Annual Report 2024

Africa Rice Center
Centre du riz pour l'Afrique
AfricaRice

CGIAR

AfricaRice Headquarters, Côte d'Ivoire
01 BP 4029, Abidjan, Côte d'Ivoire
Telephone: (225) 27 22 48 09 10
Fax: (225) 27 22 44 26 29
Email: AfricaRice@cgiar.org

AfricaRice M'bé Research Station
01 BP 2551, Bouaké, Côte d'Ivoire
Telephone: (225) 27 22 48 09 20
Fax: (225) 27 31 63 25 78
Email: AfricaRice@cgiar.org

AfricaRice Regional Station for the Sahel, Senegal
BP 96, Saint-Louis, Senegal
Telephone: (221) 33 962 64 41, 33 962 64 93
Fax: (221) 33 962 64 91
Email: AfricaRice-Sahel@cgiar.org

AfricaRice Nigeria Country Office
c/o IITA, PMB 5320, Ibadan, Oyo State, Nigeria
Telephone: (1) 201 6336094 and (234) 8034035281
Fax: (44) 20 87 11 37 86
Email: f.nwilene@cgiar.org

AfricaRice Madagascar Country Office
c/o FOFIFA, BP 1690 Antananarivo, Madagascar
Telephone: (261) 34 14 950 26
Email: g.mujawamariya@cgiar.org

AfricaRice Project Office, Liberia
c/o CARI Station, Suakoko, Bong County, Liberia
Telephone: (231) 880 946 266, 770 750 547
Email: i.akintayo@cgiar.org

AfricaRice Project Office, Uganda
c/o National Crops Resources Research Institute
PO Box 7084, Kampala, Uganda
Telephone: (256) 775 914 074
Email: e.twine@cgiar.org

© Copyright Africa Rice Center (AfricaRice) 2025

AfricaRice encourages fair use of this material. Proper citation is required. The designation used in the presentation of materials in this publication do not imply the expression of any opinion whatsoever by the Africa Rice Center (AfricaRice) concerning the legal status of any country, territory, city or area, or of its authorities, or concerning the delimitation of its frontiers and boundaries.

Citation: Africa Rice Center (AfricaRice). *Africa Rice Center (AfricaRice) Annual Report 2024*. Abidjan, Côte d'Ivoire: 27 pp.

ISBN:
Print 978-92-9113-422-9
PDF 978-92-9113-423-6

Photo credits:
All pictures are by staff members of CGIAR, AfricaRice, and networks and consortia convened by the Center.

Contents

Who we are ii
Message from the Director General iii
Message from the Chairperson of the Board of Trustees iv

1. Transformative rice breeding 1
Scaling up climate-resilient rice in Madagascar: Successful adoption of new high-yield varieties FOFIFA 197 and FOFIFA 198 1
Breeding Task Force leading varietal development and adoption in Africa 3
Impact potential: Next-generation varieties to drive the transformation of upland rice farming, Côte d'Ivoire 3
Capacity strengthening: An enabler of productivity in Africa 4
Hybrid rice: A key to transforming rice production in Sub-Saharan Africa 5
Crucial findings for managing two major rice diseases 6
Yield losses from seven key rice diseases across Africa — Insights from stakeholder surveys 7
AfRice-HEALTH Network: Strengthening rice disease surveillance across the continent 9
Safeguarding Africa's rice heritage: AfricaRice Genebank 10

2. Nutrition enhancement 11
Healthy-Rice for better diet and nutrition 11
Advancing nutritional security through red rice in Madagascar 13
Evidence to support nutrition-oriented policy instruments in Liberia 14

3. Improving rice systems productivity 15
Farmers select integrated salinity management in the Senegal River Valley 15
Scaling impact with RiceAdvice Lite 16
Integrated rice–fish farming in Africa 17
Increasing water productivity and income with alternate wetting and drying 18
Access to and willingness to pay for climate information 18
Suitability of Benin's inland valleys for rice production 19
Multiple-harvest rice: A path to profitable and labor-efficient rice production in West Africa 19

4. Policies and capacitation 20
Reshaping national and regional rice policy 20
Capacitation of Policy Task Force members 21
Can farmer adoption of paid digital extension services create a job opportunity for youth? 22
Capacitating innovation platform actors to include women and young people 22
Policy options to address social shocks: Learning from COVID-19 pandemic impacts on income and food security of rice smallholder producers in five African countries 23
Gender and climate-adapted technologies to inform policy in Mali 23

2024 Finance overview 24
Human resources overview 25
Partnership 26
Abbreviations 27

Who we are

The Africa Rice Center (AfricaRice) is a leading pan-African center of excellence for rice research, development, and capacity-building. Its work contributes to reducing poverty, ensuring food and nutritional security, and improving the livelihoods of farmers and other actors in the rice value chain in Africa. It does this by increasing the productivity and profitability of rice-based agri-food systems, while ensuring the sustainability of natural resources.

AfricaRice's highest governing body is the Council of Ministers. This unique governance gives AfricaRice unparalleled access to the highest levels of decision-making in African governments. AfricaRice has been given the mandate to support the continent in developing the rice sector through research, development, and partnership activities. AfricaRice is a CGIAR Research Center — part of a global research partnership for a food-secure future.

Vision

To sustainably improve food and nutrition security for a healthy and prosperous Africa.

Mission

To deliver rice-based innovations and transformed rice-based agri-food systems that contribute to the transformation of food, land, and water systems in the face of climate change.

Message from the Director General

I am inspired to unveil the AfricaRice Annual Report 2024, which encapsulates a year characterized by resilience, innovation, and collaboration within the rice sector across Africa. Throughout 2024, our united endeavors have furthered Africa's path toward achieving rice self-sufficiency, enhancing livelihoods, and fostering sustainable food systems.

This year, AfricaRice, alongside its partners, made remarkable progress in the realms of research, innovation, and policy advocacy. Our researchers made significant advancements in developing climate-resilient rice varieties capable of enduring drought, high temperatures, and flooding — thus, aiding farmers in adapting to the escalating effects of climate change. Additionally, we broadened our investigations into sustainable intensification techniques, focusing on improving soil health, water efficiency, and carbon management. These initiatives are in direct alignment with the African Union's Agenda 2063 and the Sustainable Development Goals, particularly those aimed at eradicating hunger and promoting climate action.

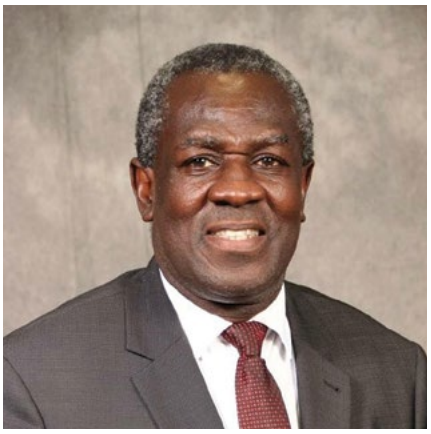
Collaboration has been pivotal to our successes. By partnering with national agricultural research systems, private sector stakeholders, farmer organizations, and development partners, AfricaRice has reinforced its position as a leading center of excellence in rice science and innovation. Our capacity-building programs have reached thousands of farmers, extension agents, and researchers, providing them with the essential knowledge and tools to boost productivity and enhance competitiveness.

We have also made significant strides in the application of digital technologies within rice value chains, enhancing access to data, market insights, and early warning systems. These technological advancements are facilitating a connection between research and practical outcomes, making sure that scientific findings yield real advantages for farmers across Africa.

Looking forward, AfricaRice is dedicated to expanding successful innovations, promoting regional cooperation, and empowering both youth and women within the rice industry. In collaboration with our partners, we will persist in developing a robust, inclusive, and sustainable rice economy for the continent.

Dr Baboucarr Manneh
Director General, AfricaRice

Message from the Chairperson of the Board of Trustees



I am delighted to highlight a year of steady progress, impactful research, and strengthened partnerships in advancing Africa's rice sector. Under the leadership of the Director General and the dedication of AfricaRice's staff and partners, the Center has continued to deliver science-based solutions that respond to the continent's pressing food security challenges.

In 2024, AfricaRice reaffirmed its role as a leading institution for rice research and innovation in Africa. The Board is particularly encouraged by the strides made in developing and disseminating climate-smart rice varieties, expanding digital tools for farmers, and deepening collaboration with national research systems and regional economic communities. These achievements reflect the Center's commitment to excellence, inclusiveness, and sustainability.

The Board also commends a vibrant ordinary session of AfricaRice Council of Ministers held in November 2024 in Madagascar. The 33rd Ordinary Session concluded with optimism for the future of rice farming in Africa and marked the official transfer of the Council's presidency from Madagascar to the Democratic Republic of Congo. This transition symbolizes inter-African solidarity and continuity in governance.

Looking ahead, we remain confident that AfricaRice's strong partnerships, sound governance, and scientific leadership will continue to drive transformation in the years to come.

On behalf of the Board, I extend our sincere appreciation to all partners and stakeholders for their continued trust and collaboration.

Emmanuel Sackey
Chairperson, Board of Trustees

1. Transformative rice breeding

Scaling up climate-resilient rice in Madagascar: Successful adoption of new high-yield varieties FOFIFA 197 and FOFIFA 198

Since rice is the Malagasy people's staple diet, rice production is crucial for the country's food security and economy. To enhance rice productivity, AfricaRice, in collaboration with the National Agricultural Research Institution (FOFIFA), is making significant efforts to develop and introduce improved varieties that are well suited to local conditions and resilient to climate and both biotic and abiotic stresses.

The case of modern varieties FOFIFA 197 and FOFIFA 198 illustrates the drivers of adoption (Fig. 1).

Farmers field day at FOFIFA 197 plot with women farmers at Bas Mangoky irrigation scheme

Figure 1. Illustration of the adoption drivers of FOFIFA 197 and FOFIFA 198 in Madagascar

From field demonstration to regional adoption

The project followed a strategic path to ensure sustainable scale-up, starting with hands-on demonstrations and building local expertise

Introduction
New varieties released in 2023

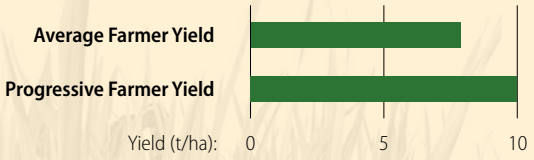
Demonstration
488 farmers established demonstration plots

Capacity-building
64 participants trained in seed production

Adoption
Adopted on thousands of hectares

Yield potential

Under farmers' management practices and optimum management practices



Farmer participation in demonstrations

Women made up 63% of the 488 farmers participating in the initial demonstration plots

Built for resilience: Specialized traits

Beyond high yields, both varieties are blast tolerant
Each is also uniquely adapted to solve specific environmental challenges facing farmers in Madagascar

General resilience	FOFIFA 197	FOFIFA 198
Both varieties are inherently high yielding and blast tolerant	Salinity tolerant, ideal for coastal regions	Resilient to adverse weather, showing cold and flood tolerance

Current scale and sustainable future

Rapid regional adoption

Thousands of hectares are already cultivated in **Atsimo Andrefana** and **Menabe** regions, with demand for seed rapidly increasing

Local seed supply secured

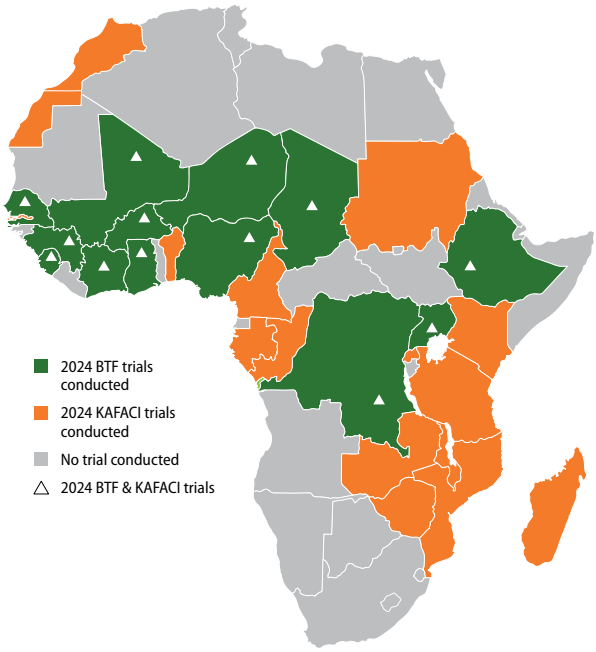
64 participants trained in certified seed production, creating a sustainable local pipeline to meet growing demand

Breeding Task Force leading varietal development and adoption in Africa

The Africa-wide Rice Breeding Task Force (BTF) is a collaborative research effort for rice development across Africa. In 2024:

- 12 countries conducted various field trials for the network (Fig. 2)
- 22 varieties were released in 6 countries: Burkina Faso, Côte d'Ivoire, Ethiopia, Malawi, Nigeria, and Zimbabwe.

Figure 2. Country engagement in AfricaRice breeding activities (2024)



KAFACI, Korea–Africa Food and Agriculture Cooperation Initiative.

Note: While AfricaRice member countries receive financial support for their participation in the BTF, non-AfricaRice member countries participate at their own expense — this is the case for Malawi and Zimbabwe.

Impact potential: Next-generation varieties to drive the transformation of upland rice farming, Côte d'Ivoire

AfricaRice and the National Center for Agronomic Research (CNRA) of Côte d'Ivoire have developed and released five high-yielding upland rice varieties — CRAM 1, CRAM 2, CRAM 3, CRAM 4, and CRAM 6 — to enhance production in rainfed upland systems.

These varieties are early maturing, outyield local varieties, exhibit drought tolerance, and possess resistance to blast disease and consumer-preferred grain quality traits.

CRAM 4 and CRAM 6 are aromatic — a highly desirable trait among consumers in Côte d'Ivoire.

This effort directly supports Côte d'Ivoire's Strategic National Rice Development Plan (SNDR), which targets reduced import dependency through enhanced domestic yields to achieve self-sufficiency.

Distribution of mini seed kit of newly released upland CRAM varieties

Seed production of newly released upland variety CRAM 6 at Man, supported by the Ivoirian Ministry of Agriculture and Rural Development

Demonstration of new upland CRAM varieties, Duekoué

Capacity strengthening: An enabler of productivity in Africa

At AfricaRice, strengthening human capacity is recognized as pivotal for achieving rice self-sufficiency across the continent. The Center invests in designing and delivering tailored training programs, starting with its own staff and extending to partners throughout the region. These initiatives go beyond knowledge and skills-building; they foster innovation, creativity, and practical problem-solving, all of which are essential drivers of productivity along the rice value chain.

"Impactful breeding begins with strong operations, shared services, and data-driven decision-making."

— Dr Vimal Kumar Semwal, Rainfed Rice Breeder and Lead at AfricaRice-Enable Area of Work for CGIAR's Breeding for Tomorrow (B4T)

Breeding operations workshop, AfricaRice M'bé Research Station, Côte d'Ivoire, 11–15 March 2024: in-house training for 20 research assistants and technicians from all AfricaRice breeding stations

West and Central Africa genotyping workshop, IITA Headquarters, Nigeria, 28–30 October 2024: regional training of 25 national agricultural and extension services (NARES) staff from 14 institutes in 9 countries

Hands-on training on breeding data analytics, Sahel Research Station, Senegal, 11–15 March 2024: regional training for 36 participants from 10 countries

Hybrid rice: A key to transforming rice production in Sub-Saharan Africa

Both development actors and policy-makers consider hybrid rice technology to be a key strategy for boosting rice productivity and achieving food security in Sub-Saharan Africa. Farmers and private seed companies in Côte d'Ivoire, Mali, Mauritania, Nigeria, and Senegal (among others) have tested different sets of AfricaRice hybrids.

Around 15 promising hybrids have demonstrated very high yield potential, surpassing popular control varieties by 20–40% in farmers' fields. The aromatic hybrid AR606H has excellent grain quality and a high yield potential of 10–12 t/ha under favorable conditions. A socioeconomic study in Benin and Côte d'Ivoire showed that farmers preferred hybrid rice varieties with a low seed rate of 15–20 kg/ha and were willing to pay US$ 3.5/kg for hybrid rice seeds.

Hybrid seed production at AfricaRice Sahel Station, Saint-Louis, Senegal

Crucial findings for managing two major rice diseases

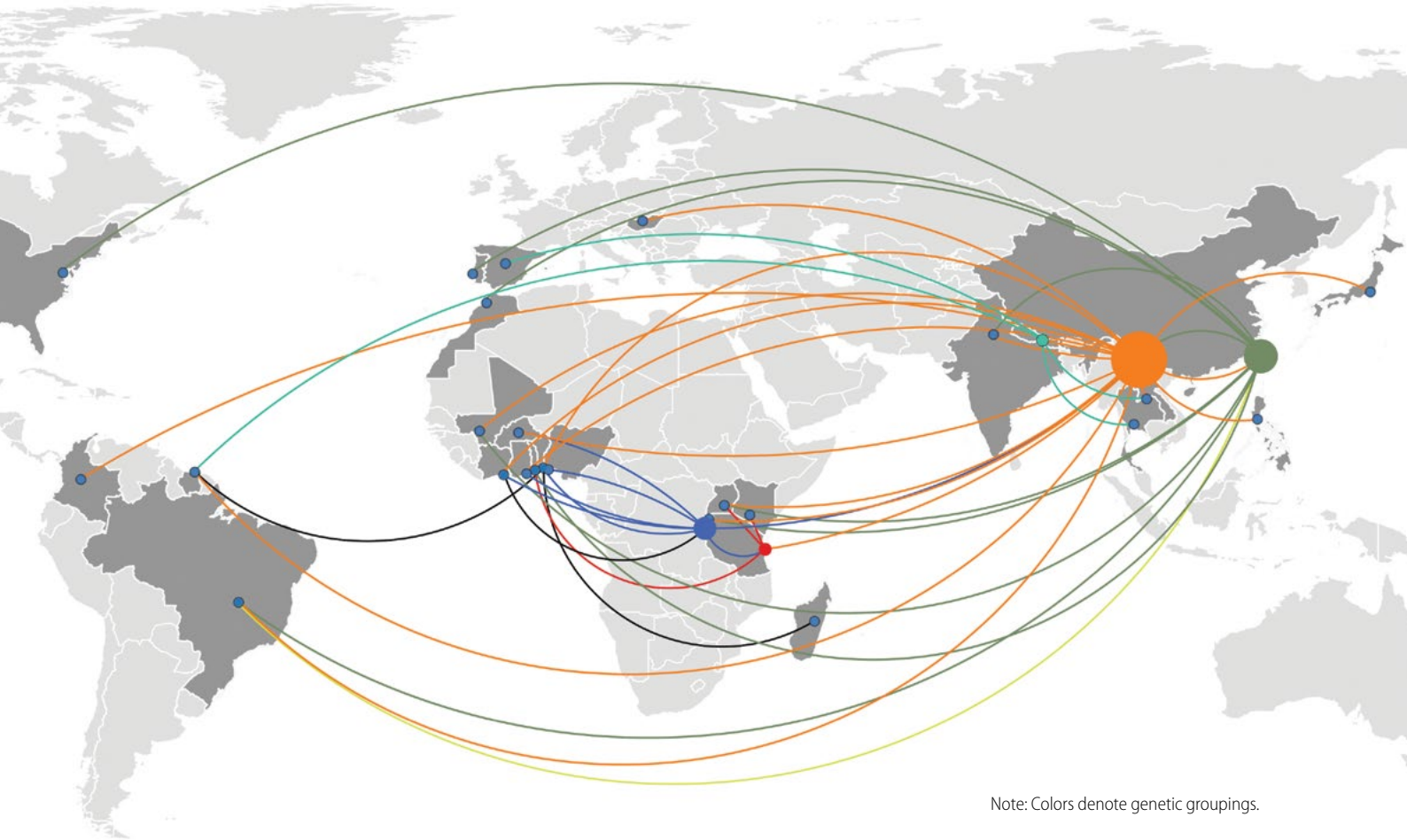
Geographic origins and dispersal of rice blast

The introduction of rice blast (*Pyricularia oryzae*) into Sub-Saharan Africa has been traced through genomic and historical analysis. The study reveals global dispersal routes and recent divergence among regional pathogen populations (Fig. 3).[1]

Origin and dispersal of Rice yellow mottle virus

The origin of *Rice yellow mottle virus* (RYMV) in East Africa has been traced, along with its spread to West Africa, Ethiopia, and Madagascar (Fig. 4). This study explored the role of human activities, alongside ecological factors, in driving the spread of crop pathogens across regions. Genetic analyses revealed ancestral connections and intertwined emergence patterns across these countries, providing valuable insights for designing targeted disease management strategies.[2]

Figure 3. Rice blast dispersal routes from Asia to Africa (CC BY 4.0 International Deed)



Note: Colors denote genetic groupings.

1 Onaga G, Suktrakul W, Wanjiku M, Quibod IL, Entfellner JBD, Bigirimana J, Habarugira G, Murori R, Asea G, Tella HE, Amagnide GAGY, Zenna N, Jantasuriyarat C, Ismail AM and Oliva R. 2025. Genomic profiles of *Pyricularia oryzae* in Sub-Saharan Africa: Exploring population differences and their evolutionary implications in the region. *Frontiers in Plant Science*, 16: art. 1650532. https://doi.org/10.3389/fpls.2025.1650532

2 Ndikumana I, Onaga G, Pinel-Galzi A, Rocu P, Hubert J, Wéré HK, et al. 2025. Grains, trade and war in the multimodal transmission of Rice yellow mottle virus: An historical and phylogeographical retrospective. *PLOS Pathogens*, 21(6): art. e1013168. https://doi.org/10.1371/journal.ppat.1013168

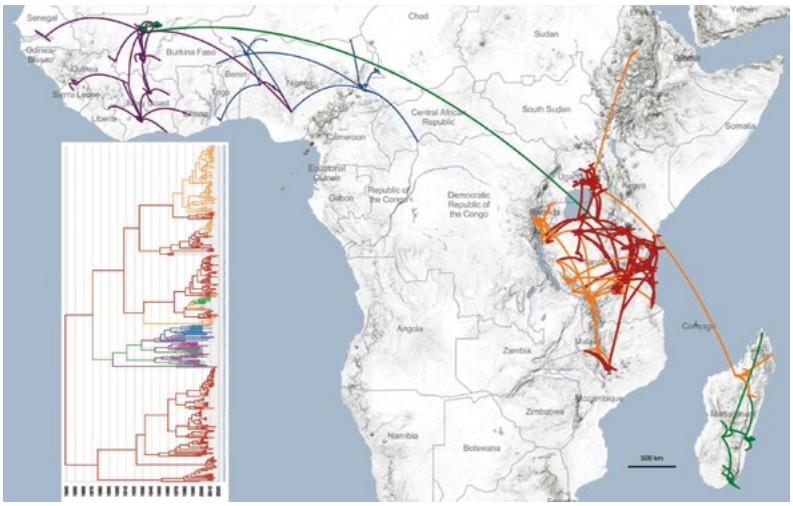
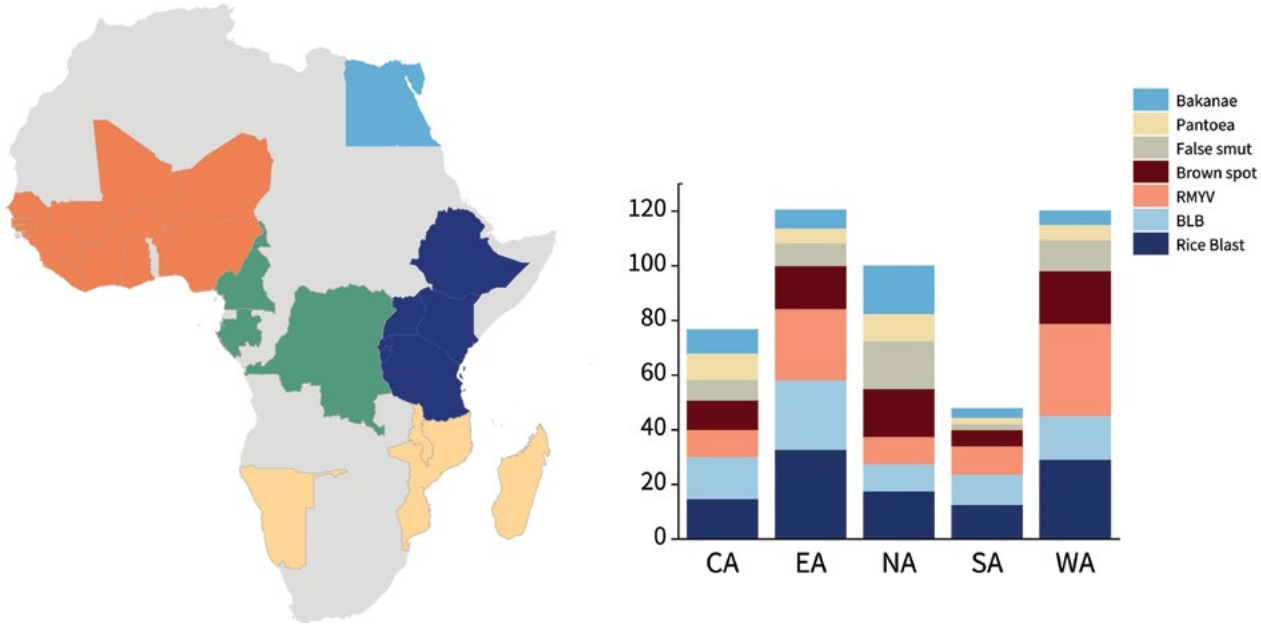


Figure 4. RYMV dispersal routes from East Africa to West Africa, Ethiopia, and Madagascar (CC BY 4.0 International Deed)

Yield losses from seven key rice diseases across Africa — Insights from stakeholder surveys

A survey conducted among 123 respondents in 27 countries, predominantly led by national agricultural research systems (NARS), highlighted the yield losses caused by seven rice diseases in Africa (Fig. 5). These losses differ significantly across regions and countries, reflecting diverse disease pressures and management challenges. Country-level yield losses are summarized in Table 1.

Figure 5. Countries surveyed and cumulative rice yield loss estimates per region



BLB, bacterial leaf blight; CA, Central Africa; EA, East Africa; NA, North Africa; RYMV, Rice yellow mottle virus; SA, Southern Africa; WA, West Africa.

Table 1. Rice yield losses caused by seven rice diseases across 27 countries

Country	Estimated yield loss per disease (%)						
	Rice blast	BLB	RMYV	Brown spot	False smut	Pantoea	Bakanae
Benin	10	–	–	–	–	–	–
Burkina Faso	75	38	38	75	18	18	18
Burundi	38	–	38	10	10	–	–
Cameroon	13	13	13	18	14	18	18
Côte d'Ivoire	51	22	48	46	20	10	12
DR Congo	18	21	16	16	14	15	11
Egypt	18	10	10	18	18	10	18
Ethiopia	44	22	10	19	10	10	10
Gabon	18	38	–	–	–	75	75
Gambia	18	18	31	18	18	18	18
Ghana	48	35	53	34	30	18	28
Guinea	–	–	–	–	–	–	–
Guinea Bissau	–	–	–	–	–	–	–
Kenya	41	40	37	16	13	10	13
Liberia	75	18	10	10	10	10	10
Madagascar	19	15	38	18	10	10	10
Malawi	38	18	38	18	10	10	10
Mali	–	28	75	–	–	38	–
Mozambique	–	38	18	18	–	–	–
Namibia	–	–	–	–	–	–	–
Niger	38	28	38	24	24	28	24
Nigeria	40	24	37	24	35	18	18
Rwanda	41	10	37	10	18	10	28
Senegal	33	30	37	18	16	16	16
Sierra Leone	10	10	24	10	10	10	10
Tanzania	22	44	24	18	10	24	10
Uganda	40	25	36	32	13	14	12

Yield loss data were collected and reviewed from the 27 countries. Summary statistics identified outliers, and findings were cross-checked against historical and published data for plausibility.

BLB, bacterial leaf blight; DR, Democratic Republic of; RYMV, Rice yellow mottle virus.

Dash (–) indicates missing or unreliable data.

AfRice-HEALTH Network: Strengthening rice disease surveillance across the continent

In 2024, AfricaRice and its partners launched the AfRice-HEALTH Network, marking a major milestone in regional rice crop health. This pioneering initiative was designed to transform how rice diseases are monitored, diagnosed, and managed throughout the continent.

The member countries actively participating in AfRice-HEALTH reflect a broad regional commitment to safeguarding rice production and ensuring food security across the continent (Fig. 6).

Members of AfRice-HEALTH with the AfricaRice Director General during the workshop in Abidjan, 29 March 2024

Figure 6. Member countries of the AfRice-HEALTH Network

Safeguarding Africa's rice heritage: AfricaRice Genebank

The AfricaRice Genebank operates under solid and efficient systems, enabling the implementation of a range of activities. These include the collection, characterization, regeneration, processing, and conservation of seeds along with their associated data. All activities are conducted in accordance with high standards of quality management to ensure the long-term viability and accessibility of rice genetic resources.

As of 2024, the genebank maintains approximately 20,000 accessions in its collection, an impressive 94% of which are readily available to researchers, scientists, breeders, students, and partners in NARS for breeding and other research uses. The genebank holds the world's largest collection of *Oryza glaberrima*, the African cultivated rice species, with more than 4,000 accessions; *O. glaberrima* is crucial for developing rice varieties adapted to Africa's diverse climates and local needs.

In 2022–2024, some 8,277 rice samples were distributed to various countries — more than 90% (7,449 rice samples) to African countries. The genebank has developed core and mini-core sets, which represent most of the genetic variation of the total collection, of both cultivated rice species. Core and mini-core sets make accessing the genetic diversity held in the genebank easier for genebank workers and breeders alike.

The genebank continues to acquire new rice genetic resources from various sources to enrich the diversity of materials available. Currently, the genebank has the capacity to hold around 60,000 accessions.

Services provided to users (especially NARS partners) include multiplying seed from users and securely storing their plant genetic resources under a 'Black Box' system, whereby AfricaRice merely stores that seeds while the owner-partners hold the data (including passport data). This commitment helps ensure the long-term conservation of essential rice genetic resources of the continent and beyond.

A genebank worker takes seed packets to the shelves in the new AfricaRice genebank in M'bé

2. Nutrition enhancement

Healthy-Rice for better diet and nutrition

What it is

Healthy-Rice is a next-generation, climate-smart, and health-sensitive staple that addresses the triple burden of malnutrition — undernutrition, hidden hunger, and overnutrition — in Africa. It will:

Boost calorie availability: Healthy-Rice has high and stable yields in the face of climate change in Africa and grain quality preferred by local consumers.

Deliver key micronutrients: It is enriched with micronutrients including iron, zinc, folate, calcium, vitamins A and B12 through biofortification, agro-fortification, and postharvest fortification (including parboiling).

Lower post-meal glucose spikes: It has a reduced Glycemic Index (GI) — this can make rice safer and healthier for diabetics, obese individuals, and health-conscious consumers.

Healthy-Rice should have these three features together. One example is parboiled Orylux 6 in Côte d'Ivoire.

Delivery pathways

1. **Seed and grain systems:** Releasing and distributing biofortified low-GI rice varieties, together with agronomic fortification, through national seed systems and private seed enterprises.
2. **Fortification infrastructure:** Equipping women-led parboiling enterprises to enhance mineral retention while producing low-GI rice. Promoting blending of fortified rice kernels with preferred rice brands.
3. **Institutional demand:** Integrating Healthy-Rice into school meals, maternal–child health programs, and public food procurement systems to drive demand at scale.
4. **Public–private partnerships (PPPs):** Leverage agro-industrial players and digital platforms to scale processing, distribution, and awareness creation of Healthy-Rice.
5. **Behavior-change campaigns:** Increase consumer demand through education, branding, and labeling — focused on Healthy-Rice's low-GI and nutritional benefits.

Youths at the Opportunity Industrialization Center, Côte d'Ivoire receive enhanced capacity to produce and market Healthy-Rice

Scaling underway — example of parboiling systems

- 155 GEM (Grain quality enhancer, Energy-efficient and durable Material) parboiling groups in 10 countries have been supported with equipment and training now supply healthy rice to over 2 million consumers each month.
  - Benin (8), Cameroon (2), Côte d'Ivoire (22), Guinea-Bissau (1), Ghana (1), Mali (5), Madagascar (5), Niger (10), Nigeria (100), Senegal (1).

Key benefits

- Increased production efficiency
- Improved nutritional quality of rice
- Reduced energy costs.

- In addition, GEM parboiling lowers CO_2-equivalent emissions linked to rice parboiling by 60%.

Advancing nutritional security through red rice in Madagascar

In Madagascar's central highlands and regions such as Analamanga, Itasy, and Vakinankaratra, red rice is more than just a meal; it is a tradition passed down through generations. Traditionally enjoyed as a rice soup for breakfast and dinner, it is often paired with greens (*vary amin'ny anana*) or prepared as *mokary*, *koba*, or *vary zaza* for babies, also serving as a nutritious meal for breastfeeding mothers. Red rice holds a special place in family life and culture.

The cultural significance of red rice in Madagascar makes it truly unique. Reviving these varieties honors Malagasy heritage while supporting farming communities in the highlands.

The new red rice varieties promoted by AfricaRice and its partners mature earlier than the traditional varieties, such as Maromila red rice, which we use as a control in our studies. This helps farmers harvest sooner and enhances yields. They are also resistant to neck blast disease that can cause catastrophic losses to susceptible varieties through panicle sterility.

3 regions reached
Analamanga, Itasy, and Vakinankaratra received targeted seed dissemination

3,000+
farmers reached with 41 demonstration plots
Improved red rice seeds distributed: FOFIFA 194 (M'rile), FOFIFA 195 (Rosie), FOFIFA 196 (Vaniala)

42 farmers trained
for certified seed production in the highlands and more than 15 tonnes of certified seed produced

77%
of seed recipients were **women**

Nutrition benefits and appreciation

Heathy-Rice is rich in the antioxidant anthocyanin. It is also rich in iron, zinc, and magnesium (Table 3). All three micronutrients support heart health, strengthen the immune system, support child development, and are good for people with diabetes. Magnesium and zinc also have a role in reducing inflammation.

Table 2. Sensory evaluation of red rice varieties (FOFIFA 194, 195, and 196)

Variety	Taste	Texture	Aroma	Appearance
FOFIFA 194	★★★★☆	★★★★☆	★★★★☆	★★★★☆
FOFIFA 195	★★★☆☆	★★★☆☆	★★☆☆☆	★★★☆☆
FOFIFA 196	★★★★☆	★★★★☆	★★★☆☆	★★★★★

Table 3. Nutrient contents of new red rice varieties, Madagascar

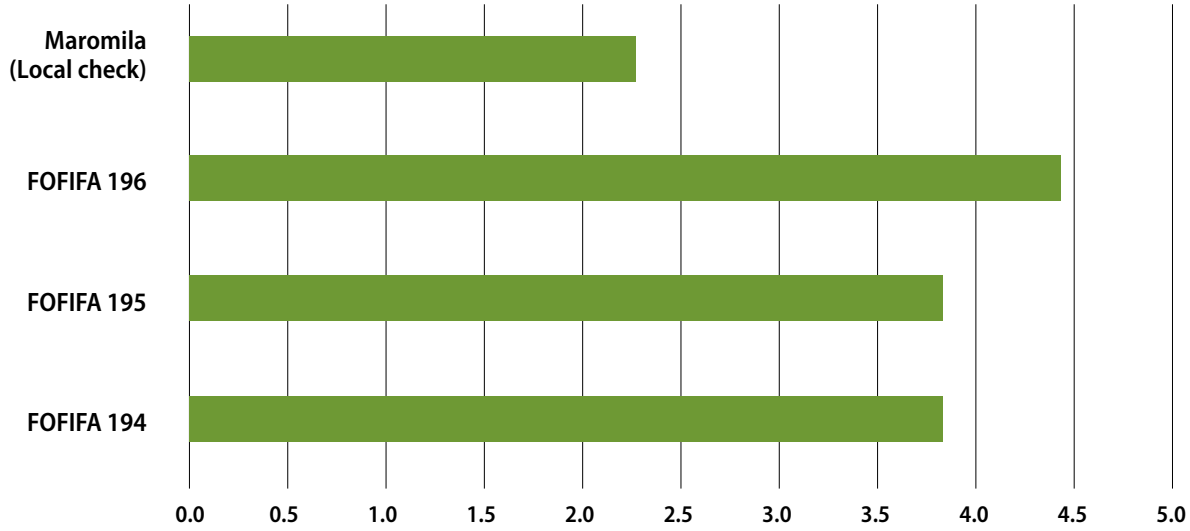
Variety	Mg (mg/kg)	Mn (mg/kg)	Fe (mg/kg)	Zn (mg/kg)
FOFIFA 194	<LOD*	26.50	22.00	21.50
FOFIFA 195	957.00	36.00	23.00	24.00
FOFIFA 196	<LOD*	28.00	16.50	19.50
FOFIFA 160 (local check)	1543.00	29.50	16.50	17.50
Maromila (local check)	<LOD*	21.50	14.00	24.00

* Below limit of determination.

Yield potential

Farmers achieve average yields of 2.7 t/ha with local varieties and at least double that with the new varieties (Fig. 7).

Figure 7. Yield of new red rice varieties (t/ha), farmers' fields, Vakinakartara, Madagascar



Evidence to support nutrition-oriented policy instruments in Liberia

The seed system in Liberia is mostly informal, characterized by community-based seed enterprises and use of seed from the previous harvest.

About 66% of farmers express a need for high-yielding varieties and 92% are willing to grow biofortified rice varieties.

Consumers like rice that is sticky, slow to digest, and that swells when cooked. Moreover, 91% of them say they would buy a biofortified product if one was available and affordable to them, and they are willing to pay an average of US$ 0.83 per kg for biofortified milled rice.

Promotion of market-based policy instruments is required to scale biofortified rice products in Libera.

CERTIFICATE OF RECOGNITION

This certificate is proudly presented to

Edgar Twine, Aminou Arouna, Rachidi Aboudou, Sali Ndindeng

In recognition of their hard work and for winning the **Best Poster Award** for their poster, titled **Consumer preferences for rice in Liberia: Some preliminary results**, presented during the **Future Market Segments session** at the CGIAR Market Intelligence WP1 and WP2 Workshop in Harare, Zimbabwe, held from October 15-18.

Melanie Connor, IRRI — Dean Muungani, IITA — Moti Jaleta, CIMMYT

A poster presenting the results of the survey on evidence to support nutrition-oriented policy instruments in Liberia was awarded 'Best poster' at CGIAR Market Intelligence workshop in October 2024

Enumerators and NARS partners during training on consumer data collection at Suakoko, Liberia, 18–19 July 2024

3. Improving rice systems productivity

Farmers select integrated salinity management in the Senegal River Valley

Soil salinity poses a severe constraint to traditional rice varieties, leading to poor crop development and yield reductions of 40–90% depending on cultivar susceptibility. The Senegal River Valley is a hotbed for salinity, especially the estuary and parts of the river where the crop is irrigated with salty water from shallow aquifers.

A participatory approach was used in one of the first field-level assessments of newly developed salt-tolerant rice varieties incorporating the Saltol resistance gene (ISRIZ 10 and Sahel 108-Saltol). This approach directly engaged farmers in the evaluation and selection of integrated salinity management options. The research adds new insight into how these varieties perform under real salinity-stress conditions when combined with relevant management practices.

In 85% of the on-farm trials, farmers adopted the salt-tolerant rice varieties, confirming widespread farmer interest in the new varieties. The most frequently selected fertilizer combinations were:

- NPK (nitrogen–phosphorus–potassium) alone (43% of fields)
- NPK + gypsum (calcium sulfate) + zinc (28%)
- NPK + gypsum (25%)
- NPK + zinc (4%).

Salt-affected soil

Poor crop development in salt-affected soil

Agronomic management: Salt-tolerant rice varieties + good nutrient management (NPK + gypsum + zinc)

Overall, nutrient management alone increased yield by 0.9 t/ha (24%), while integrated salinity management (new varieties *and* new nutrient management) led to a 1.2 t/ha (26%) increase. These interventions also resulted in notable profitability gains: €258/ha for nutrient management and €317/ha for integrated salinity management. In short, combining improved varieties with appropriate agronomic practices enhances both productivity and economic return under salt-affected conditions.

Scaling impact with RiceAdvice Lite

Android-based app for site-specific rice crop management RiceAdvice has been disseminated in several countries and shown positive impacts on yield and profitability. However, it typically takes around 23 minutes for a user to enter the required information (site, inputs, targeted yield, and other factors).

Consequently, a pared-down version called 'RiceAdvice Lite' that typically requires just 3 minutes to enter the information was developed which can return similar outputs. Thus, easier scaling is expected with RiceAdvice Lite than RiceAdvice.

Validation trials in Burkina Faso, Mali, and Nigeria saw yield increases of 0.4–1.1 t/ha (17–27%) and net profit increases of US$ 104–256/ha (25–67%). With scaling started in Nigeria, RiceAdvice Lite has been used by 68,000 farmers across the three countries thus far.

Future prospects

RiceAdvice and RiceAdvice Lite can be used off-line on smartphones. Once reconnected to the internet, all data of sites, inputs, and outputs are transferred to the server. AfricaRice has collected a vast amount of data from many sites in a number of countries. The accumulated data will quickly increase with further scaling of RiceAdvice Lite.

Such data could be used to train AI models such as chatbots — the applicability and capability of an AI model depend on the quality and quantity of data used for training. The trained chatbot can then immediately be used as a supplemental tool for RiceAdvice, which could improve the effectiveness of 'Advices' returned from RiceAdvice and RiceAdvice Lite.

The chatbot will be incorporated into the two RiceAdvice apps. And the new tool, 'AI-assisted RiceAdvice', will be able to produce more effective advice with less input information.

Integrated rice–fish farming in Africa

In some contexts, monoculture rice systems experience low productivity and consequently limited income for farmers. Integrated rice–fish farming is a synergistic solution for improved income, ecosystem health, and nutrition security.

Both fish and rice are important staples in Africa, and rice farmers have shown great interest in rice–fish farming.

The rice paddy is suitable habitat for fish farming, both during crop growth and (assuming the fields can be left flooded) the off-season. The growing crop provides a protective habitat for the fish, and the fish excrete organic fertilizer to the benefit of the rice.

The rice–fish system was promoted in farmers' fields in Côte d'Ivoire, Ghana, Mali, and Nigeria, and its use led to measurable impacts.

Rearing fish in rice paddies increased their growth by 6%. Rice yield in integrated rice–fish systems was similar to that with the recommended level of fertilizer application (5.5 t/ha), but over three times that of the yield without fertilizer application (1.6 t/ha). Rice–fish farming also leads to healthy soils with fewer weeds, and lower incidence of malaria (the fish eat many mosquito larvae). The farmers using the integrated rice–fish system had US$ 1,500/ha greater net benefits than farmers growing rice alone.

Thus, integrated rice–fish farming offers economic and ecological co-benefits and can contribute to food and nutrition security.

Rice–fish paddy in Mali

Tilapia harvested from an integrated rice–fish system in Mali

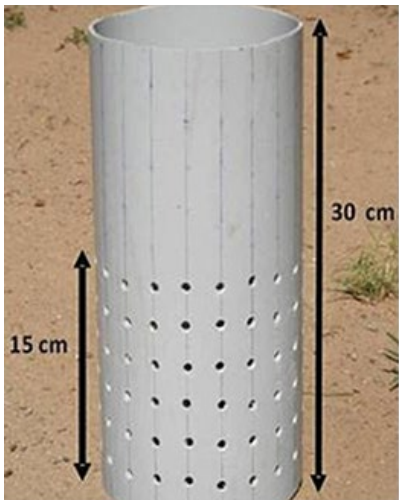
Increasing water productivity and income with alternate wetting and drying

An increasing human population that requires food, consequent expansion of farming, and the added complexity of changing global and regional climate continue to turn water into an increasingly scarce commodity that needs to be managed well to minimize further depletion. This growing water scarcity threatens the sustainability of irrigated rice.

Alternate wetting and drying (AWD) is a water-saving technology with greenhouse gas (GHG) emission mitigation co-benefits. It requires monitoring of the water level in the field, so that fields are irrigated as soon as the water level falls to 15 cm below the soil surface.

AWD reduced water use by 30%, and increased rice yield by 6%, water productivity by 29%, and profit from rice farming by 5% on farmers' fields in Burkina Faso and Côte d'Ivoire, while there was no difference in the production costs between farmers' practices and AWD. In Côte d'Ivoire, where GHG emissions were measured, AWD reduced GHG emissions by 47%.

Thus, AWD is a scalable, climate-smart strategy for transforming rice irrigation.



Simple field water tube for groundwater monitoring

Access to and willingness to pay for climate information

Gender inequality in access to climate information systems (CIS) hinders wide-scale adoption of inclusive and effective climate-smart agriculture, especially among women rice farmers.

It is therefore necessary to understand the gender-specific predictors of access to and willingness to pay for CIS.

Farmers use CIS to guide crop choices and planting. Research conducted in Mali determined that women's willingness to pay for the service was influenced by social groups, and men's by access to training.

These insights will enable us to design gender-responsive CIS to boost climate-smart agriculture and farmer resilience in the face of climate change.

Accessing climate information via mobile phone in Mali

Suitability of Benin's inland valleys for rice production

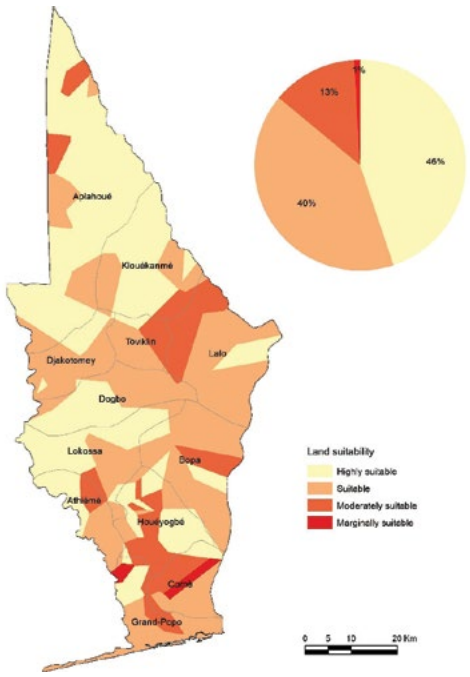
Inland valleys are important for agriculture, but their suitability for rice farming differs and is not well understood across landscapes.

Determining the suitability of inland valleys for rice cultivation is essential to guide investments toward areas with the highest production potential while reducing risks linked to poor soil, water, or landscape degradation.

Two modeling approaches — Geographically Weighted Regression (GWR) and Ordinary Least Squares (OLS) — were used to assess inland valley suitability for rice. GWR outperformed OLS by capturing spatial variability in key biophysical and socioeconomic factors, enabling more accurate local predictions and identifying 31–46% of inland valley areas in Benin as suitable for rice.[3]

Such geographically weighed regression can guide investment in inland valley development to increase rice production.

Figure 8. Map for suitable inland valley rice development in Mono and Couffo departements in Benin (© Djagba et al., 2024)



Multiple-harvest rice: A path to profitable and labor-efficient rice production in West Africa

Rapid population growth, labor scarcity, and soil nutrient depletion threaten food security and sustainable rice production across Africa.

Ratoon rice cultivation was evaluated on AfricaRice research stations in Côte d'Ivoire and Senegal, and the results showed that the rice–ratoon–ratoon system offers a low-labor and cost-effective alternative to traditional double rice cropping (transplanting rice twice a year [rice–rice]). A ratoon is the regrowth of a 'new' rice plant from the rootstock left after harvesting.

This novel rice system achieved an annual yield of 22.1–28.0 t/ha, which is similar to traditional double rice cropping, but with 4–20% increased labor productivity, and 7–12% increased profit.

Rice–ratoon–ratoon shows promise for enhancing both profitability and labor productivity. One drawback to the system is that each ratoon yields less rice than the main crop or ratoon before it. We are seeking to gain an understanding of this yield decline in the ratooning seasons with a view to mitigating it in the future.

Ratoon rice in Côte d'Ivoire

3 Djagba JF, Dossou-Yovo ER, Sintondji LO, Vissin EW and Zwart SJ. 2024. Assessing the spatial distribution patterns of suitable inland valleys for rice development: A case study of two contrasting regions in Benin. *Modeling Earth Systems and Environment*, 10: 5009–5025. https://doi.org/10.1007/s40808-024-02047-7

4. Policies and capacitation

Reshaping national and regional rice policy

It is essential that recommendations of policy options be based on evidence.

AfricaRice is supporting the development and implementation of various policy instruments in agriculture in general and the rice sector in particular in various member countries and at regional level.

Some of our recent achievements:

- Assessment of nutrition-related policy gaps in eight countries (Benin, Cameroon, Côte d'Ivoire, Ghana, Kenya, Liberia, Nigeria, and Uganda) and identification of best practices policy to share with other countries for peer-learning.
- Test of three youth business models in Nigeria to support youth employment policy.
- AfricaRice is a member of the task force developing the first Regional Rice Development Strategy for Central Africa under the coordination of the Economic Community of Central African States (ECCAS).
- AfricaRice is supporting member countries in the implementation of their second-generation national rice development strategies (NRDSs) through policy and intervention development, analysis and evaluation, and policy brief development.
- In partnership with the National Agricultural Research Organisation (NARO) and Japan International Cooperation Agency (JICA) in Uganda, AfricaRice is represented in the group working on the development of sustainable rice production guidelines for Uganda.
- AfricaRice is also contributing to the analysis of the CGIAR centers' involvement in the new Comprehensive Africa Agriculture Development Programme (CAADP) Kampala declaration.
- Quantitative and qualitative evaluation of existing seed policy in the Economic Community of West African States and West African Economic and Monetary Union (ECOWAS/UEMOA) region within the 'Creating employment opportunities for young people in West Africa's rice value chain' (RIZAO) project.

- Participation in the panel discussion on rice policy during the launch of the ECOWAS Rice Observatory (ERO), 21–22 May 2024.
- Supporting the development of the second Continental Investment Plan for Achieving Rice Self-Sufficiency in Africa (CiPRISSA).

Dr Aminou Arouna, AfricaRice Program Leader for Policy, Innovation System and Impact Assessment, addressing audience in the panel session on evidence-based policy to achieve rice self-sufficiency during the launch workshop of ERO, 21–22 May 2024

Capacitation of Policy Task Force members

Strengthening the capacity of youth and value-chain actors in policy design and evaluation, entrepreneurship, business development, and management is crucial to developing the value chain and to increasing employment.

Via in-country courses, AfricaRice trained NARS partners on new tools for policy design, evaluation, and impact assessment. Participants were also trained on entrepreneurship, business development, and management.

So far, a total of 126 participants have been trained in courses in Benin, Côte d'Ivoire, Ghana, Nigeria, and Rwanda. Among these were 60 women and 20 youth.

Capacity-strengthening of youth and value-chain actors in policy design and evaluation, entrepreneurship, business development, and management in Goma (Democratic Republic of Congo), 17–26 August 2024

Training of NARS partners on new tools for policy design, evaluation, and impact assessment, Cotonou, 19–25 September, 2024

Can farmer adoption of paid digital extension services create a job opportunity for youth?

How can the adoption of digital tools be increased while creating a job opportunity for youth?

We experimentally tested 1560 rice farmers' adoption of paid digital extension services in Jigawa and Kano states, Nigeria, using three business models with private milling companies. We then linked this into youth employment policy design.

Paying for digital extension services means that farmers do not have to own a smartphone or tablet, do not need to know how to use the app(s), and even do not need to be tech-savvy.

We investigated how farmers perceive the paid extension approach and the usefulness of the services proposed. Depending on the service, there are notable differences in the impact of "perceived usefulness" and "perceived ease of use" on "attitude," "adoption," and "actual use" on farmers' decisions. However, we found that a solid and favorable perception exists of farmers using paid digital extension services. Furthermore, our evidence suggests that price options and payment methods positively influence farmers' decisions to accept the assigned extension service.

Farmers' positive attitudes toward paid digital extension services opens job opportunities for youth in Africa, who are the ideal candidates for digital extension providers.

Capacitating innovation platform actors to include women and young people

Institutional innovations including Innovation Platforms (IPs) are tools for local development through inclusive processes in agricultural value chains. However, youth and women have not been well represented in IPs to date.

Our aim is therefore to increase IPs' impact by improving the social and economic inclusion of women and young people in them.

Back-stopping and capacity-building to strengthen IPs with the inclusion of women and young people were provided as a priority intervention.

Six gender-based and youth agricultural IPs were strengthened in five countries — Côte d'Ivoire, the Democratic Republic of Congo, Ghana, Nigeria, and Rwanda.

In these IPs, 2257 youth and 2943 women have access to good agricultural practices and had their capacities developed on rice farming systems, agricultural entrepreneurship, market access, and general skills.

The techniques honed in strengthening these gender-based and youth IPs will be extended to other IPs that have much broader representation, giving the women and youth stakeholders in these value chains an equal voice in innovation.

Policy options to address social shocks: Learning from COVID-19 pandemic impacts on income and food security of rice smallholder producers in five African countries

The whole world experienced unprecedented shocks at various levels during the coronavirus disease (COVID-19) pandemic. As COVID-19 is predicted by many to be the first of many widescale tests of human resilience, countries need to prepare for shocks such as disease outbreaks and climate crises. Analysis of the impact of COVID-19 provides policy evidence to prepare smallholder rice producers for the effects of future pandemics.

Data were collected from 2705 smallholder rice producers in Côte d'Ivoire, Madagascar, Senegal, Sierra Leone, and Togo.

Results:

- 81% of respondents perceived that their income had decreased due to the COVID-19 pandemic, by an average of about US$ 240 per month.
- Access to production inputs such as seeds, fertilizers, and herbicides has become more difficult and expensive.
- 45% of the rice farmers reported difficulty in accessing agricultural extension services.

Proposed policy options are to support smallholder producers against the effects of future pandemics: income-enhancing actions, such as increasing access to credit and subsidies for agricultural inputs, should be prioritized.

Gender and climate-adapted technologies to inform policy in Mali

Farmers' awareness of the existence of climate-smart rice varieties falls short of what is required to generate widescale adoption. This is then compounded with difficulties in accessing good-quality seeds.

To create awareness and address the access difficulties, AfricaRice tested an incentive-based policy instrument to scale climate-smart varieties with rice producer groups in Mali.

Achievements:

- Eight groups of producers made up of women and youth were incentivized to adopt climate-smart varieties through the provision of quality seed.
- AfricaRice contributed the policy of increasing resilience of farmers at community level through access to quality rice seeds of climate-smart varieties. Adoption of these varieties resulted in higher yields, resilience to climatic variability, lower fertilizer use, and profit for seed producers. Seed producers in Sirama used their profits to buy fertilizer and offer credit to members and other women farmers in the village, while those in Blendio used theirs to buy small ruminants.

Winnowing climate-smart rice after harvest in the village of Sirama (Kolikoro region), Mali

2024 Finance overview

AfricaRice's financial status is still steady and progressively improving. Between 2023 and 2024, the Center's overall operational revenues rose from US$ 15.187 million to US$ 18.218 million. Meanwhile, operating expenses went up from US$ 14.865 million in 2023 to US$ 17.927 million in 2024. As a result, AfricaRice had an operational surplus of $0.291 million in 2024 as opposed to $0.322 million in 2023.

Other indicators of financial health

The Center's short-term solvency (liquidity) indicator level dropped to 145 days from 160 days in 2023, while the long-term financial stability ratio fell to 107 days from 121 days in 2023. AfricaRice's audited indirect cost rate fell to 12.8% this year, from 16.1% in 2023. And the current ratio fell from 1.49 in 2023 to 1.23 in 2024, but still within the CGIAR recommended range.

The funding sources

Funding source	2024 (US$ thousands)
Initiatives	6,616
Restricted funds (W3)	3,182
Bilateral	8,192
Member states	140
Other	88
Total	18,218

Categories of expenses

Category of expenses	2024 (US$ thousands)
Research expenses	14,682
CGIAR Collaboration expenses	–
Non-CGIAR Collaboration expenses	1,204
General and administrative expenses	2,041
Total expenses and losses	17,927

Human resources overview

AfricaRice continues to cultivate a skilled, motivated, and diverse workforce. In 2024, the Center concentrated on enhancing employee and partner capabilities via specialized training, leadership growth, and inclusive policies. Our commitment to continued improvement of staff well-being and engagement is fundamental to our operations. Through strategic recruitment, we ensured that the talent acquired aligned with the Center's priorities.

262
total staff

193
men

69
women

26
hosted staff

2,793
people trained

1,269
men

1,524
women

Partnership

Collaborative alliances are key to translating research findings into practical benefits and real-world impact.

At AfricaRice, this commitment to partnership is woven into everything we do. Our work thrives through deep collaboration with governments and local authorities, national agricultural research systems, regional and continental institutions, the private sector, development partners, farmer organizations, and rural communities. Together, we form a vibrant ecosystem that drives innovation from farms to consumers.

Through these shared efforts, AfricaRice contributes decisively to strengthening food and nutrition security and advancing food sovereignty across the continent.

Our partners include but are not limited to:

Abbreviations

AfricaRice	Africa Rice Center
art.	article
AWD	alternate wetting and drying
B4T	Breeding for Tomorrow (CGIAR)
BTF	Africa-wide Rice Breeding Task Force
CAADP	Comprehensive Africa Agriculture Development Programme
CC BY 4.0	Creative Commons Attribution license 4.0
CiPRISSA	Continental Investment Plan for Achieving Rice Self-Sufficiency in Africa
CIS	climate information systems
CNRA	National Center for Agronomic Research (Côte d'Ivoire)
CO_2	carbon dioxide
COVID-19	Coronavirus disease
ECCAS	Economic Community of Central African States
ECOWAS	Economic Community of West African States
ERO	ECOWAS Rice Observatory
Fig.	Figure
FOFIFA	National Agricultural Research Institution (Madagascar)
GEM	Grain quality enhancer, Energy-efficient and durable Material (rice parboiling technology)
GHG	greenhouse gas
GI	Glycemic Index
GWR	Geographically Weighted Regression
ha	hectares
IITA	International Institute of Tropical Agriculture
IP	Innovation Platform
JICA	Japan International Cooperation Agency
KAFACI	Korea–Africa Food and Agriculture Cooperation Initiative
kg	kilogram
NARES	national agricultural and extension services
NARS	National agricultural research systems
NARO	National Agricultural Research Organisation (Uganda)
OLS	Ordinary Least Squares
PPP	public–private partnership
RIZAO	Creating employment opportunities for young people in West Africa's rice value chain (project)
RYMV	Rice yellow mottle virus
SNDR	Strategic National Rice Development Plan (Côte d'Ivoire)
t	tonnes
UEMOA	West African Economic and Monetary Union
US$	United States dollars

Africa Rice Center (AfricaRice)
Headquarters, 01 B.P. 4029,
Boulevard François Mitterrand,
Cocody, Abidjan 01, Côte d'Ivoire

Telephone: +225 27 22 48 09 10
Fax: +225 27 22 44 26 29
Email: AfricaRice@cgiar.org

www.AfricaRice.org