IFC International Finance Corporation
WORLD BANK GROUP

Sustainable Rice Market Insights

A Preliminary Survey: Introduction to the Market and Financing Opportunities

FOLUR

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Contributors:

Kathleen Bottriell, Lead author and external consultant
Sustainable Natural Resources
kate.bottriell@naturalresources.ch

Heather Oh, Sustainability, Smallholder Supply Chains
International Finance Corporation (IFC)
hoh3@ifc.org

Alan Johnson, Lead, Smallholder Supply Chains
International Finance Corporation (IFC)
ajohnson6@ifc.org

Josefina Maiztegui, Associate Operations Officer
International Finance Corporation (IFC)
mmaiztegui@ifc.org

Jessica Bluestein, Operations Officer, Global Trade Supplier Finance (GTSF) Program
International Finance Corporation (IFC)
jbluestein@ifc.org

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Table of Contents

Acronyms

AWD	Alternate wetting and drying
CAB	Conformity assessment body
CH4D	Global Methane Reduction Platform for Development
CoC	Chain of custody
COP	Conference of the Parties
EBA	Everything But Arms
EVFTA	EU–Vietnam Free Trade Agreement
ESG	Environmental, social, and governance
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FMCG	Fast-moving consumer goods
GWFP	Global Warehouse Finance Program
GMP	Global Methane Pledge
HBL	Habib Bank Limited
HRIA	Human rights impact assessment
IFC	International Finance Corporation
ILO	International Labour Organization
ILAB	Bureau of International Organization Affairs
ISEAL	International Social and Environmental Accreditation and Labelling Alliance; now known simply as ISEAL
IMS	Internal management system
IRRI	International Rice Research Institute
LTA	Loc Troi Agricultural Products JSC
LTI	Loc Troi Agricultural Research Institute
LTS	Loc Troi Seeds JSC
LTV	Loc Troi Agricultural Materials
MRV	Measurement, reporting, and verification (of carbon)
MRL	Maximum residue limit or maximum residue level
mt	Metric ton, also tonne (1,000 kg)
PBHF	Pakistan Basmati Heritage Foundation
PI	Performance indicators
PS	Performance Standards
RPL	Rice Partners Limited
SACE	Italian Export Credit Agency (Sezione speciale per l'Assicurazione del Credito all'Esportazione)
SAI	Sustainable Agriculture Initiative
SARI	Sustainable Aromatic Rice Initiative
SME	Small and medium-sized enterprise
SRI	System of Rice Intensification
SDC	Swiss Agency for Development and Cooperation
UNFCCC	United Nations Framework Convention on Climate Change
VSLA	Village savings and loans association

Note: All currency conversions to U.S. dollars in this report are based on the average exchange rates for June 2024, as published by the International Monetary Fund (IMF), unless otherwise specified.

Executive Summary

Food security, livelihoods, and climate impact

RICE

is one of the world's most important staple foods, and it is integral to global food systems.

3.5 billion

people rely on rice as a daily staple, which contributes to about one-fifth of the global calorie supply.

1.5 billion

people (18.5% of the global population) depend on rice for their livelihood, mostly in Asia and the Pacific regions, including →

144 million

farm households, the majority of whom grow their crop on less than 2 hectares (ha) of land.

Rice is also responsible for approximately 12% of human-generated methane emissions and it has a significant impact on land use (15% of global wetlands) and water usage (up to 30% of global freshwater withdrawals). Implementing sustainability measures in rice fields could contribute significantly to reducing methane emissions by at least 30% below 2020 levels by 2030, as outlined in the Global Methane Pledge (GMP) at the United Nations Framework Convention on Climate Change Conference Of the Parties 26 (COP26) in November 2021 (Wang et al. 2023). In 2023, the World Bank launched the Global Methane Reduction Platform for Development (CH4D), to support low-and middle-income countries to realize the "methane triple wins" of abating emissions, enhancing resilience, and empowering livelihoods (Global Methane Pledge 2023). Rice plays an increasing role in the World Bank Group (WBG) Climate Change Action Plan (2021–2025), which puts a special emphasis on the promotion of climate-smart rice-farming systems and value chains.

In this context, the International Finance Corporation (IFC) is examining opportunities for investment in the rice sector. IFC is already working with several private sector clients in Southeast Asia and South Asia on sustainable rice cultivation (see list of advisory projects in Annex 1) and has been involved in the development of the Sustainable Rice Platform (SRP), a multistakeholder alliance which operates a standards system for sustainable rice. To date, IFC has invested in rice-processing facilities (e.g., Meghna Group of Industries (MGI) in Bangladesh, Amru Rice Co., Ltd. in Cambodia), in intermediary banks with risk-sharing facilities for rice-processing mills (e.g., Cambodia), and in smallholder rice farmers (e.g., Senegal), as well as in warehouse-receipts programs with rice farmers (e.g., Senegal and Ghana).[1]

[1] Warehouse receipt financing is the use of securely stored goods as loan collateral. These programs allow producers to deposit a finished good or agricultural product in a secure warehouse where the producer receives a receipt certifying the deposit of goods of a particular quantity, quality, and grade. The farmer can use the receipt as a form of portable collateral to request a loan from a financial institution such as a bank or an MFI (https://pdf.usaid.gov/pdf_docs/PNACQ697.pdf_). This tool enables farmers to manage the timing of the sale of their crops. It is especially beneficial for farmers and small- and medium-sized businesses, which are often unable to secure financing due to lack of sufficient conventional loan collateral (https://www.ifc.org/en/what-we-do/sector-expertise/financial-institutions/global-trade/global-warehouse-finance-program).

Opportunities for supplier finance for the rice sector

Supplier finance in the rice sector has been identified as a potential investment opportunity for IFC, to drive uptake of climate-smart agricultural practices and promote sustainable livelihoods. The seasonality of the rice harvest creates a concentrated need for working capital one to three times per year, when millers purchase paddy. Millers typically pay their suppliers quickly (either on delivery or within a few days), but they experience wide variability in terms of when their own customers pay them. Arrangements can vary from a payment, or credit, period of 30 days or more, to one where 30%–40% of payment is due on order, with the balance due on shipping. Furthermore, some mills may store the paddy and process it over the course of the year, which creates an even longer cash-conversion cycle and greater need for working capital. Downstream supply chain actors including exporters (without their own mills), secondary processors, and traders are also candidates for supplier finance, as they pay their suppliers before they are paid by their customers, in some cases up to 120 days after shipment.

IFC's Global Trade Supplier Finance program (GTSF) provides short-term financing to suppliers in emerging markets selling to large international companies on open account terms. A key feature of GTSF is to incentivize emerging market suppliers to improve their environmental and social (E&S) practices by offering interest rates that are linked to E&S performance and providing progressively lower rates to suppliers as they improve E&S performance. The Sustainable Rice Platform Standards System provides a useful framework for measuring progress on E&S performance for rice. For mills, milestones would be based on their role as an implementation partner for Sustainable Rice Platform projects with farmers as they work towards sustainable cultivation. For downstream supply chain actors, progress milestones could be linked to engagement with the SRP, chain-of-custody verification, establishment of SRP-verified products, and year-on-year increases in SRP-verified rice sourced.

Based on initial discussions with a sample of SRP supply chain members, feedback suggests that GTSF would be useful for the sector, though there was not a strong demand signal from the companies interviewed. This can be further explored through opportunistic discussions with potential clients, as well as further in-depth research on the size of the potential market.

Market for sustainable rice

The SRP Assurance Scheme was launched in 2020 and sets out a framework for verifying compliance with the SRP Standard for Sustainable Rice Cultivation. By the end of 2023:

46,280
hectares of land were under SRP verification, which generated

200,000
metric tons (mt) of milled rice. This represents

<1%
of globally traded rice, and

0.04%
of global production

Expected global trade value for the rice market in 2024: **$30** BILLION

Current SRP-verified portion of the market: **~$111** MILLION

Despite the small market share, the Sustainable Rice Platform is making inroads. SRP-verified rice was first launched in the retail consumer market by Lidl supermarkets in June 2021. By the end of 2022, the SRP-verified rice label was available in 11 countries, compared to five in 2021. The SRP's 38 supply chain members also provide an indication of the potential scale of uptake, as they include billion-dollar, global, fast-moving consumer goods (FMCG) manufacturing companies Diageo, Ebro Foods S.A, Mars, Incorporated, and SunRice; Olam Group, one of the world's largest rice traders and merchandisers; importers, finishing mills, and packers (LT Foods Limited, SunRice, Van Sillevoldt Rijst (VSR) (acquired by Euricom), and Westmill Foods) as well as a number of integrated milling, finishing, packing, and export businesses in India, Pakistan, Thailand, Vietnam, Cambodia, Nigeria, Spain, Italy, Australia, the United States, and Uruguay.

Recommendations for supporting further market development

The results of the analysis undertaken for this report indicate that IFC can further support the development of the sustainable rice market through deploying the GTSF facility in the rice sector.

With an increasing global focus on methane reductions and Scope 3 reporting, the ongoing development of the SRP's new Low Carbon Assurance Module provides a useful engagement point for existing and new private-sector members. Furthermore, the new module could unlock climate-finance opportunities for companies. A next step could be benchmarking the SRP Standards System against the Common Principles for Climate Mitigation Finance Tracking (African Development Bank Group et al. 2023).

Certainly, the IFC has other opportunities to use its financing instruments to leverage uptake of sustainable practices in the rice sector and support the development of a sustainable rice market. Its involvement would build on IFC's investment experience in the rice sector, including, for example, its issuance of loans for capital expenditure and working capital loans, risk-sharing agreements with local banks, warehouse finance, and crop insurance and advisory work on supporting implementation of the SRP Standards System. Additional research and analysis are recommended to identify the options with the highest potential for client uptake and development impact.

Box 1: Benchmarking of the SRP Standard

In early 2024, IFC commissioned a study, conducted by an external independent consultant, to benchmark the Sustainability Rice Platform (SRP) Standard against IFC's own Performance Standards (PS) and good practices for assurance and governance. IFC's Performance Standards provide clients with guidance on how to identify risks and impacts, and are designed to help avoid, mitigate, and manage risks and impacts as a way of doing business in a sustainable way, including stakeholder engagement and disclosure obligations of the client in relation to project-level activities.

The SRP Standards System was assessed to be credible, based on the analysis of the SRP documentation and follow-up clarification with the SRP Secretariat. The analysis found that the SRP Farm Standard is aligned with the IFC PS on key topics, and implementation of the Farm Standard puts farmers on a path towards meeting IFC's Performance Standards, though not all IFC PS are covered. Similarly, the SRP Standards System includes well-documented requirements on assurance and governance, though there are still some areas for improvement. Finally, the analysis noted that the SRP Standards System has been developed with stakeholders for a specific commodity context, and it may not be necessary or desirable to add new requirements to address the gaps identified with the IFC PS.

1. Introduction

1.1 IFC context

Rice plays an increasing role in the World Bank Group's (WBG) Climate Change Action Plan (2021–2025) with emphasis on the promotion of climate-smart rice-farming systems and value chains. At COP28 (in 2023), the World Bank announced the launch of its Global Methane Reduction Platform for Development (CH4D platform), to support low- and middle-income countries to realize the "methane triple wins" of abating emissions, enhancing resilience, and empowering livelihoods (Global Methane Pledge 2023).

The International Finance Corporation (IFC) is already working with several private sector clients in Southeast Asia and South Asia on sustainable rice cultivation, building capacity of rice smallholders to adopt low-carbon, water-efficient methods of rice cultivation with a business case for yield and income improvements. Furthermore, IFC has been involved in the development of the Sustainable Rice Platform (SRP), a multistakeholder alliance which operates a standards system for sustainable rice (see IFC Advisory rice project list in Annex 1).

This report provides background context on sustainable rice to inform the development of potential investment opportunities and advisory services for companies in the rice supply chain. It has been commissioned as part of a wider study that benchmarks the SRP Standards System against the IFC Performance Standards (see Box 1), analyzes opportunities for trade finance, and proposes illustrative milestones for sustainability-linked finance.[2]

1.2 Global importance of rice

Rice is one of the world's most important staple foods, and it is integral to global food systems. It is a daily staple for 3.5 billion people, contributing to about one-fifth of global calorie supply (Calpe 2006). Rice is the primary dietary energy source for people in 15 countries in Asia and the Pacific, 10 countries in Latin America and the Caribbean, one country in North Africa, and seven countries in Sub-Saharan Africa (FAO 1999). In 2022–23, approximately 521.6 million metric tons (mt) of rice were consumed worldwide (FAO 2023a). In addition to direct consumption, rice is also used as seeds for the next crop, as animal feed, and as raw material for related industries, such as noodles, alcohol, and flour. The livelihoods of more than 1.5 billion people (18.5% of the global population), mostly in Asia and the Pacific, depend on rice, including those of an estimated 144 million farm households (Mishra et al. 2022), the majority of whom grow their crop on less than 2 hectares (ha) of land each (Bouman 2017). Rice farmers are typically among the poorest in the world and earn roughly US$ 2–US$ 7 per day on average (Bouman 2014).

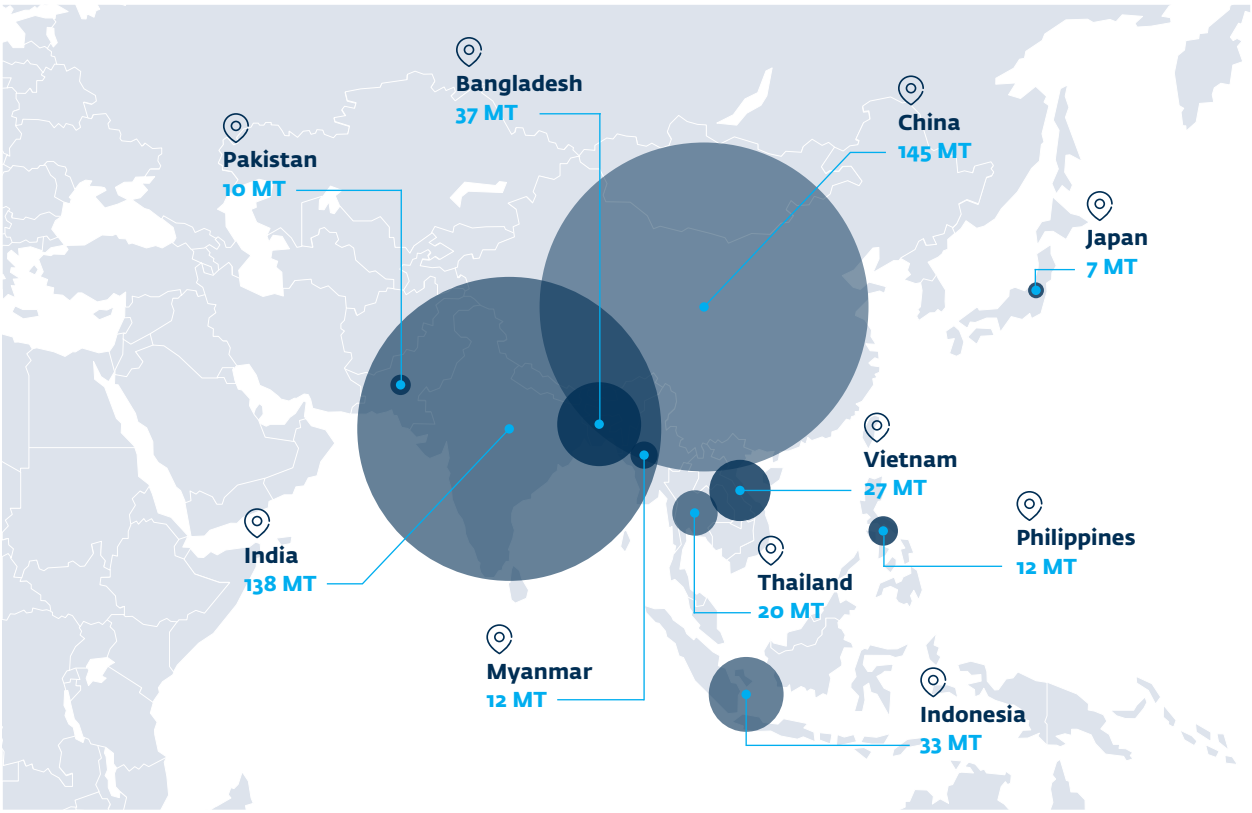
Among agriculture commodities, rice is by far the biggest producer of greenhouse gas (GHG) emissions after livestock. It is responsible for approximately 12% of human-generated methane emissions. Rice cultivation also has a significant impact on land use (taking up 15% of global wetlands) and water usage (accounting for up to 30% of global freshwater withdrawals) (Lampayan et al. 2015).

[2] Sustainability-linked finance is designed to incentivize the borrower's achievement of environmental, social, or governance targets through pricing incentives (IFC 2022).

1.3 Global production and trade

Rice is produced on over 160 million hectares of land, predominantly in Asia and the Pacific regions. In 2022/23, global milled rice production was 514.4 million metric tons (USDA Foreign Agriculture Service 2024), and it is forecasted to reach 515.5 million metric tons in 2023/24 (Childs and LeBeau 2024). Ten countries are responsible for almost 85% of global rice production, with China and India alone accounting for 28% and 26% of the total, respectively (Figure 1). India has the largest area under paddy in the world, occupying 48 million hectares of the country's total arable land of 154.4 million hectares (USDA Foreign Agriculture Service 2024).

Figure 1: Milled Rice Production in major rice producing countries in Asia/ Southeast Asia (units in 1,000 MT)



Source: USDA 2024

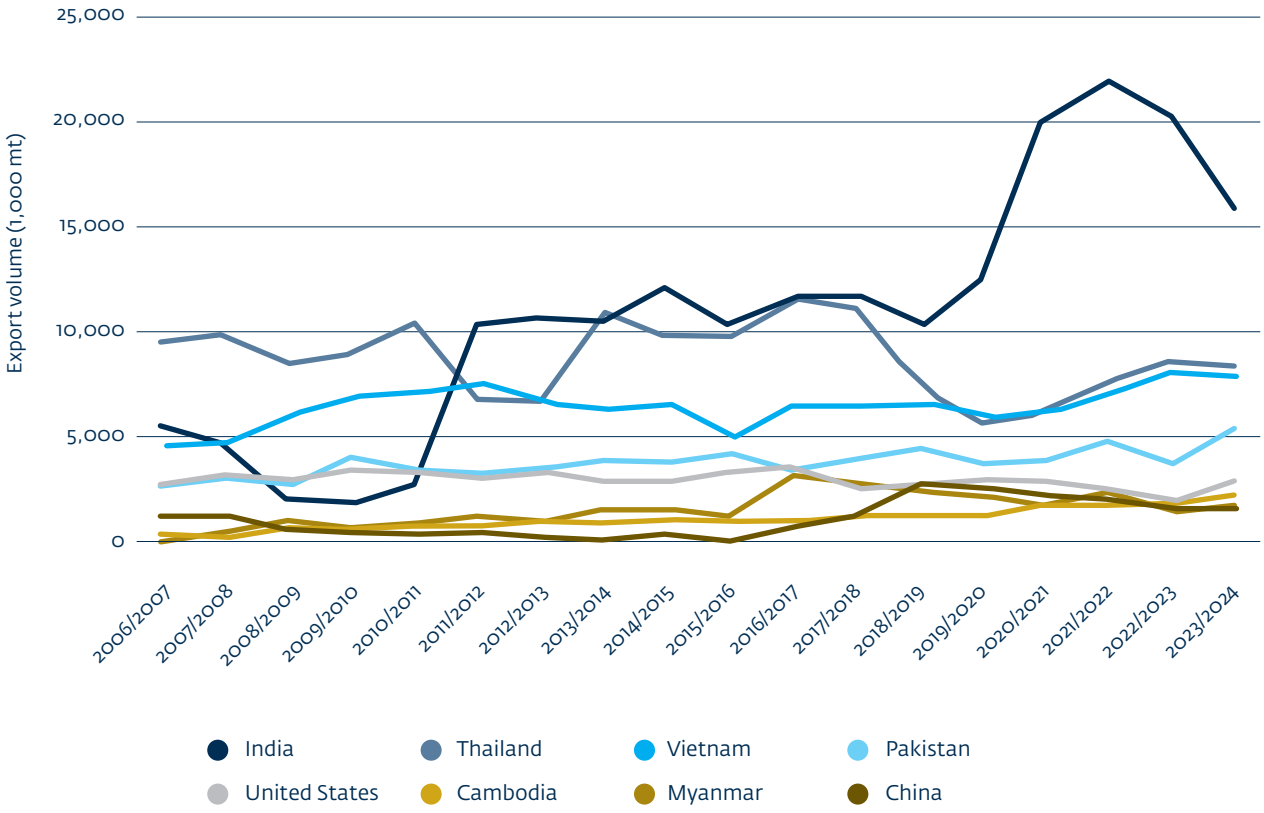
European (EU) rice is produced on 425,000 hectares in eight member states: Italy, Spain, France, Greece, Portugal, Bulgaria, Romania, and Hungary. Italy represents 50% and Spain 30% of this production. Some 75% of production is of *Oryza sativa* L. *ssp. japonica* (japonica), with the EU a net exporter of this variety. The remaining 25% consists of *Oryza sativa* L. *ssp. indica* (indica), of which the EU is a large importer, purchasing approximately 1.2 million metric tons annually (EU Directorate-General for Agriculture and Rural Development 2019).

American rice production is characterized by large-scale producers, with integrated supply chains from field through to branded retail products. The United States has 28 rice mills, including farmer-owned cooperatives and privately owned mills (USA Rice 2024). It also imports significant quantities of finished rice (1.4 million metric tons in 2023) (USDA 2024), with more than 60% consisting of aromatic varieties from Asia, mostly jasmine from Thailand as well as basmati from India and

Pakistan (Childs 2023). Imports are destined for direct sale to the consumer, for reexport, or for sale in bulk quantities for further processing by food manufacturers.

Approximately 10% of global rice production is traded. The 2024 global trade forecast for rice is 53.5 million metric tons of a total projected global production of 515.5 million metric tons for 2023/24 (Childs and LeBeau 2024). The value of the global rice market (including domestic consumption) is estimated at US$306.4 billion for 2024 (Mordor Intelligence 2024), with the total trade value projected to total about US$30 billion. India accounts for 40% of world rice exports, and the remaining top exporters include Thailand, Vietnam, Pakistan, the United States, Cambodia, Myanmar, and China (Figure 2).

Figure 2: Global (Milled) Rice Exports



Source: USDA Foreign Agricultural Service Database 2024.

As a staple food, rice has political importance, and governments systematically use trade-policy instruments such as export restrictions, export bans, import quotas, and import tariffs to meet national-policy objectives of food security, to provide support for domestic producers, and to achieve price stability. Protectionist policies coupled with exports concentrated in a handful of countries make the global rice trade susceptible to changes in government policies in these countries. The extent of rice trade policy instruments deployed globally can be seen through a review of the Food and Agriculture Organization's Commodity Policy Developments Database (FAO n.d.), which recorded more than 60 instances of rice policy instruments deployed across more than 30 countries based on a 12-month snapshot (March 2023–April 2024). A notable trade policy over this period was India's ban on the export of non-basmati white rice, its introduction of a fixed minimum export price

for basmati, and its imposition of duties on parboiled rice, due to surging domestic prices. Global rice prices reached a 15-year high as a result, and exporting countries increased their shipments to compensate for the drop in exports from India. Exporters such as Thailand and Vietnam have benefited from increased demand and higher export prices as international buyers have sought alternatives to Indian supplies (Imarc 2024).

Trade policies can also shape the physical supply chain infrastructure: An EU agreement with India and Pakistan set up in 2006 allows duty-free imports into the EU of husked basmati rice, which has resulted in dehusking and final processing generally being undertaken at rice mills in the EU, rather than in the country of origin.[3]

Least Developed Countries (LDCs) exporting milled rice to the EU have benefitted from the European Union's Everything But Arms (EBA) scheme, which entered into force in 2001 with the aim of encouraging the development of the world's poorest countries. Under this initiative, all imports except for arms and ammunition from LDCs enter duty-free and quota-free. Major rice exporters on the LDC list include Bangladesh, Cambodia, and Myanmar. The EBA has been cited as the catalyst for the modernization of Cambodia's rice sector, as it has encouraged investors from Cambodia, the EU, and Asia to invest, supported by IFC's Cambodia AgriSector Project (World Bank Group 2018). However, between 2019 and 2022, the EU temporarily reintroduced import duties on rice from Cambodia and Myanmar due to a significant increase in imports of indica that caused the market share of EU rice producers to drop substantially from 61% to 29% (European Commission 2019).

The Everything But Arms initiative had initially given Cambodia a trade advantage compared to neighboring Vietnam, though its impact has been reduced with the EU-Vietnam Free Trade Agreement (EVFTA), which came into force in 2020 (though Cambodia still benefits from quota-free imports). The agreement calls for duties on imports from Vietnam to be progressively removed by 2027, with 99% of all tariffs to be eliminated and the remaining 1% partially removed through limited, zero-duty quotas (European Commission 2020). The EVFTA gives Vietnam a quota of 80,000 metric tons of rice per year, including 30,000 metric tons of milled rice, 20,000 metric tons of unmilled rice, and 30,000 metric tons of fragrant rice. Broken rice will be completely liberalized, which is expected to result in an annual export of 100,000 metric tons to the EU (Center for WTO and International Trade 2022). In September 2020, Loc Troi Group (an SRP member) was chosen by Vietnam's Ministry of Agriculture and Rural Development to export the first shipment of jasmine rice to Europe under the EVFTA (Loc Troi Group 2021).

1.4 Rice varieties

The global rice trade is highly segmented by rice variety (indica, aromatic, japonica, glutinous, and other specialty rice types), by degree of processing (paddy, parboiled, brown, or white rice), and by degree of milling (percentage of broken rice).

More than 40,000 varieties of cultivated rice exist worldwide. The most widely grown rice variety is Asian rice *(Oryza sativa* L.*)*, including its two major subspecies (indica and japonica). Indica rice varieties are generally classified as long grain, while japonica rice varieties can be either medium or short grain. Indica rice varieties are grown mainly in Asia, and japonica varieties are predominately grown in Australia, China, Taiwan, Korea, the European Union, Japan, Russia, Turkey, and the United States. African rice *(Oryza glaberrima)* is estimated to make up 20% of West Africa's rice production. Wild rice *(Zinania aquatica)* is a tall aquatic grass that grows in the shallow lakes of North America, and is not actually rice, but rather a seed of a type of wild grass. The International Rice Research Institute (IRRI) has a significant global role in breeding and conserving rice varieties (see Box 2).

[3] See Commission Regulation (EC) No 972/2006, supplemented by EU 2023/2835.

The premium aromatic (fragrant) market includes basmati (Kishor et al. 2022) and jasmine (a type of indica), and accounts for 40% of the global rice trade (Imarc 2024). Basmati is grown in the Himalayan foothills of India (in the states of Bihar, Punjab, Haryana, Himachal Pradesh, Delhi, Uttarakhand, Western Uttar Pradesh, Odisha, Jammu, and Kashmir) and Pakistan (in the state of Punjab). Small volumes of basmati are also produced in Indonesia, Nepal, and Sri Lanka, though India has sought to register geographical indication (GI) protection for basmati in the EU and Australia, which would prevent other countries from marketing rice as basmati (Upreti 2023). Basmati is a staple in Indian and Middle Eastern cuisines. Jasmine is grown primarily in Thailand (Thai hom mali, or Thai fragrant rice), Cambodia (Phka rumduol, or Cambodian jasmine rice), Laos, and southern Vietnam. Jasmine rice is favored in Southeast Asian cuisine.

White rice is polished rice with the husk, bran, and germ removed. Colored rice varieties, including brown rice, are either semipolished or unpolished rice. Parboiled rice has been soaked in hot water or steamed and then dried while still in the husk, before any other processing has been carried out (for example, husking or milling).

Box 2: IRRI Rice Varieties

132,000

types of cultivated and wild rice are conserved by the International Rice Research Institute (IRRI) in its genetic resources center.

>60%

of the global planted area of rice is estimated to be from IRRI-bred varieties. IRRI's breeding research includes genetic modification for the purposes of biofortification, including Golden (or Malusog) Rice, which has been approved for propagation in the Philippines and in Bangladesh (as BRRI Dhan 29).

Source: IRRI n.d.(d)

1.5 Rice cultivation

Rice is a cereal crop (family Poaceae) and is normally an annual (planted at the beginning of each season), though in the tropics, it may also be grown as a ratoon, where a second crop is produced from the stubble after the harvest of the main crop (Wang et al. 2020). It can either be planted directly, or seedlings can be transplanted into the field, with the latter requiring considerably more labor. The crop cycle ranges from 120 to 160 days, depending on the variety, and can be double or triple cropped if conditions allow (see Figures 3 and 4). There are four broad rice-production ecosystems as defined by IRRI:

IRRIGATED
Rice grown with good water control and flooded throughout the growing season

RAINFED LOWLAND
Rice relying on rainfall, with fields bunded to retain water

UPLAND
Rice grown without surface water, relying solely on rainfall

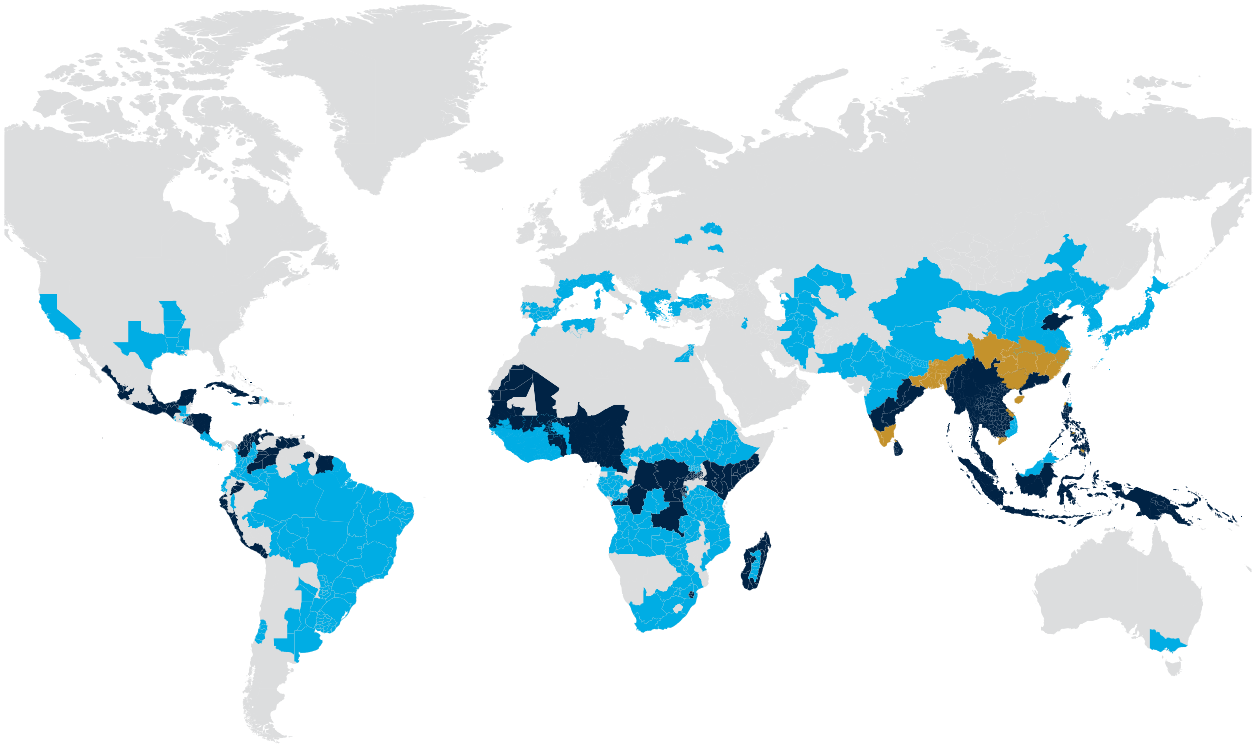
FLOOD PRONE
Deepwater rice, grown in river areas, with no structured water control

Irrigated rice systems cover about half of the global rice area and generate about three-quarters of global output. Rainfed lowland rice production systems cover about 35% of the global rice area, upland production systems around 9%, and flood-prone production systems about 3% (Calpe 2006).

In developed countries such as the United States and Australia, rice farmers rely on sophisticated technology including computerized laser-guided land levelling, seed drills, airplane seeding and fertilizer application, and recirculating irrigation systems.

Rice can be harvested manually or mechanically. Harvesting includes cutting the mature panicles and straw above ground; threshing to separate the paddy grain from the nongrain material; cleaning to remove immature, unfilled, and nongrain materials; optionally leaving the cut crop in the field for sun-drying; temporarily storing the harvested crop in stacks or piles; and bagging the threshed grain for transport and storage (IRRI n.d.[a]). A combine harvester can be used for cutting, handling, threshing, and cleaning, or mechanical threshing can be combined with manual harvesting. After the initial harvest, the product is called "paddy" rice, which still has the outer husk.

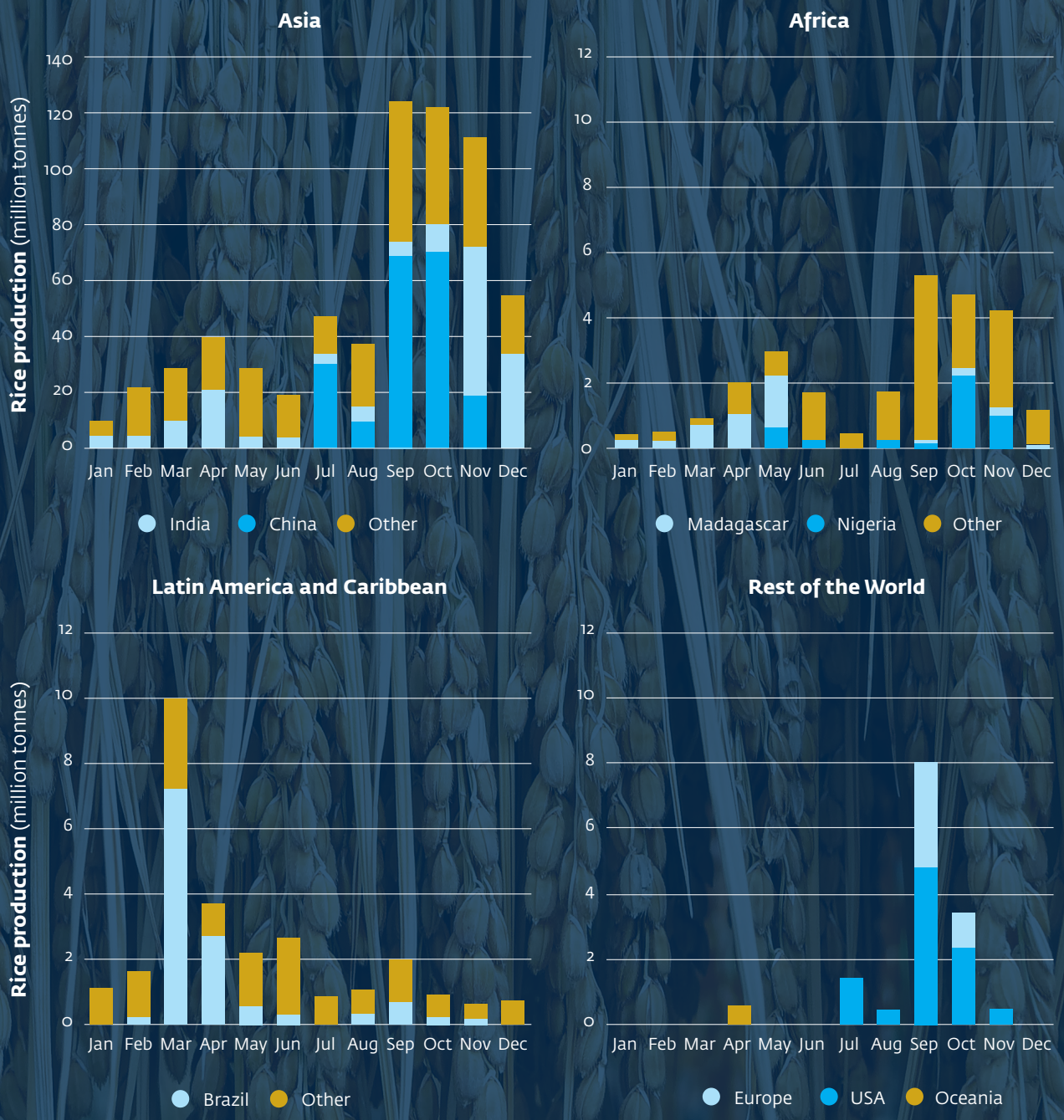
Figure 3: Number of Crop Seasons



One season Two seasons Three seasons

Source: Laborte et al. 2017.

Figure 4: Timing of Crop Seasons



Source: Laborte et al. 2017.

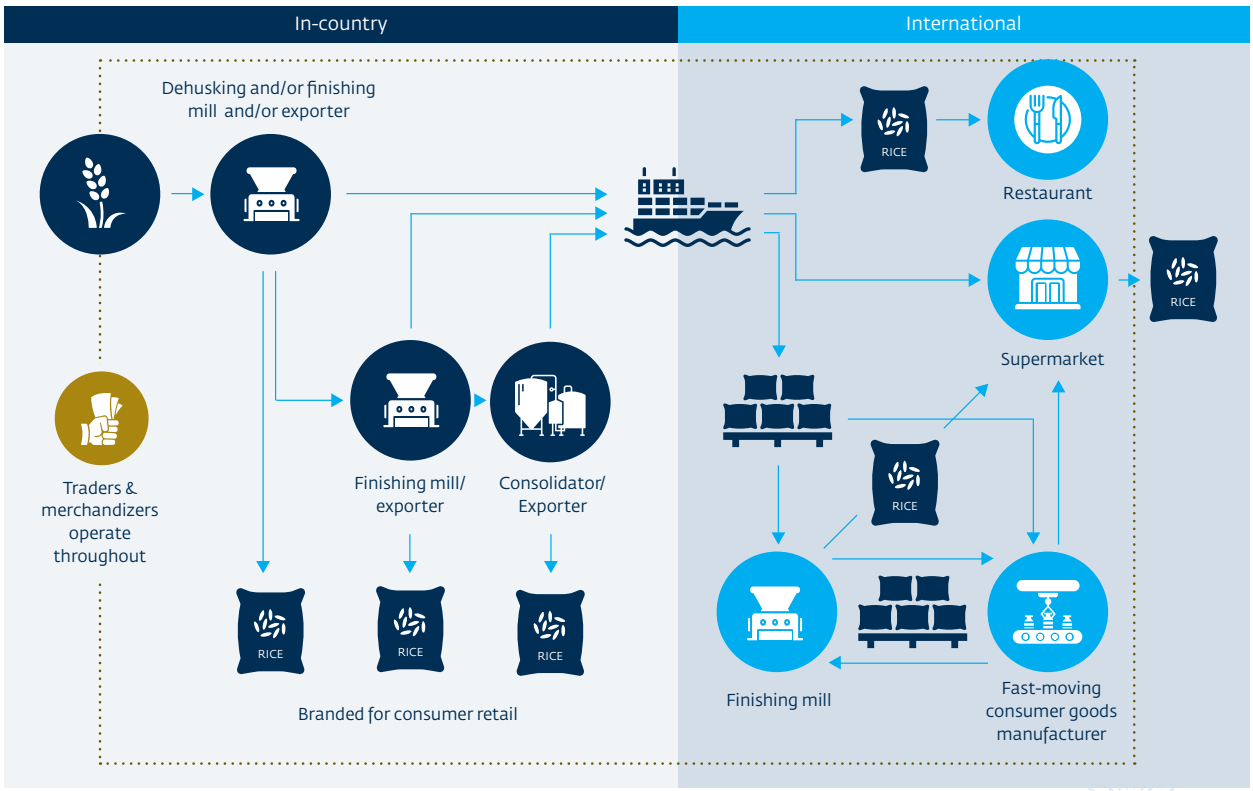
2. Rice Supply Chain

2.1 Overview

The rice supply chain comprises production, collection, milling, processing, and distribution (Figure 5). Supply chains for commercial export often involve global food companies with highly integrated supply chains, which control all these stages. Additionally, branded rice for the retail market is packed and distributed by milling, processing, trading, and distribution companies operating independently from each other. Often the supplier serves the domestic retail market, and the buyer serves an international retail market; however, in some cases, suppliers of bulk rice (with their own retail brand) may directly compete with their buyers in the consumer retail market (Figure 6).

Figure 5: Stages in a Rice Supply Chain

Figure 6: Export Rice Supply Chain



2.2 Physical transformation

The physical transformation of rice after harvest first involves cleaning of paddy rice (or "rough" rice) (Figure 7a), to remove foreign material such as straw, mud balls, thread, stones, and metal particles. Rice may optionally be parboiled, which involves soaking, steaming, and drying before further processing. The next step removes the outer husk, or hull, from the rice kernel ("dehusking" or "hulling"). This produces "husked" or "brown" rice (Figure 7b), which is unpolished rice that retains the rice bran layer and the germ. Brown rice may be consumed in this state or processed further. Further processing involves whitening, which removes the bran layer and the germ, and polishing, by rubbing the kernels against each other to remove the loose bran to create a smooth surface ("milled" or "white" rice, Figure 7c). Rice can then be mechanically graded into head rice, broken rice fractions, and tips. It is then packed either for bulk transport or retail. Rice may be consumed as a whole grain (brown, milled, or parboiled); further manufactured into products such as ready-to-eat foods, baby food, pet food, and animal feed; milled into flour or noodles; or distilled into vinegar and alcoholic beverages. Husk and bran are by-products.

Figure 7: Export Rice Supply Chain

a. Paddy rice

b. Husked or brown rice

c. Milled or white rice

2.3 Subsistence milling

In rural communities, rice from small-scale production is consumed locally. After the farmer harvests and threshes the rice, there are several options for milling. Traditional milling involves using a mortar and pestle to separate the husk from the kernel; mobile mills are mounted on a vehicle and process the paddy rice directly at the farmer's field; or village mills provide central processing, with farmers bringing their paddy rice to the site.

This type of subsistence milling is not likely to be part of IFC investments, nor a Sustainable Rice Platform verification program. However, it could potentially be part of an SRP-registered project (see Section 4.2 Structure and Scope), where development partners work with farmers to implement sustainable practices using SRP tools.

2.4 Commercial paddy sourcing

In commercial rice supply chains, millers use various paddy rice-sourcing models (Table 1), depending on their business strategy, the local context, and market demands. Millers may use multiple paddy-sourcing models for the same mill, and farmers may switch between direct mill delivery and sales to local collectors, markets, or brokers depending on the price and other incentives offered by the buyers.

If customers have specific quality or sustainability specifications that need to be met, then sourcing models with greater control over the production process and direct relationships with the farmers will be most effective for rolling out training

programs and verification. These sourcing models include mills that manage their own farms, contract farming, direct sourcing from farmers, and direct sourcing from cooperatives.

In some cases, local regulations define the paddy-rice sourcing strategy. For example, in many states in India, mills are legally required to purchase paddy rice from mandis (officially, APMCs, or agricultural produce market committees). These are physical marketplaces that regulate the first transaction between the primary producer and the buyer. Some Indian states have introduced reforms where a mandi fee can be paid while sourcing privately, while other states have abolished APMCs entirely. However, even in cases where mills purchase through mandis, mills have in some cases been able to coordinate the timing of delivery at the marketplace with farmers in their SRP-verification projects to ensure supply chain traceability.

Where demand and local competition are high for paddy rice, proactive and opportunistic sourcing strategies can be deployed. Millers may use preharvest deposits to secure their supply (as was the case in Thailand in 2023, when traders were paying deposits of US$200 per hectare up to two months in advance to secure volumes) (Ngoc 2023). Similarly, in Cambodia, traders from Vietnam buy rice directly from the farmer at their paddy for immediate export to and further processing in Vietnam.

Spot buying from the open market results in a loss of information about the farmer origin of the paddy rice and therefore the associated environmental and social practices. However, millers typically use a combination of sourcing strategies, including spot buying alongside direct farmer sourcing or contract farming, especially if SRP-verified rice or other quality labels are only a small part of their customer demand.

Table 1: Paddy-Sourcing Models

Type	Description
Own farm	Mills operate their own rice farms to supply their milling operations.
Contract farming	Farmers enter into an agreement with a mill for volumes, quality, sustainability standards in some cases, and price at the beginning of the season. Mills may provide inputs (seeds, fertilizers), which are deducted from the delivery price, as well as extension services.
Preharvest deposit	Mills or traders pay a deposit to the farmer before harvest.
Preharvest purchase	Mills or traders prepurchase from the farmer before harvest, in some cases at the beginning of the season. They may also take responsibility for the harvest and transport to the mill.
Direct sourcing	Farmers deliver their paddy rice directly to the mill and are paid a spot price.
Cooperative sourcing	Farmers deliver their paddy rice to a cooperative-owned central storage, which sells to middlemen or directly to mills.
Local collectors	Local collectors buy directly at farmer's paddy field and may sell to the mill or the central market exchange. They are sometimes a big farmer or shopkeeper in the village with truck transport and storage. Alternatively, collectors hired by a mill will drive with a large truck by smallholders until their truck is fully loaded.[a]

a. Van Hamburg 2016.

Type	Description
Central markets	Central markets can be run by government agencies or by local business actors, and may also provide services such as moisture measurement, drying lawns, warehouses, and financing. Rice can be sold at auction or through commissioning agents who facilitate the buyer-seller transaction.
Merchandisers and brokers	Merchandisers act as an intermediary between the mill and the rice seller, which may include central markets, local collectors, cooperatives, and farmers. They source rice of a certain type, quality, and quantity as per the buyer requirements. Some brokers may conduct auctions and charge a fee from both sellers and buyers.[b]

b. KEK-CDC et al. 2022.

2.5 Commercial rice mills

The modern commercial rice sector is characterized by a high degree of vertical integration, which has developed from both forward integration by millers in the rice-growing country and backward integration by manufacturers in import markets, as well as traders in both directions. The physical transformation of rice through processing (see Section 2.2 Physical transformation) can have various supply chain configurations.

In a fully vertically integrated supply chain model, the rice mill is in the country of rice origin, has its own farms or purchases either through contract farmers or directly from farmers, and undertakes parboiling, dehusking, whitening, polishing, branded retail packaging, distribution, export of milled rice, and is some cases, manufacture of processed consumer goods. Large-scale commercial rice-milling operations are characterized by a high degree of automation for cleaning, husking, whitening, and polishing, as well as bulk and consumer packing and onsite storage.

Because India and Pakistan have zero import duty on husked basmati rice imported into the EU, mills exporting to this market undertake the first step of dehusking in-country, and then ship bulk husked (brown) basmati rice to mills in Europe, to undertake the finishing (whitening, polishing, and retail packaging). Dehusking for the European market is undertaken at the beginning of the harvest season, and then the mills switch over to whitening, polishing, and packaging basmati for other markets (both domestic and international). In this configuration, mills will operate in a segmented supply chain for the EU market and vertically integrated supply chain for other markets. For example, in the United States, rice in retail packaging is imported directly from processing facilities in the original market.

Large millers in origins markets may also operate vertically integrated supply chains, supplying branded retail products to the local market, in parallel with private-label processing and packing for domestic and international retail, and bulk export of brown and milled rice (see Figure 6).

The first processing step may also take place at rice mills in importing countries, where unprocessed paddy rice is exported from origins before dehusking. Rice for food purposes should be stored in paddy form rather than as milled rice, as the husk provides protection against insects and helps prevent quality deterioration (IRRI n.d.[c]). In this supply chain model, paddy rice is dried, packed for bulk transport, and shipped, and may include multiple middlemen and traders before reaching the mill.

Because of the seasonality of the rice harvest, millers store paddy rice to maintain suitable raw material inventory for uninterrupted production throughout the year. The mills distribute the milled rice to consumers, brokers, commercial merchants, such as wholesalers and retailers, and government agencies.

2.6 Trading and transport

Historically, rice exporters were specialist traders who brokered transactions between mills and international buyers. However, mills are increasingly acting as exporters. This is due in part to the removal of language barriers, as younger generations have learned English and are now able to engage directly with overseas importers. Digitalization of information and marketing has also facilitated this transition.

International rice traders purchase rice from exporters and sell to purchasers in countries of destination. International merchandisers and brokers work on behalf of client companies to locate, trade, and purchase commodities. Rice is not a standardized commodity; therefore, brokers play an important role in facilitating trade by identifying a suitable buyer and seller for the required rice types and qualities, in return for a commission for their services. Key players active in rice merchandising include global commodity houses such as Louis Dreyfus Company (LDC), Olam Agri Holdings Pte Ltd., Cargill, and Bunge (all of which also trade on their own accounts), as well as specialized rice brokers including Schepens & Co. (Belgium), Marius Brun & Fils (France), Jackson Son & Co. Limited (UK), Creed Rice Co., Inc. (U.S.), and Western Rice Mills Ltd (Canada). In Europe, AMS is an Amsterdam-based, nonprofit, strategic-buying alliance that procures over €1 billion (US$ 1.2 billion) in goods annually, including rice. It currently works on behalf of eight top European food retailers, including on the purchase of rice (ESM 2012).[4]

Rice is stored in a global network of silos, warehouses, transloading facilities, and ports. It is dried prior to transport and when stored in proper conditions, has a storage life of approximately 12 months (Müller et al. 2022). Rice is generally transported by sea, either in breakbulk or container vessels. Breakbulk-vessel capacity varies from 100 metric tons to more than 25,000 metric tons, and the rice is usually packed in polyethylene bags, varying in weight from 1 kilogram (kg), 30 kg, 50 kg, and up to 1,000 kg. Container vessels allow for quick and convenient loading and unloading but are more expensive. Rice is placed in bags into containers, with a capacity ranging from 23 to 27 metric tons each, and these are then placed on the vessel deck.

[4] These retailers include: Ahold Delhaize (Netherlands), Musgrave Group plc (Ireland and Spain), Salling Group (Denmark), ICA Gruppen (Sweden), Kesko Corporation (Finland), Morrisons (UK), Booker (UK), and Hagar (Iceland). Further details are available on the AMS website: https://www.ams-sourcing.com/ams/

3. Key Impacts of Rice Cultivation

The SRP Standards System was developed with input from stakeholders to address both good agricultural practices and issues of critical importance for rice cultivation. Further details are provided in Section 4.

Good agricultural practices as defined by the Food and Agriculture Organization (FAO) are a "collection of principles to apply for on-farm production and post-production processes, resulting in safe and healthy food and non-food agricultural products, while taking into account economic, social and environmental sustainability" (FAO 2023b).

In addition to good agricultural practices, for each crop a few issues typically stand out as critically important, either because of the scale or the severity of their potential impact. For rice, these are greenhouse gas emissions, water use, human and labor rights, and contamination, residues, and food safety. Each of these is discussed in detail below.

3.1 Greenhouse gas emissions

Rice is responsible for 10.1% of total agricultural emissions and approximately 1.3%–1.8% of global anthropogenic greenhouse gas (GHG) emissions (Wang et al. 2023). Rice cultivation is the third-largest source of non-carbon dioxide (CO_2) GHG emissions in agriculture globally, after livestock and all croplands (EPA 2019), and according to the FAOSTAT database, accounts for an estimated 12% of global methane (CH_4) emissions and 11% of global agricultural nitrous oxide (N_2O) emissions (FAOSTAT 2024). Methane is produced when organic matter decomposes in flooded rice fields without access to oxygen; this creates ideal conditions for the growth of bacteria that emit methane. The application rate for nitrogen-based fertilizer is the key driver of N_2O emissions for rice.

Some practices have been shown to reduce methane emissions, including alternate wetting and drying (AWD), midseason drainage, direct seeding, aerobic rice systems, the System of Rice Intensification (SRI), and alternative practices to rice-straw burning (Food Forward NDCs n.d.). (See Annex 4 for a description of these practices.) Studies have shown that improved water and straw management could reduce one-third of global methane emissions from rice fields, and sustainability measures adopted in rice fields could contribute significantly to the target to reduce methane emissions by at least 30% below 2020 levels by 2030, as outlined in the Global Methane Pledge at COP26 in November 2021 (Wang et al. 2023).

3.2 Water use

Rice production requires intense water use, with a global average water footprint of 1,325 m3/ton (Chapagain and Hoekstra 2011), or 3,000 to 5,000 liters of water per kilogram of rice (the second-highest agricultural crop consumption after cotton) (WWF 2013).

Rice consumes an estimated 34%–43% of total irrigation water globally, and accounts for about 24%–30% of global freshwater withdrawals (Bouman, Lampayan, and Tuong 2007).

Rice paddies are typically flooded continuously and then drained seven to 10 days before harvest. However, practices such as alternate wetting and drying allow the water levels to drop and reflood, which reduces water use in irrigated fields. Practices such as direct or dry seeding, field laser levelling, and use of aerobic rice varieties can also reduce water use (IRRI n.d.[b]).

3.3 Human and labor rights

Rice is on the U.S. Bureau of International Labor Affairs list of goods that are believed to be produced using child labor or forced labor in violation of international standards. The list identifies 12 rice-producing countries engaged in such alleged rice production, including Brazil, Myanmar, Dominican Republic, Ecuador, Ghana, India, Kenya, Mali, Pakistan, Philippines, Uganda, and Vietnam (ILAB 2022).

A human rights impact assessment undertaken by a Sustainable Rice Platform member of its Indian basmati rice supply chain identified contract migrant labor families, including children, working in rice fields, and it recommended the integration of monitoring on child labor into the SRP standards (ImpactBuying 2023). Similarly, in 2023, a field assessment of rice-growing communities in Cambodia identified high risks of child labor, forced labor, and human trafficking linked to unsafe migration and insufficient income of rice farmers and rice-mill workers (Centre for Child Rights and Business 2023). The assessment also raised concerns about lack of access to collective bargaining, social protections, labor rights for migrant workers, and grievance mechanisms.

3.4 Contamination, residues, and food safety

Rice has a high prevalence of aflatoxin contamination. Aflatoxins are a family of toxins produced by Aspergillus fungus that are prevalent in tropical regions with hot and humid climates (for example, Sub-Saharan Africa and Southeast Asia) and can be both toxic and carcinogenic. Aspergillus fungus growth particularly occurs in the field, during rice harvest, handling, and storage (Ali 2019).

Rice frequently contains levels of pesticide residues that exceed the maximum residue levels (MRLs) for food. The principal international source defining maximum residue levels is the Codex Alimentarius, or "Food Code"—a collection of standards, guidelines, and codes of practice adopted by the Codex Alimentarius Commission. MRLs are set by the Codex Committee on Pesticide Residues (CCPR), based on recommendations made by the FAO/WHO Joint Meeting on Pesticide Residues (JMPR) (FAO 2024). For example, pesticide residues including Acephate, Carbendazim, Thiamethoxam, Triazophos, and Tricyclazole have been previously documented to exceed EU maximum residue levels in Indian rice (European Commission 2023).

Rice can also take up and accumulate toxic heavy metals and metalloids from the soil, such as arsenic, cadmium, lead, and mercury, which occur naturally as well as from human activities (Qian et al. 2010).

Monitoring and controlling aflatoxin levels, pesticide residues, and heavy-metal contamination for rice is a critical aspect of food safety and security.

4. The Sustainable Rice Platform

4.1 History and evolution

The Sustainable Rice Platform (SRP) was cofounded in 2011 by the International Rice Research Institute (IRRI), the United Nations Environment Programme (UNEP), and the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. It was initially established as a platform to link research, production, policy making, trade, and consumption, and to bring together development stakeholders working on rice sustainability.

The SRP Secretariat, which is responsible for the overall coordination of the operations and administration of the SRP, was initially hosted by UNEP. It became an independent membership association (registered in Germany as an "eingetragener Verein," or registered association) in 2020. The first annual General Assembly of members was held in 2019.

In 2014, the SRP took the decision to develop a voluntary standard for sustainable rice. Voluntary standards are rules, guidelines, or characteristics about a product or a process. They are not mandatory regulations, but are used voluntarily by producers, processors, retailers, and consumers (FAO 2013). The SRP's voluntary standard is a normative framework that can serve as a basis for supporting claims to sustainability performance in rice supply chains. The SRP developed this system to support the transformation of the global rice sector towards sustainability, by:

The first version of the SRP Standard for Sustainable Rice Cultivation (Farm Standard) and the SRP Performance Indicators (PI) were launched in 2015. The Farm Standard applies to all farm-level processes in rice production, including postharvest processes under the farmer's control, and can be applied by individual farmers, smallholder farmer groups, as well as larger farms. The Farm Standard was piloted in Thailand in 2016 with Thailand's Rice Department, Olam, GIZ, and UTZ under the Better Rice Initiative Asia (BRIA), and piloted in 2017 in Vietnam with the Loc Troi Group working with IFC and IRRI (IFC 2017). The second version of the standard was published in January 2019 and then a year later, in January 2020, Version

2.1 was launched, based on feedback from farmers, users of Versions 1.0 and 2.0, and consultation among members and external stakeholders. This was followed by the development of the Assurance Scheme, launched in September 2020, with significant updates implemented in 2024. The Assurance Scheme defines rules for proving compliance with the SRP Standard for Sustainable Rice Cultivation and offers rice industry actors a robust, cost-effective method to verify and communicate sustainability claims. Based on demonstrable evidence, the Scheme enables rice farmers and producer groups, as well as the buyers they sell to, to show proof of compliance with the SRP Standards.

GIZ provided much of the funding for the development of the Platform and Standards System, through the BRIA (2013–2017) (GIZ n.d.[b]) and Market Oriented Smallholder Value Chains (MSVC) (2018–2022) programs (GIZ n.d.[a)].

IFC has been involved with the Sustainable Rice Platform since its initial meetings in 2011 and has been continuously represented on the Board. IFC was a key partner in the development of the Farm Standard and has had—and continues to have—several advisory projects with clients supporting the implementation of SRP practices (see Annex 1 for a list of IFC's projects).

4.2 Structure and scope

The Sustainable Rice Platform is an independent membership association. It is managed by the SRP Secretariat, headquartered in Bangkok, Thailand, with oversight from the SRP Board (14 Board members, including one observer), which meets quarterly, and the annual General Assembly of members. The SRP currently has 106 members split across four categories (supply chain actors; service, input, and equipment providers; public sector; and civil society).

The platform's primary activity is operating the SRP Standards System, including the Farm Standard, the Chain of Custody (CoC) Standard, the Assurance Scheme, as well as a number of normative and guidance documents to support implementation. This standards system has been analyzed separately as part of a wider study with the results indicating that the SRP Standards System is well documented and follows good practice for voluntary standards systems (see *Assessment of the Sustainable Rice Platform: A Benchmark Analysis including the IFC Performance Standards, Good Practice for Standards Systems Assurance and Governance, and Selected Elements of Other Standards Systems*).

The SRP Farm Standard comprises 41 requirements structured under eight themes: farm management, preplanting, water use, nutrient management, integrated pest management, harvest and post-harvest, health and safety, and labor rights. The Farm Standard is complemented by the Performance Indicators, which set out impact measurements for profitability, labor productivity, grain yield, water-use efficiency, nutrient-use efficiency (for P, or phosphorus-based fertilizer), nutrient-use efficiency (for N, or nitrogen-based fertilizer), biodiversity, greenhouse gas emissions, food safety, worker health and safety, child labor and youth engagement, and women's empowerment.

Alongside the SRP Standards System, the SRP also provides a platform for members to register projects that are using SRP tools to shift farmers to sustainable practices. SRP verification is not required to register a project, and these projects count towards the SRP's goal of reaching 1 million smallholder farmers.

The Platform also serves as a knowledge hub, leveraging the collective experience and network of the SRP and its members to enable learning from existing experiences in implementation and to facilitate dialogue with the aim of building awareness among stakeholders that will advance the sustainable-rice agenda.

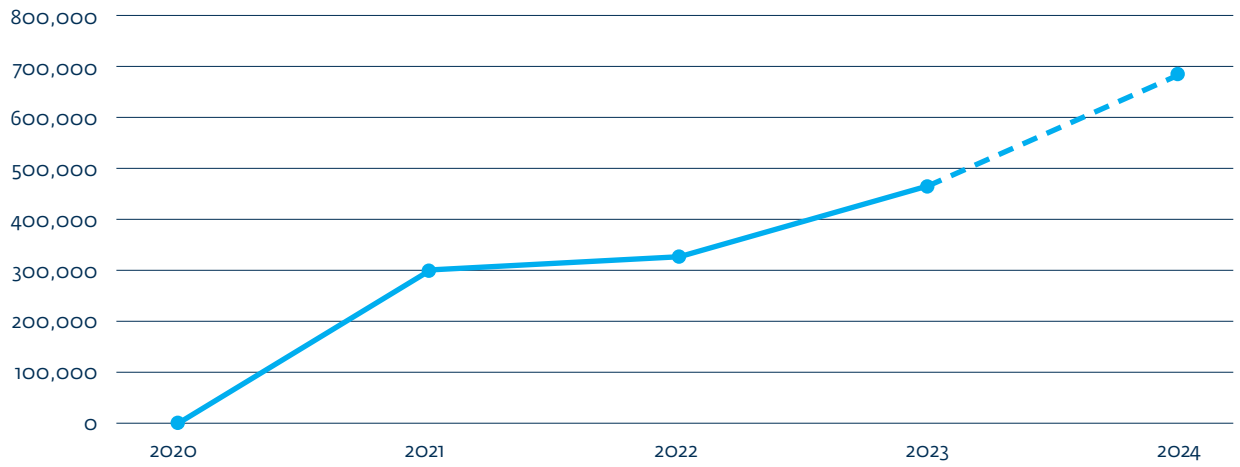
4.3 Overview of the SRP market

4.3.1 Availability in the market

The SRP Assurance Scheme was launched in 2020, which set out the framework for farm verification. By the end of 2023, a total of 46,280 hectares of land was under SRP verification, which was equivalent to approximately 200,000 metric tons of milled rice, 0.37% of globally traded rice, or 0.04% of global production.[5] Based on an expected trade value of US$30 billion for the global rice market for 2024, the current SRP-verified portion of the market is estimated at US$111 million.

The Sustainable Rice Platform is projecting 67,992 hectares of SRP-verified rice for 2024 based on planned verifications, which is a year-on-year increase of 47% (see Figure 8). According to SRP data, currently, SRP-verified rice is grown in India, Pakistan, Thailand, Singapore, and Spain, and farmers in Cambodia are also preparing for verification. Previously, producer groups in Myanmar were also verified, but they are no longer participating in the platform.

Figure 8: Trajectory of SRP-Verified Rice



Source: SRP 2023.

SRP-verified rice was first launched in the retail consumer market by Lidl supermarkets in June 2021. By the end of 2022, the "SRP Verified" rice label was available in 11 countries, an increase from five in 2021.

SRP membership does not mean a company's products are SRP verified, but it does indicate an interest in sourcing SRP-verified rice. Therefore, the current supply chain-actor membership can be used as a broad indicator of the short-term market potential.

SRP members include four retailers that sell their own-brand rice (Lidl, Kaufland, Koninklijke Ahold Delhaize N.V. and Jumbo), five branded manufacturers producing rice or consumer goods with rice as an ingredient (Diageo; Ebro Foods, S.A.; Mars, Incorporated; Riso Gallo; and Riso Scotti SPA) as well as a number of companies and company groups with integrated

[5] This is calculated using 2022 data, with 200,000 metric tons SRP-verified, and 54 million metric tons of globally traded rice. (Traded rice accounts for about 10% of total rice production, most of which is consumed domestically and not traded.) Data is from the USDA Economic Research Service.

supply chains, which includes packing their own-label branded rice as well as trading, processing, and packing private-label rice for the market. In Europe and Australia, Van Sillevoldt Rijst B.V.(VSR)(acquired by Euricom), LT Foods Europe B.V, SunRice, Veetee Foods Ltd, and Westmill Foods all sell branded rice for the retail market, in addition to operating milling and trading activities.

In the short term, the European market for fragrant rice is expected to be the main demand driver for SRP-verified rice. However, SRP members have engaged in some initial discussions about supplying SRP-verified rice to local markets in the countries of production. Several SRP member companies operating in countries that produce rice in origins sell branded rice to the local retail market, in addition to supplying export markets. These are Al Wahab Rice Mills Pvt Ltd (Pakistan), Atlas Foods (Pvt) Ltd (India), Galaxy Rice Mills (PVT) Ltd. (Pakistan), Loc Troi Group (Vietnam), LT Foods (India), Olam Agri (Nigeria), Saman (Uruguay), Sarwar Foods (Pvt) Ltd. (India), and Supreme Rice Mills Ltd (Nigeria).

4.3.2 On- and off-pack labels and claims

The SRP Brand Manual & Claim Guidelines set out the permitted uses of the SRP name, organizational logo, and "SRP Verified" label (Figure 9). On-pack labels are allowed when the producer, producer group, or individual farmer has been third-party verified as complying with the SRP Standard for Sustainable Rice Cultivation, and the rice has been processed by a mill that has been SPR chain of custody-verified using either the identity preserved or segregated supply chain model.[6]

Figure 9: "SRP Verified" Logo for On-Pack Use

On-pack labels are not permitted when the mass balance supply chain model is used, likely because of concerns that stakeholders, including distributors, retailers, and consumers, might object to there being potentially little physical SRP-verified rice in the package. This is an issue other certification and verification systems have also grappled with. In practice, mass balance drives uptake of equivalent volumes at origin by doing in-out volume reconciliation of verified product at each stage in the supply chain. It is a sourcing method that allows certified and non-certified ingredients to become mixed as they move along the supply chain (i.e. aggregation, milling, shipping), and thus reduces costs and complexity by not requiring product segregation (Rain Forest Alliance 2023). This concept can be challenging to explain simply to stakeholders, though other standards systems generally do allow on-pack labels for mass balance, because global commodity supply chains are built on bulk aggregation. In fact, all major international sustainability initiatives use mass balance in one form or another (Rain Forest Alliance 2023). This could be the reason some SRP members use generic "sustainable agriculture" on-pack labels, rather than "SRP Verified" labels.

[6] The SRP recognizes three types of CoC models, which are consistent with the CoC models of other voluntary standards in primary production: (1) identity preservation (IP), where the identity of the farm that produced the rice is preserved through the supply chain; (2) segregation system (Seg), where SRP-verified rice is kept separate from conventional rice through the supply chain; and (3) mass balance (MB),where SRP-verified rice is mixed with conventional rice in the supply chain, and accounted for so that an equivalent volume of SRP rice is sold (volume reconciliation). Mass balance allows tracking the net amount of sustainable rice as it moves through the supply chain and ensures an appropriate allocation of these materials to the finished goods based on auditable bookkeeping.

Figure 10: Rice with On-Pack Labels

Currently, four brands carry on-pack "SRP Verified" labels. These include two from the Schwarz Group: Lidl's private-label "Golden Sun" brand and Kaufland's own-brand rice (Figure 10); Albert Heijn's own-brand rice (Figure 10); and Axfood's private-label "Garant" rice. The on-pack labels are for specific product lines (not for the entire range) and do not cover the entire inventory of the specific product lines. Also, Olam Agri has been involved in the development of a sustainable rice brand "Harmony," to promote sustainable jasmine rice grown in Thailand. It had planned to carry the "SRP Verified" label. However, the company has not yet brought this brand to market, and it remains unclear at this time whether it still plans to do so.

The following companies have off-pack labels or claims, but do not use the on-pack "SRP Verified" label:

Mars Food & Nutrition, a segment of Mars, Incorporated, reported in 2020 that 99% of its Ben's Original-brand rice comes from farmers working towards the SRP Farm Standard. In some markets, it uses a generic on-pack label that says, "Sustainably Grown." (Mars 2020).

Riso Gallo has an off-product statement for its basmati rice, which is sourced from two SRP-verified suppliers. It uses a generic on-pack label and a tagline that says, "From Sustainable Agriculture" (Figure 10).

Ebro's Lassie brand has an off-product descriptive statement, "SRP quality mark (Sustainable Rice Platform)."

Nice Rice (owned by Mission Brands Ltd) was launched in 2023 in the UK, and has an on-pack tagline that says, "Leading a sustainable rice revolution." On its website, Mission Brands states that 100% of its rice is "level 3," which the SRP classifies as "sustainably farmed" (Nice Rice n.d.).

Nice Rice is an example of a brand that has sourced SRP-verified rice without being an SRP member. It does not use an on-pack label and is not using the SRP logo in any communications material, both of which would have required SRP membership. However, it is making off-pack verification claims, which are permitted without membership. The SRP Brand Manual & Claim Guidelines requires that companies making off-pack claims request approval from the SRP, and while the Guidelines refers to "licensees," the SRP doesn't use a license agreement, so it's not clear how the claims would be controlled for nonmembers.

The SRP Standards System does not require buyers of SRP-verified rice or processors of SRP-verified rice to be members. Therefore, additional retailers and brands might be sourcing SRP-verified rice but might not have been identified in this report. The SRP membership list was used as the primary reference point for identifying companies to interview.[7]

4.3.3 Costs of SRP verification

The scope of this study does not cover a systematic assessment of the costs of SRP verification. However, interviews with companies identified anecdotal information about costs, as well as costs defined within the SRP Standards System.

In addition to audit and SRP membership fees, a fee of €2.00 (US$2.45) per hectare is charged for all verified producers and producer groups. This is paid to the conformity assessment body (CAB) either by the sponsoring organization or implementing partner, or by the producers or producer groups if they directly contracted the auditors.

One SRP member implementing an SRP project in India estimated that the cost of training farmers to adopt SRP farming techniques totaled US$19 per metric ton of paddy rice (or up to US$40 per metric ton of milled rice). Besides training, costs cover seed expenses, laser land levelling, digital-training platform, drones, specialized harvesting equipment, and farm visits.

Another SRP member implementing an SRP verification program in Vietnam reported that SRP rice costs it 30% more to produce than conventional rice. Additional costs accrue from training, field management, per-hectare fees charged by the SRP, and premiums that the member pays farmers.

The cost of SRP CoC verification varies between sites depending on the size and complexity of the company's operations, and fees are negotiated freely between the company and the conformity assessment body. As an example, one of the current SRP members reported that it cost them €15,000 (US$18,396) per facility.

4.3.4 Collaboration and competition

While no other equivalent rice-specific sustainability standards exist, other voluntary standards systems and quality marks can be applied to rice. Currently the amount of SRP-verified rice in the market is limited. Therefore, competition occurs at the decision-making level of rice buyers (particularly retailers and manufacturers), in terms of what standards and labels they commit to sourcing and what roundtables and alliances they choose to participate in. Competition will also occur in development projects as part of the project design and in the choice of sustainability framework to follow for training and support of rice farmers and rice sourcing.

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[7] An SRP CoC-verified site may process and package rice with an "SRP Verified" label without the processor being an SRP member. However, if the buyer of this rice wants to make a public claim and use the SRP logo in its communication, then the buyer is required to have SRP membership.

Table 2 features a list of standards systems that are implemented in the same market space as the Sustainable Rice Platform. These have been identified based on interviews with SRP members and a review of what other standards systems both the SRP and its members have engaged with. Food safety standards have not been included in the list, as they are expected to be implemented in parallel.

Greenhouse gas emissions from rice are globally significant, and therefore are of critical importance for measuring and reporting in the rice sector. Several SRP buyers interviewed expressed an interest in being able to communicate about GHG mitigation of their SRP-verified rice, to fulfill insetting commitments, as well as to potentially develop projects to register for carbon credits. While the SRP Performance Indicators include measurements of greenhouse gas emissions, these cannot be used to make SRP-verified claims. The SRP Standards System does not yet provide standardized emissions factors for country or subcountry zones, and no methodology is available to aggregate GHG mitigation through an SRP-verified supply chain.

Feedback from company interviews indicates that some members are concerned about the continued relevance of the Sustainable Rice Platform, and that other generic farm standards systems combined with robust greenhouse gas measurement and monitoring by specialized companies would be more attractive. Indeed, some companies are even developing their own methodologies. Food company Kellanova was an early SRP member but has moved on to develop and pilot its own InGrained program to implement climate-smart irrigation practices in the United States. It has partnered with Regrow Ag, rice producers, Kellogg supplier Kennedy Rice Mill, and agribusiness firm Syngenta (Van Wyk 2023). PepsiCo, Inc. and Walmart Inc. are partnering to implement regenerative rice-farming practices in the United States to improve soil and water health, as well as to lower carbon emissions (Walmart 2023).

The Sustainable Rice Platform has responded to these concerns by launching the development of a Low Carbon Assurance Module in 2024, in collaboration with Regrow Ag, a software firm that helps companies measure, report, and take action to reduce on-farm emissions, and Gold Standard, a leading carbon and sustainable development standard. This is a critical step for the SRP to ensure that it remains competitive among buyers of SRP-verified rice. The module is expected to be based on a clearly documented process incorporating cutting-edge measurement, reporting, and verification (MRV) technologies. It will validate Scope 3 reductions achieved by rice farmers through adoption of the SRP Farm Standard by measuring the greenhouse gas impact of SRP-verified rice. It will also deliver robust emissions factors that quantify the impact of SRP-verified rice and which can be used by SRP buyers to contribute towards their corporate greenhouse gas-reduction targets. Similarly, as water becomes increasingly scarce, the Sustainable Rice Platform has an opportunity to further develop its Performance Indicator for water to be a reference point for best practice for measuring and monitoring in the rice sector. The Alliance for Water Stewardship (AWS) is an SRP member, providing a clear opportunity for collaboration.

Other standards focused on organic and fair-trade production have well-recognized consumer labels. If the strategy is for SRP-verified rice to be driven by consumer demand, then there is likely to be direct competition with these labels as they occupy a similar retail niche. Encouragingly, the Dutch Certification Label Guide (produced by independent public-information organization Milieu Centraal) selected the SRP label as one of the 12 top-quality sustainability labels in the Netherlands for 2022 (Milieu Centraal 2022). SRP verification may have more traction as a risk-management and Scope 3 reporting tool for manufacturers and retailers, rather than solely as a consumer label. As noted in Table 2, some SRP members already supply the organic and fair-trade market segments, and therefore SRP verification could be deployed in parallel to address a wider range of social and environmental risks.

Table 2: Other Standards Systems That Operate in the Rice Sector

Standards system	Overview	Collaboration
	Sustainable Agriculture Initiative's Farm Sustainability Assessment (SAI FSA) is applicable to any crop, anywhere in the world, with any farming system, and is designed to improve social, environmental, economic, and general farm-management practices.	In 2015, a joint benchmark between SAI and the SRP showed compliance with the requirements in the SRP Farm Standard 1.0 would correspond with compliance with the majority of essential and basic questions in the FSA.[a] Some SRP members are implementing the SAI FSA. In Italy, the SAIRISI (Sustainable Italian Rice) is a collaborative partnership that includes SRP members Ebro and Euricom Group, as well as Migros and nine millers (Ceriotti, Curtiriso, Martinotti, Mundi Riso, Naturis, Parboriz, Scotti, Riso Salsa, and Taverna) and seeks to implement the SAI FSA.[b] SAI is working in Pakistan with companies such as PepsiCo, Ingredion, Diageo (an SRP member), and Nestle on raw-material sourcing, which includes rice.[c] In Indonesia, Vietnam, and Thailand, under the Market-oriented Smallholder Value Chains (MSVC) program (Better Rice Initiative Asia II), the SAI FSA was implemented in parallel to the SRP Farm Standard and the proposed "Harmony" rice branding had both the "SRP Verified" and FSA logos.
	GLOBALG.A.P. is a farm assurance program promoting safer and more sustainable farming practices in over 130 countries worldwide. Its Integrated Farm Assurance standard for fruits and vegetables can be applied to rice.	When the SRP Farm Standard was first launched in 2017, GLOBALG.A.P. ran joint training covering GLOBALG.A.P.'s Integrated Farm Assurance standard for fruits and vegetables (Version 5), combined with a supplementary module of the SRP Standard, with a view to undertake certification of both standards without duplication in the implementation or verification processes.[d] SRP and GLOBALG.A.P. went on to collaborate closely on the SRP's Assurance Scheme 1.0; however, they no longer have an active partnership.
	Verra is a carbon registry than manages the Verified Carbon Standard (VCS), the biggest standard in the carbon market based on market share.The standard sets out specific requirements for developing projects and for the validation, monitoring, and verification of projects and GHG emissions. In December 2023, Verra initiated the development of a new Verified Carbon Standard program, "Methodology for the Quantification of Greenhouse Gas Emissions from Rice Production Systems."	
	Gold Standard is an international offset program which sets out specific requirements for developing projects and for the validation, monitoring, and verification of projects and GHG emissions, as well as contributions to the UN Sustainable Development Goals (SDGs).	An SRP pilot project is currently underway to implement GHG impact measurement, working jointly with Regrow Ag; Mars, Incorporated; LT Foods; and Gold Standard, with grant funding from the ISEAL Alliance. The aim is to develop an add-on GHG module for the SRP Standards System.

a. SAI Platform 2015.
b. SAI Platform n.d.(b).
c. SAI Platform n.d.(a).
d. Eurofresh Distribution 2017.

Standards system	Overview	Collaboration
	In July 2023, the Gold Standard released a new methodology for reducing methane emission from rice production: "Methane Emission Reduction by Adjusted Water Management Practice in Rice Cultivation."	
	Organic standards generally cover the avoidance of synthetic chemical inputs, use of farmland that has been free of prohibited chemical inputs, and avoidance of GMO seeds. A global network of standards systems has broadly similar requirements. Organic labeling is regulated in the EU, U.S., Canada, and Japan.	Several SRP member companies are already supplying organic rice to the market, including Amru Rice Cambodia Co. Ltd, Loc Troi Group, LT Foods (Nature Bio Foods), and Mars, Incorporated (Seeds of Change).
	The Alliance for Water Stewardship's International Water Stewardship Standard is a framework for major water users to understand their own water use and impacts, and to work collaboratively and transparently with others for sustainable water management within the wider water catchment context. It has third-party certification.	The AWS is a member of the SRP, and together with the Better Cotton Initiative (BCI), was a project steering partner for the Water Productivity Project (WAPRO), which ran from 2015 to 2022, and included implementation of the SRP Farm Standard in India, Pakistan, and Myanmar.
	The fair-trade movement combines the payment of higher prices to exporters with improved social and environmental standards. A number of fair-trade labelling organizations operate worldwide. Fairtrade International covers almost a dozen rice varieties in both organic and conventional form. Both the Premium and the Minimum Price vary for production region and type of rice, and are regularly revised.	Fairtrade International works with approximately 10,000 rice farmers in Thailand, Pakistan, and India. Foodtech Solutions (Thailand), an SRP member, is Fairtrade certified.

4.4 Current challenges and opportunities

As a multistakeholder initiative, the Sustainable Rice Platform has seen different perspectives brought to the table over the past decade regarding what the platform should focus on. A push by several key private sector members led to the creation of the Assurance Scheme and "SRP Verified" label, though even some current members are more interested in using the Performance Indicator framework to measure progress than getting SRP verified. These differing perceptions are likely to persist, though they are also valuable in terms of helping the Sustainable Rice Platform stay relevant and evolve with the changing world.

The SRP is seeking to be both a development-driven project platform and a market-driven label. The SRP has a three-pillar strategy of developing sustainable rice value chains, creating partnerships for scale, and serving as a knowledge hub. In addition to overseeing the SRP Standards System, the platform is working to mainstream SRP tools into regional and national policies and regulations, and to participate in global consortia.[8] There is a risk that undertaking a wide scope of activities may send mixed messages to stakeholders about the purpose of the platform. Furthermore, the effort required to participate in grant applications and consortium coordination takes significant resources, and given its limited resources, the SRP may need to sharpen its focus.

Discussions with SRP members operating in rice-producing countries indicated that some are struggling to find a market for their SRP-verified product. Several interviewees indicated that the SRP has widely promoted the idea that its verified rice would not cost any more than conventional rice, on the basis that farmers' incomes would increase through the implementation of good practices, which in turn should compensate for any additional costs borne by the farmer from the verification process. However, interviewees said this model does not account for costs borne by the implementing partners for training, chain-of-custody verification, and other costs of compliance, and that in practice, most buyers reported paying a premium. Managing the expectations of buyers and suppliers about the costs and premiums is, therefore, important.

Because the Sustainable Rice Platform was initially established for development impact rather than because of market demand, it lacks some of the sense of urgency that other voluntary standards systems have. SRP members don't face nongovernmental organization campaigns against their rice procurement, as some members of other standards systems do, for example. It is, therefore, important that the Sustainable Rice Platform build a market strategy based on a current understanding of what rice buyers need to do to manage their risks and communicate with their stakeholders. Several of the largest member companies are not labelling their products as SRP verified, though the use of bulk commodity supply chains may also be a reason for this, as on-product labels are not permitted in SRP-verified, mass-balance supply chains.

The number of SRP members has hovered at about 100 for several years, and the platform has an opportunity to recruit additional private sector companies, especially with the increasing global focus on methane reductions and Scope 3 reporting. Furthermore, by offering services around Scope 3 reporting, the Sustainable Rice Platform could unlock climate finance opportunities for companies. A next step could be benchmarking the SRP Standards System against the Common Principles for Climate Mitigation Finance Tracking (African Development Bank Group et al. 2023).

The SRP may also have an opportunity to increase its membership (and engagement in the platform) among companies that are trading and retailing SRP-verified rice, as the current SRP Standards System doesn't require them to be members. This would seem to be a missed opportunity for membership revenue as well as a risk for those companies, as changes to the Standards System could be implemented without their knowledge or input.

[8] Such consortia include the Sustainable Rice Landscapes (SRL) Initiative, through which the SRP will participate in several large-scale, country-level projects funded under the Global Environment Facility (GEF) and Least Developed Country Fund (LDCF).

5. Selected Financing Opportunities for Sustainable Rice

This study contributes to IFC's wider scope of work on rice finance by highlighting selected investments in the sector and profiling companies currently involved in the Sustainable Rice Platform.

Further details on opportunities for sustainable financing for the rice sector is available through two reports published by the Sustainable Rice Landscape Initiative (SRLI): "Scaling Private Sector Investment in Sustainable Rice: Needs and Opportunities" (WBCSD 2022) and "Financing Sustainable Rice for a Secure Future: Innovative Finance Partnerships for Climate Mitigation" (Earth Security 2020).[9]

5.1 Rice investment experience to date

A range of financial instruments including loans, equity investments, trade and commodity finance, derivatives, structured finance, and blended finance can be deployed in the rice sector to support sustainable development. Selected examples from IFC's experience as well as from SRP members are provided below.

Loans for capital expenditure in the rice sector, when provided to companies with good social and environmental management systems, can expand the capacity for producing, processing, and trading sustainable rice. For example, in 2023, IFC invested US$35 million in Meghna Group of Industries (MGI) (Bangladesh) to set up a greenfield automated rice mill with processing capacity of 1,000 metric tons per day, a rice-bran oil plant with a daily capacity of 80 metric tons, and a husk-based cogeneration plant. This IFC investment included US$14 million in the form of a subordinated loan (blended concessional finance coinvestment) provided through the Private Sector Window of the Global Agriculture and Food Security Program (GAFSP), which is hosted within the World Bank Group (IFC n.d.[c]). As part of the IFC Environmental and Social (E&S) Action Plan, Meghna will institute supply chain management systems to address specific E&S risk aspects such as child and forced labor, occupational health and safety, and biodiversity-related supply chain risks. The company will also implement a paddy-supplier code of conduct and farmers' education and training programs.

In 2019, IFC invested US$10 million in Amru Rice Cambodia Co., Ltd to increase its working capital funding and refinance short-term debt which was used to finance the construction of the company's rice mill in Kampong Thom Province. IFC Advisory Services helped to enhance Amru's capacity to implement the Sustainable Rice Platform (SRP) standards, strengthen its supply chain, enhance food safety management, and support the implementation of IFC's Environmental and Social Action Plan (IFC n.d.[b]).

IFC investment in intermediary banks can also help reach clients that would otherwise not be suitable for IFC investments. For example, in 2011, IFC signed a risk-sharing agreement (RSA) with ANZ Royal Bank in Cambodia.[10] The investment was

[9] The Sustainable Rice Landscapes Initiative (SRLI) is a consortium of six partners working together to meet the growing global demand for sustainable ricerice. It was convened by the World Business Council for Sustainable Development (WBCSD), together with the SRP, FAO, IRRI, GIZ, and UNEP.

[10] ANZ Royal Bank is a banking joint venture between major Australian and New Zealand banking interests and a local Cambodian business conglomerate.

expected to generate a portfolio of agribusiness loans worth US$30 million, with the risk shared 50:50 between ANZ Royal and IFC, and with the World Bank Group's International Development Association (IDA) and the Royal Government of Cambodia (RGC) providing a first loss guarantee to IFC totaling up to US$3 million.

Rice contributes a significant amount to Cambodia's gross domestic product (22% in 2022) (ITA 2024), and the expectation was that the investment would create access to financing for 19 rice-processing firms. However, Cambodia's attractive export prices under the EU's Everything But Arms agreement provided operating profit margins that attracted investors from the neighboring rice industry and marketers. Commercial bank lending to agribusinesses increased sharply between 2011 and 2013, leading to increased competition among local banks as well as lower-cost financing from China and equipment suppliers. This resulted in decreased lending rates and decreased margins. In addition, firms wanted to borrow smaller amounts than the required stable funding (RSF) minimums.[11] Therefore, the risk share was no longer needed or economically viable (World Bank 2013).

A similar risk share was set up in Senegal in 2023, where IFC is investing US$7.2 million in a risk-sharing facility to support Bank of Africa-Senegal's lending to thousands of smallholder rice farmers and small rice-producing businesses, helping them to access insurance, inputs, and equipment, including seeds, fertilizers, and harvesters (IFC 2023). IFC's Global Warehouse Finance Program (GWFP) aims to increase working-capital financing to agricultural producers and traders by leveraging their commodities in storage. To date, the program has supported more than 750,000 farmers in 66 emerging-market countries (IFC n.d.[a]). In 2018, IFC, in partnership with the World Bank's Development Impact Evaluation and the Senegal Ministry of Commerce, implemented a warehouse-receipts financing pilot with rice farmers in Senegal. Selected farmers were offered the opportunity to bring their rice production to a designated warehouse, and received a warehouse receipt that they could take to the Caisse nationale de crédit agricole du Sénégal (CNCAS, now known as La Banque Agricole), to access credit for up to 80% of the value of the product in storage, at a 5% annual interest rate, prorated to the duration of the credit. However, the pilot had a very low participation rate (2% of the potential 363 farmers), which was attributed to farmers not expecting prices to increase sufficiently during the post-harvest period to justify the costs of bringing their rice to the warehouse, storing it, and bringing the receipt to the bank in exchange for credit (Adjognon n.d.). In 2022, the Global Warehouse Finance Program also launched a program in Ghana in partnership with the Ghana Commodity Exchange (GCX) and with support from Switzerland's State Secretariat for Economic Affairs (SECO). The program includes rice farmers and aims to increase access to financing for farmers and better pricing for their produce (Agamah 2022).

Crop insurance is also likely to become increasingly important with the impacts of climate change. IFC has been involved in the development of typhoon insurance for rice farmers in the Philippines (Hermoso 2023). Crop insurance was also part of IFC's 2023 investment in a risk-sharing facility to support Bank of Africa-Senegal's lending to thousands of smallholder rice farmers and small rice-producing businesses. These loans help them purchase insurance as well as inputs and equipment, such as seeds, fertilizers and harvesters (IFC 2023).

IFC's client Amru Rice set up the Cambodian Agriculture Cooperative Corporation (CACC) in partnership with farmer cooperatives and private investors to provide a community warehouse facility and services for drying, packaging, and storage to support 39 agricultural cooperatives. The deposited rice paddy is used as collateral to provide noncash loans to farmers

[11] A bank's total required stable funding (RSF) is the amount of stable funding that it is required to hold given the liquidity characteristics and residual maturities of its assets and the contingent liquidity risk arising from its off-balance-sheet exposures. For each item, the RSF amount is determined by assigning an RSF factor to the carrying value of the exposure. These range from 100% to 0%. An RSF factor of 100% means that the asset or exposure needs to be entirely financed by stable funding because it is illiquid (https://www.bis.org/fsi/fsisummaries/nsfr.pdf).

for seeds, agricultural inputs, and small farm machinery (supported by SNV's Innovations Against Poverty project) (Jones, Sweeney, and Borja 2022).

Interviews with Sustainable Rice Platform member companies identified farmer financing as a key area of investment for the member companies. Ebro indicated it sometimes offers rice mills in Cambodia financing from its own account (depending on the relationship). Herba Bangkok S.L (an Ebro company) and its customer Mars were involved in a pilot project with Rabobank in Cambodia, in which Herba's purchase orders were used as collateral to secure financing for the supplying mill, Battambang Rice Investment Co., Ltd (BRICo), and BRICo in turn used the funds to prefinance farmers. Mars acted as the guarantor for the prefinance but cancelled its guarantee due to significant side-selling (selling to other buyers) by the farmers.

Olam Agri Holdings Pte. Ltd., often referred to as Olam Agri and a subsidiary of Olam Group, ran a blended-finance pilot in Nigeria with the United Nations International Fund for Agricultural Development (IFAD) and the Central Bank of Nigeria through the Nigeria Incentive-Based Risk Sharing System for Agricultural Lending (NIRSAL Plc.), a wholly owned subsidiary, in which Olam Agri prefinanced rice farmers (IFAD 2018). Under the arrangement, NIRSAL agreed to cover losses if the farmers didn't deliver their products to Olam Agri at harvest. In 2021, Olam Agri also secured an environmental, social, and governance (ESG) trade finance loan from Citibank for rice farmers in northern India, which will use the Sustainable Rice Platform standard as the ESG benchmark (Citigroup 2021).

Lessons learned from the rice farmer-financing experiences indicate that it is more effective for buyers or project implementing partners to prepay for inputs (seeds, fertilizers, and pesticides) in lieu of cash or credit loans and to distribute these to farmers, with their prepayments recouped on delivery of the harvest to the mill. According to interviews with the IFC team, this type of farmer prefinance is being used in IFC's Cambodia Mars advisory project.

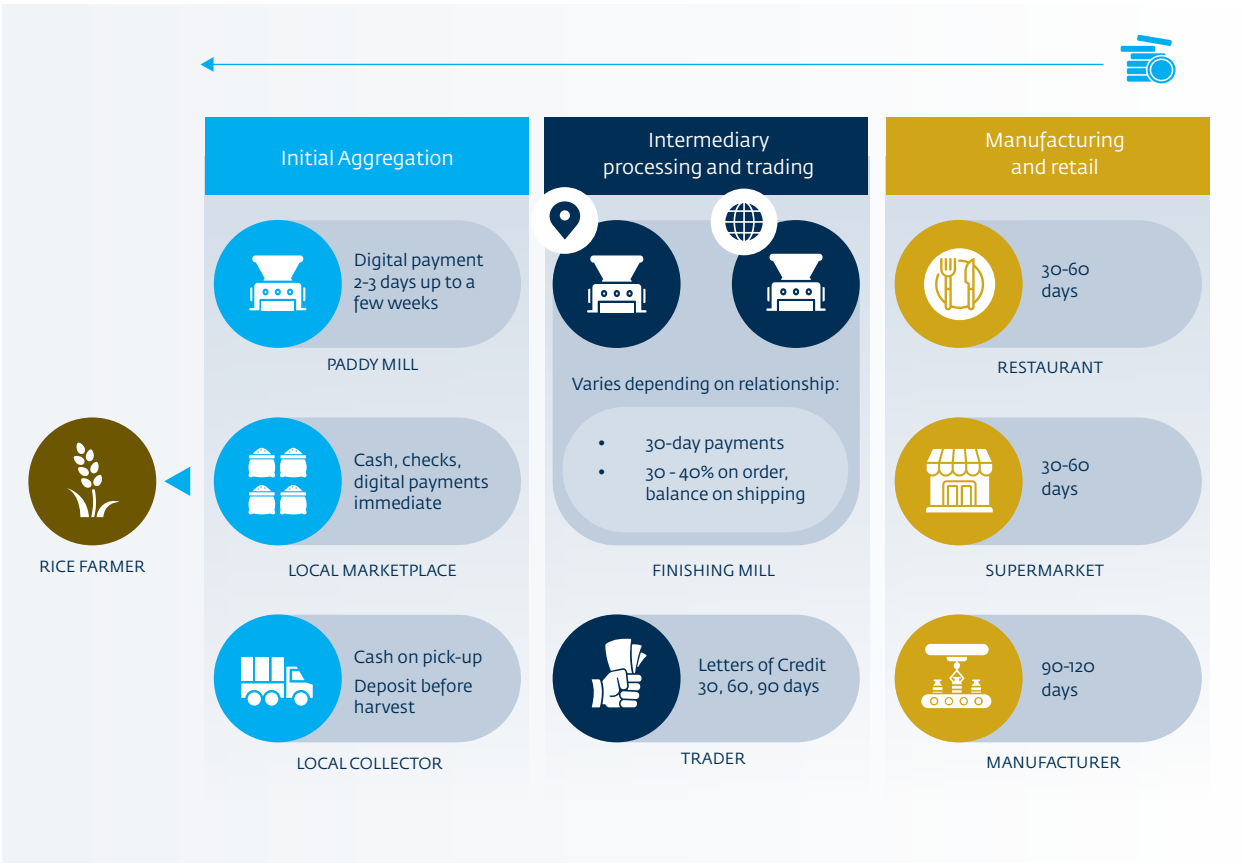
5.2 Opportunities for supplier finance

The seasonality of the rice harvest creates a concentrated need for working capital one to three times per year (depending on growing conditions; see Section 1.5 Rice Cultivation), when millers purchase paddy. Millers typically pay their suppliers quickly (either on delivery or within a few days) but can have varied payment terms with their own customers. These terms can range from a payment (or credit) period of 30 days or more, to an arrangement where 30%–40% of payment is due on order, with the balance due on shipping. Some mills may store the paddy and process it over the course of the year, which creates an even longer cash conversion cycle and greater need for working capital. Rice mills are therefore potential candidates for supplier finance.

Downstream supply chain actors including exporters (without their own mills), secondary processors, and traders are also possible candidates for supplier finance, as they pay their suppliers before they are paid by their customers. Interviews with SRP member companies indicate that payment terms for their suppliers can vary significantly depending on their relationship with, and the size of, the supplier. Branded manufacturers reportedly pay suppliers on terms of up to 120 days, while European foodservice supermarkets have much shorter payment terms for suppliers, from 30 to 60 days (Figure 11).[12]

[12] If the transaction occurs within the EU, regulation currently allows up to a 60-day payment term, though in 2023, the European Commission presented a proposal to reduce this to a maximum 30 days for all commercial transactions within the European market. In the UK, commercial payment terms are between 30 and 60 days.

Figure 11: Payment Terms in the Rice Sector



IFC's Global Trade Supplier Finance program provides short-term financing to suppliers in emerging markets that are selling to large international companies on open account terms. The financing is provided through electronic platforms that integrate transactions between buyers, suppliers, and IFC.

A key feature of GTSF is that it incentivizes emerging-market suppliers to improve their environmental and social (E&S) practices by offering interest rates that are linked to E&S performance. This feature, known as sustainability-linked pricing, provides progressively lower rates to suppliers as they improve E&S performance. The Sustainable Rice Platform Standards System provides a valuable framework for measuring progress on E&S performance in the rice sector. Given that the SRP Farm Standard applies only to production, measuring progress must focus on the role of the mill as an implementation partner for SRP projects with the farmer. Similarly, for downstream supply chain actors, progress milestones can be linked to engagement with the SRP, establishment of SRP-verified products, and increases in SRP-verified rice purchased.

IFC previously explored GTSF financing in the rice sector with Australia's SunRice (the trading name of Ricegrowers Limited), one of the world's largest rice food companies with businesses, assets, and operations across Australia, New Zealand, the Middle East, the United States, the Pacific Islands, and Asia. In 2018, SunRice and IFC entered discussions about a US$50 million GTSF facility to finance Asia-wide rice processors including two suppliers in Vietnam and one in Pakistan. The suppliers would have been required to meet a Global Food Safety Initiative (GFSI) standard to participate in the facility. While the investment did not proceed, it nonetheless provides practical experience for developing the product further for the sector.

In terms of SRP members' interest in supplier finance, one miller (Galaxy Rice) indicated a need for what it called "inventory finance," and two traders interviewed highlighted their working-capital needs. LT Foods, which is both a miller and a billion-dollar global food company, did not see a need for supplier finance, though it was interested in grants to cover the premiums for SRP-verified rice in the EU market. Cambodian mills Amru and BRICo apparently access finance informally and through local financiers, though Ebro indicated that it sometimes provides financing to its suppliers in Cambodia. Mars reported that its suppliers were typically large, creditworthy companies (for example) which likely already have access to the financing they need. However, the interviews only covered six of the Sustainable Rice Platform's current 38 supply chain members; therefore, it is possible that other SRP members would have shown a stronger interest. The high degree of vertical integration in the rice sector, as well as the propensity for almost every step in the supply chain to sell rice packaged for the retail market, also means that supplier and buyer relationships can be blurred.

6. Conclusion

Rice cultivation has significant global impacts, but the potential for influencing the market through trade is limited.

Rice is a critical global commodity from the perspective of food security and livelihoods, while at the same time being a significant source of human-generated methane emissions. However, several factors can make it challenging to influence the sector.

Only 10% of global rice production is traded, therefore scope is limited for influencing behavior by working with global supply chains or through market-driven demand. Furthermore, the trade policy instruments used by governments worldwide can have significant impacts on trade balances and market access. One of the reasons cited for the limited uptake of IFC's Cambodia risk-share with ANZ Royal Bank was the success of the EU's Everything But Arms policy in facilitating rice exports to the European market, which generated significant profits for mills, allowing them to access commercial finance. The recent export bans on rice in India have driven up demand in Thailand and Vietnam, though it's not clear how long this situation will last. The volatility of the global market is a risk for SRP verification programs, which currently appear to be either dependent on buyers abroad or dependent on development grants, and this should be considered in project development.

GTSF offers a channel for providing supplier finance, but the level of demand for such services requires clarification.

IFC's GTSF program provides short-term financing to suppliers and has potential to be useful in the rice sector. The technical information identified in this report about the seasonal concentration of working capital need, and the payment terms between buyers and suppliers in the sector suggest that supplier finance could be a useful tool for the sector. Especially when coupled with sustainability-linked pricing, such financing could help drive uptake of climate-smart agricultural practices and promote sustainable livelihoods.

However, interviews with Sustainable Rice Platform supply chain member companies did not provide a clear demand signal for supplier finance. Only six of the 38 supply chain members were interviewed, so a skewed sample could be a contributing factor. Furthermore, those interviewed were all either sustainability managers or managers for the company's SRP farmer programs (see Annex 3), which means the interviewees may not have had insight into their companies' financial needs.

Several interviewees did indicate that they thought deploying GTSF for the rice sector would be useful, just not for their supply chains. Because the demand for SRP-verified rice is largely driven by the high-value fragrant rice segments in Europe, it is possible that SRP millers' and exporters' finance and working capital needs are already met, either through their own account or through commercial trade finance. IFC will need to consider the commercial supplier finance rates available to potential clients as part of client negotiations.

The research undertaken for this report has been able to identify where in the rice supply chain supplier finance could be deployed, and what the sustainability-linked milestones could be, using the SRP Standards System as the framework for sustainability-linked pricing milestones. However, if IFC wants to have an in-depth understanding of the GTSF market potential for rice clients, the following additional research is recommended.

1.

Estimation of the potential demand for SRP-verified rice, based on how much rice current SRP retailers and manufacturers source, and what they have already or are likely to commit to sourcing as SRP verified

2.

Market analysis of the companies handling the bulk of the rice trade and what proportion of the global trade could potentially be converted to "sustainable" rice, based on factors such as corporate commitments, markets they operate in, and regulatory regimes

3.

Assessment of the costs of SRP verification to determine whether the GTSF's preferential rates would provide enough financial incentive to implement an SRP verification program

Further strategic analysis is needed to identify additional ways to support the Sustainable Rice Platform.

IFC has invested significantly in supporting the development of the Sustainable Rice Platform and is currently represented on the Board. Therefore, it has both a responsibility and an opportunity to provide strategic support and guidance. While the scope of this work package includes a technical analysis of the SRP Standards System, it became clear after discussions with stakeholders that some issues outside the normative system documents warrant further attention. These include:

The platform's dual strategy of being a development-driven project platform and a market-driven label

The growing importance of greenhouse gas-emissions measurement for SRP-verified rice

A choice by some buyers of SRP-verified rice not to label nor to join the platform

Demand (and demand drivers) for SRP-verified rice and the costs of implementation for both implementing partners and farmers

It is also recommended to review and to benchmark the climate benefits (both adaptation and mitigation) of applying the SRP Farm Standard and the GHG module under development, for example using the Common Principles for Climate Mitigation Finance Tracking (December 2023) as a framework (African Development Bank Group et al. 2023). This could unlock climate-finance opportunities for companies implementing the SRP Standards System.

These issues have been raised briefly in Section 4.4. However, they warrant further, well-structured discussion with the SRP Secretariat and stakeholders, along with a strategic analysis and recommendations.

In addition to making the GTSF facility available in the sector, IFC has an opportunity to further support the development of the sustainable rice market through its range of investment products. Such a move would build on IFC's experience in the rice sector. Examples of products and services it could offer include loans for capital expenditure, working capital loans, risk-sharing agreements with local banks, warehouse finance and crop insurance, and advisory work on supporting implementation of the SRP Standards System. IFC could offer its wider investment experience in equity, trade, and commodity finance, derivatives, structured finance, and blended finance. It could also support the introduction of innovative financing tools, such as a digital finance platform to channel financing to smallholders or a sustainable rice bond (both proposed as part of a joint report published by the Sustainable Rice Landscapes Initiative) (Earth Security 2020). Another innovative finance tool IFC could support is linking lending interest rates to client implementation of the SRP Standards.

Additional research and analysis are recommended on how IFC can most effectively deploy its financing instruments to drive uptake of climate-smart agricultural practices and promote sustainable livelihoods in the rice sector. Sustainability-linked financing presents a potential opportunity to integrate SRP verification into many diverse types of financing, and thus strengthen the incentives and rewards for SRP compliance.

The Sustainable Rice Platform should seek new ways to create value for members and to scale SRP-verified rice

The Sustainable Rice Platform Board, Secretariat, and SRP members are the stewards of the only rice-specific, voluntary sustainability standard, offering private sector companies operating in rice supply chains a robust, well-considered methodology. The SRP has a significant responsibility not only to maintain the standard but also to scale it. The task at hand is significant: When compared to its peer voluntary standard systems, the Sustainable Rice Platform has the lowest number of members and the smallest market share, just 0.4% of globally traded rice.

At the same time, as awareness of rice's contribution to greenhouse gas emissions and momentum towards achieving net zero goals grow, agribusiness companies are under increasing pressure and scrutiny to demonstrate that they are driving down emissions in their supply chains. Shifting from conventional to SRP-verified rice presents a significant opportunity for meaningful emissions reductions and offers benefits to smallholder farmer households and communities.

The Sustainable Rice Platform is now developing its Low Carbon Assurance Module in collaboration with partners, to provide a robust method for estimating GHG mitigation from SRP-verified rice. This is an example of how the SRP is serving the needs and demands of agribusiness members. It also presents an opportunity to attract new members with emissions-reduction mandates and other sustainability commitments. The SRP must continue to respond to members' needs and priorities and strengthen its value proposition to members. Another potential way that the Sustainable Rice Platform can provide more value-added to its members is by addressing water scarcity and water quality, as mentioned in Section 4.3.4. Considering that the Alliance for Water Stewardship (AWS) is an SRP member, the platform has a clear opportunity to create value for members in this area.

To reach scale and have a material impact on global rice sustainability, the demand for SRP-verified rice must be strengthened and the Sustainable Rice Platform has a key role to play in driving this change. Some SRP members indicated they have struggled to find markets for their SRP-verified product due to a lack of buyers willing to pay a premium for SRP-verified rice; others have indicated a readiness and willingness to supply more SRP rice when they receive the demand signal from the market. Another constraint to expanding the share of SRP-verified rice is a perception among supply chain actors that the third-party verification is costly, a common theme across verification and certification systems.

Growing the demand for SRP rice and increasing the market share of sustainable rice could unlock an abundance of opportunities for other private sector actors, such as financial service providers and investors, to engage and support scale up. For example, last year, Gold Standard released a new methodology for measuring methane-emissions reductions from improved rice production, and it is now collaborating with the SRP to develop an SRP-specific methodology. These new methodologies open a potential, new source of income from the sale of carbon credits, which could significantly strengthen the incentive for farmers to shift to sustainable rice cultivation.

Annex 1. IFC Advisory Rice Projects

Project Name	Number	Country	Approved	Project Description (from project proposal documents)
MARS Cambodia Sustainable SKO Rice	607179	Cambodia	2023	The project has three components: 1. increasing production of sustainable fragrant rice. At the farm and household level, the project will (a) facilitate farmers' adoption of climate-smart agriculture technologies and practices consistent with the Sustainable Rice Platform (SRP) standard in the production of fragrant jasmine rice; (b) improve farmers' financial awareness and business management skills; and (c) support income-diversification activities at the household level; 2. improving business-management performance among farmer aggregators. At the farmer-aggregator level, the project will use IFC's Agribusiness Leadership Program (ALP) to improve agriculture cooperative (AC) management capacity among AC officers and boards of directors; and 3. engaging additional potential buyers of SRP rice. At the market level, the project will support activities aimed at increasing the likelihood of international buyers sourcing SRP-verified rice in Cambodia.
Rice Mars-BRICo	603217	Cambodia	2019	The project has two specific objectives: 1. increasing access to SRP-verified rice, including strengthening farmer groups and cooperatives and traceability; and 2. improving farmers' adoption of technology and climate-smart agriculture practices, including improving their access to planting seeds and services.
OCP Integrated Advisory Services	604953	Senegal	2020	The project will support rice and millet cooperatives in Côte d'Ivoire and Senegal to improve their professionalism.
India Sustainable Rice Project	605334	India	2020	The project will provide technical assistance and capacity-building support to identified smallholder rice farmers on all aspects of sustainable, climate-smart rice cultivation, including land preparation, planting, crop husbandry, water management, crop protection, crop nutrition, and harvest and postharvest handling.
Odisha Rice Storage PPP	599904	India	2013	IFC will provide transaction advisory support to the Government of Odisha to assist in the implementation of multiple grain-storage warehouse facilities, which involves construction, financing, operation, and maintenance by competitively selected private sector developer(s).
Cambodia Rice Sector Support	584347	Cambodia	2012	Firstly, at the farmer level, the project will improve the quality of paddy through seed-multiplication projects with rice millers, farmer training, mass media campaigns to reach large groups of farmers, and advisory services to seed firms. Secondly, at the miller level, the project team will introduce food safety management principles, provide advice on equipment and technology upgrades, and improve rice-mill management through the introduction of mill software and financial-literacy training. Finally, the project will aim to improve the marketing of Cambodian rice. It will provide Advisory Services to the following companies: Battambang Rice Investment Co. Ltd (BRICo), the Loran Group Plc, and Amret Rungroeung Group Ltd (Amru).

Annex 2. SRP Supply Chain Membership List

As of April 2024

Company	Area of Business	Country	IFC	Status
Al-Wahab Rice Mills (Pvt) Ltd	Mill, Export	Pakistan		SRP-verified
Amiha Agro Pvt. Ltd	Technical Assistance	India		
Amru Rice Cambodia Co., Ltd	Mill, Export	Cambodia	IFC investment client	New member
Atlas Foods Private Limited	Mill, Export	Pakistan		
Bangsue Chia Meng Rice Mill Co. Ltd.	Mill, Export	Thailand		
Battambang Rice Investment Co Ltd	Mill, Export	Cambodia	IFC advisory project	
Battambang Union of Agricultural Cooperatives (BUAC)	Farmer Co-op	Cambodia		New member
BENEO-Remy	Ingredients manufacturing	Belgium		
Diageo Great Britain Limited	FMCG	UK		New member
Ebro Foods	Mill, Export, FMCG	Spain	IFC advisory project	
Euricom S.p.A.	Mill, Trade, Export	Italy, Netherlands, India		
Farm Angel Pte. Ltd.	Technical Assistance	Singapore		
Fatima Rice Mills Limited	Mill, Export	Pakistan		
Flying Trade India Private Limited	Mill, Export	India		
Foodtech Solutions (Thailand) Co., Ltd.	Mill, Trade, Export	Thailand		
Galaxy Rice Mills (Pvt) Ltd	Mill, Export	Pakistan		SRP-verified
Golden Sunland	Mill, Export	Singapore/ Myanmar		
Jumbo Supermarkten BV	Retailer	Netherlands		
Koninklijke Ahold Delhaize NV	Retailer	Netherlands		
Landmark Agri Exports Private Limited	Software	India		
Lidl Stiftung & Co KG	Retailer	Germany		
Loc Troi Group Joint Stock Company	Mill, Export	Vietnam	IFC advisory project	SRP-verified
LT Foods Limited/LT Foods Europe	Mill, FMCG	India, Netherlands		SRP-verified
Mars Food	FMCG	Belgium	IFC advisory project	
Matco Foods (Pvt) Ltd	Mill, Ingredients, Export	Pakistan		SRP-verified
Meskay & Femtee Trading Company (Pvt)	Mill, Trade, Export	Pakistan		

Company	Area of Business	Country	IFC	Status
NetZeroAg Ltd (NZA)/ Rice Partners Ltd.	Technical Assistance	UK/ Pakistan		SRP-verified
Olam Global Agri Pte Ltd	Mill, Trade, Export	Singapore	IFC investment client	
Rice Exchange	Software	Singapore		
Riso Gallo	Mill, FMCG	Italy		
Riso Scotti S.p.A.	Mill, FMCG	Italy		
Saman	Mill, Export	Uruguay		New member
Sarwar Foods (Pvt) Ltd	Mill, Export	Pakistan		New member
SunRice	Mill, FMCG	Australia, Vietnam		
Supreme Rice Mills (Private) Limited	Mill	Pakistan		
Veetee Rice Ltd	Mill, FMCG	UK, India		
Westmill Foods Co Ltd	Mill, FMCG	UK		

Note: Data on SRP-verification status was from the GLOBALG.A.P database (accessed May 2024). An updated SRP membership list is available at: https://sustainablerice.org/become-an-srp-member/#member-directory

Annex 3. Interview List

Selected Companies Operating in the Global Rice Supply Chain

Company	Job Title	Name
Herba Bangkok S.L (Ebro Foods S.A.)*	Compliance & Sustainability Director	Diederik Pretorius
Herba Group (Ebro Foods S.A.)*	Sustainability Director	Fatima Laffitte Solis
Loc Troi Group*	Vice Director of Dinh Thanh Agricultural Research Center, Loc Troi Group	Tran Trang
LT Foods*	Advisor, Farm Connect Program	Kevin Sunil Parker
Lui Hing Hop Rice Co Ltd	Director	Benjamin Lu
Olam Agri*	Vice President, Head of Rice Research and Sustainability	Paul Nicholson
Mars Global Food & Nutrition*	Global Sustainable Sourcing Lead	Inge Jacobs
Associated British Foods, PLC*	Sustainability Manager, ABF UK Grocery Group	Anoushka Harris

Note: Asterisk (*) indicates SRP membership

IFC Rice Team

Location	Job Title	Name
Bangladesh	Country Anchor, Upstream and Advisory, Bangladesh, Bhutan, Nepal, Sri Lanka, and Maldives	Harsh Vivek
Cambodia	Agriculture Specialist	Soly Seak
Cambodia	Agribusiness, Trade, and Competitiveness Consultant	Viryak Sem
Nepal	Agribusiness and Capacity Building Specialist	Akira Dhakwa
Pakistan	Agribusiness Specialist	Zaheer Ahmad
Senegal	Senior Operations Officer Previous: Vietnam Agri Business Advisory Program Current: Africa Medical Equipment Facility (AMEF)	Bas Rozemuller
Vietnam	Lead, Smallholder Supply Chains	Alan Johnson

Annex 4. Descriptions of Sustainable Rice Practices

The table below briefly describes some selected sustainable rice practices. It is illustrative and not exhaustive of sustainable rice practices.

Sustainable Rice Practice	Description	Impact
Aerobic rice systems[a,b]	An aerobic rice system is a production system in which rice is grown like other grains such as wheat or maize, under nonpuddled, nonflooded, and nonsaturated soil conditions. Specially developed aerobic rice varieties are used, and the usual establishment method is dry direct seeding. Because it requires less water at the field level than conventional lowland rice, the system is targeted at drier or water-scarce climates. However, soil-borne pests and diseases are known to occur more in aerobic rice than in flooded rice, especially in the tropics.	+ Reduces water consumption + Offers suitable option for water-scarce climates - Decreases yields, when compared to lowland rice
Alternate wetting and drying (AWD)[c]	AWD is a water-management technique that involves periodically flooding and draining the field, instead of keeping it continuously flooded. The number of days between irrigations can vary from one to more than 10 days, depending on the soil type. This helps to control weeds and ensure rice crops have sufficient water while reducing methane emissions from paddy rice systems, as well as the uptake of arsenic by rice plants, which is highly unhealthy for human consumption.	+ Reduces water consumption by up to 30% + Reduces arsenic levels - Requires irrigation systems - Increases risk of weed infestations
Alternative practices to rice straw burning[d,e]	Burning quickly clears massive volumes of rice-paddie stubble that mechanized harvesting leaves behind, but this method of stubble clearance is bad for the environment. Some alternative practices include: • **Repurpose rice straw and residue:** Instead of being burned, rice straw and residue can be harvested and used to make paper, replacement wood products (e.g., medium-density fiberboard, or MDF), or biochar, for supplementing soil. • **Mulch rice straw and residue and retain them in the field:** After harvest, rice-crop residue can be mulched or converted into fertilizer (by applying a microbial bioenzyme solution that accelerates decomposition) and left on the field or incorporated in the soil before seeding the next crop. This process can be mechanized using technology such as the Happy Seeder Machine.	+ Avoids air pollutants and carbon emissions + Avoids soil degradation and/or enriches soil nutrition - May not remove pests, weeds and crop diseases from the last crop cycle as effectively as burning

a. Bouman, Lampayan, and Toung 2007.
b. IRRI n.d.(a).
c. IRRI n.d.(e).
d. Kurnik and Devine 2022.
e. Prasad 2021.

Sustainable Rice Practice	Description	Impact
Direct seeding of rice (DSR)[f]	DSR is a method of growing rice by sowing seeds directly into the field, as opposed to transplanting seedlings from a nursery. Direct-seeded rice, which can be implemented by dry direct seeding or wet direct seeding, is seen to be one of the most efficient, sustainable, and economically viable rice production systems used today. Compared to the conventional puddled transplanted rice (PTR) method prevalent in Asia, DSR delivers faster planting and maturing, conserves scarce resources like water and labor, is more conducive to mechanization, and reduces emissions of greenhouse gases that contribute to climate change. The adoption of direct seeding onto flooded and saturated soils has increased in Asia due to labor shortages in rural areas. Direct seeding, however, requires large quantities of seed, and weed competition in direct-seeded fields is high.	+ Reduces irrigation water by 12-35% + Reduces cultivation time, energy, and cost + Reduces GHG emissions + Matures faster than transplanted crops - Requires more seed - Increases weeds - Increases risk of lodging (when a plant's stem is permanently displaced from its vertical position) - Increases risk of poor or nonuniform crop establishment
Field laser leveling[g]	Level land is essential for good water management as well as for weed control and the efficiency of nitrogen use. Even land means irrigation water reaches every part of the field with minimal waste from run-off or waterlogging. Farmers, especially in Asia, traditionally have relied upon soil puddling, which is tilling rice paddies while flooded, for land levelling. However, soil puddling requires substantial water and time. Land levelling using a machine equipped with a laser-guided drag bucket to create a flat, tabletop-like surface more effectively and quickly than conventional methods.	+ Considerably lowers irrigation time, energy, water required + Increases yield by an average 8% - Requires access to laser-leveling technology, which may be limited in some areas
Mid-season drainage (MSD)[h]	Mid-season drainage involves a single removal of all surface water from the rice crop at mid to late tillering (when the rice plant develops branches, or tillers, from the main stem) for 10—14 days allowing the soil to dry, crack, and reaerate. This aeration of the soil interrupts methane production. Although it also increases nitrous oxide emissions, this is offset by the reduction in methane emissions. The single drain is easier for farmers to manage than multiple drain events (e.g., alternate wetting and drying).	+ Reduces methane emissions by 7-95%, depending on crop context + Conserves water + Facilitates process for farmers - Induces weeds, which can reduce rice yields - May increase plant height, which makes the crop more prone to lodging
System of rice intensification (SRI)[i]	SRI is an agro-ecology methodology for increasing the productivity of irrigated rice. Developed in Madagascar in the 1980s, it is based on the four main cropping principles: 1. Early, quick and healthy plant establishment 2. Reduced plant density 3. Improved soil conditions and fertility through enrichment with organic matter 4. Reduced and controlled water application Based on these principles, farmers adapt practices according to their agroecological and socioeconomic conditions. AWD is the irrigation method used.	+ Increases yield by 20%–50% or more + Reduces required seed amount by up to 90% + Up to 50% water savings - Requires knowledge/skills that may be difficult to access

f. IRRI n.d.
g. Aryal and Jat 2015.
h. UNEP n.d.
i. Cornell University n.d.

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