers. The roles of these stakeholders are discussed in detail in table 5.

These are the primary stakeholders that are involved in the rice fortification supply chain of Sri Lanka. The key challenges in the supply chain remain – FRK is still imported, extrusion machinery is unavailable locally. The lack of local suppliers and an undeveloped ecosystem for fortification make it essential to create a robust supply chain. These and other barriers to fortification are discussed in more detail in the next chapter.

**Table 5: Other stakeholders in Sri Lanka**

Authority	Role
FRK suppliers	<ul style="list-style-type: none"> <li>- FRK suppliers supply FRK directly to millers, or the respective government bodies for distribution among millers at little or no cost. Currently, there are no local FRK suppliers in Sri Lanka.</li> </ul>
Blending machinery suppliers	<ul style="list-style-type: none"> <li>- There are local suppliers who can provide fabricated blenders according to the demand</li> <li>- There is blending machinery installed at the NFPB Facility at Kalankuttiya near Galnewa. The machine was fabricated locally. It has been used for making fortified rice for the acceptability trial and pilot programme. The facility is currently not in use; however, NFPB expects this facility to be the national reference point for rice fortification standards.</li> </ul>
Extrusion machinery suppliers	<ul style="list-style-type: none"> <li>- FRK is typically produced by using extruders, which are similar to noodles/pasta making machines</li> <li>- There are no domestic suppliers of extrusion machinery in Sri Lanka</li> </ul>
Rice associations	<ul style="list-style-type: none"> <li>- Sri Lankan millers have two associations: <ul style="list-style-type: none"> <li>• Small and Medium-scale Rice Millers Association which consists of about 700 millers</li> <li>• Large-Scale Millers Association</li> </ul> </li> <li>- Their roles are as follows: <ul style="list-style-type: none"> <li>• Communicate issues faced by millers with the Government and other entities</li> <li>• Support government organizations and link research teams with millers</li> </ul> </li> </ul>
Sri Lanka Nutrition Society (SLNS)	<ul style="list-style-type: none"> <li>- Organize training sessions and conduct research related to nutrition practice and innovations</li> <li>- Conduct awareness programmes through research and publications to increase nutrition awareness among the population</li> </ul>





## 6. Discussion and Analyses

### 6.1 Stakeholder Discussion: Summary of Findings

As explained in the Introduction, detailed discussions were held with important decision makers in the Government and relevant stakeholders in the rice value chain.

#### Discussion with government stakeholders –

From the discussions it was evident that government stakeholders are interested in scaling up rice

fortification in the country. The focus of discussion with government stakeholders was on development of a sustainable supply chain for the raw materials and machinery and the distribution of fortified rice under the Government of Sri Lanka's social safety nets. Their key suggestions included conducting mass campaigns and expanding the pilot school feeding programme.

The highlights of the discussions with the government entities are provided in table 6 along with a summary of some of the key inputs received during these discussions.

**Table 6: Summary of discussions with government stakeholders**

Discussion points	Entity name	Details
Government interest in scaling up rice fortification	NFPB, MoH, PMB and SLNS	<ul style="list-style-type: none"> <li>Government is highly interested in scaling up rice fortification in the country, as it is aware of the numerous health benefits and the long-term advantages of consuming a balanced diet</li> <li>There is a necessity to introduce fortified rice in the open market to improve the nutritional profile of the consumers</li> </ul>
	MoH and PMB	<ul style="list-style-type: none"> <li>There is need for Government involvement for successful implementation and expansion of the pilot programme</li> <li>Once the programme is successful, there is scope for expanding the coverage of fortified rice to other vulnerable groups.</li> </ul>
Expansion of pilot programme (School feeding programme)	PMB	<ul style="list-style-type: none"> <li>For successful implementation, there is a requirement for better coordination between the various government entities.</li> </ul>
	MoH and NFPB	<ul style="list-style-type: none"> <li>At present, there is concern over the lack of progress on the expansion of the pilot programme due to budgetary constraints</li> <li>An additional budget is essential to facilitate the expansion</li> </ul>
Need for private sector involvement	NFPB	<ul style="list-style-type: none"> <li>Sri Lanka does not have a Public Distribution System (PDS). Because of this, the distribution of fortified rice has to be done through the private sector</li> </ul>
Supply side challenges	NSCFF	<ul style="list-style-type: none"> <li>The top 4–5 millers need to be involved in the government programmes as they contribute 50 percent of the milled rice in the country and have the required production capabilities</li> <li>The balance of production is done by more than 1,000 small-scale producers. Many of these small-scale millers are from rural areas. This poses a major logistic problem for expansion as it is not easy to reach out to all of them</li> </ul>
	MoH	<ul style="list-style-type: none"> <li>The supply chain is inefficient due to the involvement of several multi-cooperative societies (thereby increasing the overall cost)</li> </ul>

Target audience and pricing	PMB	<ul style="list-style-type: none"> <li>The price of fortified rice should be such that it is affordable for the low-income groups</li> <li>The large millers association is dominant and they impact the price variations (elaborated in the private sector entities discussion on the price-related challenges – table 7 and 8)</li> </ul>
Case for voluntary fortification	NFPB	<ul style="list-style-type: none"> <li>As mentioned in the supply chain point, there are many small-scale millers spread across Sri Lanka</li> <li>If rice fortification is made mandatory, it would not be feasible to monitor the quality of the fortified rice produced by the small millers. As a result, voluntary rice fortification would be a better option</li> </ul>
Awareness levels of millers and consumers	NFPB, MoH, PMB and SLNS	<ul style="list-style-type: none"> <li>There is a need to increase awareness about the costs and expected profits to encourage the millers to start producing fortified rice</li> </ul>
	PMB	<ul style="list-style-type: none"> <li>Awareness can be spread by organizing workshops with millers from other countries to share the success stories</li> </ul>
	NFPB, MoH, PMB and SLNS	<ul style="list-style-type: none"> <li>For the consumers, it is necessary to improve awareness levels to eliminate the misconceptions around consumption of fortified rice and increase the acceptance of fortified rice</li> </ul>
	PMB	<ul style="list-style-type: none"> <li>Advertising through TV channels will help reach a wider audience</li> </ul>

### Discussion with millers –

The stakeholders in the rice value chain, particularly millers, were aware of rice fortification and its health benefits. The discussion with all the millers tended to centre on understanding two key variables: the expected demand for fortified rice and the profits. They showed hesitation to invest as they were not adequately

aware of these key business variables. They were also unaware of the production techniques involved, the costs and expected profitability, and the raw materials and machinery used.

A summary of some of the key inputs received during these discussions is provided in table 7.



**Table 7: Summary of discussions with millers**

Discussion points	Details
Health benefits	<ul style="list-style-type: none"> <li>- They are aware of benefits of producing fortified rice to improve the nutritional profile of the country</li> </ul>
Introducing fortified rice to consumers	<ul style="list-style-type: none"> <li>- Fortified rice needs to be provided under the existing government feeding programmes, as there is no consumer demand. This can be better achieved if the Government and private sector collaborate</li> <li>- The top 4-5 millers need to be approached for scaling up the government programmes</li> <li>- Once the initial demand is created, open market sale can be introduced by the millers</li> </ul>
Lack of demand from the consumers	<ul style="list-style-type: none"> <li>- At present, the biggest challenge in introducing fortified rice in the open market is the lack of demand. Efforts need to be made to increase awareness before launching the product in the market</li> </ul>
Target audience and pricing	<ul style="list-style-type: none"> <li>- To ensure that the rice can be purchased by the vulnerable groups, the price of fortified rice should be affordable</li> </ul>
Low awareness among producers	<ul style="list-style-type: none"> <li>- There is lack of knowledge of the production process for fortified rice along with the costs and the expected profits</li> <li>- To help spread awareness, workshops can be conducted with millers from other countries (the success stories)</li> </ul>
Support required to scale up	<ul style="list-style-type: none"> <li>- Support is required from WFP to help them gain the technical know-how and understand the market</li> <li>- The millers will also need funding for the required investments</li> </ul>
Need for awareness programmes	<ul style="list-style-type: none"> <li>- There are misconceptions related to production of fortified rice. For this reason consumers may consider fortification harmful to their health</li> <li>- Awareness programmes need to be conducted from the ground level of the administration areas. These promotions could be organized by the CAA and MoH</li> <li>- Mass advertisements such as promotions on social media might be one of the best methods to promote fortified rice in Sri Lanka</li> <li>- This can be coupled with distribution of samples of fortified rice among the consumers</li> </ul>
Development of standards	<ul style="list-style-type: none"> <li>- Currently, there is a lack of standards needed to provide quality products for end-users of fortified rice</li> </ul>



## Discussion with other stakeholders –

Discussions were also held with a rice association and traders and wholesalers. The highlights of the discussions are provided in table 8.

**Table 8: Summary of discussions: rice traders/wholesalers and Rice Millers Association**

Discussion points	Details
Health benefits	<ul style="list-style-type: none"> <li>- Aware of importance of producing and consuming fortified rice to improve the nutritional profile of the country</li> </ul>
Introducing fortified rice to the consumers	<ul style="list-style-type: none"> <li>- Introducing fortified rice to the consumer needs to be done under the existing government feeding programmes as this will increase the trust in the product. This can be better achieved if the Government and private sector collaborate</li> <li>- After the initial demand is created, the rice can be introduced in the open market</li> </ul>
Price-related challenges	<ul style="list-style-type: none"> <li>- The small millers are unable to handle loss once the Government sets the Maximum Retail Price (MRP)</li> <li>- Adding to their concerns, considerable harvest from the paddy is lost due to the high transportation cost</li> </ul>
Lack of availability of funds	<ul style="list-style-type: none"> <li>- The small- and mid-sized millers are unable to expand production capacity due to lack of affordable credit. Consequently, this will impact the investment for rice fortification</li> <li>- However, large-scale millers will be able to enter the market by collaborating with the Government</li> </ul>
Low awareness among the traders/wholesalers	<ul style="list-style-type: none"> <li>- There is low awareness about the storage needs along with shelf-life of the fortified rice</li> </ul>
Lack of demand from the consumers	<ul style="list-style-type: none"> <li>- Lack of demand is one of the major deterrents in introducing fortified rice in Sri Lanka. All the stakeholders need to make efforts to increase awareness before launching the product in the market</li> </ul>
Need for awareness programmes	<ul style="list-style-type: none"> <li>- Mass awareness programmes need to be launched. The programmes need to be conducted from the ground level of the administration areas. Large-scale advertisements such as promotions on social media will also help promote fortified rice in Sri Lanka</li> <li>- These promotions could be organized by the CAA and MoH</li> <li>- This can be coupled with distributing samples of fortified rice among the consumers</li> <li>- To enhance acceptability, fortified rice should be certified by the MoH</li> </ul>
Distribution channels	<ul style="list-style-type: none"> <li>- In Sri Lanka, only 15 percent of the rice is distributed via the government channels and the rest through private. It is essential to involve the private sector for maximum reach</li> </ul>
Development of standards	<ul style="list-style-type: none"> <li>- Currently, there is lack of standards needed to provide quality product for end users of fortified rice</li> </ul>

The successful implementation of rice fortification requires a coordinated effort among the important stakeholders in the fortified rice supply chain and a clear understanding of the difficulties faced on the ground. The subsequent section elaborates on the ongoing economic crisis and its impact on the efforts in scaling up rice fortification in Sri Lanka.

## 6.2 The Sri Lanka Economic Crisis

Sri Lanka is facing an unprecedented economic crisis: a combination of high government borrowings and a series of natural disasters (such as heavy monsoons and the Covid-19 pandemic) and human-induced catastrophes (Government ban on chemical fertilizers that has severely affected farmers' harvests).

### **Government borrowings –**

In 2019, the Asian Development Bank described Sri Lanka's economy as "a tale of two deficits". Persistent high deficits, both fiscal and trade, have been funded by increased debt. In March 2022, the central bank ordered Sri Lankan exporters to convert their foreign currency into rupees (LKR) within 180 days to help replenish the bank's foreign reserves. However, as the debt levels are four times the country's reserves, this measure was not effective and the country defaulted on its sovereign debt.

### **Covid-19 pandemic –**

The country's ability to service its debt was further hindered by the Covid-19 pandemic. The tourism sector accounts for 13 percent of the country's gross domestic product, and was badly impacted by the pandemic. This led to a severe decline in local incomes, as well as foreign exchange reserves.

### **Import ban on chemical fertilizers –**

In April 2021, the Government announced a ban on import of chemical fertilizers, in an attempt to shift the country to organic farming. But the move severely impacted rice yields, and rice production fell by 14 percent, forcing the country to import large quantities of rice. The worsening foreign exchange crisis limited imports, which were unable to bridge the gap between production and consumption. Tea, one of the island's key export industries, also saw a slump in production levels.

### **Economic crisis compounded by political uncertainty –**

The economic turbulence has caused a spike in the prices of household items, including food, fuel and medicines. Food inflation rose by 29.5 percent in one year (March 2021 – March 2022). The retail price of rice (Samba) was 60 percent more than it was the year before. The price of onions was 79 percent, potatoes 66 percent and eggs 93 percent higher year-on-year.

The severity of the crisis has affected the political situation, with country wide protests and resignations by ministers. This uncertainty further complicates efforts to resolve the crisis quickly.

Sri Lankan authorities are in talks with the International Monetary Fund and the World Bank to negotiate a bailout. However, this will mean taking hard decisions on government spending, and that might impact a range of programmes in the medium term (25) (10).

The economic and agrarian crisis will take time to solve. In terms of rice, the focus initially will be to boost production and reduce price inflation. Given these challenges, the funding needs for fortification programmes are unlikely to be met in the near term, and will depend on how quickly the crisis is resolved.

## 6.3 Barriers to Scaling up Rice Fortification

### **Barrier 1**

#### **Inadequate budgets for expansion of rice fortification**

While the Government is keen to address nutrient deficiencies, adequate budgetary allocation to rice fortification is not provided. The relevant government entities in the rice fortification programme such as MoE, MoH and MoA (NFPB which is part of MoA) are all keen on institutionalizing the use of fortified rice for the school meal programme. It has been estimated that the incremental cost of using fortified rice in the school meal programme is around LKR 300 million a year. At present the Government spends nearly LKR 6 billion a year on school meals (28).

Given the current economic crisis, this problem will probably worsen in the short run. The private sector, too, is facing severe economic challenges. Until the Government's finances improve, funding for the school feeding programme remains uncertain. In the interim, there is an urgent need for donors to help supplement resources via financial aid.

### **Barrier 2**

#### **Lack of comprehensive food safety standards for fortified rice and FRK**

There are no food safety standards for FRK imports or domestic production. However, the regulatory bodies FAC and SLSI are in the process of developing the standards for producing and distributing fortified rice in Sri Lanka. After the standards are set, it is essential to lay down the monitoring and enforcement environment by provincial food authorities. Otherwise, there will be inconsistency in the product sold in the market, potentially harming the safety and health of the general public.

### Barrier 3

#### **Limited awareness among millers about the production techniques, costs involved, and suppliers of raw materials and machinery required for rice fortification**

Most of the millers are unaware of the technical processes involved in rice fortification. They are also not aware of the raw materials such as premixes and FRK that are required, or their likely costs. Nor do they know about the machinery (blending/extrusion) needed for rice fortification.

Given the limited awareness about the production process, millers lack knowledge about the costs of various inputs and the appropriate channels to purchase them. Addressing such knowledge gaps is an essential step in establishing a sustainable and efficient supply chain for fortified rice in Sri Lanka. This will require coordinated efforts from international agencies such as WFP, donors, government entities and stakeholders in the rice industry.

### Barrier 4

#### **Perceived poor return on investment in fortified rice production due to lack of awareness of various costs of production and lack of consumer demand**

Given the limited knowledge of production processes as discussed earlier, millers are unable to assess the quantum of investment needed, and the likely returns on this. Most prominent millers believed that the required investment in machinery as well as increased costs would be substantial, even though they were unable to quantify this.

Added to this, the absence of demand and the absence of government support make them very reluctant to make investments in rice fortification.

It is important to educate millers on likely costs and investments, as this will provide a framework for them to seriously evaluate the option.

### Barrier 5

#### **Lack of funds to invest in machinery and capacity expansion**

The millers cited the concern that they don't have the required budget to invest in machinery required for rice fortification. Their current business is not yielding the required returns needed for investment. They need additional funding for future investments.

In all likelihood, this problem has been exacerbated by the current economic crisis.

### Barrier 6

#### **Lack of awareness among the population about fortified rice and its benefits, leading to negligible demand**

Although WFP has conducted pilot programmes to promote fortified rice, there is a lack of awareness about fortified rice and its benefits among the general population in Sri Lanka. There are also misconceptions about toxicity of fortified food items. Creating awareness about the safety and positive health impact of fortified rice is essential to generate demand in the market.

The above-mentioned impediments need to be addressed by a series of interventions, coordination between different entities across the value chain, and sustained over a period of time. The next chapter highlights various recommendations that could be considered to accelerate the scaling-up of rice fortification in Sri Lanka.

## 6.4 Commercialization by the Private Sector

In conversations with private sector stakeholders, it was clear that the vast majority of the millers and other players were not willing to invest in rice fortification without any clarity on the available market for fortified rice.

The stakeholders require a basic understanding of the return on their investment. At the moment, these players do not believe that the commercial sale of fortified rice would generate any profits. Hence, financial support or guaranteed off-take of fortified rice through government-led procurement programmes is required to provide initial economies of scale to manufacturers.

The prospects for consumer-driven market demand are also not encouraging due to the price differential between fortified and non-fortified rice and the negative perceptions about fortified rice being harmful to health. The current economic crisis will also hamper the process.

Essentially, this research indicates that commercialization (by the private sector) at this stage does not seem very likely or viable.

In this chapter, recommendations to accelerate the scale-up of rice fortification are highlighted.

# 7. Recommendations for Scaling up Rice Fortification

Sri Lanka is at the early stage of laying down food standards for fortification. In the past, the Government conducted a pilot study through social safety net programmes, such as feeding programmes in schools, to distribute fortified rice, as discussed in section 2.2. Although the school meals programme is not distributing fortified rice at present, it will be used to provide fortified rice for schoolchildren in the future.

The previous sections have highlighted the barriers that need to be surmounted. Similar experiences in different countries at different stages of evolution towards large-scale rice fortification also lend themselves to optimism that a well-designed programme can succeed. Of course, this will require coordinated efforts from all stakeholders along several parameters: continuing advocacy and awareness building, business model development, development of standards and a regulatory framework, and demand creation.

A comprehensive approach is required with the coordination of key decision makers within the Government and the industry leaders in the rice value chain.

The recommendations below provide a detailed road map to successful scale-up, including commercialization as well as subsidized distribution of fortified rice under social safety nets.

*Note: Given the recent worsening of the economic crisis in Sri Lanka, the timelines suggested may need to be revised, depending on how soon the economy returns to normalcy.*

## Recommendation 1: Advocacy with government decision makers

Indicative timeline: short term (ongoing process)

### 1.1 Conduct meetings with the government entities to put rice fortification as a priority in the budgetary allocation process

In order to scale up rice fortification in Sri Lanka, the active participation of government entities is essential. Hence, sustained advocacy with government departments and regulatory authorities is an indispensable step. Development partners such as WFP

must conduct meetings with the relevant government entities (MoH, MoA and MoE) to increase the budgetary allocation for the rice fortification programme. This will in turn increase the scope of the programme. More schoolchildren will reap the benefits of consuming fortified rice.

Given the current low budgetary priority for rice fortification, such meetings/interactions would be essential to convince government entities about the significant potential for rice fortification in tackling MNDs in the country. This will help spark interest and engagement of important government stakeholders, and provide a big push for fortification efforts.

### 1.2 WFP must persuade FAC and SLSI to develop comprehensive standards for rice fortification

Indicative timeline: medium term (advised to begin within a year)

Rice fortification could be voluntary initially and, in the long run, made mandatory as with other food fortification initiatives. However, enabling infrastructure in terms of standards and mechanisms for monitoring and compliance of these standards are critical. Without standards and compliance, there are likely to be a variety of differing products leading to quality issues, and this will negatively impact the expected health benefits. Also, without standardization, consumers will not have the required trust in fortified rice products.

In Sri Lanka rice milling is very fragmented with a large number of small rice mills in the country. Because of this fragmented nature, making rice fortification a mandatory provision by law is not very practical. Enforcing such mandatory regulations will be difficult and impractical. Hence, rice fortification needs to be voluntary.

To avoid any inconsistency in the quality of fortified rice and the micronutrients to be added to the FRK, it is essential to develop comprehensive food safety standards for them. WFP must advocate with FAC and SLSI, with recommendations from the MoH, to set food safety standards for fortified rice along the lines of the international guidelines set by WFP.

Also, if there are no standards in place, millers might not feel secure about investing in production of fortified rice. In the future after the standards are set, they might face the risk of producing fortified rice that does not meet the standards. Setting the standards at an early stage will eliminate this risk and more millers might be willing to produce fortified rice.

The studies conducted so far (by WFP and MoH) can be used as a reference to understand the health benefits of consuming fortified rice by the target population. MoH can recommend the micronutrients composition of premixes for producing FRK, based on the health status of the population.

After the rice fortification standards are implemented, a well-designed monitoring system is essential for quality control and assurance. WFP, in partnership with MoH and NNSL, can provide technical assistance to support the regulatory authorities in the effective integration of a quality assurance and quality control (QA/QC) plan for rice fortification. This would help in monitoring the quality of fortified rice and, in the long run, monitoring FRK production, if FRK were to be produced locally.

As mentioned earlier, standardization and compliance are essential to scaling up rice fortification, and this means intensive and sustained support from institutions like WFP and MoH.

## Recommendation 2: Interact with potential funding partners

**Seek funding from development partners to procure FRK and machinery, which will help to support and reduce the onus of investment on millers**

Indicative timeline: medium term (to be done in parallel with setting standards)

In addition to the above point, the relevant government entities (MoH, MoA and MoE) can explore the procurement of funds from development partners such as SDF, WFP and USAID to supply FRK to millers and install blending machinery at mill premises. This will be especially important considering the current economic situation in the country; the majority of the funding in the initial years will have to come from private donors or international development agencies.

- In 2017, United Nations Sustainable Development Goals Fund (SDG-F) funded the Sri Lanka national food fortification workshop. SDG-F can help millers to invest in the machinery required.

- The World Bank and the SAARC Development Fund can fund the current feeding programmes of the MoE, MoH and NFPB. The funds can be used to procure fortified rice from millers.
- It may be necessary to find additional funding partners, given the crisis in Sri Lanka.

Additionally to help the millers bridge the gap in their budgets, funding from the local development banks can be explored. The relevant government entities must involve banks such as the SDB Bank, Bank of Ceylon, the HNB Bank and other development banks to explore offering cheaper funding options to millers for installing machinery.





### Recommendation 3: Business model return on investment

#### **Create and disseminate a technical document for millers entailing the technical know-how of rice fortification processes, the costs involved and the economic returns in selling fortified rice**

Indicative timeline: short term (ideally to be done within a year)

Millers and rice associations are largely unaware of the concept of rice fortification and its health benefits. They are unaware of the technical know-how of rice fortification processes and the costs involved and economic returns in selling fortified rice. WFP, in collaboration with MoH, could develop a technical report and share it with the millers to inform them about these aspects in detail.

Indicative contents of the document:

- i. Health benefits of rice fortification
- ii. Different processes of rice fortification and the most feasible technology
- iii. Raw materials and machinery required
- iv. Process innovation in FRK and machinery through case studies in other countries
- v. Costs involved:
  - Cost of importing FRK
  - Cost of blending machinery
  - Cost of FRK for local production (includes the cost of extrusion machinery)
  - Any other associated costs
- vi. Investment needed and expected returns under different scenarios:
  - Whether FRK is imported or produced locally
  - Whether blending machinery is imported or produced locally
  - Whether extrusion machinery is imported or produced locally
  - Whether subsidies are provided by the Government for importing FRK or machinery
- vii. Financial viability in producing fortified rice – expected return on investment
- viii. Case studies of successful rice fortification projects across other countries through existing WFP reports

Creating such documentation will go a long way in enabling appropriate advocacy efforts with stakeholders.

### Recommendation 4: Advocacy with millers

#### **Conduct periodic workshops and individual meetings with the leading rice millers to educate them about rice fortification, its health and economic benefits and the technical processes involved**

Indicative timeline: medium term (ongoing process – once the technical document is prepared)

Given the lack of awareness among millers about the economic benefits of rice fortification, MoH, NFPB and WFP can conduct workshops and individual rice miller meetings to disseminate information about rice fortification in detail. The technical report (recommendation 3) can be leveraged to disseminate the necessary information. Such workshops and meetings would help in signing on a few millers (ideally, among the larger millers in Sri Lanka) to pilot test the programme for rice fortification.

These workshops/meetings can include discussions on:

- i. Health benefits of consuming fortified rice
- ii. Guidance about the financial viability of producing fortified rice
- iii. Success stories of rice fortification in other countries through existing case studies of WFP
- iv. Technical processes involved in rice fortification
- v. Gaining the commitment of 4–5 significant millers for a pilot testing programme for rice fortification

Though a workshop was conducted in 2017, the impact was limited, due to lack of follow-up. In future, workshops need to be designed with adequate and periodic follow-ups and continuous engagement among the stakeholders. This will ensure that learnings result in actual implementation on the ground, over a period of time.

## Recommendation 5: Demand creation through school feeding programme

The involvement of government entities is crucial to effectively scale up the rice fortification programme in Sri Lanka. The scale-up requires a phased approach, as discussed below:

Phase 1: Creation of institutional and/or consumer demand for fortified rice to incentivize millers to invest in rice fortification

Phase 2: Sourcing funds for the scale-up of the rice fortification programme

Phase 3: Assistance to millers in installation of blending machinery and procurement of FRK

Phase 4: Development of a domestic supply chain mechanism for FRK

The case study of rice fortification scale-up in India and Bangladesh sheds some light on the efforts of the governments in those countries:

### India:

In August 2021, the Indian Prime Minister announced the distribution of fortified rice throughout the Public Distribution System and other government schemes in all States and Union Territories (UTs) by 2024 in a phased manner.

In 2022, Food Corporation of India (FCI) in multiple states announced the procurement of fortified rice from private millers. For instance, the procurement of 260,000 MT of fortified rice from private millers was announced in the state of Telangana as a part of 'PM Poshan' (Mid-day meal programme).

The rice would be distributed in pre-primary education centres and then would be further expanded to include distribution of fortified rice among schoolchildren. The Indian Food Ministry advocated for the relevant entities to provide financial assistance to rice millers for installing blending machinery. Currently, 600 out of the 900 major rice mills in the state have installed the required equipment.

To ensure that the millers are provided with FRK, multiple state governments invited tenders from manufacturing companies. Such efforts of the government have led to a significant increase in the availability of FRK suppliers in the country (29) (30) (31).

### Bangladesh:

The Government of Bangladesh has integrated the distribution of fortified rice through national social safety net programmes. This has helped the private sector manufacturing companies to get a sustainable market for FRK. The scale-up of domestic production of FRK can be attributed to the unrelenting support of WFP, Nutrition International (NI), Global Alliance for Improved Nutrition (GAIN) and other partners

Initially, FRK was being imported at higher costs; however, with technical support from WFP, three local privately funded FRK facilities were set up in 2019. WFP is also providing technical assistance to the government in establishing a FRK factory (production capacity of 200 kg per hour) and a laboratory facility for kernel testing. More than 50 blending units (rice mills) are operational in Bangladesh (9).

From both these cases, it is evident that government efforts are essential to efficiently scale up rice fortification.

Thus, the following recommendations are made for the scale-up of production and supply of fortified rice in Sri Lanka.



### 5.1. To create a demand for fortified rice in the market, invite tenders from millers to supply fortified rice to feeding programmes for schoolchildren

Indicative timeline: medium – long term (ideally to be started after the budget is approved)

#### Create demand by expanding the school feeding programme

To generate an interest among large millers to invest in production machinery; Government of Sri Lanka and WFP could invite tenders for supplying fortified rice. Rice could then be distributed to a greater number of schoolchildren (through the School Feeding Programme).

The pilot study conducted through the School Feeding Programme only catered to 34,000 students (34). However, the total number of school students is more than 120 times that, or around 18 percent of the Sri Lankan population. Hence, substantial initial demand can be created by expanding the current school feeding programme. Knowing this, the cabinet approved the inclusion of fortified rice across all school meal programmes, which is a positive step to tackle malnutrition. This initiative will provide incentive for private millers to invest.

However, in the near term, government funding will be more challenging than usual, necessitating aid or international funding. Without significant bulk demand, millers will not be willing to invest, especially given the fact that their businesses are already reeling from the crisis.



## Recommendation 6: Awareness creation campaigns

### Campaign to generate awareness about the benefits of consuming fortified rice among the population

Indicative timeline: long term (ongoing process)

Once the Government is able to generate some level of awareness among consumers about fortified rice through its distribution programmes, it would be essential for the relevant entities to invest in mass-awareness campaigns. The current health campaigns conducted by MoH are insufficient to generate the level of awareness needed to address the large Sri Lankan population. It is essential that the MoH, in collaboration with NFPB, run campaigns for the public across media – TV, print and social – about fortified rice and its benefits.

The Consumer Affairs Authority, MoH and MoA (NFPB) can partner with state-owned broadcasters (such as Sri Lanka Rupavahini Corporation) and other media channels to run advertisements about the benefits of consuming fortified rice. This would help in generating traction for fortified rice among consumers, especially those that are more health conscious and willing to pay a premium. Given their understanding of MNDs and the importance of vitamin supplements, they are likely to be more inclined to demand fortified rice owing to its nutritional benefits.

Along with television, innovative digital outreach could supplement the awareness efforts, and help reach a certain section of the population (digitally active, younger cohort) at lower cost.

Apart from government funding, aid agencies and corporate social responsibility funds can substantially enhance this effort.

As described above, the key success factors in scaling up rice fortification in Sri Lanka include the following:

- A nudge from the Government by creating initial demand
- Significant funding from aid agencies or international organizations
- The belief that rice fortification is beneficial among all stakeholders
- Establishment of a viable business model for millers
- A sustained campaign to build awareness among consumers

# Conclusion:

## Possible Road Map to Commercialization

As discussed in the previous section, the scale-up of rice fortification would require immense efforts from the Government along with WFP, other development partners and donor agencies. The success will depend on continuing advocacy and awareness building, business model development, restructuring of the mandatory fortification legislation and implementing a regulatory framework, and demand creation.

Given the hesitancy of the private sector to invest in rice fortification without support from the Government, commercialization of fortified rice will take time, and needs several other things to fall into place first. However, based on the recommendations above

(chapter 7), figure 9 shows a possible road map to commercialization of fortified rice.

Though Sri Lanka's well-developed domestic rice industry would otherwise have provided room for optimism, the current crisis is likely to set back existing initiatives and slow down progress. A greater amount of external funding will be required. In the near term, it will also be difficult to ensure the required levels of commitment and coordination between different arms of the Government, as well as other stakeholders. However, at the same time, it is important to step up efforts, so as to minimize the impact of the current crisis, and work towards better nutrition for Sri Lanka's population.

**Figure 9: Possible Road Map to Commercialization**



Invite tenders from millers to create initial demand for FR through government social protection programmes.



Provide financial support (in the form of cheaper and/or subsidized loans from banks, funding from govt. and/or WFP, grants, etc.) to encourage millers to invest in capacity for blending.



Initially, a few large millers that have indicated interest, or those that might show interest after understanding business and technical aspects – will initiate FR production and supply it to the government programmes.



As millers would have already invested, they could consider selling additional FR in the open market. They could create a nutritious rice brand (niche premium product) and sell it at slightly higher prices.



As awareness spreads gradually (as mentioned in recommendation 6), along with the marketing efforts of private millers' marketing teams, more millers would be willing to participate in the market.



As the supply of the product increases, costs will also reduce. The final price of FR would become more affordable to customers and would not be only limited to the premium customers who were initially targeted.



# Annex:

## STEPS TAKEN TO REDUCE THE PREVALENCE OF ANAEMIA

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Other initiatives taken by the Sri Lankan Government are as follows:

- An annual national school medical inspection is conducted across all schools. Through this, iron and folate supplements, deworming treatment and health education is provided to all students (18).
- A targeted iron supplementation programme for children (<5 years) who are born pre-term or have low birth weight.

- According to the Family Health Bureau, Ministry of Health 2019, the following activities were carried out in 2019:

- Distribution of Multiple Micro Nutrient Powder (it is a home fortificant supplement to reduce iron deficiency anaemia in children aged 6–24 months. It can be mixed with semisolid or solid food) as a strategy to prevent iron deficiency anaemia during infancy and young childhood. The sachets are distributed by the Family Health Bureau (FHB) of MoH and are distributed from FHB to Regional Medical Supplies Division island wide.
- Island-wide distribution of therapeutic food for nutrition rehabilitation of children (<5 years) with severe acute malnutrition (16).

# Annex:

## GOVERNMENT FORTIFICATION POLICIES AND STRATEGIES

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Recognizing the need to address the malnutrition in women and children, the Government launched, in 2012, an evidence-based Multi-Sector Action Plan for Nutrition (MSAPN). The plan aims to reduce malnutrition in a multisectoral, coordinated and systematic manner. The timeline for MSAPN is as follows:

- The first MSAPN was from 2013-2016 and was in line with the 2010 National Nutrition Policy.
- In 2017, the Sri Lankan Government established the National Nutritional Secretariat Sri Lanka (NNSL) within the Presidential Secretariat to coordinate the multisectoral nutrition responses within the country (19).
- The second MSAPN was from 2017-2020. The activities under the plan were strengthened as they were integrated into the national development planning mechanisms and monitored annually through a reporting mechanism established in March 2016 (32).
- The latest MSAPN time span is from 2018-2025. The plan aims to end all forms of malnutrition by 2030, in line with Sustainable Development Goal 2 (Zero Hunger). The strategic objectives of the plan are:
  - Strengthen and enable an environment for nutrition
  - Improve quality and coverage of nutrition-specific interventions to enhance maternal and child nutrition status
  - Improve quality and coverage of nutrition-sensitive interventions to enhance nutrition status of the population
  - Strengthen the National Nutrition Information System (NNIS) as a planning and monitoring tool
  - Strengthen community empowerment to optimize nutrition at the household level (33)

# Annex:

## SCHOOL FEEDING PROGRAMME

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Fortified rice was introduced through the school feeding programme, which is one of several social safety net programmes in Sri Lanka.

### Acceptability trial

An acceptability trial was conducted in 2016–17 by the Faculty of Agriculture of Peradeniya University supported by WFP. It was carried out with 2,518 primary schoolchildren and their parents and households in 60 representative schools in Monaragala and Kandy districts.

WFP supported the MoA to set up the facility to blend FRK with normal rice. The facility is installed at the NFPB Facility at Kalankuttiya near Galnewa. It has been used for making fortified rice for the trial and the pilot programme, and the staff has been trained in standard operating procedures (blending, packaging and distribution) for this purpose. The facility is currently not in use; however, NFPB expects this facility to be the national reference point for rice fortification standards (19).

### National School Feeding Programme

In 2018, the Government of Sri Lanka endorsed the introduction of fortified rice in social safety net programmes and voluntary production. With WFP's technical and financial support, initial steps started to provide fortified rice through the national school feeding programme to 17,500 schoolchildren in the Anuradhapura District (34).

The rice fortification pilot programme, implemented since 2019 in Anuradhapura District, ended successfully in March 2020. The study was conducted across 267 schools (34,000 children) under the National School Meals Programme (NSMP). WFP provided financial and technical support (they also provided the FRK) to fortify rice and build market demand for it. The operational feasibility study conducted on introducing fortified rice in the NSMP helped raise awareness of the policies needed to scale up rice fortification efforts (35).

In 2020, SAARC Development Fund (SDF) and WFP launched a project, "Scaling up rice through social safety net programmes in Sri Lanka". Through this project, Government of Sri Lanka was expected to receive USD 3.58 million. The three-year project will benefit 800,000

schoolchildren in Sri Lanka by introducing fortified rice through the school feeding programme (36), (37). (Current status: there was no launch of a scale-up programme on fortified rice as the required funds were not released.)

In 2021, WFP planned to provide school meals for an average of 12 days per month for over three months. The planned rice fortification programme was not implemented due to resource constraints. Due to this, production and distribution of fortified rice did not take place, but WFP did multi-scenario costing analyses to inform advocacy efforts. The study revealed that fortifying rice in the NSMP could further reduce the cost of a school diet. A food safety risk assessment was conducted to evaluate potential food safety hazards of the models implemented. With this, a food safety and hygiene toolkit for Home-Grown School Feeding (HGSF) caterers was also developed (11).

### Challenges

MoH conducted an operational feasibility study which identified several issues:

- This programme is currently only implemented in primary schools (children aged 6–10 years). But, the majority of schoolchildren not restricted to 6–10 years are suffering from anaemia. Therefore the current school meal programme must be expanded to provide fortified rice to all schoolchildren.
- At the moment the Government is spending LKR 30 per student on the school meal programme, which is not enough. Therefore, the funds allocated must be expanded to provide fortified rice under the school meal programme.
- There are problems related to the distribution system. Multiple cooperative societies are distributing fortified rice in relevant schools but find it difficult to transport the rice to the right places.



## Annex:

### DISTRIBUTION OF FORTIFIED RICE THROUGH MULTI-PURPOSE COOPERATIVE SOCIETIES

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Although there is no Public Distribution System (PDS) in Sri Lanka, there is a network of cooperative retail shops. In the past, these shops were used as a government platform to distribute rationed food items. Although there is no rationed food distribution now, the shops are still frequented by low-income consumers. This is because the retail prices at these shops are relatively low.

Under each district there is a Multi-Purpose Cooperative Society (MPCS), and under each MPCS, there are several

retail shops at village level. These cooperative stores are used to distribute staples and other consumer items. The mark-up on the items by the cooperatives is low and the retail prices of most products available at these shops are very competitive, as compared to other retailers and supermarkets.

Therefore, the distribution of fortified rice could be done through the network of cooperatives and private retail outlets.

# Annex:

## KEY SEASONS FOR RICE PRODUCTION AND HARVEST

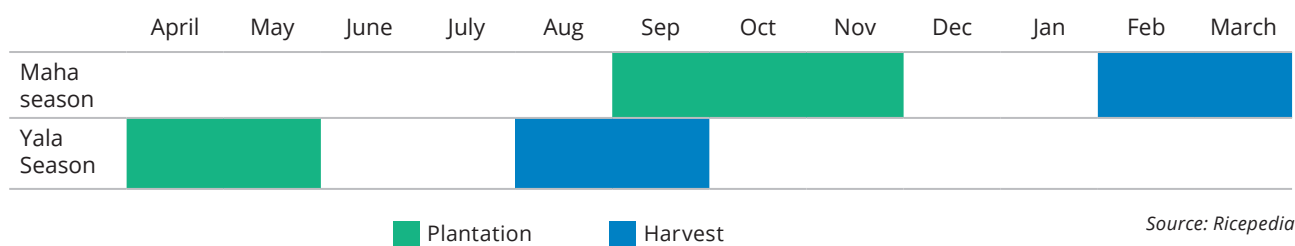
There are two cultivation seasons in Sri Lanka, Maha and Yala. Maha season falls during the North-east monsoon from September to March of the following year. Yala season is effective during the period from April to the end of September.

Under normal conditions, the Maha season accounts for majority of the country's rice crop (60–65 percent of the annual production). The crop productivity is dependent on the monsoon.

The Yala season produces the country's minor rice crops (35–40 percent of annual production). This season normally has lower water availability resulting in less planting and low production.

The main raw material for producing fortified rice (i.e. premixes in the form of FRK) needs to be supplied before the harvest commences as it has to be blended with the regular rice

**Table 9: Plantation and harvest seasons of rice in Sri Lanka**



Source: Ricepedia

# Annex:

## RICE IMPORTING COUNTRIES

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### Rice Importing Countries

Sri Lanka mainly exports to European and Asian countries, accounting for 75 percent of the total exports. The top three European importing countries are Germany, United Kingdom and Italy, while Australia is Asia's biggest importer. Canada and United Arab Emirates account for about 20 percent of the imports.

**Table 10: Top rice importing countries from Sri Lanka (2020)**

Country	Region	Exported quantity (MT)	% of imports out of total
Germany	Europe	1,549	17%
United Kingdom	Europe	1,330	14%
Canada	N. America	1,326	14%
Australia	Asia	1,019	11%
United Arab Emirates	Middle East	759	8%
Italy	Europe	626	7%
Other	Misc.	2,765	29%
Total		9,374	100%

Source: Trademap

# Annex:

## VARIETIES OF RICE PRODUCED

Table 11 elaborates on the various rice varieties.

**Table 11: Rice varieties in Sri Lanka**

Variety Name	Details	Prices (LKR/kg)
Keeri Samba	Shorter and harder grain than plain Samba, comprises more vitamins (B6) and minerals absorbed from rice bran	LKR 215–230
Keeri Samba – Supri	This is a special type of rice with short grains and is tastier than other varieties of samba rice. Mostly used for making biriyani, fried rice and other rice varieties.	LKR 160–165
Kekulu – Red	Commonly polished rice, never parboiled, similar to Nadu variety	LKR 150–160
Kekulu Samba – Red/White	Kekulu rice but a short ovular grain like Samba and usually comes in red and white.	LKR 150–160
Kekulu – White	Kekulu in particular – neither preboiled nor milled – is considered to be one of the most nutritious rice varieties in Sri Lanka. But usually Kekulu is not raw but peeled. Most Kekulu is white or red rice.	LKR 135–145
Nadu – Red	Red Nadu is the most popular Sri Lankan red rice. The kernel is rich in anthocyanin, an anti-oxidant. Red Nadu also has a high vitamin and mineral content.	LKR 140–150
Nadu – White	Medium–long grain, about one third of the rice consumed on the island is white Nadu rice	LKR 130–140
Samba	Short-grain rice with a distinct taste and slightly pungent aroma	LKR 160–165
Suwandel – White	Fragrant white rice with a milky taste. Suwandel has more vitamins than most other common rice varieties.	LKR 360–390

# Annex:

## KEY RICE BRANDS OPERATING IN SRI LANKA

Table 12: Key rice brands operating in Sri Lanka

Key brand	Rice mill/Company	Prices – Keeri Samba (LKR/kg)
<p><a href="#">Araliya</a></p> 	Araliya	LKR 240
<p><a href="#">Hiru</a></p> 	Nipuna Rice Mill	LKR 200
<p><a href="#">Golden Crop</a></p> 	CIC Golden Crop Rice	LKR 160
<p><a href="#">Nipuna</a></p> 	Nipuna Rice Mill	LKR 200
<p><a href="#">New Rathna Rice</a></p> 	Rathna Rice Mill	LKR 170 (Samba rice)

# Annex:

## ROLE OF DIFFERENT ENTITIES IN THE RICE SUPPLY CHAIN

**Table 13: Supply chain participants and their role**

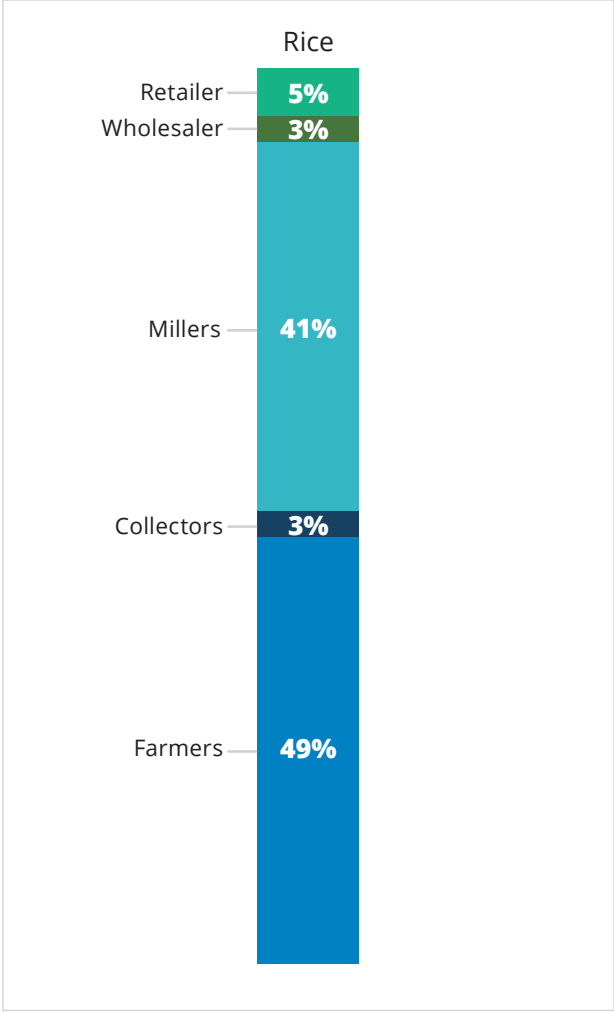
SN	Key players	Step involved in
1	Input suppliers	Supply of inputs such as seeds, fertilizers and pesticides to farmers
2	Farmers	Produce paddy and sell it to wholesalers through the following channels: <ul style="list-style-type: none"> <li>- Via the small millers</li> <li>- Farmers sell their produce to: <ul style="list-style-type: none"> <li>• Paddy Marketing Board (PMB) and Multi-purpose Cooperative Societies (MPCS) who sell it to small- and mid-sized millers</li> <li>• Mobile traders who sell to small, mid and large millers</li> <li>• Collectors who then sell it to the large millers</li> </ul> </li> </ul>
3	PMB and MPCSS	PMB is a government institution in Sri Lanka involved in storage for the purpose of stabilizing prices and revenues to farmers and protecting consumers during the off-season. MPCSs also work in collaboration with the Sri Lankan Government to sell essential food items such as rice at prices 10 percent lower than the private sector stores.
4	Collectors	Buy rice from small farmers and sell it to the large farmers The paddy purchased by the collectors are sold to the private millers
5	Mobile traders	The mobile traders purchase paddy directly from farmers as well as from the collectors in the villages and nearby towns. The paddies purchased by the mobile traders are sold to the private millers.
6	Small and medium rice millers	Small and medium rice mills (milling capacity of less than 2 MT/hour) obtain paddy rice from farmers/collectors/traders/PMB and sell the milled rice in the domestic market through Cooperative Societies outlets and retail markets.
7	Large rice millers	Large rice millers (milling capacity greater than 10 MT/hour) process milled rice and sell it in the domestic market through retailers and supermarkets.
8	Cooperative Societies	The principle objective of Cooperative Societies is to play the role of a business institute (wholesale) for essential consumer products. They handle a very small amount of paddy stocks for its own processing. Cooperative Societies also act as a rice importer for the Government, but manages very limited stocks.
9	PMB Stores	They have 300 stores around Sri Lanka, which together have a storage capacity of 3,000 MT for paddy They can purchase paddy as a government organization and process fortified rice via mills (through partnership with private mills as well as cooperative mills and PMB mills)
10	Retail outlets	At retail level, rice is sold by supermarket chains and traditional retailers.
11	Wholesalers	They purchase the rice from large and small rice millers and sell it to the retailers.
12	Domestic consumer	Consumers can buy rice from multiple channels such as Cooperative Societies outlets, supermarket chains, e-commerce websites, online stores and retail stores of major brands in Sri Lanka, and supermarkets.

# Annex:

## VALUE ADDITION OF RICE ACROSS THE RICE VALUE CHAIN

Most of the value addition takes place at only two points in the entire value chain: the farmer and the miller levels (26).

**Figure 10: Value addition in the rice value chain in Sri Lanka**



# Annex:

## TECHNOLOGIES FOR RICE FORTIFICATION

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Rice can be fortified using multiple technologies, such as dusting, coating, cold extrusion, warm extrusion and hot extrusion. This report focuses on rice fortification through extrusion.

Extrusion is a fortification technique in which FRK is added to the polished rice in ratios ranging from 1:50-1:200. Two types of extrusion process can be applied for rice fortification: cold extrusion and hot extrusion.

**Cold Extrusion:** The process, also called “shape forming”, uses no additional heat except that generated during the mechanical processing of the rice dough. The product temperature during the entire processing operation remains below the melting temperature of the rice starch (30–40°C); hence gelatinization of the starch does not take place.

**Hot Extrusion:** In this process, additional heat energy is applied normally through steam heated barrel jackets and the melting temperature of starch is exceeded (80-110°C). The dough containing micronutrient premix in the required concentration and other optional additives are pressed through the extruder tube where steam and water are added. The pasta shaped extrudate is cut into rice size pieces at the exit and the wet FRK is subsequently dried. The process results in fully or partially pre-cooked simulated rice kernels that have similar appearance to normal polished rice (38)



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# Annex: Acronyms

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CAA	Consumer Affairs Authority
ENOH	Environmental, Occupational Health and Food Safety – MoH
FAC	Food Advisory Committee
FAO	Food and Agriculture Organization of the United Nations
FCAU	Food Control Administration Unit
FFI	Food Fortification Initiative
FRK	Fortified rice kernels
IPHT	Institute of Post-Harvest Technology
IRRI	International Rice Research Institute
LSFF	Large Scale Food Fortification
MMT	Million metric tons
MN	Micronutrients
MND	Micronutrients deficiency
MoA	Ministry of Agriculture
MoE	Ministry of Education
MoH	Ministry of Health
MPCS	Multi-purpose Cooperative Societies
MRI	Medical Research Institute
MT	Metric tons
Mtph	Metric tons per hour
NFPB	National Food Promotion Board
NNSSL	National Nutrition Secretariat of Sri Lanka
PDS	Public Distribution System
PMB	Paddy Marketing Board
SDF	SAARC Development Fund

SLNS	Sri Lanka Nutrition Society
SLSI	Sri Lanka Standards Institute
TAG	Technical Advisory Group
UNICEF	United Nations Children's Fund
US	United States
USDA	United States Department of Agriculture
USI	Universal Salt Iodization
WFP	World Food Programme
WHO	World Health Organization
WIFS	Weekly Iron Folate Supplementation
WRA	Women of reproductive age

