WFP
World Food Programme
SAVING LIVES
CHANGING LIVES

The Journey of Scaling Up Rice Fortification in Asia

Connecting food systems with social protection to enhance diets of those who need it most

Policy Guide with success stories from four countries

April 2021

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Executive Summary

While food insecurity predisposes vulnerable populations to rely on undiversified diets,[i] disruptive shocks such as the current coronavirus disease 2019 (COVID-19) economic fallout further impair households' ability to afford nutrient-rich foods and diversified diets often favouring calories over nutrients. Ensuring the availability, safety, and nutritional value of foods becomes even more critical.

There are multiple ways to achieve healthier diets. Government policies, investments and research must prioritize production of nutritious foods and improving the nutritional value of these foods. In addition, creating consumer demand for healthy and nutritious foods is also critical for ensuring sustainable consumption of healthy diets. Post-harvest food fortification is a proven, cost-effective opportunity to enhance the nutritional value of foods.

Given that Asia accounts for 90 percent of rice consumption globally, governments in the region have increasingly turned to rice fortification to improve diets and fill nutrient gaps of their population. The large evidence base and recent publications have drawn further attention to this solution.

The South Asian experience provides valuable lessons on how to reach millions of vulnerable people with fortified rice using social safety nets. In October 2020, the World Food Programme (WFP) undertook a review of the rice fortification programmes implemented to date in the region to develop this policy guide. It documents the successes, enabling factors and lessons learnt along the process steps and intends to serve as guidance and roadmap for government officials, WFP staff and partners in countries that are beginning to scope and design rice fortification projects.

The journeys of Bangladesh, Bhutan, India and Sri Lanka started 10+ years ago are described in detail and demonstrate that fortified rice is effective in addressing micronutrient deficiencies, it is widely accepted by local populations and it contributes to improving the diet of millions of vulnerable people.

This policy guide gives access to essential information on the critical steps and actions that maximize chances of successfully bringing fortified rice to scale and in particular how banking on social safety nets contributes to the nutritional improvement of the food baskets of the most vulnerable.

Introduction

Half of the total undernourished people (an estimated 350.6 million people) and over half of the people affected by moderate or severe food insecurity in the world live in Asia (an estimated 1.03 billion people).[ii] The lack of dietary diversity and high consumption of processed and unhealthy foods is a key contributor to undernutrition, micronutrient deficiencies and obesity across the life stages in Asia.

Food fortification can help hundreds of millions of people access essential nutrients early on in their lives, without changing food habits, so they can reach their full potential. For example, by improving a child's nutrition it will allow them to do better in school, grow into more productive adults, contributing more to society and improving economic benefit.[iii] Countries in North America and Europe have been adding micronutrients to foods since the 1920s. This has led to the virtual eradication of goitre, rickets, beriberi, and pellagra in these regions.[iv]

In terms of food consumption, what distinguishes Asia from the rest of the world is its great dependency on rice: it is the basic staple for most of the population, including the region's 560 million poor. While it provides for up to 70 percent of the energy intake in some Asian countries, it is known to be a poor source of micronutrients.[v]

Although the past ten years have seen a tremendous increase in government engagement with rice fortification, currently, only 1 percent of industrially milled rice is fortified. Main barriers to the global adoption of fortified rice include cultural sensitivities around rice, supply chain and technological challenges and collaboration with multi-sectoral stakeholders. These issues have steadily been addressed in a number of countries however, and their experience shows that there is now an increasing potential to scale up rice fortification in the region.

Over the last decade, WFP has been working with governments and the private sector in twelve countries[1] in South and South East Asia to generate evidence, advocate for changes in policy framework to support rice fortification and advance scale-up of rice fortification programmes. WFP has been providing technical assistance to local and regional governments and private sector partners on policy and regulatory frameworks, advocacy, analysis, production, food safety, programming, demand creation and consumer awareness. WFP has also been leveraging multi-sectoral partnerships for rice fortification between government entities (e.g. health, social affairs, food, agriculture, education, trade, finance), civil society, technical partners, academia and the private sector.

Several countries in the region have moved beyond pilot implementation of rice fortification and scaled up to large-scale national safety net programmes while others are still in the early days of programme implementation. Bangladesh, Bhutan, India and Sri Lanka in particular have witnessed significant successes in recent years, banking on national social safety net programs to reach vulnerable population groups.

1. Bangladesh, Bhutan, Cambodia, India, Indonesia, Laos, Myanmar, Nepal, Pakistan, Philippines, Sri Lanka, Timor Leste

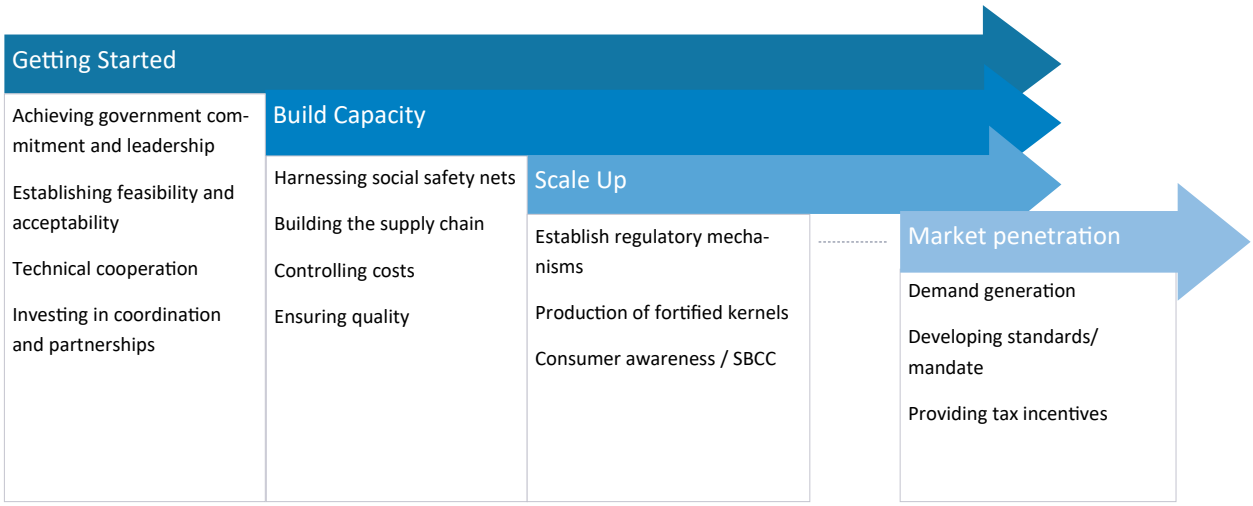
Country Journeys

Capital investments required by the private sector to start with rice fortification can appear prohibitive in the early days and it is necessary to demonstrate the commercial viability of producing fortified rice in the long run. Generating robust evidence of organoleptic and cost acceptability, effectiveness and investing in consumer awareness / demand creation are essential for voluntary fortification and private sector engagement to ensure that the target population understands the nutrition benefits of fortified foods and demands fortified rice.

The unique approach used in South Asia was to leverage social protection programmes to reach vulnerable populations at scale with fortified rice. In Bangladesh and India, the journeys started 10 years ago while it took 5 to 6 years for Bhutan and Sri Lanka to reach pilot implementation phase. Yet, all countries still have a long way to go until fortified rice is fully mainstreamed in social safety nets and through commercial channels.

Although the size, complexity, environment and political interest greatly vary from one country to another, the analysis of the experience of rice fortification in these four countries suggests four critical steps to take rice fortification to scale as highlighted in Figure 1.

Figure 1: Critical steps for scaling up rice fortification



Pilot projects should be used to serve as proof of concept and their multiplication helps to strengthen the supply chains, reduce operational costs and catalyse sufficient demand for private sector to invest across the supply chain, from blending fortified rice to more capital and technical-intensive processes such as production of fortified rice kernels.

Each of the four countries have experienced a tipping point where governments' commitment, leadership and investment accelerated indicating that fortified rice had become a part of the solution-mix used to eradicate micronutrient deficiencies. Including fortified rice in social safety nets contributes to the overall nutritional improvement of the food baskets and work is ongoing in the four countries to mainstream fortified rice within both national social safety nets and across commercial distribution channels.

The present section documents the policy journeys of Bangladesh, Bhutan, India and Sri Lanka with detailed country journey timelines highlighting critical milestones undertaken in each country.

Bangladesh

Evidence-Based Programme Scale-Up

South-South Cooperation

Harnessing Social Safety Nets

Since 2013, the Government of Bangladesh, WFP and other multisectoral stakeholders have worked in partnership to scale up the production of fortified rice, making it more widely accessible and available. The Government of Bangladesh has taken keen interest and allocated funds to mainstream the distribution of fortified rice among ultra-poor households through its largest national safety net programmes.

As a result of these joint efforts, since the start of the programme, the number of people in Bangladesh with access to fortified rice has grown from 30,000 in 2013 to more than 5 million in 2020.

IMPROVING THE NUTRITIONAL VALUE OF SOCIAL SAFETY NETS' FOOD BASKETS

The programme built upon existing public and private partnerships, and earlier evidence-generation that included a rice landscape analysis and a micronutrient survey that highlighted the need for food fortification.

Since the inception of the programme, WFP has been working in partnership with Bangladesh's Ministry of Women and Children Affairs, Ministry of Food and Ministry of Disaster Management and Relief to mainstream the distribution of fortified rice into large-scale social protection programmes, such as the Vulnerable Group Development (VGD) programme and the Food Friendly Programme (FFP). An acceptability trial conducted in 2014 confirmed acceptability of fortified rice and an effectiveness study demonstrating the impact of fortified rice on micronutrient status of women and children receiving rice consumed at household level provided robust evidence for the Government to expand the distribution of fortified rice to other social safety nets while enhancing the nutritional value and micronutrient content of foods distributed.

TECHNICAL COOPERATION AND SOUTH-SOUTH COLLABORATIONS

Developing a successful, autonomous supply chain for rice fortification encompasses both production and testing of fortified rice. Transfer of technology was brought about through in-country training as well as exposure visits to foreign countries. Rice millers were taken to extrusion plants in China to learn about the extrusion process for production of FRK. Laboratory technicians of the two national reference laboratories, the Bangladesh Standards and Testing Institution (BSTI) and the National Food Safety Laboratory (NFSL), were first taken both to the USA to learn testing methods for 6 micronutrients and to India to finalize their training. In turn, Bangladesh hosted Nepal and Sri Lanka delegations to pass on their experience. For Bangladesh, building in-country testing capacity through technical partnerships with public testing facilities was paramount to reduce total lead-times and increase cost-efficiency of the entire fortified rice supply chain. The south-south exchanges contributed to the strengthening of national capacities, development of blending operations and overall take up of rice fortification in Nepal and Sri Lanka.

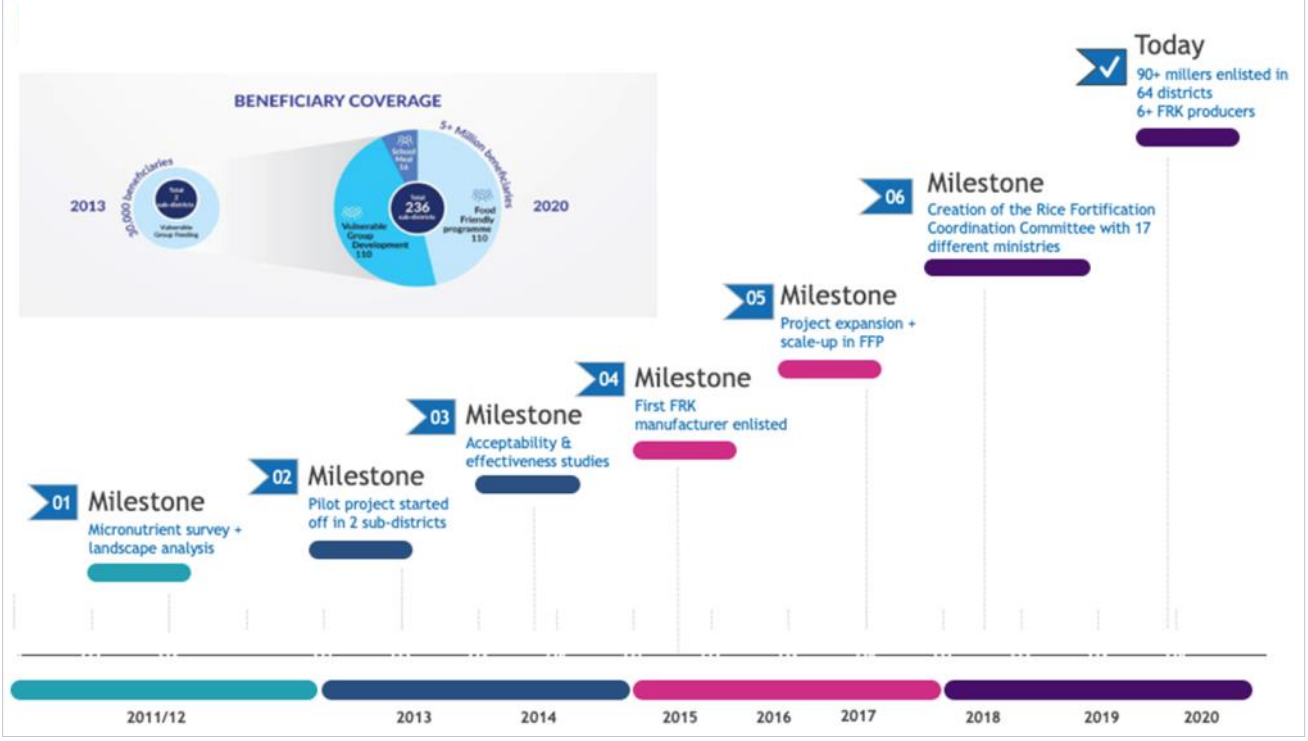
BUILDING THE DEMAND AND RAISING AWARENESS

WFP is also investing in innovative approaches to raise awareness and increase demand for fortified rice among the wider population in rural and urban areas. For example, the national Rice Fortification Coordination Committee (RFCC) has approved and endorsed a television commercial on fortified rice, which was broadcasted across private and national channels. The commercial helps to raise awareness of fortified rice among the general population, thereby supporting the gradual process of commercialization.

KEY SUCCESS FACTORS

- The Government's commitment to integrate fortified rice into large scale, national social safety net programmes provided private sector partners with a steady market for FRK and fortified rice.
- Robust evidence generation demonstrating the impact of fortified rice in reducing micronutrient deficiency to support programme scale up
- Collaboration and synergies with local, national and international partners in providing technical assistance to build national capacity,
- Development of standard specification and its critical role in ensuring quality,
- Building in-country testing capacity to reduce costs and lead-times.

Bangladesh Journey



Bhutan

 Multi-Sector Engagement

 Creating an Enabling Environment

 Building Institutional Memory

Peripheral neuropathy outbreaks amongst boarding schoolchildren suspected to be linked to thiamine deficiencies triggered concerns in 2011 over vitamin B deficiencies in the country and initiated a dialogue between WFP and relevant government stakeholders around ways to improve micronutrient intake. With daily per capita consumption of 471g, rice was identified as the ideal vehicle for fortification. Fortified rice was first introduced in 2017 to 17'000 children enrolled in the WFP school feeding programme. As of 2019/2020, around 90'000 children, 75 percent of school meals, received fortified rice through the national school feeding programme which is now entirely owned and operated by the Government.

LAYING THE GROUNDWORK FOR RICE FORTIFICATION

It took two years (2015 to 2017) of sensitization, engagement and education at all levels of the Government to secure buy-in from relevant Ministries and allow introduction of the first pilot project in Bhutan. This groundwork was paramount to future operational successes of the programme and was based on 3 key pillars:

First, a national rice fortification workshop took place in 2015 where an official delegation from Bangladesh was invited into Bhutan to share their experiences and key successes around rice fortification in their country. The delegation was accompanied by experts from WFP Regional Bureau for Asia and the Pacific (RBB) who could showcase other programmes and experiences being implemented in other parts of the region.

Second, shortly after the workshop, the Rice Fortification Task Force, a multisectoral representation lead by Ministry of Agriculture, was created to spearhead the rice fortification agenda in the country which in turn strengthened the Government's ownership of the programme.

Third, a landscape analysis was conducted in 2016 outlining key industrial, nutritional and political features conducive to rice fortification in Bhutan.

ENSURING MULTISECTORAL COLLABORATION

Introduction of rice fortification through the school feeding programme required coordination with the ongoing micronutrient supplementation of school children. Multisectoral collaboration across Ministry of Agriculture, Ministry of Education and Ministry of Health was key to create an enabling environment in the country that prepared for successful implementation of rice fortification.

BUILDING INSTITUTIONAL MEMORY

Staff turnover, both internally and externally, can become a threat to the smooth delivery of the expected outcomes and long-term durability of the project. To build and maximize institutional memory, policy documents were developed to document the key milestones and an institutional video showcasing government officials presenting the rice fortification journey in Bhutan was created that serves both as advocacy tool as well as an onboarding material for newcomers to the team(s).

KEY SUCCESS FACTORS

- Educating, engaging and involving all stakeholders prior to piloting the first rice fortification project enabled building strong foundations for rice fortification,
- Forming a multisectoral platform led by the Government empowered and increased its ownership of the programme,
- Hosting government representatives from other countries that had successfully implemented rice fortification participated to building confidence of national stakeholders.

Bhutan Journey

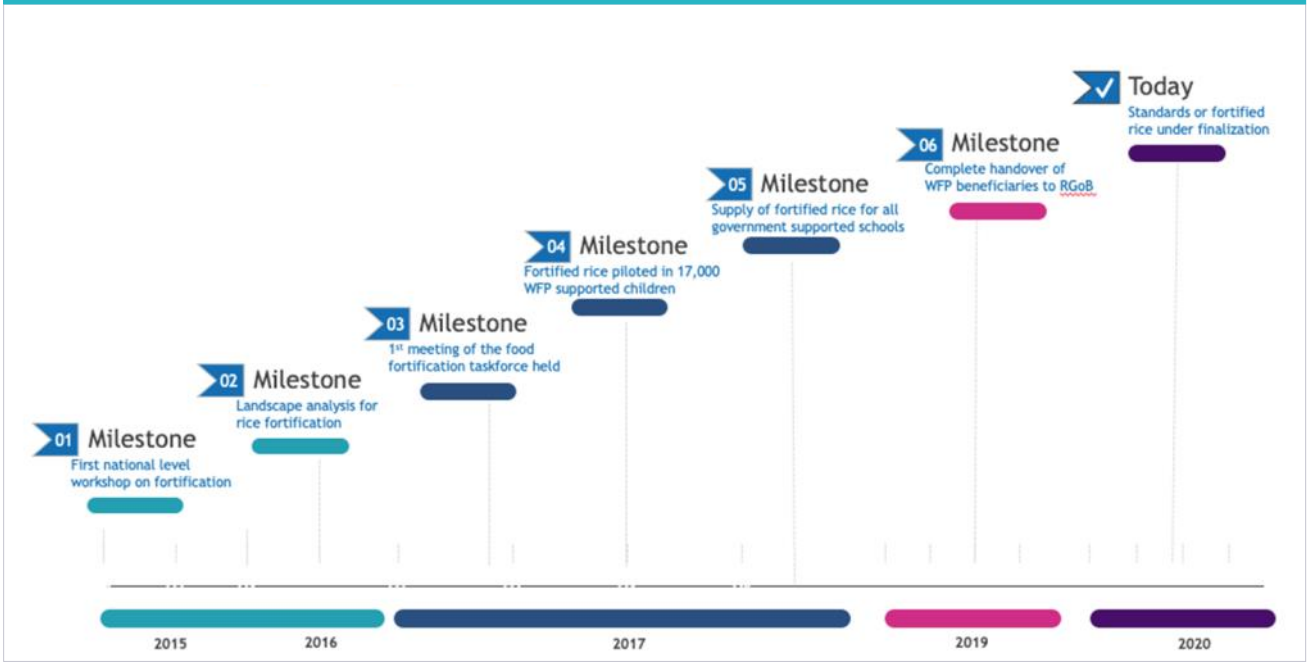


Figure 2: Evidence generation steps

1. Delegation visits helped build the business case for rice fortification

2. Institutionalizing the task force helped cement national ownership

3. Landscape analysis triggered operational implementation

4. Private sector engagement helped with operationalizing the project

BHUTAN POLICY JOURNEY

India

Evidence Generation

Harnessing Social Safety Nets

Improving Local Systems

Over the past 8 years, evidences have been generated on the effectiveness of fortified rice and various pilots have been conducted on rice fortification in multiple States on operational feasibility. Four studies were conducted on school aged children demonstrating the efficacy and effectiveness of fortified rice in improving micronutrient status.[vivii] Rice fortification standards were operationalized in 2016 and gazetted in 2018 and in 2019 the Government of India invested 28 million US in rice fortification for a new Centrally Sponsored Pilot Scheme for "Fortification of Rice and its Distribution under Public Distribution System".

PILOT TO SCALE APPROACH

The unique approach developed and used by WFP in India consisted of using the pilot to scale-up approach by multiplying the numbers of pilots, over a significant enough period of time in order to obtain and ensure Government buy-in in the programme. Once projects are completed, the objective is to hand back the programme to the local Government who then will have built capacity and capability to continue rice fortification programme beyond the pilot phase.

INVOLVING GOVERNMENT ENTITIES IN ALL STEPS OF THE PROJECT

From baseline studies, to monitoring and end line evaluations, the involvement of different stakeholders and government counterparts across the National and State level and across various Ministries and Departments from the onset and throughout the journey has been a key success factor that 1) helped them increase confidence with the intervention and 2) demonstrated that initial concerns over safety were unfounded. Costing out precisely how much it would take for Governments to take over, building their capacities once WFP transitions out, developing a clear handover plan and building local Governments' confidence in taking over contributed to ensuring a smooth transition following each project.

THE POWER OF BUILDING PARTNERSHIPS

While WFP actively advocated for rice fortification throughout the years, it also benefited from and participated in a collective effort led by a network of 11 agencies and international non-governmental organizations (INGOs) whose mandate was to encourage staple food fortification. This concerted effort allowed to 1) position rice fortification as part of a broader staple food fortification effort, 2) align all interventions and actors of the field and 3) build credibility and coherence at local and national levels.

Study tours within and outside India, leveraging south-south technical cooperation, have also been instrumental in developing collaborations and building national capacities.

KEY SUCCESS FACTORS

- State-level and national-level Government involved at each step of the process from the onset,
- Multiple pilot projects implemented across different states provided ongoing visibility at National level,
- Piloting rice fortification in the Prime Minister's constituency raised the profile of rice fortification nationally,
- Several implementation models have been developed, costed out and tailored to the local set-ups,
- Persistent advocacy efforts and sustained technical and capacity strengthening support to the Government by WFP and in country technical partners

India Journey

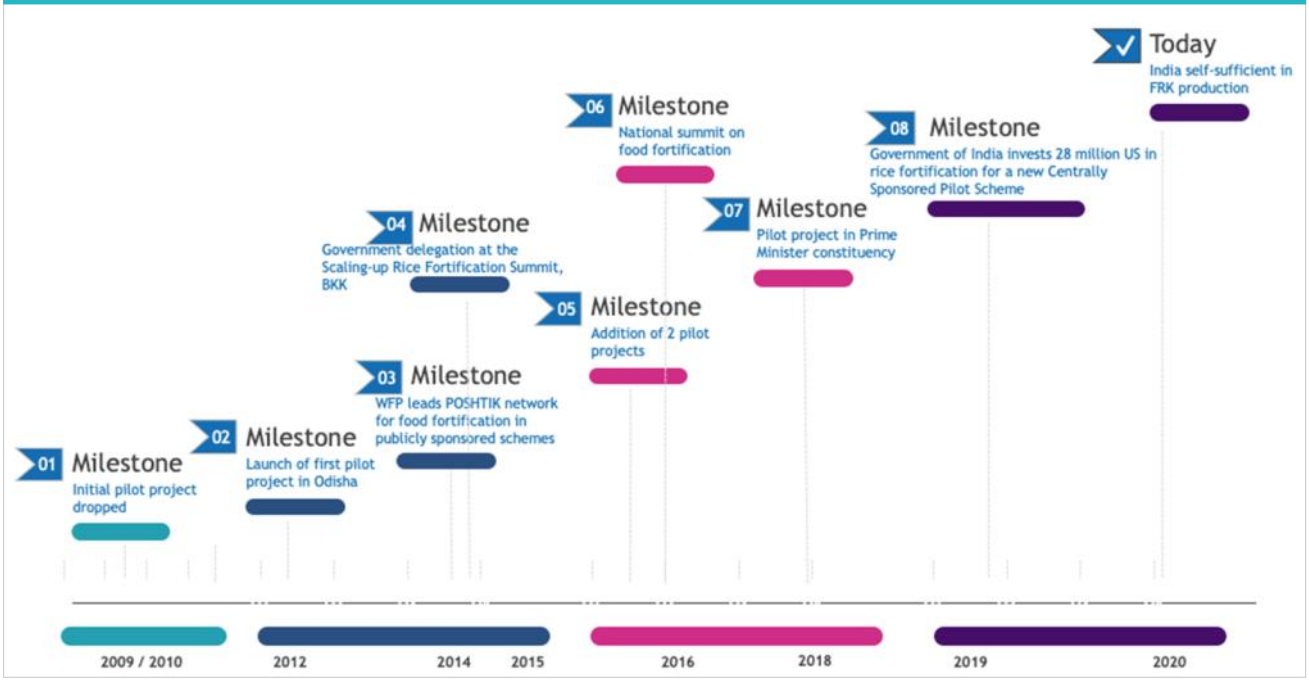


Figure 3: Pilot to scale approach

Introduce proven interventions

Demonstrate the intervention at scale, over a considerable period of time and in different contexts

Evaluate the impact on:
- Health
- Acceptability

Take learnings to the Government at the national level and advocate for inclusion into government schemes and programmes

Provide technical assistance to Government at State-level to scale up

Sri Lanka

Evidence-based Programme Scale-Up

An Incremental Approach

Building Institutional Memory

More than 5 years of effort, using a phased approach, resulted in the Cabinet of Ministers officially endorsing the use of fortified rice in the National School Meals Programme (NSMP) and encouraging the development of standards and regulatory mechanisms for voluntary fortification. This reflects highest policy level commitment and led to a pilot project to include fortified rice in the NSMP of Anuradhapura district in 2019.

The Sri Lanka experience of engaging with the Government highlights the importance of a stepwise approach, employing various strategies including evidence-generation, policy and programme advocacy, capacity strengthening and regional exchanges to ensure national ownership of the programme.

GENERATING EVIDENCE TO FILL KNOWLEDGE GAPS

The creation of a technical advisory group, chaired by the Government, allowed to secure high-level political commitment while also identifying information, data and knowledge gaps to be answered to further secure political engagement.

Findings from a Fill the Nutrient Gap (FNG)[viii] study showed that market availability of fortified rice could decrease the cost of a household's nutritious diet by 50-60LKR per day (13 percent) while fortifying rice in the current SMP could further reduce the cost of a school child's nutritious diet.

DEFINING A COUNTRY ROADMAP FOR RICE FORTIFICATION

The evidence gathered throughout the first years of the project culminated in a national rice fortification workshop that defined a roadmap and action plans for rice fortification in the country. One of the outcomes of both the workshop and the evidence generated throughout the initial years took the form of a memo that sought to obtain approval to streamline rice fortification into the national school feeding programmes. This then in-turn led to the implementation of a 1-year pilot project that began in 2019 and ended in March 2020. As immediate follow-up, a multi-scenario costing analyses to inform advocacy efforts and fill gaps/address concerns is being conducted. Plans are now to scale up the distribution of fortified rice as part of the NSMP to 12 of Sri Lanka's 25 districts, covering the Central, Uva, Southern, North Western, East and North Central provinces. The project intends to provide fortified rice to 700,000 primary school students, aged 6-12 years by 2022, or 65 percent of the total number of primary school children being reached through the NSMP.

CREATING AN ENABLING ENVIRONMENT FOR PUBLIC-PRIVATE PARTNERSHIPS

Rice fortification thrives in an environment where public- and private-sector actors trust and collaborate with one another. Through the technical advisory group, actions have been taken that will contribute to creating the necessary legislations and standards which support appropriate regulation for private-sector engagement and voluntary fortification initiatives. The Scaling Up Nutrition (SUN) Business Network (SBN) has proved a useful platform with private sector members embarking on production of fortified rice. The SBN has also helped raise the interest of the garment industry in introducing fortified rice into workplace canteens.

KEY SUCCESS FACTORS

- Establishing a technical advisory group chaired by government entities maximizes government ownership, leadership and collaboration,
- Conducting a rice landscape analysis and acceptability trials help build robust evidence,
- Developing a national roadmap and action plans contribute to mobilizing partners towards a common goal and agenda,
- South-south exchanges with India and Bangladesh on programme design and standard setting have been key to sensitize, educate and build national capacity.

Sri Lanka Journey

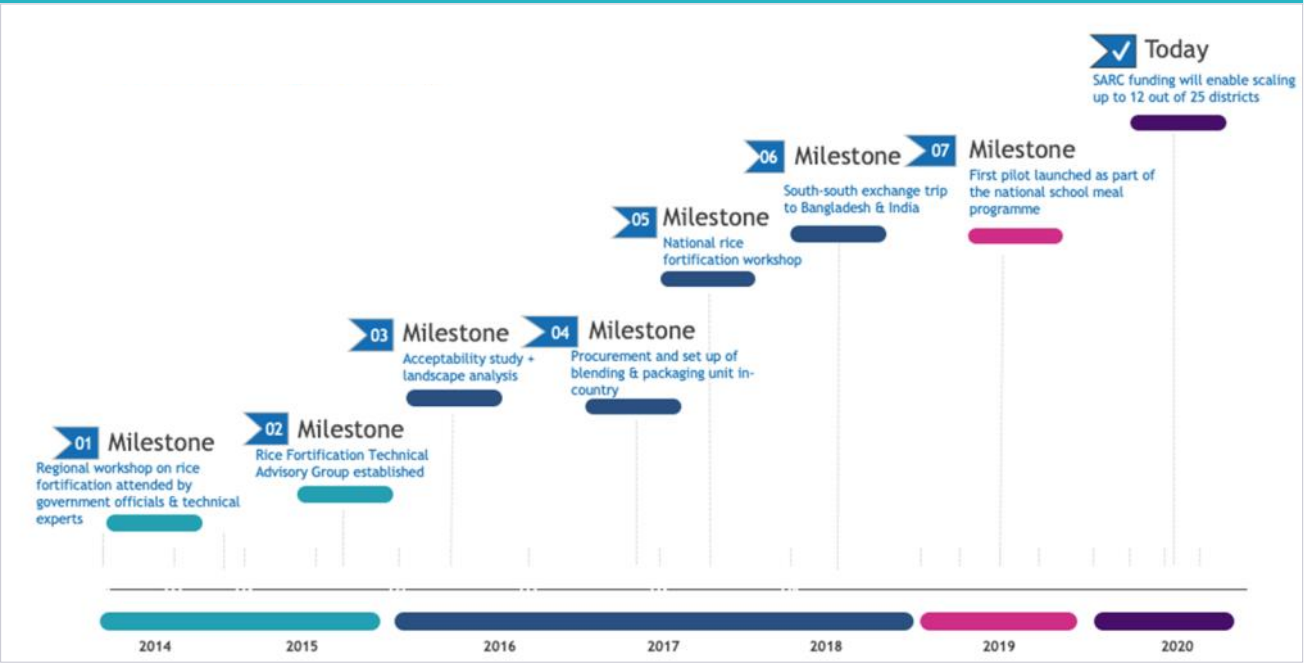


Figure 4: Evidence generation steps

1. Conduct a landscape analysis to determine the potential of the intervention

2. Undertake an acceptability trial to prove that fortified rice is accepted by the local population

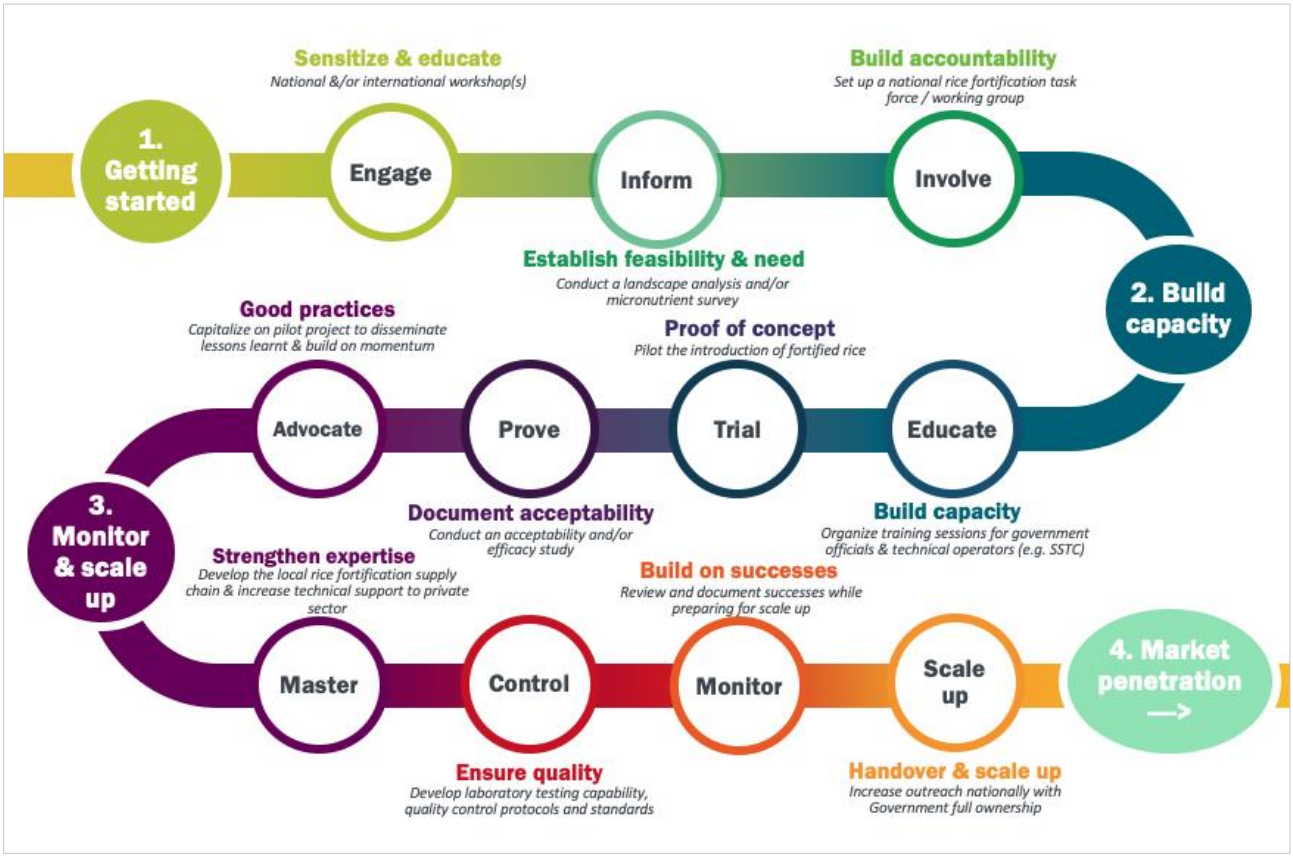
3. Establish in-country operational capacity in support of future programme scale-up

4. Regional exchanges to ensure national ownership of the programme

Summary of critical steps and enabling factors

A number of critical steps and actions that maximize chances of successfully implementing rice fortification programmes were identified across the four countries and are detailed in this section.

Figure 1: Visual pathway for countries embarking on rice fortification



1. Getting Started

COMMITMENT

Securing interest and commitment of key stakeholders requires credibility and expertise. In this context, experience and knowledge sharing are critical to attend to potential misconceptions and/or reluctances that partners may have, and to establish confidence. Programmes should be framed in line with the Government's strategic priorities and contribute not only to the health and nutrition of local communities but also to the development of local expertise, infrastructure and resilience.

The expertise doesn't necessarily need to be locally available from the start. National, regional or international forums and workshops offer a great setting to start building momentum, educate, sensitize and showcase different country-level experiences and operational successes.

Lessons learned on laying the ground for long-term impact:

- Buy-in from decision makers is a pre-requisite for making rice fortification a reality.
- Involving government entities in all steps of the process is key.
- Learning from other countries through multilateral forums is a great way to engage with government and key stakeholders.
- Solid evidence and experience sharing adds credibility to the intervention.

ESTABLISH FEASIBILITY AND ACCEPTABILITY

At inception, the design of rice fortification projects must seek to generate strong evidence on relevance, acceptability, effectiveness and potential for scale up. In South Asia, this has been done using four key tools:

1) In-depth situation analyses which seek to (a) analyze micronutrient status and rice consumption data to justify the intervention, either by means of a national micronutrient survey or through alternative situation analysis such as FNG studies, (b) study operational structures, (c) collect data on the supply chain and (d) map out potential entry points to introduce fortified rice and evaluate ease of implementation and complexity in the rice supply chain. Landscape analyses can either be national, looking into the overall rice value chain or tailored specifically to regional, sub-regional areas or even at the level of social safety net programmes.

2) Conducting acceptability studies are a crucial step to demonstrate that fortified rice is accepted by the target population including especially by school children and canteen cooks preparing meals in the case of school feeding programmes. Such studies also serve as basis to estimate beneficiaries' understanding of the benefits of fortified rice.[ix]

3) In settings where there is a high level of sensitivities around rice, effectiveness studies help demonstrate the impact of fortified rice on micronutrient deficiencies.

4) Conducting operational feasibility studies is also important, in particular to inform programme design.

Lessons learned on robust evidence generation :

- Acceptability and effectiveness studies help increase government's confidence in fortified rice as a tool to combat micronutrient deficiencies and incentivize the private sector to invest in rice fortification.
- Market assessments demonstrate the viability of fortified rice in the commercial market as well as the need for increased awareness raising activities.
- Assessment of quality control measures strengthens the regulatory and policy framework.

SOUTH—SOUTH TECHNICAL COOPERATION

South-south cooperation, study tours and exposure visits to more advanced countries in rice fortification or industrial engineering like Costa Rica, India or China are powerful tools to gain exposure, build capacity, engage private sector actors and in-turn to stimulate interest and investment.

These south-south exchanges have contributed to the strengthening of national capacities, development of blending operations and overall take up of rice fortification nationally.

They offer unique opportunities for governments to gain exposure to the rice fortification process, learn from other countries on their experiences implementing rice fortification programme, get the views of peers and realize how much rice fortification is already being used as a safe, effective tool in the fight against micronutrient deficiencies. For pioneer countries that have acquired a wealth of experience, south-south study tours offer an opportunity to showcase their successes and acknowledge their leadership and technical expertise.

COORDINATION AND PARTNERSHIPS

Introducing fortified foods requires multisectoral coordinated advocacy efforts to encourage governments to create supportive policies and regulations. Ministries of Agriculture, Education and Health are key players at the National level to create a policy and regulatory environment that is supportive of large-scale fortification and conducive to a fair trade and business environment.

While WFP acted as a catalyst for rice fortification in all 4 countries, collaboration with national and international partners has been instrumental in bringing the projects to scale.

Lessons learned on collaboration and synergies with local, national and international partners:

- Scale cannot be achieved by working in isolation and in particular in cross-sectoral projects.
- Working in partnership with local and international organizations is essential to success, allowing for expertise and networks to be leveraged for awareness raising, capacity strengthening, and development of policy, regulatory and monitoring frameworks.
- Multi-sectoral coordination and public-private partnerships are necessary to enable the implementation and scale-up of rice fortification programmes.

STRUCTURING THE APPROACH

Bringing about coherence and mobilizing consensus are key to the long-term credibility and sustainability of rice fortification programmes and this can be pursued at two levels: internally within the lead organization, and externally, amongst constituents of the micronutrient/ nutrition and food fortification ecosystems.

Lessons learned from country teams' strong and diverse technical capacity:

- A dedicated rice fortification team, consisting of technical experts, facilitates partnership with multi-sector local and international experts.
- Support and leadership from senior management is critical to programmatic success and sustainability.
- Strong technical experts at the regional level provide invaluable inputs to various programme.

2. Build Capacity

HARNESSING SOCIAL SAFETY NETS

National social safety nets, including school feeding programmes, offer excellent settings to prove operational feasibility and inform programme design and scale up. Initial projects are used as proof of concept to demonstrate acceptability of fortified rice by local populations whose diets fall short of essential nutrients, to test operational models, to understand the costing / cost-effectiveness and to gain experience and build local expertise.

Different projects can be introduced in sequence, in different states, directly built into the Government's already existing food-based programs. This approach guarantees that the Government is an integral part of the project development from the onset, thereby contributing to securing their long-term buy-in. The "pilot to scale approach" whereby pilot projects are conducted for a significant enough period of time (around 3 years) ensures that local governments build enough capacity to be ready to take over at the end of the project cycle. This method can prove particularly effective in the context of a large, fairly decentralized country.

Lessons learned from banking on social safety net projects:

- Governments' existing food-based systems can be used to first introduce fortified rice to the most vulnerable in need for nutritious diets
- An incremental approach to piloting projects allows testing several different implementation models and build credibility with the local and national governments along the way.
- The length of pilot projects should be as long as possible to ensure that proper hand-over plans are being designed.
- More pilot projects add pressure to the central government, particularly in large, decentralized countries.
- Pilot projects allow to build local supply chains and develop models that match supply chains of government

BUILDING THE SUPPLY CHAIN

Functional and cost-effective supply chains for FRK and fortified rice are an essential driver to bring rice fortification to scale and sustain it. Building strong supply chains brings about technology transfer, new infrastructures and access to new skills and technical know-how. Rice fortification therefore does not only present itself as a public health intervention, it also provides an occasion to bring technology and enhance the food systems capacity of the country through public-private partnerships.

Engagement, capacity building and investment from the private sector are critical to provide programmes with reliable supply sources of fortified rice, and to overcome key challenges including high costs, risks, and a difficult business environment.

Although a government may in the course of the programme endorse a standard for fortified rice or FRK, quality control is an ongoing challenge for all stakeholders. Implementation of a country -specific quality control and assurance system is an integral part of establishing a self-sufficient supply chain. Quality management systems, quality controls and a regulatory monitoring framework

Lessons learned from private sector engagement and investment:

- Different private sector partners are needed to produce fortified rice: premix suppliers, FRK producers and millers.
- Achieving sustainable demand for fortified rice, through national safety nets and commercial markets is essential to ensure private sector investments.
- Finding local solutions to developing necessary equipment improves cost-efficiency and sustainability.
- Understanding the regulatory environment, taxation of premix mixtures, is a major concern for FRK producers because it has a significant impact on the retail price of fortified rice.

with standard and regulation to monitor and enforce compliance all have a critical role in ensuring quality and building an inclusive food system.

CONTROLLING COSTS

Improving cost-efficiencies along the supply chain will improve the cost-effectiveness of rice fortification as an intervention to increase affordability of a nutritious diet. The series of core cost components specifically related to making fortified rice available at different steps depends heavily on the existing rice supply chain. Location, rice prices, energy prices, cost of capital, transport costs etc. all have their impact and are very context specific. The cost of fortifying rice will therefore vary significantly from one setting to the other. However, experience shows that the costs involved in rice fortification will decrease substantially when large-scale production is reached creating economies of scale, and when competitive markets are created

Lessons learned from operational measures improving cost-efficiencies :

- Finding local solutions to developing necessary equipment improves cost-efficiency and sustainability.
- Partnering with local engineers and millers to build equipment instead of importing it improves cost-efficiency while building in-country capacity.
- Local production of FRK can significantly reduce costs.
- Cost analysis can help identify areas across the supply chain to improve processes.
- Building in-country testing capacity significantly reduces costs of production and lead-time of deliveries.

ENSURING QUALITY

Along with quality management, ongoing quality control of process outputs i.e. FRK and fortified rice are necessary to ensure that they meet standards and criteria. Quality controls should be performed at two levels: Internally, as part of the manufacturer's output release procedures and through third-party testing to ensure compliance with standards and regulations in place. Internal quality control mechanisms include blending ratio checks through weight method, inventory management and regular visits from food authorities.

Monitoring and inspection checklists for quality checks of government officials or management of schools, in the case of school feeding programmes, are a first tool that can be used to monitor quality. When embarking on rice fortification, the national capacity of a given country to adequately test micronutrient content in FRK or rice can prove limited due to either lack of in-house laboratory testing equipment, technical expertise or access to key reagents. In the early days of a programme, reference regional laboratories can therefore be used by countries in the midst of building in-country testing capacity.

Lessons learned from the critical role of ensuring quality

- Assessments of quality assurance and control systems need to be carried out to understand the current situation and identify entry points for further support.
- Assessment of quality control measures strengthens the regulatory and policy framework for monitoring rice fortification to comply with food safety standards
- Enhancing the capacities and ownership of national technical institutions is key to ensuring effective quality control standards of fortified rice.
- The formation of national quality control standards is an essential step to ensuring best practices, and to establish a commercial market for fortified rice.

3. Monitor and Scale Up

REGULATORY MECHANISMS

As part of the ongoing support to enhance in-country technology and capacity, efforts to build and increase quality management systems of all actors of the supply chain, from FRK manufacturers to millers and quality laboratories are required. Developing approved lists of FRK manufacturers and rice millers that comply with national and international quality standards not only contributes to give visibility to those who have invested to improve supply and quality but it also creates transparency to the overall sourcing process for government programmes.

Collaboration with bureaus of standard to develop regulatory monitoring frameworks with standards and regulations to monitor and enforce compliance has been a key angle of all projects which have led Bangladesh and India for example to develop and implement national rice fortification standards.

SCALING UP

To scale up rice fortification intervention designing initial projects within governments' national safety net programmes are critical and provide three benefits:

1) Queries of both local and national stakeholders are being answered along the way.

2) All partners of the food value chain acquire collaterals, build capacity and experience and thereby facilitate autonomy across all levels and partners.

3) In particular in large, decentralized countries: the more pilot projects the more evidence is built and the more visibility rice fortification gains throughout the country.

The government's continued and demonstrated support to and belief in the rice fortification intervention is instrumental in stimulating private sector's willingness to invest. The example of Bangladesh is particularly enlightening in the virtuous cycle that was created (cf. Bangladesh country journey Section 3).

Public-private partnerships are formed at every step in the process, from the early sensitization stage through to providing support and technical assistance to producers of micronutrients, producers of FRK and millers who blend fortified rice. Enlisting manufacturers under government / WFP list of approved manufacturers further gives them opportunities to participate in tenders, amortize investments made and further scale up operations.

4. Market Penetration

Scaling-up through commercial markets via voluntary or mandatory fortification requires long-term investment and engagement to raise awareness and improve knowledge on food and nutrition to ensure behavioural change and incentivize consumers to opt and search for more nutritious foods.

Private sector marketing rarely targets the poor as consumers; awareness and affordability are also critical challenges in engaging the poor to purchase fortified rice. Therefore, innovative marketing strategies, SBCC and business incentives are needed to ensure that the most vulnerable groups can access fortified rice in the long term.

The experience from South Asia suggest that the social safety net programs act as a catalyst in creating initial demand and private sector interest and are an important entry point for wider market penetration of fortified rice.

Conclusions and policy considerations

This policy guide is a call to action for policymakers and health professionals to improve quality and affordability of diets by increasing access to fortified rice, for vulnerable populations benefiting from social protection programmes.

In Asia, rice is the staple that offers the best potential to reach large numbers of vulnerable people with nutritionally improved diets. Scaling-up rice fortification in the region requires policies to provide better access to nutritious foods to lower-income consumers through for instance social protection instruments, including school feeding programmes and healthy public procurement policies.

The journeys of Bangladesh, Bhutan, India and Sri Lanka have shown that it is possible to improve the diet of millions of vulnerable people with fortified rice. The lessons learnt point out to three key policy actions to act upon in order to unlock the potential of fortified rice:

I) USING SOCIAL SAFETY NETS TO INTRODUCE AND MAINSTREAM FORTIFIED RICE

The operationalization of fortified rice distribution channels to reach groups who can most benefit from the consumption of fortified rice is key to provide necessary incentives for production and supply in the initial phase. Experience from Bangladesh, Bhutan, India and Sri Lanka shows that banking on social protection programmes as a way to first introduce fortified rice offers a great setting for piloting and take up.

As initial entry point, distributing fortified rice within existing national safety net systems helps in building local and national ownership of the intervention across all stakeholders, from public to private organisations, while guaranteeing steady demand for fortified rice which is essential to ensure private sector investments.

Across all 4 countries, WFP has been instrumental in catalysing investments in robust evidence generation to ensure strong government buy-in for the introduction of fortified rice within national social assistance programmes and stimulate private sector's interest.

II) CREATING AN ENABLING ENVIRONMENT THROUGH PUBLIC PRIVATE PARTNERSHIPS

Fortification programs are most successful when driven by partnerships and trust between the public- and private-sector actors with a final public health objective. Multisectoral collaboration between various Ministries, Agriculture, Education and Health in particular, as well as with academia and local and international INGOs helps create an enabling environment for rice fortification, with each stakeholder contributing their individual expertise and sphere of influence. This includes an appreciation and recognition of the important social benefits as well as the economic incentives required to deliver successful and sustainable fortification programming.

The rationale for food fortification is widely accepted by the public sector, which has a key role to create the legislation and/or standards which support appropriate regulations for rice fortification and to establish clear rules which ensure the public interest.

Because the private sector is the one undertaking the actual fortification processes, its motivation and interests require a special focus, including the need to see profitability as markets expand, to enhance brand value through improving nutritional content, and to help ensure fortified foods develop a healthy and productive labour force in low-income communities.[x]

III) INCENTIVIZING THE PRIVATE SECTOR TO INVEST IN BUILDING ROBUST SUPPLY CHAINS

Incentivizing the private sector to invest in building robust supply

chains

Capital investments required by the private sector to start with rice fortification can appear prohibitive in the early days and it is therefore necessary to demonstrate the viability of producing fortified rice in the long run. The government's continued and demonstrated support and belief into the intervention is therefore instrumental in stimulating private sector's willingness to invest. Government's expansion during the scale-up phase is critical to convince the millers to further invest.

Generating robust evidence of acceptability and effectiveness and investing in consumer awareness / demand creation are important steps to further engage the private sector in producing fortified rice as a viable business proposition. WFP has offered technical support when required, partnered with local engineers and millers to build equipment locally instead of importing it thereby improving cost-efficiency and connected interested private sector companies with specialists to facilitate production.

Through the journey of scaling up rice fortification WFP has gained significant technical expertise and experience accompanying governments in the region in their respective journeys to scale up rice fortification. Acting as a catalyser, WFP has been instrumental in building partnerships, alliances and mobilizing governments, nongovernmental organizations, advocacy groups and the private sector in joining efforts to harness the potential of rice fortification in the creation of nutrition focused food systems.

While a purely social platform approach can prove insufficient for sustainable scale-up of fortified rice to achieve public health impact in a 3- to 5-year period, embarking on rice fortification through social protection programmes should be seen as a critical first building block towards creating a favourable environment towards progressive, nation-wide take up.

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Acronyms

BSTI	Bangladesh Standards and Testing Institution
COVID-19	Coronavirus disease 2019
FFP	Food Friendly Programme
FNG	Fill the Nutrient Gap
FRK	Fortified Rice Kernel
GAIN	Global Alliance for Improved Nutrition
INGO	International Non-Governmental Organizations
NFSL	National Food Safety Laboratory of Bangladesh
NI	Nutrition International
NSMP	National School Meals Programme
RBB	Regional Bureau for Asia and the Pacific of the World Food Programme
RFCC	Bangladesh Rice Fortification Coordination Committee
SBCC	Social Behaviour Change Campaigns
SBN	SUN Business Network
SDG	Sustainable Development Goals
SUN	Scaling Up Nutrition
VGD	Vulnerable Group Development
WFP	World Food Programme

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