RICE+ hub for regenerative ricescapes

Mission paper

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World Business Council *for Sustainable Development*

FOLUR
Food Systems • Land Use • Restoration

Just Rural Transition

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Call to action

Given the unique opportunity for sustainable rice landscapes to deliver solutions for climate mitigation and adaptation, nature recovery and improving farmer livelihoods while contributing to food and nutrition security, there is an urgent need to target finance and scale up actions in high-impact landscapes, such as those in Asia where farmers produce 90% of the world's rice.

We call on the private sector across rice value chains to step up with ambitious targets and strategies that scale and accelerate the adoption of sustainable and regenerative rice production systems and landscapes.

To this end, the RICE+ Hub, under the auspices of the Sustainable Rice Landscapes Initiative, will bring together committed companies to drive an action-oriented agenda that will tackle the major challenges that inhibit investments in sustainable and regenerative rice-based landscapes (regenerative ricescapes, for short). Companies will collaborate to forge public-private investment alliances, adopt high-integrity rice carbon and sustainability standards, facilitate knowledge exchange and promote innovations.

Committed companies must establish relevant targets and action plans that they measure and disclose in a credible and transparent manner and that make a demonstrable contribution to sustainable and regenerative rice production systems and landscapes. These commitments will unlock opportunities for pre-competitive collaboration and provide investment roadmaps in high-impact landscapes.

Context of sustainable rice

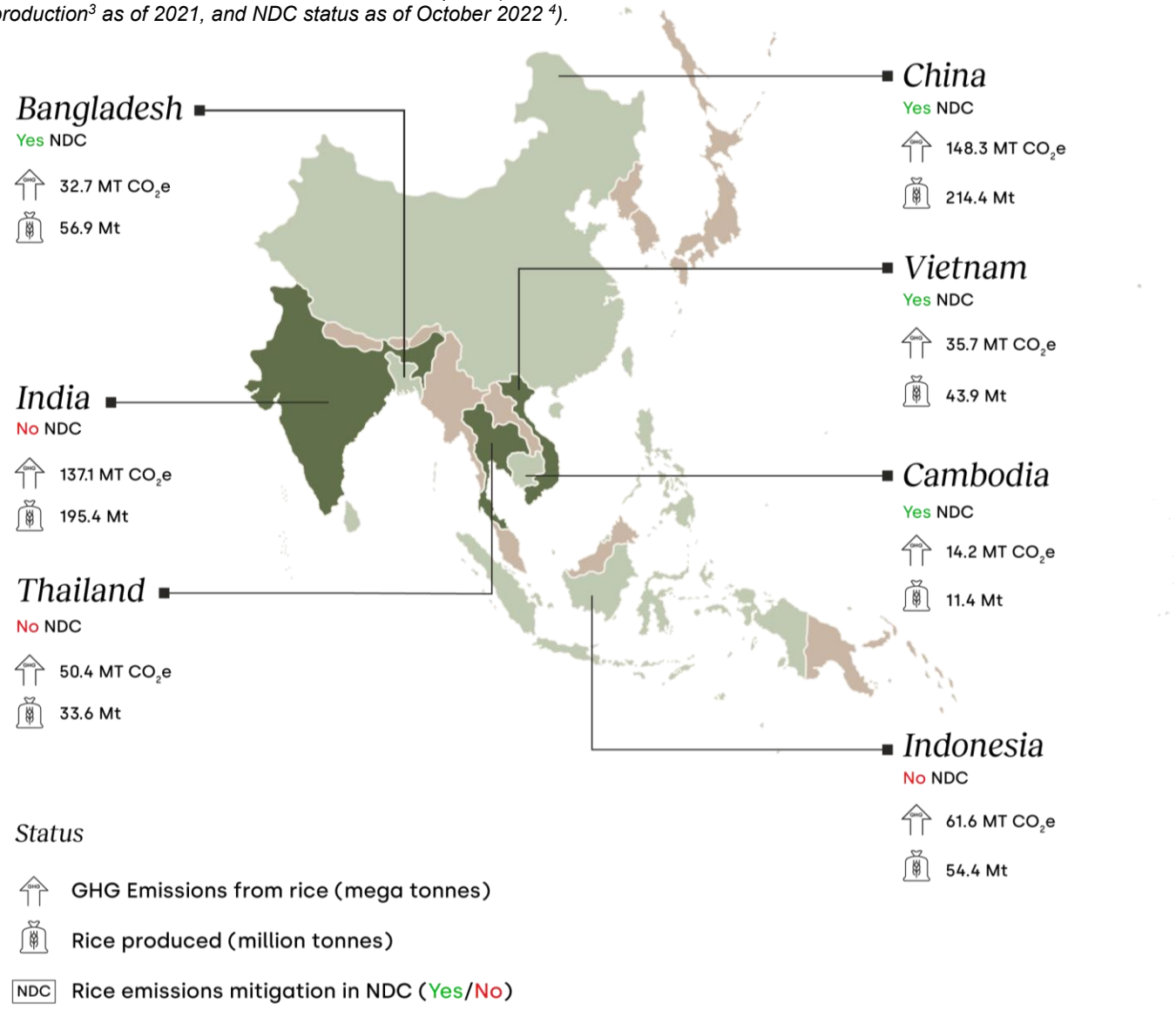
Sustainability impact potential of rice production systems and landscapes

Sustainable rice production systems offer multiple benefits for climate, nature and livelihoods. However, conventional rice production systems release significant greenhouse gas (GHG) emissions and have substantial environmental impacts globally on freshwater resources, wetland ecosystems and biodiversity. At the same time, they are central to the food security of half the world's population and to the livelihoods of over 1 billion people (as detailed further in Table 1).

This paper's aim is to mobilize the private sector to make commitments and take collective actions across rice value chains to scale sustainable rice production systems and landscapes to fully realize the potential for multiple positive impacts. Our call for commitments and action has a main focus on the Asia region, where farmers produce 90% of the world's rice, but is applicable and open to commitments in other rice-producing regions globally.

Table 1: A snapshot of the global impacts from rice production

Figure 1: Information about rice GHG emissions and production volumes for the 7 countries analyzed in the Asia Rice Nature-Based Solutions Accelerator Baseline Report [1] *(based on latest data available - status of emissions[2] and production[3] as of 2021, and NDC status as of October 2022 [4]).*



Improved rice cultivation systems present a significant opportunity to reduce GHG emissions in row crop agriculture. Rice fields emit significant methane and nitrous oxide emissions when conventional water, nutrient, and plant management techniques are applied. Management practices have a key influence on GHG emissions from rice fields.[6] For methane emissions, water management and organic matter (straw and manure) are the most important predictors of emissions. For nitrous oxide emissions, nitrogen fertilizer application rates are considered the most important driver.[7]

Despite rice production being responsible for between 10% to 20% of GHG emissions in Southeast Asia,[8] not all countries in the region include rice mitigation opportunities in their Nationally Determined Contributions (NDCs) under the Paris Agreement. In South and Southeast Asia, only a

The Global Methane Pledge

The Global Methane Pledge (GMP) is a collective global effort led by the United States and the European Union to reduce global methane emissions at least 30% from 2020 levels by 2030, with 150 countries endorsing the GMP since its launch in 2021. The GMP launched a "Food and Agriculture Pathway" in 2022 that aims to advance climate and food security goals through new actions that increase agricultural productivity, reduce food loss and waste, and improve the viability of agriculture in the future, with rice methane mitigation included.[5]

few countries have made direct commitments to reduce emissions from rice production (see Figure 1). Globally, less than 20% of rice-producing countries (17 of 99) have quantified measures for rice emissions reductions in their NDCs.[9] Estimates show the cost-effective annual global mitigation potential for rice is 171 $MtCO_2e$[10] while the total quantified GHG reduction of the new and updated NDCs as of end-2022 is only 20.6 $MtCO_2e$.[11] Given the high GHG emissions from rice production, reductions can contribute significantly to NDCs and to the Global Methane Pledge.[12]

Forecasts show global rice demand will continue to rise with growing populations. However, climate change and resource constraints threaten rice production through temperature increases, droughts, floods, sea-level rise, saltwater intrusion, sediment depletion, water scarcity, upstream land degradation and habitat loss. Estimates suggest these factors could result in a global average 15% rice yield reduction by 2050 (and higher in the Asia region).[13] Since less than 10% of rice is traded internationally,[14] local and national climate impacts and resource scarcity can have significant impacts on rice prices, threatening smallholder income and food security. Conversely, regions such as the Mekong Delta in Vietnam export a majority of the rice produced, exposing them to global and regional market risks and opportunities.

Enabling policies, tested practices and systems help increase rice farming's sustainability and productivity significantly. For example, the Government of Vietnam is implementing policies that incentivize the use of high-quality seeds and reductions in water use, fertilizers and pesticides. Bangladesh has set targets to expand alternate wetting and drying (AWD) practices to reduce rice emissions (see Box 1 for AWD information). Thailand has a Thai Rice Nationally Appropriate Mitigation Action (NAMA) project to transition to climate-smart practices for rice production in the central part of the country – a jointly implemented project between the Government of Thailand and the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, with funding from the Mitigation Action facility.[15]

In addition to AWD, other proven practices and approaches can improve water and agrochemical management, soil health, biodiversity and ecosystem services. These include the direct seeded rice (DSR) approach, the Sustainable Rice Platform (SRP) Sustainability Standard, and the System of Rice Intensification (SRI) methodology (see Box 1 for summaries). These approaches also all prioritize cultivation practices that are adapted to the local biophysical and socioeconomic context – including improved nitrogen fertilizer and nutrient management, better stubble management, diversified rice varieties and more diversified cropping systems when feasible.[16]

The sustainability of rice-based production systems also depends on the health of the landscapes of which they form an intrinsic part. In particular, watershed wetland and forest ecosystems are vital in ensuring the stability of rice paddy system water supplies (see Box 2 for more information). Expansion of rice production areas into natural areas results in biodiversity loss and can negatively affect the provisioning of ecosystem services. It is therefore important to prevent further conversion of natural habitats for rice farming and mitigate the impacts of conventional rice production in existing rice farmlands.

Smallholder rice farms of 1 hectare or less of land (~144 million farms) produce some 90% of the global rice supply but a majority of these farmers are living at or below the poverty line.[17] Approximately half of these smallholder farmers are women, who make up 60-80% of the labor force in food processing and agri-food systems (based on global averages).[18] Providing a living income – defined by the Global Living Wage Coalition as "the net annual income required for a household in a particular place to afford a decent standard of living for all members of that household"[19] – would have substantial positive impacts on millions of farmer livelihoods, including for women rice farmers (research has shown that despite women's important role in rice farming, they receive lower wages compared to men).[20] While for some agricultural commodities (such as cocoa, cotton) living income developments are advancing, in the rice sector the issue is still in its infancy.[21]

Box 1: More sustainable rice production practices and approaches

Alternate Wetting Drying (AWD): is a management practice in irrigated lowland rice that saves water and reduces methane emissions while maintaining yields. AWD entails periodic draining of the field to a certain threshold, usually 15 cm below the soil surface, and re-flooding. During the dry phased this inhibits methane-producing bacteria, reducing methane emissions. On-farm tests with AWD have shown reductions in methane emissions by 20–70%. IPCC 2006 Guidelines for National Greenhouse Gas Inventories estimate a 48% reduction in methane emissions from AWD. By reducing the number of irrigation events required, AWD can reduce water use by up to 30%. Farmers must have control over irrigation of their fields and know that they will have access to water once fields have drained. AWD in rainfed rice is not recommended due to uncertain water availability when fields have to be reflooded. Research has consistently found that non-continuous water regimes such as AWD produce significantly lower methane emissions compared with continuous flooding. Empirical models indicate that 10-15% of the benefit gained by decreasing methane emissions is offset by increased emissions of nitrous oxides. However, net Global Warming Potential (GMP) is still significantly lower under AWD than in continuously flooded fields.[22]

Direct seeded rice (DSR): is a crop establishment system wherein rice seeds are sown directly into the field, as opposed to the traditional method of growing seedlings in a nursery, then transplanting into flooded fields. Compared to the conventional puddled transplanted rice (PTR) method prevalent in Asia, DSR delivers faster planting and plant maturing, is more conducive to mechanization, conserves water scarce resources and reduces GHG emissions. Mechanized DSR also creates avenues for employment through new service provisions and is less labor intensive.[23] DSR saves on labor, water (16-38%), cost of cultivation, and increases net income without yield penalty. It reduces methane emissions by significant ranges: 30-98% and GWP by 20-44%.[24]

The **Sustainable Rice Platform (SRP)** is a global, multistakeholder alliance originally established by the International Rice Research Institute (IRRI), the United Nations Environment Programme (UNEP) and private sector partners. Its goal is to transform the global rice sector by improving smallholder livelihoods and reducing the adverse social and environmental impacts of rice production while meeting the growing global demand for rice. In 2015 SRP developed the world's first voluntary sustainability standard for rice.[25] The SRP Standard for Sustainable Rice Cultivation offers a working definition of rice sustainability, and a normative framework that can serve as a basis for supporting claims to sustainability performance in rice supply chains. The SRP Performance Indicators for Sustainable Rice Cultivation allow for quantitative measurement and assessment of the sustainability impacts of adoption of recommended practices at farm level. The Standard applies to all farm-level processes in rice production, including postharvest processes under the farmer's control. The Standard can be applied by individual farmers, smallholder farmer groups, as well as larger farms, and focuses on ensuring relevance, practicality and impact.[26] The SRP Assurance Scheme allows rice value chain actors to demonstrate compliance with the SRP Standard, as well as impact as measured by the SRP Performance Indicators. On average, farmers who adopt the SRP Standard earn 10% higher net income, reduce water use by 20%, and cut greenhouse gas emissions by up to 50%.[27]

The **System of Rice Intensification (SRI):** is a climate-smart, agroecological methodology for increasing the productivity of rice by changing the management of plants, soil, water and nutrients. SRI methodology is based on four main principles that interact with each other: early, quick and healthy plant establishment; reduced plant density; improved soil conditions through enrichment with organic matter; reduced and controlled water application. Based on these principles, farmers can adapt recommended SRI practices to respond to their agroecological and socioeconomic conditions. Adaptations are often undertaken to accommodate changing weather patterns, soil conditions, labor availability, water control, access to organic inputs, and the decision whether to practice fully organic agriculture or not. The SRI International Network and Resources Center (SRI-Rice) was established at Cornell University to advance and share knowledge about SRI to improve

the technical implementation of the methodology, and to support networking among interested organizations, agencies and individuals around the globe.[28]

Box 2: Rice landscapes as one of the world's largest sources of human-modified wetland habitats[29]

Often overlooked at the landscape level, rice landscapes are semi-aquatic agroecosystems that can offer habitats to numerous threatened species and can provide many ecosystem services. However, prevalent rice farming practices that are water- and agrochemical-intensive are contributing to the diversion, degradation and conversion of wetlands.

Agricultural development is a primary cause of wetland loss and degradation through drainage, infilling and water pollution. The extent of natural wetlands has declined by 35% since 1970, while human-modified wetlands, including rice paddy fields and reservoirs, increased by 233%.[30] Rice is a significant driver of habitat and biodiversity loss and degradation in a range of natural ecosystems, including wetlands, grasslands and forests. For example, in the Mekong Delta region of Vietnam, floodplain wetlands, seasonally flooded grasslands and swamp forests have been converted to rice paddies.[31]

Globally, wetlands form only about 5-8% of the land surface but hold about 30% of the total soil carbon store, with peat wetlands and coastal wetlands (present in important deltaic rice production areas in Asia) particularly important for carbon storage.[32] The drainage of wetlands for agricultural development results in lost capacity for continued carbon sequestration and storage. This is particularly important for wetland types that store large amounts of carbon, such as peatlands and forested wetlands. Therefore, the conservation of natural ecosystems in rice producing landscapes – which can include wetlands, grasslands and forests – provides opportunities to protect important carbon sinks and biodiversity.

Nature-based solutions

Nature-based solutions are actions to protect, conserve, restore, sustainably use and manage natural or modified terrestrial, freshwater, coastal and marine ecosystems that address social, economic and environmental challenges effectively and adaptively while simultaneously providing human well-being, ecosystem services, resilience and biodiversity benefits.[33]

In recent years progress has been made in the area of implementing nature-based solutions (NBS) that improve the ecosystem functions of local environments and landscapes affected by agricultural practices and land degradation, while enhancing livelihoods and other social and cultural functions.[34] In agricultural landscapes, it is possible to apply NBS to achieve diverse and integrated benefits in terms of climate change mitigation and adaptation (referred to as natural climate solutions), soil health, water quantity and quality management, biodiversity and ecosystem services, while also improving food security, nutrition and creating more inclusive rural economies.[35] Implementing NBS in rice production systems and landscapes can play a key integrating role for the sustainable future of rice; however, it is necessary to overcome some key challenges to do so at scale.

Natural climate solutions

Natural climate solutions (NCS) are nature-based solutions addressing climate change. NCS include actions that protect healthy ecosystems, improve the management of working lands, and restore all types of land and coastal ecosystems.[36]

To sustain the future of rice production systems and landscapes already impacted by climate change and natural resource constraints, it is urgent to transition to agricultural and land-use practices that have positive environmental outcomes from field to landscape levels and that provide living incomes while realizing NBS financing opportunities for positive socio-economic outcomes for farmer and value chain livelihoods and local communities.

Challenges to overcome for sustainable rice

Despite the potential for integrated environmental and socio-economic benefits from more sustainable rice production practices, a range of challenges limits the acceleration of the rice sustainability transition at the scale needed for global impact mitigation, avoidance and restoration. One major challenge is the fragmentation of rice production at the farm-level. Smallholder rice farmers commonly operate in value chains and production landscapes that do not enable them to take full advantage of sustainability opportunities. Many smallholder rice farmers lack access to reliable and affordable inputs, mechanization, irrigation, advisory services, off-takers (meaning buyers of agricultural products) and financial services, including credit and insurance.[37] Where farmers have access to crop inputs such as nitrogen fertilizers, many tend to overuse them when they don't have the technical support they need to determine appropriate rates of application, causing water and soil pollution.[38] Smallholder rice production within fragmented land holdings have also not received the same level of global attention as commodities such as soy and palm oil (which have greater international trade), nor attracted significant financial investment despite growing global demand.[39]

In addition, the private sector also faces challenges across the rice value chain. Financing, value chain coordination and uncertainties about incentives are some key challenges to overcome. The transformation of rice practices and landscapes requires harnessing finance for an essential set of national and local capacities and incentives. National and local policies and regulations, political dynamics, land tenure, subsidies and other structural incentives strongly influence the potential for sustainable rice landscapes and value chains. Based on an extensive literature analysis and stakeholder interviews, we have identified and prioritized five key challenge areas – that consistently arise across South and Southeast Asia rice landscapes – to overcome to accelerate rice nature-based solutions for climate, nature and equity benefits. We explain these in Table 2.

Table 2: Priority challenge areas and specific challenges to overcome to scale sustainable rice

Challenge area	Specific challenges to overcome
Customized support for rice farmers	• Technical support for farmers on innovative practices, tools, inputs, seed varieties, sustainable soil, water and stubble management customized to national and landscape contexts is limited or non-existent. • Farmer willingness to change practices can be complex – influenced by culture, perceived and actual productivity risks (including risks of increased pests and weeds), financial needs and risks of adopting new production practices, and incentives to maintain in the long term. • The highly fragmented and scattered distribution of smallholders across landscapes, with limited financial inclusion, hinders access to extension and financial services. • Smallholder rice farmers often possess limited assets, along with insecure land tenure (especially for women), which can result in ineligibility for financial support.
Transition costs & long-term agreements	• Transitioning to sustainable practices and rice GHG project development can present considerable upfront financial and technical barriers for farmers to change their practices, including infrastructure (such as irrigation), mechanization, project design, implementation and measurement, reporting and verification (MRV) tools and costs. • Unharmonized MRV systems and high MRV costs can make compliance difficult to meet. • Investment risks mean off-takers in the rice value chain can be hesitant to lock in long-term agreements, disincentivizing farmers with no long-term security of sale (also applicable for carbon credits, which need long-term off-take agreements).
Voluntary carbon market (VCM) uncertainties and barriers	• Verra's recent inactivation of the dominant clean development mechanism (CDM) emissions crediting methodology (which accounts for over 90% of currently registered rice projects in the VCM) exacerbates the availability of consistent high-integrity GHG quantification methodologies for rice projects; but Gold Standard introduced new rice-specific methodologies in 2023 and there will be a new methodology from Verra.[40] • The lack of a robust rice carbon crediting methodology, which can also account for other environmental co-benefits (such as water), makes demand and reasonable prices for high-integrity rice-based credits uncertain. • There are high costs and risks in implementing rice carbon projects due to the aggregation of smallholder farms needed to make carbon credit revenue viable, as well as challenges with ensuring permanence of the practice changes and the needed MRV technologies and costs. • Sampling soils in rice fields is also particularly challenging due to the flooded nature of rice fields and can create problems if adapting existing agricultural soil methodologies to rice.
GHG emissions targets, nature targets, and living wage/income guidance gaps	• Access to suitable frameworks for holistic GHG emissions quantification in rice systems that include emissions reductions and removals is necessary. This should include consideration of the diverse array of agronomy practices that result in GHG emissions (carbon, methane, and nitrous oxides) reductions and increased sequestration of soil organic carbon. Regenerative agriculture frameworks and metrics could be well suited to this but are still in development. • Farmers are often unable to access guidance on rice carbon project development and VCM engagement (e.g., limited practical applicability for different field sizes); and rice cultivation practices guidance often covers emissions reduction practices or sustainable land management practices rather than an integrated approach. • Detailed guidance specific to the rice value chain on how companies can set and achieve science-based targets for climate[41] and nature[42] is limited – it is under development or being tested, including for scope 3 emissions reductions and landscape engagement requirements. • The GHG Protocol is finalizing its draft Land Sector and Removals Guidance which requires:[43] *"Companies that own or control lands where rice is cultivated, should report CH_4 emissions from rice cultivation. Companies in the value chain of rice production that either purchase rice products or supply rice production systems but do not own or control such lands (e.g., rice processing companies, agricultural equipment suppliers for rice cultivation, etc.) should report CH_4 emissions from rice cultivation in scope 3. Companies that produce rice or are in rice production value chains must also report on other GHG emissions from managed soils associated with rice production."* This is proving to be a challenge for some companies as it is difficult to collect and monitor primary on-farm data from upstream supply chain partners. • Guidance is also lacking on living income and living wages specific to women and men smallholder rice farmers. But companies can adapt existing frameworks and tools, such as the Sustainable Rice Platform Standard,[44] IDH Living Wage Tools[45] and the Living Income Community of Practice.[46]
Public and private sector investment gaps	• Challenges stem from misalignments between public sector investments for agriculture infrastructure (e.g., irrigation) and extension services and private sector investments for sustainable rice. • Challenges also stem from misalignments on enabling conditions for sustainable rice via regulations and subsidies. • Rice sub-sector climate mitigation actions are absent from over 80% of rice-producing country NDCs – indicating that a large majority of the public sector does not yet recognize the high mitigation potential of sustainable rice production.

Opportunities to scale-up sustainable rice

Several initiatives are advancing sustainable rice production at farm and landscape scales. Technical approaches include the Sustainable Rice Platform [48] and the System of Rice Intensification's International Network and Resources Centre[49] (both described earlier in Box 1). The WBCSD-convened Sustainable Rice Landscapes Initiative (SRLI, described further below) offers important scaling pathways. [50] And more recently, rice production-based carbon credits. Multilateral financial institutions such as the Global Environment Facility, World Bank, Asian Development Bank and African Development Bank have also provided grants and other financing mechanisms for scaling sustainable rice at regional, national and sub-national levels.

Rice production-based carbon credits

Rice production-based carbon credits are a tradeable intangible instrument issued by a carbon-crediting program, representing a GHG emission reduction to, or removal from, the atmosphere equivalent to one metric ton of carbon dioxide equivalent. This is the difference in GHG emissions or removals from a baseline scenario to the emissions or removals occurring under the mitigation activity and any adjustments for leakage. An administrative body, such as a carbon-crediting program, uniquely serializes, issues, tracks and retires or administratively cancels the carbon credit by means of an electronic registry.[47]

Given the global scale of rice production and growing recognition of its environmental impacts and challenges, it is evident that more public and private sector collaboration and co-investment is needed to further scale-up adoption of sustainable and regenerative rice best practices among rice producers around the world.

The timing to invest in sustainable rice is opportune, as highlighted recently by the CEO of the Global Environment Facility: "The time is now for the private sector to invest in sustainable rice production – not only to meet global climate policy requirements, but also to ensure that rice farming is able to adapt to our changing planet and that businesses remain profitable."[51]

Scaling private sector investment in sustainable rice

Recent analysis by WBCSD and SRLI finds that targeted public-private investment partnerships are vital to achieving sustainable and equitable rice production. The recent report on *Scaling private sector investment in sustainable rice: Needs and opportunities*[52] finds that finance models that can successfully scale up investment in sustainable rice will require strong partnerships involving a range of public and private actors with different appetites for risks and returns. To ensure that the shift to regenerative food systems does not leave farmers behind, a mix of funding sources and instruments will be necessary, the most catalytic being long-term patient capital and de-risking using concessionary finance and technical assistance. Private sector investment and blended finance models, finance from carbon markets, finance for in value chain investments, finance for landscape and jurisdictional approaches, and nature and NBS finance are some of the relevant mechanisms through which it is possible to scale up private sector investments and associated sustainability impacts for sustainable rice productions systems and landscapes. We explain each of these below.

Private sector investment and blended finance

To meet the challenging financing requirements to promote sustainable rice production, the *Scaling private sector investment* report proposes three general structures that can offer viable models that are adaptable to specific geographies and contexts. These are three forms of patient capital suitable for leveraging private sector investments in sustainable rice: loan intermediation, credit guarantees and special purpose vehicles (SPVs), as defined in Table 3. Businesses may consider many variations and combinations of the three potential structures, including diverse opportunities for leveraging private capital through equity, debt, impact outcome payments, technical assistance and grant funding, as well as different types of funding recipients (further described in Table 3).

The report highlights that combining elements of these instruments in a blended finance approach will likely be necessary to address the challenges to scaling private finance for sustainable rice. Blended finance is "the use of catalytic capital from public or philanthropic sources to increase private sector investment in sustainable development."[53] It involves combining multiple finance sources (such as commercial, large multilateral funder) and approaches (for example, credit lines, loan guarantees, selected direct investments, technical assistance) into one larger facility or funding program. The Sustainable Rice Landscapes Initiative (overview provided in the next section) is developing a blended finance facility to catalyze public and private financing for climate-resilient rice landscapes, value chains and livelihoods for initial testing in Bangladesh, Cambodia and Vietnam.

It is possible to finance all three structures through – or in collaboration with – companies. The selection of one of these finance structures for adaptation to a specific context will depend on findings from a pre-investment feasibility assessment. Any proposed structure would require the identification of: (i) funding recipients such as local companies or financial institutions with a demonstrated ability to engage rice growers and value chain stakeholders in adopting sustainable production practices; and (ii) high-capacity providers of technical assistance (such as agri-SMEs, NGOs, research centers) and sustainability verification. Under all circumstances engaging commercial capital, there must be a basis for doing so – a meaningful net financial benefit that companies can reasonably capture through increased revenues or cost savings.

Table 3: Three potential structures of patient capital suitable for leveraging private sector investments for sustainable rice

Potential structures	Description	Funding recipients
Loan intermediation	An existing local or regional financial institution (e.g., commercial or development bank; microfinance institution) increases lending to rice growers and agri-SMEs based on access to new dedicated credit facilities from development finance institutions (DFIs), donors and commercial investors.	Entities capable of assisting rice growers and value chain stakeholders in adopting sustainable production practices and technologies through value-chain incentives and financing mechanisms, such as: • Companies (e.g., input and service providers, processors, traders, cooperatives, technology providers) to provide appropriate combination of off-take contracts, pre-financing of inputs and services, training, advisory support, infrastructure development, new market channels, disintermediation. • Banks, financial institutions, insurers to provide appropriate forms of low-interest farm credit, working capital to agri-dealers, insurance.
Credit guarantees	Guarantees provided (or subsidized) by concessionary capital enable an existing local or regional financial institution to fund a new or existing portfolio of sustainable rice activities (e.g., producer support; input financing) with companies engaged in rice value chains and production landscapes potentially supporting this companies.	
Special purpose vehicles (SPVs)	A blended finance SPV (e.g., investment fund; company) mobilizes commercial capital for sustainable rice activities (e.g., working capital paired with preharvest and off-take support) combined with concessionary capital (e.g., technical assistance grants).	

Source: SRLI WBCSD report[54]

Voluntary and compliance carbon markets

Companies can sell rice production-based carbon credits in voluntary carbon markets (VCMs) that can raise additional finance for sustainable rice. However, there have been few such carbon credits sold to date. While VCMs have grown rapidly in recent years and carbon credits derived from nature-based solutions account for approximately 35% of all credits issued in VCMs (second only to renewable energy),[55] agriculture-related project credits account for only about 7% and rice-related projects account for just 0.3% of issuances.[56] Recent trends in low prices for NBS carbon credits in conjunction with high costs for project development and MRV for rice carbon projects do not make VCMs a highly viable option for sustainable rice project financing.

There are also uncertainties about rice carbon credit methodologies, as Verra – the main issuer of rice carbon credits to date – inactivated the methodology[57] for such projects in early 2023.[58] Verra is currently developing a new methodology for rice and the Gold Standard has launched an updated rice carbon methodology[59] but increasing confidence in high-integrity NBS carbon credits and higher prices for them in the VCMs, as well as actions to increase the credibility of rice carbon credits (particularly on additionality and permanence aspects) will strongly influence their uptake. Recent initiatives such as the updated rice carbon methodologies and the Integrity Council for the Voluntary Carbon Market's (ICVCM) Core Carbon Principles Assessment Framework[60] can help increase credibility and confidence for agriculture projects, but high project costs and low carbon credit costs in VCMs will remain a challenge.

There are potential opportunities beyond VCMs in emerging compliance carbon markets. Some countries in Asia are adopting commitments to decarbonize their national rice sectors and reduce methane emissions, signaling potential future demand for rice-based carbon projects under regional compliance mechanisms. To date, voluntary and regulated carbon markets have operated alongside but largely independently from one another. However, the new market mechanisms established under Article 6 of the Paris Agreement introduce for the first time the potential for overlap, in theory increasing the potential trading opportunities for carbon NBS credits generated from rice projects. As Article 6 gains further detail at the United Nations Climate Change Conference (COP28) and beyond, companies can start to realize this opportunity potential.

Scaling carbon trading for rice is not only about financial incentives that can cover project and MRV costs, especially given the smallholder context. Scaling carbon trading for smallholder farmers requires clear and enabling regulations, technical assistance, access to finance, viable carbon prices, capacity building, collaboration with stakeholders, cost-effective technological solutions, and landscape and jurisdictional approaches (defined below).[61] All of these (except for carbon prices) are also important to scaling up sustainable rice production systems and landscapes. An effective way forward is for companies to promote the adoption of more sustainable and regenerative rice production systems that provide diverse environmental and socio-economic benefits to farmers, their landscapes and throughout the rice value chain. This can include financial compensation for credibly verified high-integrity emissions-reducing practices from voluntary and compliance carbon markets where viable. But carbon markets are currently not sufficient to be the main sustainability driver for rice production.

In value chain investments

For companies in the agricultural, forestry and other land-use (AFOLU) value chain sectors, scope 3 emissions can account for up to 90% of emissions, dominated by land-use change and land management.[62] Corporate target-setting and investments for net-zero commitments including scope 3 reductions are emerging as strategic opportunities to incorporate NBS as decarbonization interventions with integrated benefits for climate, nature and livelihoods. There is growing interest in investments into sustainable rice production from rice value chain actors pledging to decarbonize their own value chains[63] in ways that benefit climate, nature and farmers.[64] There are also new investments targeting methane emissions reductions from rice, with the recently launched Global Methane Pledge's Food and Agriculture Pathway[65] that aims to advance climate and food security goals through new actions that increase agricultural productivity, reduce food loss and waste, and improve the viability of agriculture in the future.

New and developing AFOLU sector guidance, such as the GHG Protocol's draft *Land Sector and Removals Guidance*, the Science-Based Targets initiative (SBTi) *Forest, Land and Agriculture (SBTi FLAG) Guidance*, and the Science Based Targets Network (SBTN) target-setting guidance for nature, all inform companies on how to adopt net-zero and nature-positive targets and corresponding action plans to meet company sustainability targets as well as benefit producer and supplier resilience. Given the large water footprint of rice cultivation, there is also interest from companies to invest in the rice value chain to achieve water-related sustainability goals. Water-related investments and target setting in the rice value chain offer an additional opportunity to leverage in value chain investments for interconnected climate and nature outcomes.

Landscape and jurisdictional approaches

To achieve the necessary scale for carbon finance in smallholder-dominated rice production landscapes and to enable effective governmental support, landscape and jurisdictional approaches will be important due to the small average areas of rice farms (1 hectare or less). It could be possible to aggregate individual rice carbon projects within jurisdictional approaches if developed for agriculture as they have been for other sectors such as forestry. This approach would also identify the potential for natural ecosystem conservation (and associated carbon storage) in rice landscapes, which would depend on the individual landscape context. Specific opportunities and sources for financing for natural ecosystem conservation and stakeholder beneficiaries would require analysis based on the spatial boundaries of identified priority landscapes (NBS finance described below can be one potential source of funding). Landscape approaches are also central to the draft SBTN Target 3 on "Landscape Engagement", which aims "to enable regenerative, restorative, and transformational actions in company-relevant landscapes through both corporate actions that improve ecological integrity and supporting the enabling conditions that help ensure successful landscape approaches."[68] Therefore, expectations are for company investments in supporting successful landscapes and jurisdictional approaches when relevant to their rice value chains to increase in the near future.

Landscape Approach

A landscape approach is a place-based management approach that involves the collaboration of stakeholders in a landscape to advance shared sustainability goals and build resilience. It aims to reconcile and optimize multiple social, economic and environmental objectives across multiple economic sectors and land uses. [66]

Jurisdictional Approach

A type of landscape approach to advance shared sustainability goals where the landscape is defined by administrative boundaries of sub-national or national governments and the approach is implemented with a high level of government involvement.[67]

Nature and nature-based solutions (NBS) finance

As recognition of the long-term value of natural capital from an economic, environmental and societal perspective has grown and as opportunities in carbon and other environmental markets from NBS continue to mature, annual financial flows into nature from public and – in particular – private sources have increased in recent years.[69] Total global investment in the world's terrestrial and marine ecosystems amounted to an estimated USD $154 billion in 2022, representing 2.6% growth from 2021. Most of that growth came from the private sector – while private sector investment represented 17% of total nature investment in 2022, it experienced 9.9% growth from 2021,[70] much of it driven by the growing carbon market.[71] Public funds make up 83% of the total, directing USD $126 billion per year towards NBS through government domestic expending and USD $2 billion per year through official development assistance. Almost half of government finance for NBS goes to the protection of biodiversity and landscapes (USD $58 billion), followed by sustainable agriculture, forestry and fishing (USD $29 billion per year or 23%).[72]

Private financial flows to NBS of USD $26 billion annually constitute 17% of total NBS finance. Sustainable supply chain investments are the largest private finance component, channeling about USD $8 billion per year (5% of total NBS flows) followed by biodiversity offsets at USD $6 billion per year and private payments for ecosystem services and impact investments, each contributing USD $3 billion per year.[73] Finance flows to carbon markets and from NGOs and philanthropy are some USD $2 billion per year each. Private finance channeled through multilateral development banks and bilateral cooperation amounts to less than USD $1 billion per year.[74] The small share of private finance to NBS compared to public finance reflects the relative novelty of investing in natural capital and suggests that the investment case, meaning the return to the investor relative to the level of risk, needs to be stronger.[75] There are clear opportunities to scale investments for sustainable rice production systems and landscapes by leveraging public and private sector nature and NBS financing and building the investment case.

The RICE+ Hub for Regenerative Ricescapes

The Sustainable Rice Landscapes Initiative[76] (SRLI) is a consortium of six partners working together to transform the rice sector into a more sustainable, regenerative and climate-resilient food system. The partners are the World Business Council for Sustainable Development (WBCSD, convenor), the Sustainable Rice Platform (SRP), the Food and Agriculture Organization of the United Nations (FAO), the International Rice Research Institute (IRRI), Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, and the United Nations Environment Programme (UNEP). The Global Environment Facility is a major donor and supporter.

SRLI has been supporting finance mobilization for sustainable rice cultivation in critical rice-growing countries in South and Southeast Asia for the benefit of climate, nature and farmer livelihoods since 2018. To date, the Global Environment Facility (GEF) GEF-7 portfolio, including through the FOLUR Impact Program, has mobilized some USD $50 million in grant resources and USD $629 million in public and private sector co-finance in seven countries in the region to support this effort. An additional USD $47 million of SRLI projects in five countries are under development as part of the GEF-8 portfolio focus on sustainable food and value chains.

SRLI consultations with public, private and civil society sector stakeholders over the course of 2022-23 have pointed to the need for a private-sector driven platform, under SRLI's private sector and investor engagement workstream, to facilitate rice value chain collaboration and collective action planning to further scale-up sustainable rice production systems and landscapes.

Food Systems, Land Use and Restoration (FOLUR) Impact Program

Funded by GEF-7 and led by the World Bank, FOLUR seeks to transform the global food system by promoting sustainable, integrated landscapes and efficient commodity value chains. It consists of a global program and 27 country projects targeting the production landscapes of eight commodities and staple crops: rice, beef, cocoa, corn, coffee, palm oil, soy and wheat. The program supported this Mission Paper and will continue to support its action planning and implementation through alignment with relevant program priorities and country projects.[77]

To realize the significant sustainability impact and emerging investment opportunities and to overcome the current key challenges identified in this paper, WBCSD is launching a private sector convening hub called the RICE+ Hub (see Box 3). It aims to facilitate pre-competitive private sector collective actions and investments across the entire rice value chain (see Figure 2 below) to accelerate rice-related carbon, climate, nature and NBS investments and project implementation to scale sustainable rice in priority countries and landscapes, starting with a focus on the major rice-producing regions of South and Southeast Asia.

The collective vision for this initiative is **to accelerate the transition of rice production systems and landscapes to be:**

- **Equitable**, ensuring benefit-sharing with farmers and livelihoods along the rice value chain and local communities (including promotion of living incomes and decent working conditions);
- **Regenerative**, promoting an outcome-based rice farm-level to landscape-level approach that generates sustainable food production while improving soil health, biodiversity, climate mitigation, water resources and supporting farming livelihoods;
- **Resilient**, adapting to ongoing climate change impacts and exhaustion of natural resources that rice producing regions are experiencing (such as warming, droughts, floods, saltwater intrusion, water scarcity, soil erosion and nutrient loss) and contributing to the longer term resilience of communities in terms of livelihoods, ecosystem health, and food and nutrition security.

Box 3: The RICE+ Hub

The RICE+ (rice-plus) Hub will use rice as the "anchor" commodity in rice-producing landscapes to achieve positive impacts for climate, nature and equity in and beyond rice production systems. The aim of the hub is to facilitate rice value chain collaboration for collective actions and investments to achieve sustainable and regenerative rice-based landscapes (regenerative ricescapes, for short) in priority high-impact landscapes, starting in South and Southeast Asia. The mission is to use rice as an influential anchor to contribute to equitable, regenerative and resilient food systems transformation in rice-producing regions and landscapes. The RICE+ acronym is dynamic, capturing the diversity of themes and topics that are critical for such a transformation:

- Rice-based, regenerative, rotations
- Innovative, inclusive, integrated
- Climate, CO_2e, coalition, collaborative
- Equitable, effective, ecosystems, ecosystem services
- + farmer and rice value chain livelihoods, women livelihoods, food and nutrition security, nature and NBS, NDCs, soil health, water resources.

It aims to realize this vision by defining and achieving targets under the three priority impact areas described below, with indicative impact metrics under which it would establish quantifiable place-based targets and key performance indicators (these impact metrics fully align with WBCSD's ongoing work to define regenerative agriculture metrics):

1. **Climate**
    - Reduced GHG (CH_4, N_2O, CO_2) emissions
    - Increased sequestered above-and-below ground carbon
2. **Nature** (incl. water, soil)
    - Biodiversity
        - Increased cultivated biodiversity
        - Increased (incl. avoided conversion of) natural and semi-natural habitats in landscapes
        - Reduced pesticide risk
    - Water
        - Improved nutrient use efficiency
        - Reduced water pollution
        - Reduced blue water withdrawals
    - Soil
        - Increased soil health
3. **Equity**
    - Increased financial benefits for farmers and rice value chain livelihoods
    - Increased social/economic equity for local communities
    - Improved well-being
    - Improved food and nutrition security

Box 4: Designing climate, nature and equity impact goals

The design of collective climate, nature and equity impact goals could use a bottom-up approach for specific sub-national regions and landscapes or a top-down approach identifying opportunities in priority countries. This will use relevant WBCSD roadmaps for the agri-food system for net-zero, nature-positive and equity goals and actions, as well as company and partner consultations in the next phase.

A 5-year goal example of a top-down approach could look like this: *Transition X M ha of rice farms to more sustainable and regenerative practices; mitigate X $MtCO_2e$; save X ML water; support the protection and/or avoided conversion of natural habitats of X M ha; X number of women and men rice farmers have increased financial access and benefits; mobilize X M amount of USD $ from the public sector and X M USD $ from the private sector towards achieving regenerative ricescapes; within X years.*

The RICE+ Hub will collectively leverage participating company and partner ambitions, commitments and actions to focus on three prioritized action areas that will be instrumental to achieving the hub's climate, nature and equity impact goals:

1. **Action Area 1: INVEST – Forge public-private investment alliances**: Establish country-specific public-private partnerships (PPPs) that create investment alliances across the entire rice value chain to achieve clearly defined climate, nature and equity targets in priority sub-national regions and landscapes.
2. **Action Area 2: STANDARDIZE – Promote high-integrity rice NBS standards, MRVs and markets:** Promote high-integrity rice carbon and sustainability standards and credible measurement, reporting and verification (MRV) systems and develop industry guidance for market uptake.
3. **Action Area 3: INNOVATE – Facilitate knowledge exchange and promote innovations:** Facilitate relevant information, data connections and knowledge exchange across the rice value chain and promote innovations that advance the scaling of sustainable rice production systems and landscapes.

The three priority action areas will be interconnected. For example, mobilizing finance from public-private investment alliances for scaling sustainable and regenerative rice production systems and landscapes will drive demand for, and the implementation of, high-integrity rice carbon and sustainability standards, which in turn can drive innovation and knowledge exchange, which can lead to increased investment alliances in more rice-producing countries.

Figure 2: The RICE+ Hub will engage across the entire rice value chain.

Commitments

To be part of the RICE+ Hub, companies must make a demonstrable contribution to sustainable rice production systems and landscapes by:

- Setting relevant, specific targets or at least committing to setting targets no later than the 2024 United Nations Climate Change Conference (COP29);
- Publicly sharing an "action plan" that will lay out their strategy, including using specific sustainable rice production practices and approaches described here in Box 1;
- Measuring and reporting on progress against targets and action plan;
- Disclosing relevant information as part of their existing public disclosures.

Companies also must commit to contributing to the collective vision of the RICE+ Hub and to active involvement in at least one of the three action areas.

Action plan timeline

- **Q4 2023 – Q1 2024**
  - Critical mass of company commitments across rice value chain to the RICE+ Hub.
  - Initial (1-2) South and/or Southeast Asian Country commitments to the RICE+ Hub.
- **Q2 2024 – Q4 2024+:**
  - Identify priority sub-national regions and landscapes of interest to companies in selected countries and define climate, nature, and equity impact goals.
  - Align investors with RICE+ Hub goals in the priority landscapes to forge value chain coalitions, design collective action plans and begin implementation in selected landscapes.
  - Develop guidance on high-integrity rice standards and promote market uptake.

Disclaimer

This publication has been developed in the name of WBCSD. Like other WBCSD publications, it is the result of collaborative efforts by representatives from member companies and external experts. Input from stakeholders listed was incorporated in a balanced way. This does not mean, however, that every member company or stakeholder agrees with every word.

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About the Sustainable Rice Landscapes Initiative (SRLI)

The Sustainable Rice Landscapes Initiative (SRLI) is a consortium of six partners working together to meet the growing global demand for sustainable rice:

- The Food and Agriculture Organization of the United Nations (FAO)
- Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)
- The International Rice Research Institute (IRRI)
- The Sustainable Rice Platform (SRP)
- UN Environment Programme (UNEP)
- The World Business Council for Sustainable Development (WBCSD).

Together, these partners have extensive networks across the public, private and civil society and research spaces, positioning them ideally to drive progress on sustainable rice. Working closely with governments, the Global Environment Facility (GEF) and a range of partners, SRLI has mobilized more than USD $50M in 7 countries, with more than $629M in co-financing, for landscape and related sustainable rice projects across Asia to date.

About JRT

The Just Rural Transition initiative (JRT) brings together food producers, governments, businesses, investors, civil society, rural and indigenous peoples to champion people-centred solutions to food systems challenges. They aim to transform food systems by catalysing policy reform, encouraging investment partnerships, and mainstreaming food, land use, justice, equity, and rural livelihoods at the centre of efforts to realize sustainable development goals and the Paris Agreement.

The JRT Secretariat is housed by Meridian Institute and is funded by the UK Department of Foreign, Commonwealth and Development Office and ClimateWorks Foundation.

www.justruraltransition.org

About the World Business Council for Sustainable Development (WBCSD)

The World Business Council for Sustainable Development (WBCSD) is a global community of over 220 of the world's leading businesses, representing a combined revenue of more than USD $8.5 trillion and 19 million employees. Together, we transform the systems we work in to limit the impact of the climate crisis, restore nature and tackle inequality.

We accelerate value chain transformation across key sectors and reshape the financial system to reward sustainable leadership and action through a lower cost of capital. Through the exchange of best practices, improving performance, accessing education, forming partnerships, and shaping the policy agenda, we drive progress in businesses and sharpen the accountability of their performance.

www.wbcsd.org

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