Foresight for Food System Transformation Bangladesh Final Report

Foresight4Food

Contents

1. Policy Summary

1.1 Introduction

The need to transform food systems in Bangladesh is driven by multiple challenges including climate change, rapid urbanization, population growth, and persistent malnutrition and environmental degradation. Current food systems struggle to provide equitable access to healthy diets while mitigating environmental harm, making transformation essential for sustainable health, food security, and economic resilience.

Foresight offers value for food systems transformation by enabling stakeholders to anticipate future uncertainties, explore multiple plausible futures, and design adaptable, resilient strategies. It facilitates proactive rather than reactive policymaking, fostering systemic and long-term thinking needed for tackling complex food system challenges.

The foresight process was conducted in Bangladesh to support the national agenda for food system transformation, engaging government, researchers, and civil society. It provided evidence-based scenarios and pathways that enriched ongoing policy dialogues, aligning closely with national frameworks like the Food System Transformation Plan of Action to inform strategic action.

1.2 The foresight process

The foresight process in Bangladesh was implemented in four key steps:

Scoping the Process: Early engagement mapped stakeholders, government institutions, and research partners including GAIN Bangladesh, Bangladesh Agricultural University, Sher-e-Bangla Agricultural University, CEGIS, INFS and ICCCAD. This phase established buy-in from ministries and development partners, identifying priorities and capacities.

Mapping the System: A comprehensive, participatory mapping of Bangladesh's food system was conducted, capturing major drivers, activities, and outcomes. Data from diverse sources shaped causal loop diagrams illustrating feedback mechanisms and trade-offs, revealing system archetypes like 'Tragedy of the Commons' related to water use in rice production and 'Limits to Success' tied to rice self-sufficiency versus dietary diversity.

Exploring Future Scenarios: Workshops identified four critical uncertainties (climate resilience, consumption patterns, business structure, equity) used to co-create four future scenarios ranging from hazardous consequences to collective sustainability. Quantitative scenario modelling using MAGNET complemented qualitative narratives, investigating diet transitions, environmental footprints, and socio-economic effects.

Mobilising for Systems Change: The foresight outputs fed into visioning exercises and pathway development defining interventions, institutional strengthening, and multi-sector collaboration to realize desired futures. This included integrating foresight insights in the National Food System Transformation Plan of Action and discussions on establishing a foresight unit within the Ministry of Food for continuity and integration.

1.3 From foresight to food systems change

The FoSTr foresight process significantly strengthened Bangladesh's food system transformation agenda by embedding evidence-based, participatory foresight into national policy and planning. Through inclusive multi-stakeholder engagement—including government, research institutes, development partners, and civil society—the process deepened the understanding of complex food system dynamics, critical uncertainties, and future risks. This fostered a shared vision for sustainable, equitable, and resilient food systems aligned with national development priorities.

By mapping current food system drivers, exploring plausible future scenarios, and analyzing trade-offs, the process equipped policymakers with insights to design adaptive strategies tackling climate resilience, dietary transitions, equity, and market structures.

Furthermore, the process catalyzed institutional innovation, including the proposal of a dedicated foresight unit in the Ministry of Food to sustain futures thinking and scenario analysis in policymaking. It also strengthened capacity at research institutions and mobilized diverse actors around transformative pathways addressing systemic challenges in food production, nutrition, and environmental sustainability.

Overall, the FoSTr foresight process institutionalized futures literacy within Bangladesh's food governance landscape, supporting evidence-driven decision-making and generating momentum for inclusive, informed action towards transformational change in the food system.

2. Introduction

2.1 The FoSTr programme

The Foresight for Food System Transformation (FoSTr) programme, which was implemented between June 2023 and December 2025, supported policy makers and other key stakeholders in the food system with scenarios and foresight analysis about the food system of the future. The programme was financed by the Kingdom of the Netherlands, overseen by IFAD and implemented by the University of Oxford's Environmental Change Institute, Wageningen University & Research and national research partners in the international Foresight4Food network. The FoSTr programme was implemented in Uganda, Kenya, Jordan, and Bangladesh.

In Bangladesh, the FoSTr programme was coordinated by GAIN Bangladesh and implemented with the support of five research partners: Bangladesh Agricultural University (BAU), Sher-e-Bangla Agricultural University (SAU), Center for Environmental and Geographic Information Services (CEGIS), Institute of Nutrition and Food Science (INFS), University of Dhaka and International Centre for Climate Change and Development (ICCCAD).

This team implemented the FoSTr programme in close collaboration with government and development partners, who were engaged in foresight training, mapping the food system, scenario development and developing recommendations to support the national food system transformation agenda.

2.2 The need to transform food systems

Food systems encompass all activities and processes involved in the production, processing, distribution, consumption, and disposal of food (Figure 1). They are central to a country's health, economy, and environment. A sustainable food system that delivers healthy diets for all is essential to achieving global nutrition targets by 2030 (Schneider et al., 2025). According to WHO and FAO guidance (2019), sustainable healthy diets promote all dimensions of health and wellbeing, exert low environmental impact, and are accessible, affordable, safe, equitable, and culturally acceptable.

Current food systems, however, are failing to meet these goals. Unsustainable agricultural practices lead to biodiversity loss and high greenhouse gas emissions, while uncontrolled food waste depletes valuable resources (FAO, 2022). At the same time, inequitable access to nutritious food drives rising diet-related disorders and compromises health, food security, and economic development. In the face of challenges such as climate change, population growth, and persistent food and nutrition insecurity, transforming food systems is essential. This transformation is needed not only to provide equitable access to healthy diets but also to protect the social, economic, and environmental foundations that underpin food security and nutrition for future generations.

Strategies such as adoption of climate-smart practices, reduction of waste, promotion of biodiversity, adoption of innovative technologies and fair trade policies, can create a resilient food system. A system that ensures sustainable food production, equitable food distribution, mitigates climate change, fosters economic growth, promotes equity and better health outcomes. It is important to note that transforming a country's food system requires a collaborative effort from its government, private sector, civil society, and individuals. Policies meant to transform the food system must target holistic approaches that consider political, economic, environmental, and social needs.

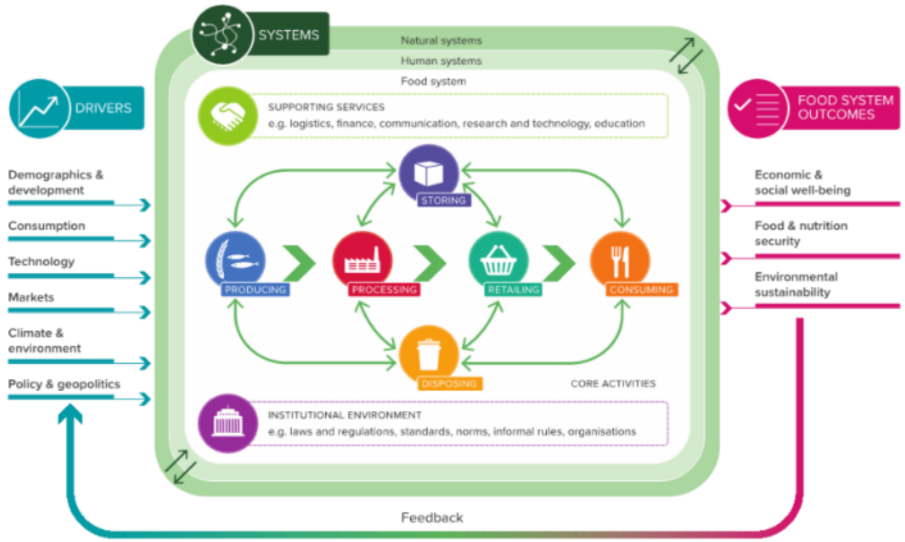

Figure 1. Food systems framework (Foresight4Food, 2019)

2.3 Foresight and futures thinking

Due to rising turbulence and uncertainty, there is a need to enhance the resilience of food systems. To ensure resilience, approaches should be able to cope with future stresses, shocks, and extreme events. To achieve this, foresight analysis and futures thinking are necessary. These are useful approaches for anticipating, preparing for, and shaping future possibilities. They involve analysing trends, identifying uncertainties, opportunities, and risks, and developing scenarios to anticipate future outcomes. This supports the formulation of resilient and adaptable strategies.

Futures thinking emphasises creative exploration of multiple futures. It complements foresight by fostering the envisioning of transformative possibilities that may not be immediately apparent. Together, they help prepare for an uncertain and dynamic future. For sustainable and resilient food systems, this could include, for example, adopting circular food economies or advanced technologies that manage food waste and enhance productivity. This approach empowers stakeholders to proactively shape desirable futures rather than react to emerging crises.

While transformation of food systems is important, it faces several challenges. Transformation requires coordinated efforts of different stakeholders, while the exact opportunities and risks that will emerge remain uncertain. Furthermore, imagining radical futures requires stakeholders to adopt a refined understanding of their food systems, which is not always straightforward. Lastly, effective transformation depends on long-term perspectives, such as strengthening the policy–science–practice interface, building effective knowledge systems, and creating a society-wide urgency for change. However, these are not easily realised in many food systems.

Foresight can support food systems transformation through providing the long-term perspective vital for such a transformation. It tasks stakeholders to appreciate their present situation and the future outcomes, as well as their alternative options and their corresponding outcomes. Additionally, foresight integrates multiple methods and tools to explore the future. For example, horizon scanning, stakeholder analysis, mapping systems, data modelling, scenario analysis, trade-off analysis, visioning and theory of change analysis among others. These can be combined for better outcomes.

2.4 The foresight process

The use of foresight for food systems change is guided by a framework (Figure 2). The framework shows the different steps in the foresight process. It shows the importance of broad stakeholder engagement and the need to support the foresight process with strong scientific evidence. The initial process involves appreciating the need for foresight, identifying the relevant stakeholders, exploring the concerns, interests and influences. In this step, mechanisms to guide the foresight process are established the stakeholders kept up to date with the entire process. The necessary, financial, knowledge and human resources are also identified. In mapping the system, the boundaries of the food systems being mapped are defined. The stakeholders are involved in understanding the current status and future trends of the food system with regard to the drivers, activities and outcomes. In this step, key relationships in the food system are identified, together with any additional information that may support the foresight process. For the exploration of future scenarios, stakeholders are involved in identifying potential futures given the available food system drivers, trends and uncertainties. With these, different possible scenarios of the future food systems can be constructed. Their implications for different stakeholders, society, strategies and policies are assessed. Lastly, there is need to mobilize for change which entails developing a common vision around the desired future(s). The pathways to achieving the vision are detailed while making sure to identify possible advantage points and challenges for the system change. The action plans should not only include goals but also people responsible, monitoring mechanisms as well as resources to realize the set targets.

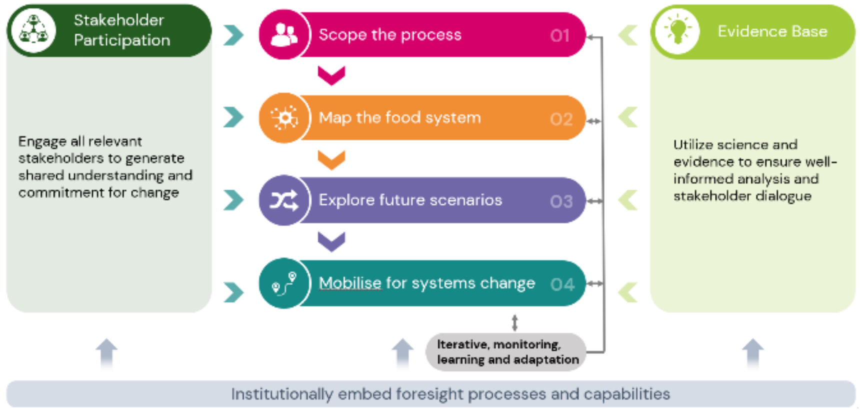

Figure 2. Foresight for food systems guiding framework (Foresight4Food, 2025)

2.5 Scoping the process in Bangladesh

Bangladesh was selected as one of the FoSTr focus countries because of its active role around the UN Food System Summit in 2021, engaging a wide range of stakeholders from across the country in 19 different dialogues. Based on these dialogues, national food systems pathways were developed by the Ministry of Food, with support of FAO and GAIN Bangladesh.

At the start of the FoSTr programme, in November 2025, the Foresight4Food team engaged with different government agencies and potential research partners in Bangladesh to explore possible synergies for the implementation of the Foresight for Food System Transformation (FoSTr) programme.

The team engaged with different key stakeholders in the Bangladesh government, such as the Ministry of Finance and the Food Planning and Monitoring Unit (FPMU) of the Ministry of Food. The team also gained more in-depth knowledge about the capacity and expertise of potential research partners and candidates for the role of country coordinator as well as a better understanding of key trends and developments in the Bangladesh food system.

After this initial visit, GAIN Bangladesh was contracted to act as the country facilitator of the FoSTr programme. Five different research partners were contracted to carry out foresight and scenario analysis: Bangladesh Agricultural University (BAU), Sher-e-Bangla Agricultural University (SAU), Center for Environmental and Geographic Information Services (CEGIS), Institute of Nutrition and Food Science (INFS), University of Dhaka and International Centre for Climate Change and Development (ICCCAD).

Figure 3. FoSTr Bangladesh research team

In May 2023, a high-level round table meeting was organized with Bangladesh government representatives and other key stakeholders from across the food system. The round table discussion aimed at deepening the understanding of foresight thinking. During the round table, participants discussed ways to maximize the impact of the FoSTr programme and explored how its foresight work could support the Bangladesh food system transformation agenda.

Together with research partners, an evidence-based participatory foresight process was designed in line with the government policies, including foresight capacity development for policy makers and researchers, the creation of a Bangladesh food systems map and a range of participatory multi-stakeholder foresight workshops, supported by rigorous foresight analysis and modelling.

Figure 4. Timeline of FoSTr activities (orange) aligned with ongoing policy processes (blue)

During the same visit in May 2023, a foresight orientation day was organized in collaboration with the Food Planning and Monitoring Unit (FPMU) of the Ministry of Food. This orientation day was part of a workshop organized by FAO and GAIN, in preparation of the UN Food System Transformation Stocktaking Momen, to be held in Rome 24-26th of July.

The foresight orientation was a part of FoSTr's aim of enhancing the foresight capability and 'futures literacy' of government agencies and research organizations to facilitate and support the food systems foresight process. During this visit, opportunities were explored for the foresight process of FoSTr to support the development of the Bangladesh Plan of Action for the implementation of the national food system transformation pathways developed in 2021.

3. Mapping the Food System

To support the development of future scenarios, the initial phase of the foresight process aimed to gain an in-depth understanding of how the food system in Bangladesh operates and evolves. This phase focused on analysing major trends and drivers and on creating a common basis of understanding among stakeholders regarding the key dynamics shaping the country's food system. It involved collecting and visualising relevant data on historical and projected developments, examining political economy dynamics, and pinpointing opportunities and barriers for transformation.

Given the interconnected nature of food systems, mapping was essential to reveal how different elements, such as production, consumption, trade, and policy, interact. Through a participatory approach, diverse stakeholders engaged in this process, helping to ensure that multiple perspectives and local knowledge informed the analysis.

The assessment applied the Foresight4Food framework (see Chapter 1, Figure 1, and Section 2.2), which builds on existing food system frameworks, including those of Ingram (2011), HLPE (2016), and van Berkum et al. (2018). This framework structured the mapping around the main components of the Bangladeshi food system: activities, drivers, support systems, and outcomes.

Food system assessment report, access via this link

The findings were summarised in the *Food System Assessment Report*, which included a set of visual maps and graphs illustrating key drivers, activities, and outcomes, and was presented to stakeholders during the national workshop's gallery walk. This shared understanding formed the basis for the next stages of the foresight process and the development of future scenarios.

3.1 Gathering food system data

The development of the Bangladesh food system map was a collaborative effort involving fifteen researchers from BAU, SAU, CEGIS, INFS and ICCCAD. Together, they compiled and synthesised data from multiple sources to capture the key components, interactions, and dynamics shaping the country's food system. This collaborative mapping process combined literature review, expert input and stakeholder engagement to ensure that both scientific insights and local realities were reflected. The resulting Bangladesh Food System Assessment Report provides an integrated overview of drivers, activities and outcomes, forming a foundation for subsequent foresight analysis and scenario development.

Stakeholder engagement was an integral part of gathering and refining food system data in Bangladesh. Input was collected at two key points in the process. The first took place during a combined meeting associated with the SHIFT workshop in November 2022, where participants contributed to exploring and identifying key trends and drivers shaping the food system. The second engagement occurred during a validation meeting in April 2023, where the first draft of the Bangladesh food system map was presented and discussed. These interactions allowed stakeholders to provide feedback, clarify relationships between drivers, activities, and outcomes, and ensure that the mapping reflected diverse perspectives and local knowledge.

Workshop participants validating food system data during the gallery walk

One key driver identified is rapid urbanisation and income growth, which reshapes food demand and consumption. As cities expand and incomes rise, diets are shifting from traditional staples to higher-value and more processed foods. While this supports economic diversification and growth in food processing, it also raises concerns about calorie-dense, nutrient-poor diets and related non-communicable diseases.

Smallholder farming remains central, with over half the population engaged in agriculture. Bangladesh has achieved notable productivity gains, especially in rice and fish, making it a top global inland fish producer. However, this intensification relies heavily on chemical fertilisers, pesticides, and aquaculture inputs, which can harm human and environmental health without proper regulation or training.

The mapping also highlights persistent nutrition challenges amid environmental strain. Despite increased food availability, diets remain monotonous and micronutrient deficiencies persist. Ecological pressures from intensive production, such as soil degradation and water scarcity, threaten long-term resilience. Addressing these issues requires pathways that improve dietary quality while protecting environmental sustainability.

Overall, the mapping provided a shared evidence base and visual framework for stakeholder discussions. It revealed both progress and vulnerabilities, offering insights into the social, economic, and environmental interlinkages shaping Bangladesh's food system.

3.2 Identifying causal linkages between food system elements

During a participatory workshop with the research partners, multiple causal loop diagrams were developed to examine the interconnections and feedback loops between food system activities, drivers, and outcomes. These individual diagrams were subsequently integrated into a single, comprehensive causal loop diagram, which is presented in Figure XX.

The causal loop diagram illustrates the complexity of Bangladesh's food system, showing how multiple feedbacks shape trade-offs and system behaviour. High population growth and density increase demand for food, driving the adoption of high-yielding crops that require substantial fertilisers and pesticides, affecting soil fertility and environmental health. Food imports supplement domestic production, exposing the system to global price fluctuations and influencing the affordability of nutritious diets.

Urbanisation and globalisation further shape consumption patterns. Rising urban populations and changing lifestyles are increasing demand for higher value-added foods rich in fat, sugar, and salt, reducing intake of traditional staples, limiting dietary diversity, and contributing to non-communicable diseases.

Staple food production, particularly rice, remains central. Government support has enabled self-sufficiency and surpluses, but reliance on groundwater and irrigation pressures natural resources. Focus on staples also constrains fruit and vegetable production, reducing access to diversified diets. Bangladesh's aquaculture sector, highly productive globally, provides protein and livelihoods, yet intensive chemical use and waste threaten biodiversity, environmental quality, and human health. Smallholder farmers dominate production and supply wet markets, where limited cold storage raises food safety concerns.

Overall, the diagram highlights key patterns: population growth and urbanisation drive staple crop and aquaculture production, which in turn affect food security, nutrition, and environmental sustainability. These dynamics reveal trade-offs between productivity, diet quality, and ecosystem health, providing a basis for targeted interventions to strengthen resilience, promote sustainable diets, and safeguard natural resources.

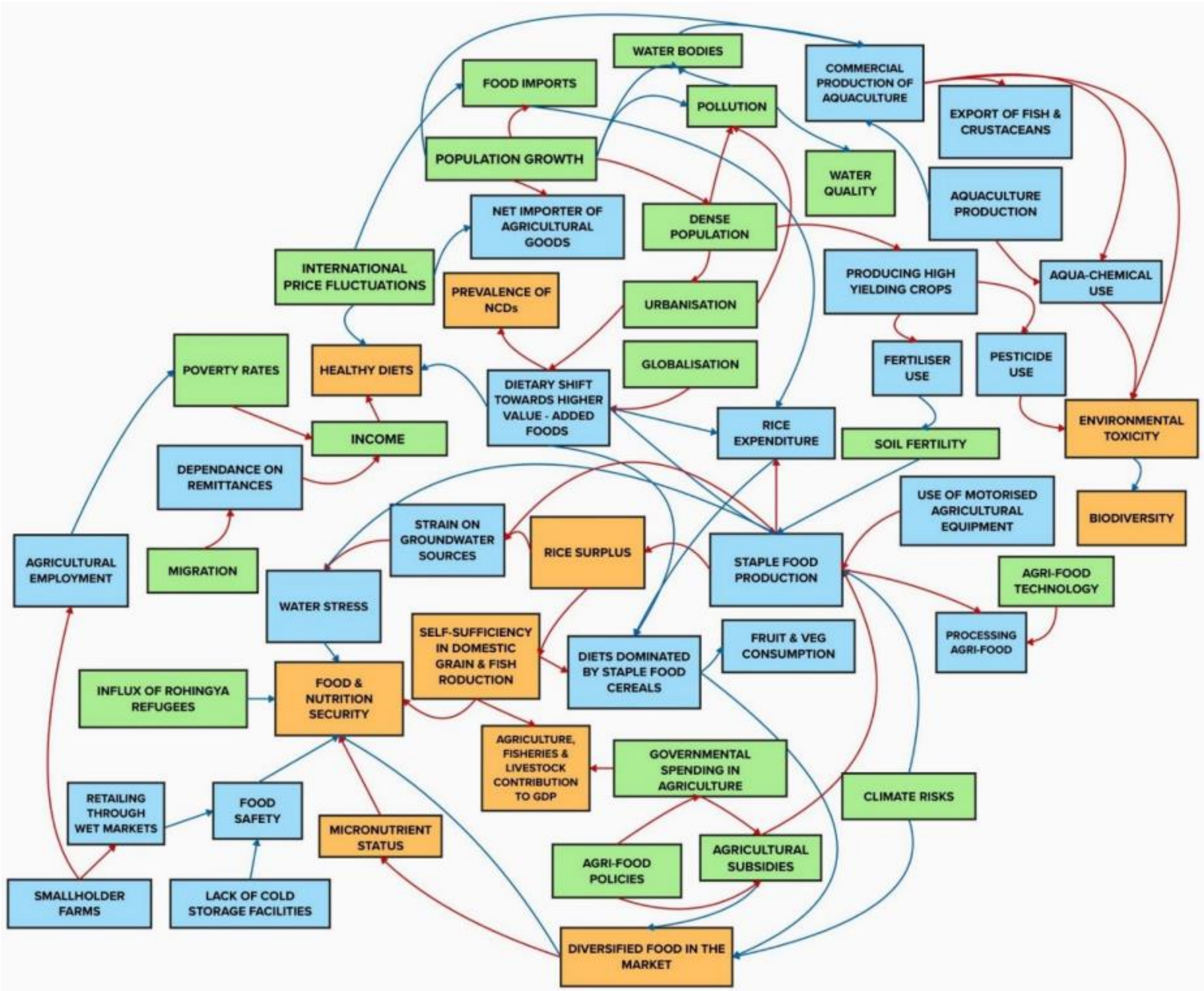

Figure 5: Causal Loop diagram of the food system in Bangladesh

Red arrows indicate positive causality and blue arrows indicate negative causality. Food system drivers [blue]; food system activities [green]; food system outcomes [orange]

3.3 System archetypes, trade-offs and synergies

After mapping the system and analysing its linkages, several system archetypes were identified. System archetypes are recurring patterns in complex systems that help explain how certain behaviours emerge over time. They reveal how reinforcing and balancing feedback loops shape system outcomes and can indicate potential leverage points for intervention (WUR & KIT, 2018). Below, we highlight two illustrative examples of these archetypes.

The first, a Tragedy of the Commons, emerges from the rapid expansion of boro rice cultivation. Between 1991 and 2013, production increased from 6.8 to 18.8 million tons due to its high yield potential. However, boro rice relies heavily on irrigation, accounting for 73% of groundwater extraction, leading to depletion and declining water quality. The reinforcing feedback loop demonstrates how efforts to maximise rice output inadvertently compromise long-term resource sustainability, exemplifying the classic tension between short-term gains and long-term ecological health.

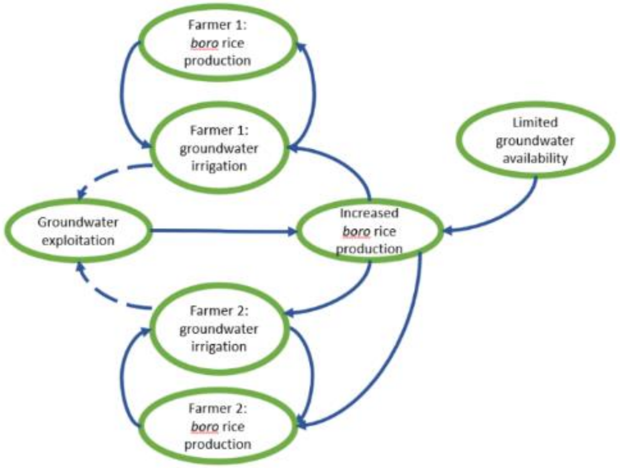

Figure 6: Example of tragedy of the commons archetype: Rice surplus vs natural resource degradation.
N.B. Dashed arrows indicate possible outcomes, no specific evidence found.

The second archetype, Limits to Success, highlights the trade-off between high rice production and dietary diversity. National emphasis on achieving rice self-sufficiency limits the land and resources available for other crops, reducing the accessibility of fruits, vegetables, and other nutrient-rich foods. As a result, 43% of households cannot afford diets aligned with national guidelines, creating imbalanced diets despite overall food availability. Here, the balancing feedback loop shows that continued focus on a single goal—rice self-sufficiency—eventually constrains complementary outcomes such as nutrition and dietary diversity.

Figure 7: Example of 'limits to success' archetype: Rice production and diversified diets. (B) balancing feedback loop, (R) reinforcing feedback loop.

The causal analysis also identifies additional trade-offs. For example, fish exports contribute to national income but reduce protein availability for domestic diets, while reliance on food imports supports food security but can undermine affordability and safety. Rising incomes and urbanisation drive demand for processed foods, improving economic outcomes but contributing to unhealthy diets.

Alongside these trade-offs, the analysis reveals synergies that could be leveraged for policy and interventions. Floating vegetable gardens in flood-prone areas enhance both climate adaptation and food security, while social protection programmes increase both income and dietary quality. Mechanisation and technological investments have improved rice yields and reduced stunting, demonstrating a positive link between productivity and nutrition. In aquaculture, optimizing feed use and co-producing rice and fish can simultaneously increase protein availability and reduce environmental impacts.

Together, the causal loop diagram, archetypes, and identified trade-offs and synergies provide a nuanced understanding of the Bangladesh food system, highlighting leverage points for interventions that can balance productivity, dietary quality, and environmental sustainability.

4. Explore Future Scenarios

4.1 Identifying critical uncertainties

During a foresight workshop in June 2024, key stakeholders from across the food system were asked to identify a range of drivers shaping the food system in Bangladesh. Mixed groups of stakeholders then rated the degree of importance and level of uncertainty of each of these drivers for the future of the Bangladesh food system. These drivers were then placed on an importance and uncertainty matrix, and the groups selected the top three drivers which were most important and most uncertain.

In plenary, each of the groups brought forward their critical uncertainties and did the exercise once more to reach a collective decision as to which were the critical uncertainties. This list was then prioritized in terms of its relevance for the future of the food system and the degree to which it may elicit a fundamental change to the way the food system operates. Climate resilience, consumption patterns, business structure and equity were considered the most critical uncertainties towards the future.

Uncertainty	Comments	Priority
Access to finance and investment	Underpins everything and related to overall governance so less useful for scenarios	7
Climate resilience	Highly critical and relevant	1
Food Price	An effect and driver of many other factors less relevant to overall structure of food system	6
Equity and inclusiveness	Critical outcome of how food systems function	4
Business structure	Big influence on structure of food system	3
Consumption patterns	Big influence on structure of food system	2
Trade	For Bangladesh important but not most significant uncertainty	5

Table 1. Critical uncertainties for the future of the Bangladesh food system

4.2 Constructing qualitative scenarios

To construct the scenarios, the four critical uncertainties were placed in a table and different combinations of these uncertainties were used to construct plausible future scenarios. From this process, four scenarios emerged which a different mix of scores on the critical uncertainties:

- Scenario 1: Hazardous consequences
- Scenario 2: Collective sustainability
- Scenario 3: Corporate sustainability
- Scenario 4: Survival of the richest

Critical uncertainties	Scenarios			
	Scenario 1: Hazardous consequences	**Scenario 2:** Collective Sustainability	**Scenario 3:** Corporate Sustainability	**Scenario 4:** Survival of the richest
Climate resilience Big vs limited disruption to food production	Big disruption	Limited disruption	Limited disruption	Big disruption
Consumption Healthy/sustainable vs unhealthy/unsustainable	Not healthy/ sustainable	Healthy/ Sustainable	Healthy/ Sustainable	Not healthy/ sustainable
Business structure Diversified (mix small & large) or consolidated (mainly large business)	Diversified	Diversified	Consolidated	Consolidated
Equity Limited inequality or high inequality	High inequality	Limited inequality	Limited inequality	High inequality

Table 2. Scenarios for the future of the Bangladesh food system

After constructing the scenarios, the participants of the workshop were divided into mixed groups around each scenario. Using the rich picture technique, these groups developed a narrative of what would happen in each of these scenarios. Based on these narratives, a professional illustrator developed images to visualize the future in each scenario.

The scenario *Hazardous Consequences* is characterized by big disruptions from climate change, unhealthy and unsustainable diets, a diversified business structure and high inequality.

In this scenario, Bangladesh faces natural disasters like floods and droughts damaging agriculture, causing high food prices. Wealthy populations mitigate impacts with resources and import access, thriving with abundant food, while poorer populations suffer due to inequity, unable to afford food or support.

This disparity fuels migration among poorer households seeking better conditions, widening the wealth gap. The rich live comfortably oblivious to the struggles of the poor, who struggle for survival amid minimal resources and worsening living conditions. The business structure is diversified but does not prevent poor equity and climate vulnerability.

Scenario 1 : Hazardous consequences

Scenario 2: Collective Sustainability

The scenario *Collective Sustainability* is characterized by limited disruptions from climate change, healthy and sustainable diets, a diversified business structure and limited inequality.

In this scenario, innovative agricultural technology benefits both small and large farmers, producing food surpluses that feed the population and generate exports. Diverse business structures enable affordable, nutritious foods across all income groups, reducing malnutrition.

The agricultural sector thrives, improving socio-economic wellbeing, and promoting inclusivity. The country effectively adapts to climate change impacts, with an equitable food system ensuring broad access to healthy diets and strong economic benefits, securing food security and prosperity for all citizens.

The scenario *Corporate Sustainability* is characterized by limited disruptions from climate change, healthy and sustainable diets, a consolidated business structure and limited inequality.

In this scenario, Bangladesh shows high climate resilience and equity despite a consolidated business structure dominated by large agri-food companies. Adapted production increases forests and output of crops, fish, and poultry.

Large businesses provide affordable food through farmers markets, ensuring access across income groups. Equity exists in education, income, and food access, enabling healthy, diverse diets aligned with national dietary recommendations.

The market concentration does not hinder inclusivity, as large-scale firms balance profitability and equitable food provision, supporting healthier consumption patterns and sustainable agri-food production.

Scenario 3: Corporate Sustainability

Scenario 4: Survival of the richest

The scenario *Survival of the Richest* is characterized by big disruptions from climate change, unhealthy and unsustainable diets, consolidated business structures and high inequality.

In this scenario, unpredictable floods and droughts reduce food production, which becomes dominated by a large agro-industry with climate-resilient technology. Small-scale farmers are pushed out due to lack of resources and support.

Food produced by the agro-industry is expensive, affordable only by wealthy households, causing malnutrition among low-income groups. Healthcare systems are burdened by increasing malnutrition.

Inequity worsens as the rich control food access and wealth, while the poor face food insecurity and economic hardship. The consolidated business model serves the wealthy at the expense of equity and resilience for small-scale producers.

4.3 A futures exploration of priority topics

During FoSTr workshops in April and October 2023 various food systems challenges were identified that will shape the future of the Bangladesh food system. As input to the FoSTr foresight process in Bangladesh, the FoSTr research team are developing background policy papers on these food system challenges. The policy papers aimed to answer the following questions:

- How can the food system of Bangladesh become more climate resilient in the future?
- How can reducing the cost of a healthy and nutrient-dense diet help address malnutrition in Bangladesh?
- How will land use in the Bangladesh food system change due to climate change and changing diets?
- How can improved fruit & vegetable production help achieve consumption of healthier diets in Bangladesh
- What should be the role of social protection programs in shaping the future of the Bangladesh food system?

The five research organizations in the FoSTr research team in Bangladesh, each took on one of these pressing questions and developed the following background policy papers:

1. "Fostering Nutritious Diets: Pathways To Greater Fruit And Vegetable Intake" by Bangladesh Agricultural University
2. "The role of social protection programs in shaping the future of the Bangladesh food system" by Sher-e-Bangla Agricultural University
3. "The Future of the Food System in the Bangladesh Delta through the Lens of Land, Water, and Climate" by The Center for Environmental and Geographic Information Services (CEGIS)
4. "Reducing the Cost of a Healthy Diet to Address Malnutrition in Bangladesh" by Institute of Nutrition and Food Science (INFS), University of Dhaka
5. "Enhancing climate resilience of Bangladesh's food system: vulnerability, measures, and way forward" by International Centre for Climate Change and Development

Each of these policy papers was presented to the relevant policy makers during the workshop 'Food System Futures: Scenarios for Shaping the Bangladesh Food System Transformation' held on June 11, 2024.

Figure 8: Background policy briefs developed by research partners

4.4 Exploring quantitative scenarios using MAGNET modelling

As part of the FoSTr programme, a research team from Wageningen Social & Economic Research investigated what trade-offs arise when transitioning to healthier diets in Bangladesh between 2022 and 2050. For this study, the team used MAGNET, a global computable general equilibrium (CGE) model. With this model, the study explores the impacts of three diet scenarios:

- Business-As-Usual (BAU) Diet: Characterized by a continued rise in animal product, sugar, and oil consumption, with heavy reliance on staples like rice.
- Bangladesh Food-Based Dietary Guidelines (FBDG) Diet: Emphasizes increased consumption of vegetables, fruits, legumes, and nuts, with a moderate intake of animal protein and dairy.
- EAT-Lancet Diet: A more plant-based protein diet with increased intake of nuts and oil seeds, lower sugar, red meat, and dairy consumption than FBDG.

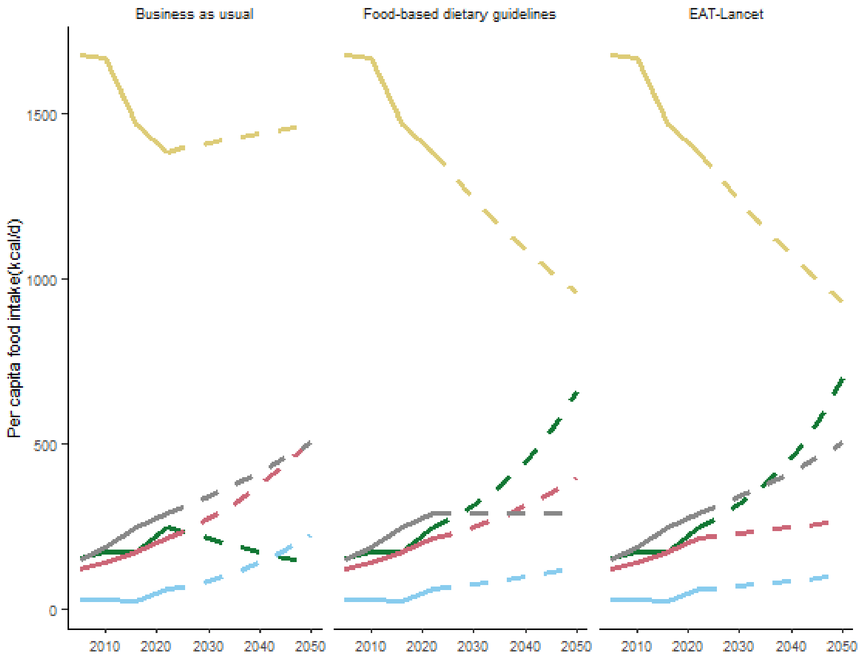

Figure 9: Modelling of projected food intake in different diet scenarios

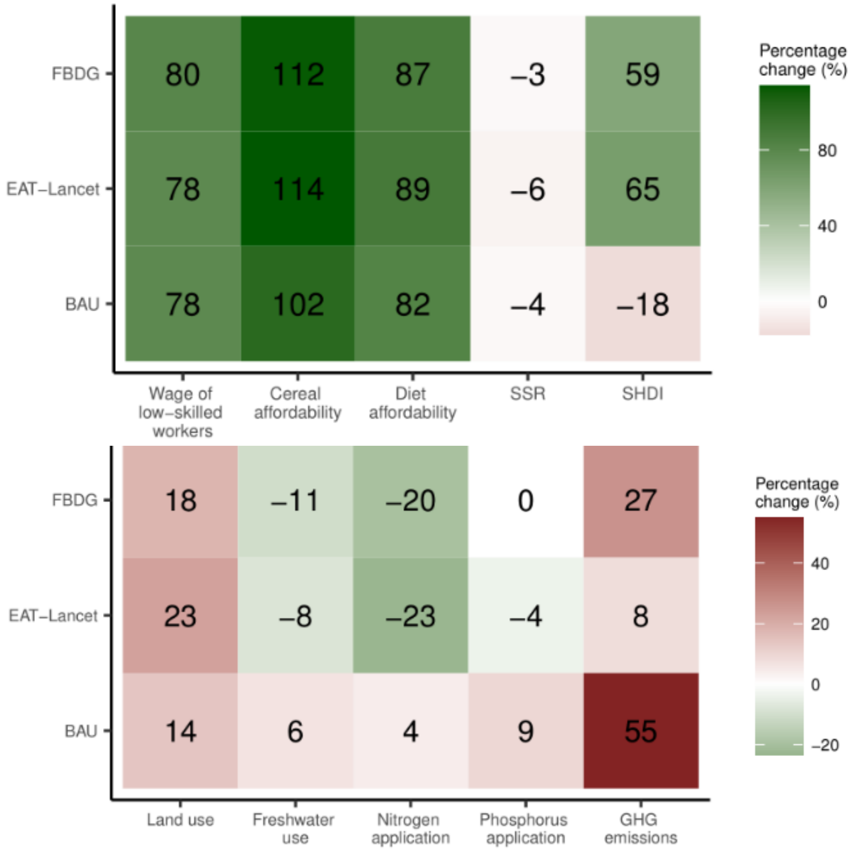

Figure 10: Modelling of trade-offs between social, economic & environmental implications of different diet scenarios

The results of this study show that promoting diets with more plant-based proteins positively impacts dietary health and environmental footprints by reducing greenhouse gas emissions, water use, and nitrogen application compared to a business-as-usual scenario. These diet transitions lead to minor socio-economic impacts on low-skilled workers' wages, food affordability, and self-sufficiency. However, trade-offs persist, such as increases in land use and phosphorus application. The findings emphasize the need for complementary interventions like reducing food loss and waste alongside dietary changes to achieve sustainable food system transformation for Bangladesh.

5. Mobilise For Systems Change

In the final stage of the foresight process, the insights from our foresight work were used to support the Bangladesh food system transformation agenda.

This happened in different ways: informing the National Plan of Action on Food System Transformation, helping the establishment of a foresight unit under the Ministry of Food, engaging farmers in climate resilience scenarios and helping to develop a foresight curriculum for agricultural universities.

5.1 The Food System Transformation Plan of Action

In May 2025, a workshop was organized with over 40 stakeholders from government, UN agencies, academia, civil society, and the private sector to explore how foresight and scenario analysis can guide Bangladesh's food system transformation. In this workshop, the scenarios developed in 2024 were revisited and based on the insights of these scenarios, opportunities and threats for implementing the action areas of the Plan of Action were identified.

To further support the development of the Plan of Action, conditions for change were identified that need to be in place to realize structural, relational and transformative change in each of the action areas of the Plan of Action (e.g. reducing food loss & waste, curbing malnutrition. improving resilience).

These conditions of change included developing nutrition-sensitive social protection programs and policies that promote healthy food environments, as well as implementing climate-resilient agricultural practices, Strengthening relationships between governments, communities, NGOs, and financial institutions, and promoting decentralization and accountability was identified as crucial for each of the action areas of the Plan of Action. Groups also discussed the need to shift mental models through valuing local knowledge, encouraging healthy choices, and increasing motivation and trust of farmers as being essential to achieving lasting transformation across the food system.

The insights from this final stage of the foresight and food systems change process were then integrated into Bangladesh's National Plan of Action for Food System Transformation. This Plan of Action incorporates these insights into the activity plans for each of the action areas, alongside the financial framework to transparently guide investments.

5.2 Establishing a foresight unit in government

Driven by the need for sustained foresight capacity, the decision was made to establish a dedicated foresight unit within the Ministry of Food. Thie purpose of this unit is to institutionalize foresight in food systems policy through continuously monitoring emerging food system trends, scenarios to support policy formulation, and multi-sectoral stakeholder engagement. The idea for this unit emerged through FoSTr's collaborative workshops, recognized as critical for embedding futures knowledge into routine government decision-making and accelerating adaptive, inclusive food system transformation.

5.3 Exploring climate futures with farmers

The International Centre for Climate Change and Development (ICCCAD) organized a participatory workshop engaging smallholder farmers to co-develop climate resilience scenarios. Using FoSTr's scenario analysis framework, farmers' insights on vulnerabilities, adaptive capacities, and local innovations were integrated to enrich scenario narratives.

This bottom-up approach increased the relevance and acceptability of resilience strategies while empowering farmers as key actors in transformation processes. The workshop fostered mutual learning between researchers, policymakers, and communities, highlighting context-specific challenges and solutions in climate adaptation.

5.4 Developing a foresight curriculum

With support from FoSTr, the Sher-e-Bangla Agricultural University (SAU) developed an innovative foresight curriculum for agricultural universities in Bangladesh under the FoSTr programme. The curriculum equips future researchers and policymakers with scenario analysis, systems thinking, and multi-stakeholder engagement skills needed for food systems transformation.

It bridges academic training with practical foresight tools tailored to Bangladesh's context, ensuring capacity building for sustained application of futures methodologies. Targeted to support academic institutions working on agriculture and food, the curriculum aims to strengthen the national talent pipeline essential for designing adaptive and inclusive food policies.

6. Reflections and way forward

6.1 Reflections

To reflect on the progress of our work, a mid-term and final reflection report were developed, in which key stakeholders involved in the FoSTr work in Bangladesh were consulted through interviews, surveys, and focus groups.

Overall, the initiative raised awareness of foresight methodologies and the interconnectedness of food security, nutrition, climate change, trade, and water scarcity. It encouraged long-term, systemic thinking and helped stakeholders anticipate trade-offs and uncertainties across the food system. The process strengthened collaboration across sectors, engaging government ministries, NGOs, academia, and the private sector, including institutions such as FPMU, BIDS, BBS, BMD, and the Ministry of Planning. Multi-stakeholder engagement fostered dialogue, joint problem-solving, and a shared understanding of priorities, while improving understanding of other actors’ perspectives, clarifying roles, and building trust.

Participants highlighted that the use of scenarios and systems tools helped explore alternative futures, stress-test strategies, and design more resilient interventions. The programme also built capacity and shifted mindsets, equipping researchers and policymakers with skills in causal loop diagrams, scenario development, and backcasting. Stakeholders reported enhanced motivation to apply foresight, although barriers such as limited training, time, and access to resources were noted.

Key lessons for future foresight work include grounding processes in local realities, strengthening continuous stakeholder engagement and cross-ministry coordination, addressing data gaps, and institutionalising foresight within national planning frameworks. Broadening participation to include marginalized groups, such as youth, women, and smallholder farmers, was recommended to increase inclusivity and policy relevance.

Overall, stakeholders rated the foresight approach very positively, noting its usefulness for learning, strategic thinking, collaboration, and aligning policies with long-term priorities. The reflection demonstrates FoSTr’s potential to support resilient, inclusive, and sustainable food system transformation in Bangladesh, while highlighting opportunities for further capacity building and institutionalisation.

6.2 Way forward

While the FoSTr programme in Bangladesh concludes in 2025, stakeholders and the research team have identified several avenues to take foresight for food system transformation forward.

First, the recently initiated interministerial dialogue on the establishment of a foresight unit or lab provides a strong foundation. Building on this, a dedicated Foresight Unit within the Ministry of Food could be formalised in collaboration with relevant ministries, including Agriculture, Health and Family Welfare, and Environment, Forest and Climate Change. This unit would serve as a hub for coordinating foresight activities, integrating insights into national food system planning, and supporting cross-ministry collaboration.

Second, validation workshops on the National Food System Pathway Plan of Action and its Monitoring Framework offer an opportunity to embed foresight analyses into policy implementation and track outcomes over time. Continuous engagement with these frameworks can ensure that scenario-based insights inform strategic decisions and adaptive planning.

Beyond 2025, several longer-term initiatives were suggested. These include developing academic courses on Foresight for Food Systems to strengthen capacity among students and researchers, as well as providing targeted training for public and private sector actors to build national expertise in foresight tools and methodologies. Additionally, foresight tools can be systematically applied in government policy and strategy formulation, ensuring that future-oriented approaches become an integral part of planning processes. Figure XX presents concrete action points identified by various stakeholder groups during the closing FoSTr workshop, illustrating the pathways through which foresight can continue to support resilient, inclusive, and sustainable food system transformation in Bangladesh.

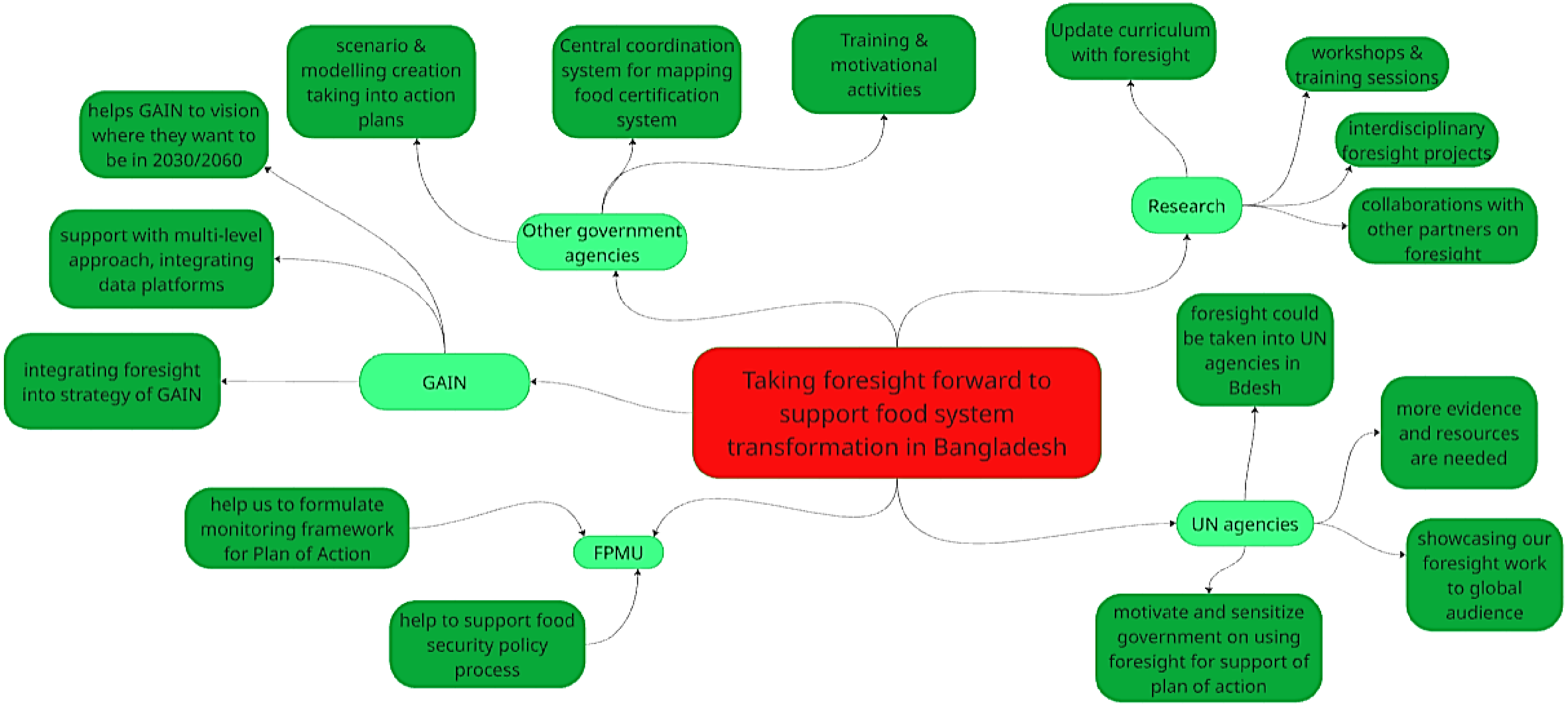

Figure 11: Concrete action points identified by various stakeholder groups during the closing FoSTr workshop for taking foresight forward to support food system transformation processes in Bangladesh

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The Foresight for Food System Transformation (FoSTr) is a programme that supports policymakers and other key stakeholders in the food system with scenarios and foresight analysis about the food system of the future.

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