Transforming Agrifood Systems in South Asia
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CGIAR Technical Reporting 2023

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In 2023, the CGIAR Research Initiative on Transforming Agrifood Systems in South Asia (TAFSSA) addressed the

**EXECUTIVE SUMMARY**

- **Initiative name:** Transforming Agrifood Systems in South Asia (TAFSSA)
- **Initiative short name:** TAFSSA
- **Initiative Lead:** Purnima Menon (01/01/2022 – 31/12/2024)
- **Initiative Co-lead:**
- **Science Group:** Z (CGIAR)
- **Region:** South Asia
- **Countries:** Bangladesh, India, Nepal, Pakistan
- **Geographic scope:**
  - **Geographic scope:**
- **APPROVED BUDGET**
  - **PROPOSAL BUDGET**
- **Budgets**
  - **2024 annual budget allocation**
  - **Carry-over and commitments**

**A busy local vegetable market in Bihar, India.**

Credit: Abdul Momin
Transforming Agrifood Systems in South Asia: Overall Initiative Theory of Change

**Objective:** Deliver a coordinated program of research and engagement across the food production to consumption continuum to improve equitable access to sustainable healthy diets, improve farmer livelihoods and resilience, and protect land, air, and groundwater resources.

The context for agrifood systems transformation is shaped by economic development, trade, politics and resulting policies, institutional capabilities, the information environment, socio-cultural influences and change.
Transforming Agrifood Systems in South Asia

While contributing to global scientific and societal demands, facilitating progression toward more sustainable agrifood systems, and addressing climate change management, the Initiative contributes to the determinants of sustainable healthy diets, and natural resources. It diversifies agroecosystems, ensures equitable markets, and promotes behavioral changes in multistakeholder platforms and data systems. Transformation of agrifood systems demands transdisciplinary and comprehensive approaches.

With a regional and nationally based approach, TAFSSA's research is organized to support equitable access to sustainable diets, enhance farmer livelihoods and resilience, and protect the region's land, air, and groundwater resources. TAFSSA's progress in 2023 is summarized below, with key outputs available online, including across five districts in Bangladesh, India, and Nepal. This assessment of progress against the theory of change includes:

- Major 2023 scientific highlights transforming and diversifying agroecosystems include:
  - Forty research notes coauthored with national partners and stakeholders have been generated from this work to inform transformation processes.
  - Major 2023 scientific highlights in equitable markets include:
    - Researchers used dynamic weather forecast-based crop advisories. Collaborating with the Agvisley platform, 8,000 extension officers have been trained in how to use its machine-supported decision-making in gender-equitable smallholder farming practices and nutrition training.
    - TAFSSA's partnerships with national research partners and Cereal Systems Initiative in South Asia (CSISA) have led to 12 monthly situation reports for South Asia.
    - In collaboration with the Solar Irrigation for Agricultural Productivity (SOLAR) project, organizing a major regional conference, TAFSSA brought together 1,500 stakeholders from 16 countries, representing more than 70 stakeholder groups.
    - TAFSSA brought together six CGIAR Centers, with nearly 95 percent of research and innovation systems that enable transformation.
    - With real-time data upload and representation in an online platform, improved environmental management practices, and groundwater use under past and projected climates and climate variability in India, and South Asia, the Initiative works with more than 160 partners to ensure resilience against climate risks.
    - Policy engagement briefs describing smallholder farmers' participatory engagement in crop diversification in Bangladesh, pathways supporting crop diversification in Bangladesh, and livestock livelihoods in India, and South Asia, and South Asia. Each data note details measurement outcomes (EOIOs). A major regional conference, TAFSSA brought together 1,500 stakeholders from 16 countries, representing more than 70 stakeholder groups.
    - TAFSSA's webinars, such as the one on testing sociotechnical variations across markets. Researchers are now offering a coordinated research and engagement program spanning environments.
    - Researchers used dynamic weather forecast-based crop advisories. Collaborating with the Agvisley platform, 8,000 extension officers have been trained in how to use its machine-supported decision-making in gender-equitable smallholder farming practices and nutrition training.
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    - TAFSSA's webinars, such as the one on testing sociotechnical variations across markets. Researchers are now offering a coordinated research and engagement program spanning environments.

Major 2023 scientific highlights in multistakeholder platforms and data systems include:

- Major 2023 scientific highlights toward behavioral determinants of sustainable healthy diets include:
  - Researchers used dynamic weather forecast-based crop advisories. Collaborating with the Agvisley platform, 8,000 extension officers have been trained in how to use its machine-supported decision-making in gender-equitable smallholder farming practices and nutrition training.
  - TAFSSA's partnerships with national research partners and Cereal Systems Initiative in South Asia (CSISA) have led to 12 monthly situation reports for South Asia.
  - In collaboration with the Solar Irrigation for Agricultural Productivity (SOLAR) project, organizing a major regional conference, TAFSSA brought together 1,500 stakeholders from 16 countries, representing more than 70 stakeholder groups.
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  - TAFSSA's webinars, such as the one on testing sociotechnical variations across markets. Researchers are now offering a coordinated research and engagement program spanning environments.

Summary of progress against the theory of change

- In Nalanda, India, a woman energetically prepares nourishing meals for her family. Credit: Shawn Sebastian
- A farmer Nalanda, India irrigating his land. Credit: Shawn Sebastian
Progress by End of Initiative outcome

**EOIO 1: Stakeholders engage with networks to inform at least two policies, programs, or market interventions.** (Metrics: number of policies, practices, or strategies).

**EOIO 2: Data informed actions implemented in at least four of TAFSSA’s learning locations.** (Metrics: number of policies, practices, or strategies).

**EOIO 3: Farmers diversify production systems on at least 0.71 million hectares (number of hectares reached by improved farming practices).**

**EOIO 4: Innovations in entrepreneurial rural service-provision markets and public and private extension systems accelerate the uptake of improved farm management practices and production diversification by at least 0.58 million farmers, including 0.20 million women.**

**EOIO 5: Business models supporting farm-product aggregation, better pricing for farmers at the farmgate, and/or shortened value chains benefit at least 95,000 farmers (22,500 of whom are women).**

**EOIO 6: At least two food-product supply chains are targeted to reduce food waste and/or financial losses for food distributors, processors, and/or retailers.**

**EOIO 7: At least five local governments engage in efforts to reshape rural food environments to support access to affordable healthy and nutritious food.**

**EOIO 8: At least two nutrition behavior-change programs provide evidence-based guidance to consumers on sustainable healthy diets, reaching 0.48 million people (all women).**

**EOIO 9: Gender- and equity-focused nutrition approaches are included in at least two agrifood systems linkages and/or SPPs.**

**EOIO 10: Farmers implement improved farming practices and/or diversify production on 1.42 million hectares (from EOIO 3), averting 16.24 Mt CO₂eq.**

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**Nutrition**

Nutrition (BCC)

Research on the groundwater–energy nexus in Bangladesh catalyzed more than 70 institutions across 16 countries in knowledge-sharing on climate services, enabling reduced risk in mung bean production.

**Partnership with JEEViKA, India, has facilitated capacity-building and policy advocacy, enhancing farm machinery scheduling, access, and operations for farmers diversifying beyond cereal-based cropping systems. In Bangladesh and Nepal, partnerships with machinery manufacturers, dealers, and service providers, and alignment of strategic support with governmental programs supported farmers to access and use innovative farm machinery on more than 5,550 hectares of land. This achievement was propelled by private-sector investment of US$3,528,350 in both countries to boost mechanization markets and services.

In 2023, TAFSSA developed a novel tool for analyzing data on household food task allocation, including intra-household disaggregation at CGIAR’s BCC.

**Research Institute (ICAR-CSSRI)

**Indian Institute of Maize Research (ICAR-IIMR)

**National Institute of Nutrition (ICCDR,B)

**Aga Khan University

**Council of Scientific and Industrial Research (CSIR), PAU, Dr. Rajendra Prasad Central Agricultural University (ICAR-CPSU), Panjab University**
Partnership with JEEVika in India boosted groundwater linkages through research on farm machinery operations and diversification. Catalyzed knowledge-sharing among over 70 institutions across 16 countries on livelihoods, gender and inclusion, mechanization services, benefitting 156,619+ farmers. In Bangladesh and Nepal, collaborations with manufacturers, dealers, and governments facilitated cost-effective mechanization services, benefitting 156,619+ farmers. Private sector investment of $3,528,350 in India boosted farm machinery operations and diversification. TAFSSA worked to enhance knowledge networks in Bangladesh's agrifood systems, facilitating knowledge transfer, innovation, and evidence-based decision-making. TAFSSA convened government officials across Bangladesh, India, and Nepal, facilitating dialogue on agrifood systems. Discussions focused on assessment findings, dietary drivers, gender equity, and knowledge gaps where over 100 officials participated. TAFSSA introduced a pioneering tool in 2023 for analyzing household food task allocation, providing data and evidence to enrich policy. Research highlighted dietary variations among different types of rural households, men, women, and youth, informing policy. Next steps include utilizing integrated agrifood systems assessment data to advance research on social safety nets and dietary patterns. TAFSSA scientists in India documented greenhouse gas (GHG) reduction benefits by diversifying cropping systems away from rice and wheat. In Bangladesh, collaboration focused on diversifying from rice-based systems to maize, promoting income generation, reduced water consumption, and GHG emissions. Diversified and climate-smart farming practices were popularized through 150+ on-farm demonstrations and maize field days, co-sponsored with the state government of India.

Progress towards end of initiative outcomes (EOIOs)

**EOIO 1** Stakeholders engage with networks to inform 2+ policies/programs/market interventions (Metrics: # of policies/practice/strategies)

**EOIO 2** Data-informed actions implemented in 4+ of TAFSSA’s learning locations (Metrics: # of policies/practice/strategies)

**EOIO 3** Farmers diversify production systems on at least 0.71 million hectares (# of hectares reached by improved farming practices)

**EOIO 4** Innovations in entrepreneurial rural service provision markets and public and private extension systems accelerate the uptake of improved farm management practices and production diversification by at least 0.58 million farmers including 0.20 million women.

**EOIO 5** Business models: supporting farm product aggregation, better pricing for farmers at the farmgate, and/or shortened value chains benefit at least 95,000 farmers (22,500 of whom will be women).

**EOIO 6** At least two food product supply chains are targeted to reduce food waste and/or financial losses for food distributors, processors, and/or retailers.

**EOIO 7** At least 5 local governments engage in efforts to reshape rural food environments to support access to affordable healthy and nutritious food.

**EOIO 8** At least two nutrition behavior change programs operated provide evidence-based guidance to consumers on sustainable healthy diets, reaching 0.48 million people (all women).

**EOIO 9** Gender and equity-focused nutrition approaches are included in at least two agrifood systems linkage and/or social protection programs/systems linkage and/or social protection programs.

**EOIO 10** Farmers implement improved farming practices and/or diversify production on 0.71 million hectares.
WP1: Facilitating agrifood systems transformation through inclusive learning platforms, public data systems, and partnerships

TAFSSA WORK PACKAGE 1

WP2: Transforming agroecosystems and rural economies to boost income, and support diversified food production within environmental boundaries

TAFSSA WORK PACKAGE 2
WP3: Improving access to and affordability of sustainably produced healthy foods through evidence and actions across the postharvest value chain

WP4: Tackling the behavioral and structural determinants of sustainable healthy diets
WP5: Building resilience and mitigating environmental impact

TAFSSA WORK PACKAGE 5

PATHWAY 1: Inclusive, resilient and low carbon agri-food systems within ecological boundaries

Intermediate outcomes

Outputs within Initiative timeline

Credit: Abdul Momin

Vigorously managing her goats, a farmer in Surkhet, Nepal tends to her livestock.

Vigorously managing her goats, a farmer in Surkhet, Nepal tends to her livestock. Credit: Abdul Momin
### Work Package Progress Rating Summary

<table>
<thead>
<tr>
<th>Work Package</th>
<th>Progress Rating &amp; Rationale</th>
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<tbody>
<tr>
<td>1</td>
<td><strong>Progress rating</strong>&lt;br&gt;WORK PACKAGE PROGRESS RATING &amp; RATIONALE&lt;br&gt;1 Progress rating&lt;br&gt;Progress made in 2023 largely matches the outlined Plan of Results and Budget, as well as the WP’s TOC. However, funding limitations have restricted the deployment of agrifood systems assessments to fewer districts. Integrated agrifood systems assessments were not carried out in northwestern India or Pakistan due to financial constraints.</td>
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<tr>
<td>2</td>
<td><strong>Progress rating</strong>&lt;br&gt;2023 progress for TAFSSA largely stayed on track with the PORB and the WP’s TOC. Reduced funding allocation continued to pose challenges for WP progress: The number of TAFSSA’s living laboratories remained curtailed, as in 2022, affecting the Initiative’s ability to meet its original plans. Research on diversified alternatives to rice-fallow cropping sequences could not be initiated in Bangladesh or India, and interactions in Pakistan remained minimal. Contingent on future funding levels being restored to the amounts requested in TAFSSA’s investment proposal, work toward these outcomes can be resumed. TAFSSA strategically adjusted to these challenges by aligning with bilateral projects that have similar impact pathways to generate significant outcomes from research, despite funding shortfalls.</td>
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<tr>
<td>3</td>
<td><strong>Progress rating</strong>&lt;br&gt;TAFSSA research is on track and responding to challenges identified in 2022’s progress rating. Price transmissions were completed by TAFSSA to enhance WP congruence. At the same time, due to inadequate funding, WP3’s commitment to engage with five local governments will be reduced to three. Persistent funding shortfalls will prevent the implementation of research on postharvest food waste in value chains within TAFSSA. Contingent on future funding levels being restored to the amounts requested in TAFSSA’s investment proposal, work toward these outcomes can be resumed.</td>
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<tr>
<td>4</td>
<td><strong>Progress rating</strong>&lt;br&gt;Work is on track but significant funding shortfalls to the Initiative and this WP made changes to the TOC necessary, with two outcomes removed (outcome 4.4: Governments and program implementers will integrate robust content from BCC innovations to reduce unhealthy food consumption, and outcome 4.6: Gender- and equity-focused nutrition approaches are included in programs focused on agrifood systems linkages). Contingent on future funding levels being restored to the amounts requested in TAFSSA’s investment proposal, work toward these outcomes can resume.</td>
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<tr>
<td>5</td>
<td><strong>Progress rating</strong>&lt;br&gt;2023 progress largely aligns with the PORB, with WP-level TOC assumptions largely holding. Slight changes were made to the detailed outputs planned due to a change in WP leadership, minorly delaying only one output. All other outputs remain on track.</td>
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Key results

This section provides an overview of results reported by the CGIAR Research Initiative on Transforming Agrifood Systems in South Asia in 2023. These results align with the CGIAR Results Framework and Transforming Agrifood Systems in South Asia’s theory of change. Source: Data extracted from the CGIAR Results Dashboard on 29 March 2024.

Overview of reported results

Outputs
- Knowledge product: 133
- Innovation development: 31
- Capacity sharing for development: 27
- Other output: 25

Outcomes
- Innovation use: 13
- Other outcomes: 3

Percentage of reported results tagged to CGIAR Impact Areas

- Climate adaptation and mitigation: 224
- Gender equality, youth and social inclusion: 201
- Nutrition, health and food security: 198
- Environmental health and biodiversity: 197
- Poverty reduction, livelihoods and jobs: 200
- Environmental health and biodiversity: 187
- Nutrition, health and food security: 142
- Gender equality, youth and social inclusion: 140
- Climate adaptation and mitigation: 13

Contributions to the UN Sustainable Development Goals

- Number of knowledge products by type (trend overview, 2022-2023)

Number of results by country

Number of knowledge products by type (trend overview, 2022-2023)
### Number of individuals trained by the initiative (trend overview, 2022-2023)

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<tr>
<th>Year</th>
<th>Female</th>
<th>Male</th>
<th>Total</th>
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<tr>
<td>2022</td>
<td>901</td>
<td>1,623</td>
<td>2,524</td>
</tr>
<tr>
<td>2023</td>
<td>1,507</td>
<td>2,076</td>
<td>3,583</td>
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### Number of innovations by readiness level

- **Proven Innovation**: The innovation is validated for its ability to achieve a specific impact under uncontrolled conditions. 
- **Uncontrolled Testing**: The innovation is being tested for its ability to achieve a specific impact under uncontrolled conditions. 
- **Prototype**: The innovation is validated for its ability to achieve a specific impact under semi-controlled conditions. 
- **Semi-Controlled Testing**: The innovation is being tested for its ability to achieve a specific impact under semi-controlled conditions. 
- **Model/Early Prototype**: The innovation is validated for its ability to achieve a specific impact under fully-controlled conditions. 
- **Controlled Testing**: The innovation is being tested for its ability to achieve a specific impact under fully-controlled conditions. 
- **Proof of Concept**: The innovation’s key concepts have been validated for their ability to achieve a specific impact. 
- **Formulation**: The innovation’s key concepts are being formulated or designed. 
- **Basic Research**: The innovation’s basic principles are being researched for their ability to achieve a specific impact. 
- **Idea**: The innovation is at idea stage.

### Pipeline overview

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<thead>
<tr>
<th>Pipeline overview</th>
<th># of innovations</th>
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<tbody>
<tr>
<td>Proof of Concept</td>
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<tr>
<td>Basic Research</td>
<td>1</td>
</tr>
<tr>
<td>Formulation</td>
<td>1</td>
</tr>
<tr>
<td>Proof of Concept</td>
<td>3</td>
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<tr>
<td>Controlled Testing</td>
<td>6</td>
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<tr>
<td>Model/Early Prototype</td>
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<tr>
<td>Prototype</td>
<td>5</td>
</tr>
<tr>
<td>Uncontrolled Testing</td>
<td>3</td>
</tr>
<tr>
<td>Proven Innovation</td>
<td>11</td>
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*Credit: Shawn Sebastian*
Partnerships and Transforming Agrifood Systems in South Asia's impact pathways

**Nutrition, health, and food security:**

- Partnerships with the Collective for Social Science Research (CSISA) and the International Development Enterprise (iDE) helped to link farmers to markets for diversified crops in Bangladesh. Nepal supported out-scaling. Twelve new food-processing companies were engaged. The Initiative's impact pathways include work on nutrition, health, and food security.

**Climate adaptation and mitigation:**

- TAFSSA is adopting photovoice methods for environmental health and biodiversity research in this Impact Area. A workshop with 189 stakeholders was piloted with innovative new research on climate services and carbon markets research.

**Poverty reduction, livelihoods, and jobs:**

- Continuing in its convening role, TAFSSA collaborated with 10 CGIAR Excellence in Agriculture project teams, engaging with five bilateral projects aligned with CGIAR’s Impact Areas. Key achievements are outlined below.

**Environmental health and biodiversity:**

- TAFSSA’s 2023 climate services and carbon markets research and collaboration with the Nicaragua National Agricultural Research Institute (ICAR) is adopting photovoice methods. Innovative new research on climate services and carbon markets research.

**Partnerships and CGIAR Portfolio linkages**

- TAFSSA actively engaged with the Nutrition Platform and the CGIAR Gender Platform on the environmental ramifications of farm diversification. The Initiative supported planning of an environmentally conscious portfolio.

- During 2023, continued collaboration with the Poverty Reduction, Livelihoods, and Jobs Initiative and the Drivers of Food Choice Initiative supported planning of an environmentally conscious portfolio. The Initiative also engaged with the Drivers of Food Choice Initiative and the Drivers of Food Choice Initiative for Resilient Cities.

- Environmental health and biodiversity: TAFSSA continued engagement with a collaborative research portfolio in this Impact Area. The latter Initiative also engaged with the Drivers of Food Choice Initiative and the Drivers of Food Choice Initiative for Resilient Cities.
## Adaptive management

### RECOMMENDATION

<table>
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<th>RECOMMENDATION</th>
<th>SUPPORTING RATIONALE</th>
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TAFSSA's Pause and Reflect exercise identified the need to create greater awareness among stakeholders, encourage more widespread use of the integrated agrifood survey and situation report approaches, and expand them to new locations.

TAFSSA's district agrifood assessment survey tools and agrifood systems situation reports have generated attention from stakeholders interested in generating data and encouraging use of evidence-based decisions and actions in South Asia and other low- and middle-income countries, particularly through CGIAR's regional integrated Initiatives. Greater engagement with different actors interested in evidence-based action in different agrifood systems domains will lead to greater use of methodological innovations by TAFSSA and generate more impact from this Initiative. Furthermore, streamlining survey modules and assessment designs will enable more frequent surveys and assessments across additional districts, enhancing the adoption of the comprehensive assessment approach and specific survey modules by researchers and stakeholders alike. However, developing streamlined approaches requires securing additional resources to fund new surveys rounds in both existing and new locations, drawing on insights from the initial round conducted in 2022–2023.

Funding limitations necessitate a streamlining of research and engagement in WPs 3, 4, and 5. Due to funding constraints, WP3 will need to limit the number of local governments with which it engages. Research on food waste across value chains envisioned in the TAFSSA investment proposal will have to be dropped. WP4 must streamline its research and engagement efforts, resulting in the removal of two planned outcomes: (1) the integration of robust content from BCC innovations by governments and program implementers to reduce unhealthy food consumption, and (2) the inclusion of gender- and equity-focused nutrition approaches in agrifood system programs. These goals have become unattainable due to budget shortfalls impacting the resources available for BCC randomized control trials. As a response, TAFSSA is seeking to strengthen partnerships with governments and BCC program implementers to suggest new and relevant research avenues. WP5 will further consolidate research under a single output in its TOC (Improving adaptive capacity to climate change through assessments of household capacities, increased use of dynamic weather-based farm advisories by farmers, adaptation research and extension prioritization, and planning tools by national research institutions through participation, partnership, and scaling strategies). WP5 outcomes 2 and 3 have been reformulated as "insights in climate and farm advisories, sustainable water use, clean air and low-emission agriculture inform core policies of the government, business models, and private-sector investment strategies."
Empowering Bangladesh’s mung bean farmers to overcome climate risk–induced loss and damage

A leap forward with real-time interactive voice-response weather advisories.

Coastal Bangladesh, part of a low-lying deltaic region, is one of the most climate risk-prone regions of the world. Climate change, variability, and extreme weather threaten the agricultural systems supporting the livelihoods of more than 30 million smallholder farmers.Difficult-to-predict extreme weather events can cause extensive crop loss and damage, pushing farmers into a poverty trap. Nevertheless, they strive for resilience, and in Bangladesh’s central coast, farmers increasingly grow mung bean after the rice harvest, selling it in emerging markets at favorable prices. However, mung bean is highly vulnerable to heavy rainfall events during harvesting, which can result in waterlogging, rotting of pods, and even complete loss of crop quality and quantity.

In south-central Bangladesh, TAFSSA is bundling climate service advisories with innovations in mobile phone-based interactive voice-response (IVR) services to transform mung bean farming. This service provides free, timely automated weather forecast-based harvesting advisories as voices calls in Bangla, safeguarding mung bean farmers against extreme rainfall events. In climate risk-prone Bangladesh, the service supported 10,472 farmers in 2023 to take action and save their crops from weather-induced loss and damage. The service is inclusive, as it is accessible to farmers with or without smartphones or the ability to read.

TAFSSA’s mung bean climate-advisory IVR service provides a beacon of change in Bangladesh’s climate risk-prone coastal region. Through high-resolution weather forecasts and automated advisory voice calls, farmers receive crucial weather updates, enabling them to make informed decisions, protect mung bean from yield losses, and secure livelihoods against extreme climate-induced risks.

The interactive voice response climate service for mung bean has been a game-changer for us. Knowing when the rain will come allows us to plan better and protect our hard work. Before this service, we were farming in the dark, guessing what the sky might bring. Now, we farm with the confidence that comes from being informed and prepared.

Credit: Rahima, mung bean farmer, Amtali, Barguna, Bangladesh

The Department of Agriculture Extension ∙ The Bangladesh Meteorological Department ∙ M-World ∙ CSISA ∙ CIMMYT

Section 1: Key result story

Country: Bangladesh
Region: South Asia
Geographic scope: Bangladesh

Contributing initiative

Transforming Agrifood Systems in South Asia

Other relevant Impact Area targeted

Asian Mega-Deltas

Contributing external partners

CIMMYT

Contributing Center

CSISA
Gaumaya Oli Khatri collects tomatoes from her fields in Surkhet, Nepal, where TAFSSA is working to improve crop diversification and support farmers growing a range of crops crucial for sustainable healthy diets. Credit: Abdul Momin

Krishna Mohan selling his vegetables in local market Dhang, Nepal. Credit: Abdul Momin