WORKFORCE NUTRITION AND LARGE-SCALE FOOD FORTIFICATION NUTRITION DIALOGUE

A SYNERGISTIC APPROACH TO COMBATING MALNUTRITION IN NIGERIA

GAIN Convening Paper n°20

May 2025

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Global Alliance for Improved Nutrition

Recommended citation

Nnabugwu C D, Oyekenu O, Ehiabhi G, Otunla A, Akpata J, Onabolu A, Alabi A, Shehu S. Workforce Nutrition and Large-Scale Food Fortification: A Synergistic Approach to Combating Malnutrition in Nigeria. Global Alliance for Improved Nutrition (GAIN). Convening Paper #20. Geneva, Switzerland, 2025. DOI: https://doi.org/10.36072/cp.20

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Acknowledgements

We thank our donors, the Gates Foundation, for advancing large-scale food fortification efforts in Nigeria, and the German Government, for their financial support in improving access to and consumption of safe and nutritious foods in Nigeria. We are also grateful to GAIN colleagues Ludivicus Omollo, Adejoke Adewusi, Olutayo Toromade, Victor Ekeleme, Amarachi Ohaegbulam, Dr. Abass Yusuf, Dr. Michael Ojo, Ifunfun Akinduro, and many others whose invaluable contributions were instrumental to the success of this dialogue. Special thanks to our partner, Civil Society-Scaling Up Nutrition in Nigeria, represented by Sunday Okoronkwo, Executive Secretary, and Kunle Ishola for their critical role in ensuring robust government stakeholder engagement. Finally, we also sincerely thank our facilitators – Dr. Ajieroh Victor, Prof. Folake Samuel, Dr. Olapeju Phorbee, and Dr. Omolara Okunlola – for their thoughtful contributions and expertise.

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SUMMARY

Adequate nutrition is essential for physical and cognitive development, improved health outcomes, and enhanced overall individual productivity, all of which contribute to broader macroeconomic and societal growth. However, malnutrition remains a pressing challenge, particularly in low- and medium-income countries, including Nigeria. Recent findings from the National Food Consumption and Micronutrient Survey reveal multiple forms of malnutrition, including micronutrient deficiencies.

To address these gaps, Large-Scale Food Fortification (LSFF) initiatives, such as rice fortification, and Workforce Nutrition Programmes (WFN) have emerged as synergistic, transformative solutions. While LSFF aims to reach the whole population through fortified staple foods, WFN targets working populations who spend a significant portion of their lives at work with strategies to increase access to and demand for healthier diets by leveraging support and access through employers, cooperatives, and other labour platforms.

In preparation for the 2025 Nutrition for Growth (N4G) Summit, GAIN, in collaboration with the Civil Society Scaling Up Nutrition in Nigeria, hosted a Stakeholder Nutrition Dialogue on 'Workforce Nutrition and Large-Scale Food Fortification: A Synergistic Approach to Combating Malnutrition in Nigeria.' The dialogue brought together 92 stakeholders from diverse sectors and featured keynote presentations, including an update from the Nigerian government on N4G 2025 preparations and thematic group discussions focused on LSFF and WFN. The discussions highlighted the importance of institutionalising WFN and the need to define what constitutes a healthy meal to promote consistency in workplace interventions. Participants also emphasised the potential of an inclusive, well-designed rice fortification programme with strong government buy-in as a vital public health measure to reduce folate deficiency and associated conditions.

KEY MESSAGES

- Most adults consume at least one meal during working hours, making workplaces an important entry point for nutrition interventions.
- There is a need for a WFN policy implementation framework with options for different contexts (e.g. formal, informal, public, private, urban, or rural) and minimum non-negotiable standards for WFN interventions.
- Mandatory rice fortification in Nigeria has great potential to reduce folate deficiency and its consequences (a major public health challenge in Nigeria) given its widespread consumption by Nigerians.
- Small- and medium-scale rice millers should be involved in rice fortification as a means of reaching rural rice consumers.
- Identifying and leveraging synergies between WFN and LSFF programs can enhance efforts to combat malnutrition.
- Fortified foods should be a cornerstone of WFN initiatives, ensuring consistent employee access to essential micronutrients and supporting workforce health, productivity, and well-being.

BACKGROUND AND OBJECTIVE

Optimal nutrition is a fundamental human right and a foundation of human health, wellbeing, and productivity. Adequate nutrition drives physical and cognitive growth, improves health outcomes, and enhances overall individual productivity – ultimately driving economic and societal progress. However, malnutrition remains a pressing challenge, particularly in low- and medium-income countries such as Nigeria, where millions suffer from both overnutrition and undernutrition, including micronutrient deficiencies. Often referred to as 'hidden hunger,' these deficiencies—especially in iron and folate—significantly impact public health and economic development.

Iron and folate deficiencies, prevalent in Nigeria due to limited dietary diversity and reliance on staple foods with low nutrient density (1), impair workforce productivity by causing fatigue, reduced cognitive function, and diminished physical capacity. Among pregnant women, folate deficiency increases the risk of neural tube defects (NTDs) such as spina bifida, leading to lifelong disabilities (2) and affecting future generations of the workforce.

The National Food Consumption and Micronutrient Survey (NFCMS 2021) (3) reported a prevalence of red blood cell folate deficiency of 91% for adolescent girls, 95% for women of reproductive age, and 85% for pregnant women. The findings, juxtaposed with estimated pooled birth prevalence of NTDs of 3.28 per 1,000 births in Nigeria (4), highlight a serious public health concern.

The World Health Organisation (WHO) recognises LSFF as a cost-effective, evidence-based public health strategy to mitigate hidden hunger (5). Nigeria's mandatory food fortification initiative began in 1997 with the Universal Salt Iodisation (USI) program (6). In 2002, Nigeria expanded its fortification efforts to include staple foods such as wheat flour, maize flour, vegetable oil, and sugar, enriching them with key micronutrients like vitamin A, iodine, iron, folate, and zinc (7). Over the years, LSFF has been a longstanding strategy to prevent and address micronutrient deficiencies across various population groups. While LSFF efforts have achieved commendable milestones (8), findings from the NFCMS 2021 highlight persistent micronutrient gaps.

Although voluntary fortification is not central to Nigeria's micronutrient deficiency control strategy, it is encouraged under the country's nutrition policy (9). Rice, a staple with growing consumption due to Nigeria's large population (about 200 million), is a good vehicle to be considered for mandatory fortification (10). Though rice fortification is in the pilot phase in Nigeria through the Promoting Rice fortification in Nigeria project, evidence from other countries indicates that rice fortification effectively reduces anaemia rates and improves folate status among consumers (11).

Despite global efforts, nutrition monitoring systems indicate that the world is off target for meeting key nutrition targets. Nigeria has shown no progress toward anaemia reduction in women of reproductive age with 55.1% of women still affected. Progress toward achieving the diet-related non-communicable disease (NCD) targets has also been limited. Obesity affects 16% of women and 6% of men, while 7% of women and 8% of men are diabetic (12). This lack of progress highlights the need to address malnutrition not only at the community and national levels but also within specific environments such as workplaces, where people spend one-third of their adult lives— often with little or no access to nutritious meals. The workplace presents a strategic entry point for tackling malnutrition and associated diet-related NCDs. Workforce Nutrition (WFN) programmes aim to improve employees' health through interventions including providing access to

healthy foods, nutrition-focused health checks, breastfeeding support, and nutrition education (13, 14).

The LSFF approach, when integrated with WFN initiatives, can help Nigeria substantially reduce the incidence of birth defects and malnutrition, leading to improved health outcomes and productivity. Recognising the importance of WFN and LSFF, the Global GAIN Nigeria, in collaboration with the Civil Society Scaling Up Nutrition in Nigeria (CS-SUNN), convened a Stakeholder Nutrition Dialogue on December 10, 2024, to explore sustainable solutions to Nigeria's malnutrition crisis, guided by the Nutrition Dialogues framework of World Vision and Skills, Systems & Synergies for Sustainable Development's (4SD).

The objectives of the Nutrition Dialogue were to:

1. Enhance understanding of WFN and its potential role in addressing malnutrition.
2. Engage diverse stakeholders in collaborative discussions to identify strategies that promote effective implementation of WFN programmes in various Nigerian work settings.
3. Comprehensively evaluate the possible role of rice fortification in mitigating micronutrient deficiencies that contribute to birth defects like Spina Bifida in Nigeria.
4. Identify opportunities for mandatory fortification and develop actionable policy recommendations to enhance public health outcomes.
5. Promote understanding of the Nutrition for Growth (N4G) Summit 2025 and highlight how this nutrition dialogue aligns with and contributes to its goals.

The event brought together 92 participants (70 in-person, 22 virtually) from the private sector, farmers' groups, food producers and retailers, banks, government/regulatory agencies, premix suppliers, academia, development partners, civil society, and consumers. The dialogue featured a keynote presentation on Nigeria's preparation for N4G, a presentation by the curator on WFN and LSFF to set the tone of the dialogue, and group discussions to generate insights and actionable recommendations.

KEYNOTE PRESENTATION: NUTRITION FOR GROWTH SUMMIT (N4G) 2025 AND NIGERIA'S PREPARATION

The keynote presentation, N4G 2025 and Nigeria's Preparation, was delivered by Dr Goodness Anyanwu of the Federal Ministry of Health and Social Welfare. She noted that malnutrition is a global challenge that is common to all countries and reminded the audience that there are only five years left to accelerate progress towards achieving the global nutrition targets on nutrition under the 2030 Agenda for Sustainable Development. N4G provides another opportunity to make bold and decisive political and financial commitments towards the fight against malnutrition in all its forms. She highlighted the goals of N4G and mentioned the summit commitment guide and Nigeria's N4G commitments across action areas like policy, financial, and programmes.

PRESENTATION BY THE CURATOR

IMPROVING WORKFORCE NUTRITION

WFN programmes are a set of interventions that are delivered through the existing structures of the workplace including corporate offices, factories, or supply chain settings to improve employee nutrition. Since people spend 1/3 of their adult lives at work, the

workplace offers a good opportunity to facilitate access to healthy diets and knowledge about good nutrition for millions of people through workforce nutrition (15).

Good nutrition can significantly affect an employee's energy levels, concentration, productivity, and overall health. By providing WFN programmes (i.e., healthy food at work, nutrition education, nutrition-focused health checks, and breastfeeding support) the burden of malnutrition in various work environments can be significantly reduced, contributing to improved workforce health and wellbeing outcomes.

At the individual level, WFN programmes have been shown to increase job satisfaction and earnings, reduce sick days, improve nutrition knowledge, promote healthier eating habits, lower the risk of NCDs such as diabetes, and support increased duration of exclusive breastfeeding. At business level, the implementation of WFN programmes can reduce absenteeism, improve productivity, lower healthcare costs, significantly lower rates of workplace accidents and mistakes, and increase returns on investment (15).

Workforce nutrition policies play a crucial role in promoting employee health and productivity. In Nigeria, few policy components support workforce nutrition. The Agricultural Sector, Food Security, and Nutrition Strategy (2016-2025) recognises healthy food at work as an entry point under Strategic Priority Area 7, emphasising the need for workplaces to provide healthier meal options (16). Additionally, national policies including the National Health Promotion Policy promotes healthy work environments (17), and the National Policy and Strategic Plan of Action on Prevention and Control of NCDs highlights workplace-focused health promotion and dietary guidance (18).However, gaps remains as there is no specific policy mandating health checks at worksites beyond the general occupational health and safety regulations. Similarly, there are no provisions for antenatal screening for pregnant employees. While government employees are entitled to 16 weeks of fully paid maternity leave and two hours of daily breastfeeding or expression time, the labour law offers only 12 weeks of maternity leave (six weeks prenatal and six weeks postnatal) at half pay, highlighting disparities in in maternity protections for all working mothers across sectors.

Introducing and enacting a workforce nutrition policy that mandates daily meals for both public and the private sector employees could significantly support Nigeria's Human Capital Development. If included as part of the government's Social Investment Portfolio, this initiative could guarantee that workers receive at least one nutritious meal each workday, potentially resulting in improved productivity and overall well-being. Implementation strategies could vary from full employer-sponsored meals, to cost-sharing arrangements with employees, to workplace gardens providing fresh produce for meal preparation.

Another approach to workforce nutrition is to regulate food environments in and around workplaces, ensuring the availability of only healthy, nutrient-rich options in workplace canteens and nearby food vendors. This would require complementary policies such as nutrient profiling systems, food labelling, and restrictions on unhealthy food sales and advertisements near workplaces. Enforcing such policies would promote healthier eating behaviours, reduce diet-related diseases, and contribute to a stronger, more productive workforce in Nigeria (19).

LEVERAGING RICE FORTIFICATION TO COMBAT BIRTH DEFECTS INCLUDING SPINA BIFIDA IN NIGERIA

Micronutrient deficiencies remain a significant public health challenge in Nigeria, particularly among vulnerable groups such as young children, adolescent girls, women of reproductive age (WRA), and pregnant women. Iron deficiency affects 20.7% of children

aged 6–59 months, 4.2% of adolescent girls (10–14 years), 10% of WRA (15–49 years), and 26.1% of pregnant women, increasing the risk of anaemia and impaired cognitive development. Vitamin A deficiency is also widespread, impacting 31.3% of children (6–59 months), 23.6% of adolescent girls (10–14 years), and 27.1% of pregnant women, leading to weakened immunity, vision problems, and increased risk of maternal and child mortality. Additionally, Vitamin B12 insufficiency and deficiency, which can contribute to neurological impairments and anaemia, are prevalent among children (12.6% insufficiency, 2.6% deficiency), adolescent girls (7.3% insufficiency, 2.0% deficiency), WRA (9.5% insufficiency, 1.6% deficiency), and particularly severe in pregnant women (32.1% insufficiency, 11.8% deficiency) (3). Addressing these deficiencies through nutrition-sensitive interventions, fortified foods, and improved dietary diversity is essential to enhancing the health and productivity of Nigeria's population.

Folate plays a critical role in red blood cell formation and DNA synthesis and is especially important during pregnancy for the proper development of the foetal central nervous system. Deficiency in folate, particularly in the early weeks of gestation, is a key contributor to NTDs such as spina bifida and anencephaly. Globally, approximately 300,000 NTDs occur annually (20), with a significant burden in sub-Saharan Africa, including Nigeria.

In Nigeria, the birth prevalence of NTDs is estimated at 3.28 per 1,000 births (4), with regional variations reported across the North-West (21) and South-East (22) zones. Despite the high burden, there remains a significant policy gap in preventive interventions. Although folic acid, the synthetic form of folate, is used globally for food fortification, rice—the most widely consumed staple food in Nigeria with a per capita consumption of 32 kg—remains largely unfortified.

Rice fortification represents a viable and scalable public health strategy to address folate deficiency. Early results from the Promoting Rice Fortification in Nigeria project demonstrate strong consumer acceptability of fortified rice, confirming its potential as a fortification vehicle. However, the absence of a mandatory rice fortification policy limits the reach and consistency of current efforts. Voluntary LSFF approaches have shown low compliance and limited impact. Addressing this gap requires a shift toward mandatory rice fortification in Nigeria to ensure population-wide access to fortified rice, thereby contributing to the reduction of birth defects and other adverse outcomes associated with folate deficiency.

After the presentation, participants were grouped into four groups (two for WFN, and two for LSFF) to have group discussions using guiding questions prepared ahead of the dialogue. Outcomes of the group discussions were presented in plenary by the group facilitators.

PRESENTATION BY FACILITATORS AT PLENARY

SUMMARY FROM WFN GROUPS

Status of WFN programme in Nigeria

There is a general appreciation for the relevance and importance of WFN in Nigeria. However, WFN programmes are implemented more in the organised private sector than in the public sector, and probably not at all in the informal private sector.

In the organised private sector, WFN programmes vary widely, from well-established canteens providing one meal to employees daily, to provision of free or heavily subsidised meals once a week, to having canteens where staff members pay for their food, to

provision of free fruits daily or weekly. Most organisations, however, do not have any WFN programmes. Some private-sector entities also support employee's post-maternity leave with flexible work hours for up to two years and domestic staff support during official trips (relevant interventions for WFN as they can enable breastfeeding).

The Nigerian public sector, on the other hand, does not have any WFN programmes. Currently, there are limited provisions for WFN in Nigeria's labour laws and policies. Some government Ministries, Departments, and Agencies (MDAs) have outsourced canteens within the vicinity of the workplace, but these are not recognised as WFN programmes because there are no deliberate efforts to ensure that these canteens provide healthy and nutritious meals. Some of the MDAs, however, provide creches to support childcare and breastfeeding within the work environment.

In the informal sector, particularly among farmers, workforce nutrition remains largely neglected. There is a common assumption that because farmers produce food, they inherently know what to eat and can access a diverse array of it. However, structured support through farmer associations and out-grower schemes presents an opportunity to integrate WFN into existing labour laws. Currently, interventions for farmers are mostly limited to agricultural inputs and financing, often overlooking their broader health and well-being.

WFN has the potential for a significant multiplier effect—employees who receive nutrition education and counselling can influence the food choices, nutrition, and overall health of their families. When employees are equipped with knowledge and tools for optimising health, nutrition, and wellbeing, they are able to influence their families positively in matters of health and nutrition. A workplace that prioritises nutrition, health, and well-being fosters employee engagement, satisfaction, and productivity. Conversely, poor workforce nutrition can negatively affect employees' financial, mental, and physical well-being, and inaction has costs to workers, employers and society.

WFN programmes can help address all forms of malnutrition including diet-related NCDs through provision of healthy meals, health checks, and nutrition education. This can result in improved productivity and reduced absenteeism due to frequent illnesses. Breastfeeding support (creches or breastfeeding rooms) supports mother-employees' peace of mind and productivity. Free or subsidised meals further ensure that employees eat a healthy meal that is affordable.

For workforce nutrition to be truly effective, it must be embedded in workplace culture, reinforced by discipline, and supported by management.

Challenges Identified for WFN in Nigeria

- **Lack of a clear policy framework:** There is no specific policy on WFN, though scattered policy statements exist within workplace and labour policies.
- **Limited access to nutritious food during working hours:** many workers lack access to safe, nutritious, and adequate meals during work hours. Additionally, meal planning is not a common practice; this highlights the need for nutrition education, meal planning tools, and general awareness on healthy eating and well-being.
- **Lack of reliable access to nutritious food in or around workplaces:** Many workplaces do not have canteens or structured arrangements for securing safe, affordable, and accessible nutritious meals. This results in time lost searching for food, reduced productivity, and increased absenteeism.

- **Workplace and urban constraints on healthy eating:** The demands of urban work life such as long commutes, heavy traffic, and the need to leave home early often lead to unhealthy dietary practices and poor food choices among employees.
- **Food quality and hygiene concerns**: for some organisations that have canteens, meals are not monitored for quality, and hygiene standards. For many workplaces, there are no standards in place to carry out health checks on food handlers.
- **Inadequate support for breastfeeding mothers:** Most public-sector workplaces do not provide breastfeeding spaces or creches, making it difficult for nursing mothers to exclusively breastfeed their babies for the first six months. This has been shown to affect absenteeism rates (23) [cite] and workers' productivity. Space can be a constraining factor for small organisations. This challenge is further compounded by labour laws that provide for 12 weeks maternity leave—6 weeks pre – and 6 weeks post-delivery. In most public-sector workplaces, creches and breastfeeding spaces are not available.

Recommended Actions to Address Identified WFN Challenges

1. Government Ministries, Departments and the Civil Society Organizations

- **Agree on the definition of a healthy meal:** Collaborate with nutrition experts, the Federal Ministry of Health and Social Welfare (FMoHSW), and other key stakeholders to define what constitutes a nutritious meal to ensure clarity in what to promote as nutritious foods within workplace settings.
- **Develop and enforce the right policies, systems, and programmes to implement WFN across all sectors** The new policy on WFN should address breastfeeding support effectively while responding to enshrined public service rules and labour laws, and ensure that mental health and overall wellbeing are part of the package to the extent appropriate and feasible.
- **Design a flexible policy implementation framework:** Develop a framework adaptable to different contexts (formal, informal, public, private, urban, and rural), with clear, non-negotiable minimum standards for WFN interventions.
- **Leverage existing policies and institutional support:**
  - There are several policies that involve WFN; review and aggregation of these different policies across sectors are needed, for synergy and coordination.
  - Capitalise on the upcoming nutrition policy reviews to give more prominence to WFN and ensure that policies speak to each other, - e.g., Public Food Procurement policy should mention that WFN procurement should be from local food sources.
  - Advocate for the Ministry of Labour and Employment to lead WFN-related policy development, but with critical inputs from FMoHSW, Federal Ministry of Agriculture and Food Security (FMAFS), and the Federal Ministry of Women affairs.
  - The Ministry of Labour and Employment has an existing plan for employee wellness; this can be leveraged as an entry point for budget line allocation for WFN by 2026.
  - The Ministry of Labour and Employment should be invited to be a member of the National Council on Nutrition as soon as possible.
- **Ensure effective policy implementation and compliance**
  - Cascade WFN policies to all levels of organisations, ensuring inclusivity and widespread participation.

  - Establish enforcement mechanisms, including clear penalties for non-compliance, to encourage accountability.

- **Secure budget lines for WFN programmes:**
  - Advocate for designated workforce nutrition budget lines in public and private organisations.
  - Formulation of a relevant policy could ensure that existing nutrition budget lines support WFN, such that WFN considerations and activities can be implemented with existing budget lines.
- **Integrate WFN into monitoring and inspection frameworks of the Ministry of Labour** to ensure consistent evaluation and compliance across workplaces.
- **Develop a WFN scorecard and incentive system**
  - Introduce a WFN Scorecard to classify organisations based on compliance with WFN. Organisations would be rated on a tiered system, such as Platinum, Gold, and Silver, with nutrition incorporated as a key indicator of a Good Place to Work.
  - Use tax breaks, financial incentives, and public recognition to reward top-performing workplaces.
  - Promote compliant workplaces through media campaigns, awards, and certifications to encourage wider adoption of WFN programmes.
- **Explore opportunities for public-private partnerships on WFN** in ways that allow for collaboration and exchange of knowledge and other assets between government and exemplary private-sector leaders in WFN.

2. Public and Private Sector Leaders/Employers

- **Engage human resources in workforce nutrition enforcement:** Integrate workforce nutrition into HR policies to drive behaviour change.
- **Promote locally sourced and culturally relevant foods:**
  - Encourage workforce nutrition programmes that prioritise Nigerian food culture and reduce reliance on imported, ultra-processed foods.
  - Support local farmers and promote in season foods to ensure affordability, sustainability, and reduced environmental impact.
- **Strengthen food safety and hygiene standards**
  - Establish health and hygiene screening protocols for workplace canteen staff, including periodic health assessments at designated medical centres.
  - Conduct regular food safety inspections and monitoring to maintain hygiene and quality standards in workplace canteens.
  - Ensure thorough background checks and health screenings for potential caregivers in workplace creches to safeguard child health.
- **Raise awareness and advocate for WFN**
  - Plan and implement continuous education and advocacy programmes to highlight the importance of good nutrition in the workplace.
  - Organise seminars to encourage personalised meal plans and incorporate wellness programmes to empower employees with practical strategies for maintaining a healthy diet despite busy schedules.
  - Utilise social media, traditional media, and other engagement tools to keep workforce nutrition in the public discourse and secure stakeholder buy-in.
- **Leverage technology to enhance WFN practices**

- Develop mobile apps to monitor nutrition, health, and wellness, providing employees with personalised recommendations and incentives for healthy behaviours.
- Organisations should integrate toll-free helplines for real-time nutrition and health support.
- Position WFN as part of Employee Assistance Programs to encourage a holistic approach to workplace well-being.

Areas of Convergence

Strong convergence was achieved on almost all nutrition challenges and actions be taken to advance WFN in Nigeria.

Areas of Divergence

The only disagreement recorded in this discussion was around creating budget lines for WFN in government MDAs. According to discussants, there are already multiple budget lines in existence without funding allocated to them; as such, budget lines can be inactive and ineffective. And beyond creating budget lines, released funds are often diverted and used for different purposes. Instead of creating new budget lines for WFN, it might help to create specific activities for nutrition support for the workforce in government MDAs, funding the activities directly rather than creating separate budget lines and monitoring how available funds are used to ensure intended purposes are achieved.

SUMMARY FROM LSFF GROUPS

UNDERSTANDING OF THE PROBLEM BY PARTICIPANTS

NTDs are common congenital anomalies that result from early malformation in the development of the spinal cord and brain. They are related to substantial mortality, morbidity, disability, and psychological and economic costs. The relationship between micronutrient deficiency and these birth defects is well documented, showing that adequate folate intake in early pregnancy is crucial to prevent NTDs. Research shows that women consuming sufficient folate-rich foods can reduce the risk of NTDs by up to 50% (24). Similarly, vitamin B12 deficiency can cause neurological delays and is an independent risk factor for NTDs. Iodine deficiency may result in cognitive impairments and foetal growth restriction, while zinc deficiency can lead to malformations affecting various organ systems. Iron deficiency is associated with low birth weight and preterm delivery.

Results from the NFCMS 2021, showed that folate deficiency is a public health concern in Nigeria (4). Research shows that fortifying rice with folic acid can significantly enhance serum folate levels, which is essential for reducing the risk of birth defects like spina bifida during pregnancy.

Challenges identified

Several challenges were identified with mandatory rice fortification in Nigeria as a public health measure to prevent/reduce NTDs:

- The prevalence of NTDs may be higher than available data suggest, given that less than 40% of women delivered their babies in health facilities.
- In Nigeria, rice fortification is currently voluntary, and voluntary fortification programmes often have low compliance rates and inconsistent implementation, limiting public health benefits.

- Previous mandatory fortification initiatives have struggled to achieve their intended goals in addressing micronutrient deficiencies, as evidenced by the results of the NFCMS 2021. Contributing factors identified by participants include insufficient enforcement of regulations, and a lack of consumer awareness about the benefits of fortified foods.

Recommended actions to address challenges identified

Following brainstorming on sustainable solutions to folate deficiency within existing programmes and policies, stakeholders agreed that food-based approaches that ensures access to folate are needed. These include promotion of home gardens and corporate gardens where feasible and LSFF with aggressive promotion through public awareness campaigns. Below are the key recommended actions:

- **Mandate rice fortification as a national priority:** Include rice in the list of staples for mandatory fortification. This, according to participants, should be implemented immediately. It will require policy support, regulatory enforcement, and monitoring for compliance, as well as setting standards for levels of fortificants. The review of the National Road Map on Rice Fortification is critical for this to happen.
- **Awareness creation for key stakeholders:** Create awareness among industry, consumers, and policymakers on the importance and benefits of rice fortification.

  Industry: Awareness creation will help rice millers understand the importance and benefits of rice fortification, particularly its role in improving public health. Rice millers can thus be encouraged to embrace rice fortification rather than resist it. Raising awareness will also ensure that rice millers are informed about regulatory requirements for rice fortification.

  Consumers: Creating awareness among consumers about the health benefits of consuming fortified rice will help promote its consumption. Educating consumers about the difference between fortification and food additives can help alleviate concerns and misconceptions regarding fortified rice. Also, the nutrition education package should be extended to nutrition labelling—e.g., the sign or symbol to look for on fortified rice and other fortified foods.

  Government: Securing political buy-in for mandatory rice fortification will help in shaping policies. Utilising government platforms like the Nigeria Governors Forum, National Assembly, and the Office of the Vice President to increase awareness among policymakers about the importance of making rice fortification mandatory is crucial for improving public health outcomes. In particular, it is important to review relevant policies, action plans, and other national strategy documents to include rice fortification, especially the review of MNDC Guidelines. It is also essential to identify existing incentives for importers of Fortified Rice Kernels (FRKs) and fortified rice producers, provide information to them on this, and facilitate linkages. It is crucial to consider tariff exemptions or rebates on imported FRKs to reduce costs and promote local fortification efforts, ultimately enhance the availability of fortified rice as a staple food.

- **Capacity building for key stakeholders:** Awareness creation needs to be accompanied by capacity building.

  Industry: Capacity building for small rice millers (e.g., technical, operational efficiency, and training on proper blending methods) ensures effective implementation of rice

fortification programmes and consistency in the fortification process, which will ultimately contribute to better nutritional outcomes.

Regulators: Building capacity for laboratory analysis of FRKs and fortified rice is vital for enhancing regulatory effectiveness and improving analytical competence.

Local artisans: Building capacity of local artisans for fabrication and maintenance of blending equipment would make rice fortification doable for small- and medium-scale rice millers and reduce capital outlay for maintenance of equipment for large scale millers.

- **Ensure Sustainable Availability of FRKs by** facilitating the packaging of FRKs in smaller, affordable quantities to cater to small-scale millers and encouraging domestic production of FRKs to reduce reliance on imports, lower costs, and ensure a stable supply.
- **Fast track the on-going development of standards for FRKs and fortified milled rice.** The Standard Organisation of Nigeria (SON) should hasten the ongoing developments.
- **Facilitate rice millers joining the National Fortification Alliance (NFA):** Membership of the NFA will provide rice millers the opportunity to learn about the numerous incentives available to LSFF stakeholders and provide a platform for sharing the challenges they may face in mandatory rice fortification.
- **Encourage millers to invest in on-the-spot micronutrient testing equipment** specifically designed for small rice millers to enable real-time quality control. It would be critical to address challenges they may face in acquiring the equipment and provide support in overcoming them.
- **Establish a Compliance Monitoring Framework:** Develop a structured system to track the implementation of the mandatory rice fortification programmes, assess adherence to fortification standards, and evaluate public health impact.

Areas of convergence

Strong convergence was achieved on actions needed to make rice fortification mandatory as a public health intervention to address micronutrient deficiencies, especially folate deficiency. The groups emphasised the following:

- Mandatory rice fortification has great potential to reduce folate deficiency and its consequences if the programme is well designed and implemented, stakeholders are effectively engaged, and government buy-in is secured. Rice fortification should, therefore, be made mandatory in Nigeria for it to deliver public health benefits.
- There may be a need to review the existing National Assembly bill related to rice that includes provisions for rice fortification to ensure that it captures the essence of mandatory rice fortification.
- The Technical Advisory Committee (TAC) on rice fortification should liaise with the National Council on Information on consumer awareness creation using appropriate communication strategies for each population group. The Council, which comprises all the states' commissioners of information, is a good avenue for grassroots consumer awareness creation on the benefits of rice fortification to address micronutrient deficiencies and NTDs.
- The TAC may need to carry out advocacy visit to the President and the Wife of the President with the intent of making the Wife of the President an ambassador for fortified rice. This advocacy initiative can significantly enhance efforts to improve nutrition and health of the general population.

- The Federal Ministry of Industry, Trade and Investment (FMITI) has many programmes and initiatives that rice millers could leverage to reduce cost of imported LSFF equipment and materials.
- The FMITI has received an application from a company that intends to produce FRKs locally; all relevant stakeholders should come together to support the process.
- Small and medium-scale rice millers should be involved in rice fortification as a means of reaching rural rice consumers. Rice that is locally processed by these millers represents a large share of the market and cannot be ignored in efforts to use rice fortification as a public health intervention.

Areas of Divergence

Some participants felt that the review of the National Road Map on Rice Fortification is not necessary because it already addresses current challenges and aligns with the goals of rice fortification initiatives.

CONCLUSION

The dialogue on LSFF and workforce nutrition in the run up to the N4G Summit highlighted the growing recognition of WFN as a critical component of public health and economic development in Nigeria. Participants emphasised the need for a clear, standardised definition of a healthy meal to effectively guide workplace nutrition initiatives. Additionally, there was a strong call for the development and enforcement of robust policies, systems, and programmes to implement WFN across all sectors. A structured policy implementation framework or adaptable template was recommended—one that accommodates diverse contexts, including formal and informal sectors, public and private institutions, as well as urban and rural settings—while ensuring minimum, non-negotiable standards for workforce nutrition interventions.

Furthermore, the dialogue highlighted the potential of mandatory rice fortification as a public health measure to combat folate deficiency and its associated consequences, particularly NTDs. To maximise impact, such a programme must be well designed, effectively implemented, and be inclusive of key stakeholders, with strong government commitment and support.

These insights reaffirm the urgent need for collective action to integrate WFN and LSFF into national policies and workplace practices, fostering a healthier, more productive workforce for Nigeria's future.

ANNEX: Agenda

Time	Activity	Responsible
08:00 – 9:00 hrs.	Arrival and Registration	All
09:00 – 09:05 hrs.	National Anthem	All
09:05 – 09:15 hrs.	Opening Remark	GAIN Deputy Country Director – Dr Abass Babatunde Yusuf
09:15 – 09:45 hrs.	Goodwill messages (3 mins each)	• Office of the Vice President • Federal Ministry of Health and Social Welfare • Federal Ministry of Budget and Economic Planning • Federal Ministry of Industry, Trade and Investment • Federal Ministry of Labour and Employment - National Agency for Food and Drug Administration and Control (NAFDAC) - Standards Organisation of Nigeria (SON) - Federal Competition & Consumer Protection Commission (FCCPC) • Central Bank of Nigeria
09:45 – 09:55 hrs.	Dialogue Objectives	Chioma Doris Nnabugwu Senior Associate, Workforce Nutrition, **GAIN**
09:55 – 10:10 hrs.	**Keynote Presentation:** Nutrition for Growth Summit (N4G) 2025 and Nigeria's Preparation	Federal Ministry of Health and Social Welfare/ Civil Society Scaling Up Nutrition in Nigeria
10:10 – 10:40 hrs.	**Presentation:** Improving Workforce Nutrition Leveraging Rice Fortification to Combat Birth Defects and Spina Bifida in Nigeria	**Curator** – Dr Adeyinka Onabolu
10:40 – 11:10 hrs.	**Tea Break**	All
11:10 – 12:25 hrs.	**Breakout Sessions: In-Depth Discussions on Key Issues**	
	Participants are divided into four groups for in-depth discussion on the way forward in using Workforce Nutrition and Large-Scale Food Fortification as strategies to address malnutrition.	**Facilitators** **Dr Victor Ajieroh** – Independent Consultant **Dr Olapeju Phorbee** – Independent Consultant **Prof. Folake Samuel** – Professor, Community Nutrition, University of Ibadan **Dr Omolara Okunlola** – Independent Consultant
12:25 – 12:40 hrs.	**Break**	All
12:40 – 13:40 hrs.	**Plenary Session**	
	Presentations by each group and Q&A (10 mins presentation and 5 mins Q&A for each group)	**Group facilitators**
13:40 – 13:50 hrs.	**Next Steps and Recap** Summary and next steps	**Curator** – Dr Adeyinka Onabolu
13:50 – 13:55 hrs.	Vote of thanks	Adetola Otunla, **GAIN** Project Coordinator, LSFF
13:55 hrs.	Photography, Networking, Lunch	

REFERENCES

1. National Bureau of Statistics (Nigeria). Nigeria Living Standards Survey. 2019.
2. Au KS, Findley TO, Northrup H. Finding the genetic mechanisms of folate deficiency and neural tube defects—leaving no stone unturned. ***Am J Med Genet A***. 2017;173(12):3042-57.
3. Federal Government of Nigeria (FGoN), International Institute of Tropical Agriculture (IITA). National Food Consumption and Micronutrient Survey 2021. Final Report. Abuja and Ibadan, Nigeria: FGoN and IITA; 2024. 550 p.
4. Oumer M, Tazebew A, Silamsaw M. Birth prevalence of neural tube defects and associated risk factors in Africa: a systematic review and meta-analysis. BMC Pediatr. 2021;21(1):190. doi:10.1186/s12887-021-02653-9.
5. World Health Organization. ***Food fortification*** [Internet]. Geneva: WHO; [cited 2025 May 13]. Available from: https://www.who.int/health-topics/food-fortification#tab=tab_2.
6. Olugbenga BO, Blessing MO, Blessing O. Progress in food fortification in Nigeria: historical overview, current issues, consumer perceptions and awareness, and the need for additional vehicles. ***Food Sci Nutr Res***. 2023;6(2):1–17.
7. Global Alliance for Improved Nutrition (GAIN). ***Large scale food fortification compliance in Nigeria: State of the Nation Report, 2022***. Abuja (Nigeria): GAIN; 2022 [cited 2025 May 13]. Available from: https://www.gainhealth.org/sites/default/files/publications/documents/large-scale-food-fortification-compliance-in-nigeria-state-of-the-nation-report-2022.pdf
8. Brai BIC, Afolabi WA, Ariyo O, Oloyede J, Anjorin F, Owolabi A. Large-scale food fortification in Nigeria: Opportunities and challenges: A position of the Nutrition Society of Nigeria. ***Niger J Nutr Sci***. 2022;43(2):1-8.
9. GAIN, World Food Programme. Towards the adoption of rice fortification in Nigeria: Landscape analysis report. 2022. Available from: https://www.gainhealth.org/sites/default/files/publications/documents/Towards-the-adoption-of-rice-fortification-in-nigeria.pdf
10. GAIN, World Food Programme. Critical review of the economic feasibility and cost analysis of rice fortification in Nigeria. 2022. Available from: https://www.gainhealth.org/sites/default/files/publications/documents/Critical-Review-of-the-Economic-Feasibility-and-Cost-Analysis-of%20Rice-Fortification-in-Nigeria.pdf
11. Pachón H, Tsang B. ***Evidence and current status of rice fortification and lessons learned from grain fortification***. First Workshop for the Promotion of Rice Fortification in Latin America and the Caribbean; 2016 Aug 10–12; Santo Domingo, Dominican Republic. Atlanta (GA): Food Fortification Initiative; 2016. Available from: http://ffinetwork.org/about/calendar/2016/documents/Rice_evidence_status_lessonsAug2016.pdf
12. Global Nutrition Report. Nutrition profiles: Nigeria. Available from: https://globalnutritionreport.org/resources/nutrition-profiles/africa/western-africa/nigeria/
13. Workforce Nutrition Alliance. Workforce nutrition programmes: short overview. Workforce Nutrition Alliance; 2022 [cited 2025 May 14]. Available from: https://workforcenutrition.org/wp-content/uploads/2022/10/Workforce-Nutrition-information-sheet_v1.pdf
14. Workforce Nutrition Alliance. 2022 [cited 2025 May 14]. Available from: https://workforcenutrition.org

15. Dhillon CN, Stone G. The evidence for workforce nutrition programmes. Global Alliance for Improved Nutrition (GAIN), Geneva; 2019 [cited 2025 May 13]. Available from: https://www.gainhealth.org/sites/default/files/publications/documents/evidence-for-workforce-nutrition-programmes-overview-2019.pdf
16. Federal Ministry of Agriculture and Rural Development (Nigeria). Agricultural Sector, Food Security and Nutrition Strategy 2016–2025. Abuja (Nigeria): 2016 [cited 2025 May 14]. Available from: https://ngfrepository.org.ng:8443/jspui/bitstream/123456789/5377/1/Agriculture-FSN-Strategy-2016-25_Printed-Version_1562696265%20%281%29.pdf
17. Federal Ministry of Health (Nigeria). National Health Promotion Policy (Revised) 2019. Abuja (Nigeria): FMoH; 2019 [cited 2025 May 14]. Available from: https://scorecard.prb.org/wp-content/uploads/2022/03/National-Health-Promotion-Policy-Revised-in-2019.pdf
18. Federal Ministry of Health. National Policy and Strategic Plan of Action on Prevention and Control of Non-Communicable Diseases (NCDs) 2013. Abuja (Nigeria): FMoH; 2013 [cited 2025 May 14]. Available from: https://extranet.who.int/ncdccs/Data/NGA_B3_NCD%20POLICY%20AND%20STRATEGIC%20PLAN%20OF%20ACTION.pdf
19. Hummel M, Dhillon CN, Adewusi A, Yusuf AB, Onabolu A. Existing workforce nutrition policies in Nigeria and opportunities for improvement. Ge Global Alliance for Improved Nutrition (GAIN); 2022 [cited 2025 May 14]. Available from: https://www.gainhealth.org/sites/default/files/publications/documents/existing-workforce-nutrition-policies-in-nigeria-and-opportunities-for-improvement.pdf
20. Christianson AL, Howson CP, Modell B. ***Global report on birth defects: the hidden toll of dying and disabled children***. White Plains (NY): March of Dimes Birth Defects Foundation; 2006.
21. Nnadi DC, Singh S. The prevalence of neural tube defects in North-West Nigeria. Saudi J Health Sci. 2016;5(1):6–10.
22. Ajah LO, Amah CC, Ezeome IV, Ozumba BC, Anozie OB, Asogwa SU. A 10-year review of neural tube defects in South-East Nigeria. Int J Med Health Dev. 2017;22(2):125–9.
23. Brown CA, Poag S, Kasprzycki C. Exploring large employers' and small employers' knowledge, attitudes, and practices on breastfeeding support in the workplace. ***J Hum Lact.*** 2001;17(1):39–46
24. Ami N, Bernstein M, Boucher F, Rieder M, Parker L; Canadian Paediatric Society, Drug Therapy and Hazardous Substances Committee. Folate and neural tube defects: The role of supplements and food fortification. ***Paediatr Child Health***. 2016;21(3):145-54. doi: 10.1093/pch/21.3.145. PMID: 27398055; PMCID: PMC4933077.

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ABOUT GAIN

The Global Alliance for Improved Nutrition (GAIN) is a Swiss-based foundation launched at the UN in 2002 to tackle the human suffering caused by malnutrition. Working with governments, businesses and civil society, we aim to transform food systems so that they deliver more nutritious food for all people, especially the most vulnerable.

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