

Agricultural and Rural Transformation for Nutrition, Entrepreneurship and Resilience (PARTNER) in Bangladesh: A SWOT Analysis of the Program

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Abstract

The agricultural sector in Bangladesh has undergone a remarkable transformation from traditional, low-yield subsistence farming to a more modernized, high-yield system. Despite its contribution to GDP declining recently (FY 2023-2024), it remains a vital economic pillar in multi-facets. Today this sector is experiencing a shift toward commercialization, ag-processing, and the adoption of climate-resilient technologies. Along with this progression, the Program on Agricultural and Rural Transformation for Nutrition, Entrepreneurship, and Resilience (PARTNER) is a flagship initiative in today's Bangladesh by the Department of Agricultural Extension (DAE), Ministry of Agriculture, Government of Bangladesh. It was launched in 2023 and scheduled to run through 2028 underpinning a collaboration between the Government of Bangladesh, the World Bank, and the International Fund for Agricultural Development (IFAD). Since the field data-statistics relating to the PARTNER are not available at this stage, this study carried out SWOT analysis theoretically in Bangladesh. It brings to light some valuable suggestions to overcome the weaknesses and threats of the PARTNER. There are some suggestions to utilize the strengths and opportunities properly in today's agricultural rural transformation in Bangladesh. Through this study, the researchers try to discuss the effect of various macroeconomic factors of strength, opportunity, weakness, and threat on Nutrition, Entrepreneurship, and Resilience in rural agricultural transformational efforts.

Keywords

Agricultural and Rural Transformation, Nutrition, Entrepreneurship, Resilience in the Agriculture Sector, The PARTNER, Economic Factors, SWOT Analysis

1. Introduction

In today's Bangladesh, agriculture accounts for 54 percent of rural employment and 43 percent of national employment (Raihan, 2022). Between 2000 and 2010, agricultural growth contributed 69 percent to rural poverty reduction in the country, with a more modest contribution of about 27 percent between 2010 and 2016, as the impacts of the earlier sector reforms and investments on productivity started plateauing and agricultural growth started trending downward (Raihan, 2022; Rashid et al., 2021).

With this ongoing progress in multi-facets, Bangladesh has made rapid social and economic improvement in recent decades, reaching lower-middle-income status in 2015. The national poverty rate fell to 24.5 per cent in 2016, while extreme poverty declined to 13.0 per cent. However, the pace of poverty reduction has slowed in recent years even as growth accelerated. To attain upper-middle-income status by 2031, Bangladesh needs to create jobs by developing a competitive business environment, diversifying exports, investing in human capital, building efficient infrastructure, strengthening the financial sector and establishing a policy environment that attracts private investment.

Along with this progression, the Program on Agricultural and Rural Transformation for Nutrition, Entrepreneurship and Resilience (PARTNER) is a flagship initiative in Bangladesh by the Department of Agricultural Extension (DAE), Ministry of Agriculture, Government of Bangladesh (International Fund for Agricultural Development, 2023). The aim of this advancement is to transform agriculture toward high-value crops, ensure food safety, and build climate resilience. Overall, it has been designed to modernize the agricultural sector. It was launched in 2023 and scheduled to run through 2028 underpinning a collaboration between the Government of Bangladesh, the World Bank, and the International Fund for Agricultural Development (IFAD). In this journey, the implementation of the PARTNER has been leading by the Ministry of Agriculture in Bangladesh and supported by the World Bank (IDA) and IFAD, with a total budget of US\$1.343 billion, including government contributions (Rezvi, 2018; Saleh, 2024; World Bank, 2023; Wardad, 2020).

It is well recognized that the goal of the proposed program is to transform agriculture toward high-value crops ensuring food safety and building climate resilience. Accordingly, at this stage, this study advances by carrying out a SWOT Analysis for better understanding the prospects and shortcomings of the PARTNER in aim to ensure agricultural and rural transformation in Bangladesh economy.

2. The Specific Objectives of the PARTNER in Bangladesh

The specific objectives are as follows

- 1) To increase area under fruits and vegetables with Good Agricultural Practices (GAP) certification to 300,000 hectares.
- 2) To shift Bangladesh from a rice-centric system to a more diversified, profitable, and climate-resilient agri-food system.

- 3) To increase new area under high-yielding rice varieties to 200,000 hectares.
- 4) To increase area under non-rice cereals, pulses, oilseeds, and horticulture crops to 200,000 hectares.
- 5) To cover 100,000 hectares of new area under improved and efficient irrigation Technologies.
- 6) To roll out services (such as extension support, input subsidy support, and credit support) and make them available through the “Krishak Smart Card (KSC)” system.
- 7) To promote the production of high-value, nutrient-dense crops such as fruits, vegetables, pulses, and oilseeds when it comes to Nutrition & Diversification matters.
- 8) To train at least 20,000 youth and women to become “Agri-pioneer” for moving beyond traditional farming toward business-oriented value chains on entrepreneurship.
- 9) Adopting Good Agricultural Practices (GAP), efficient irrigation technologies, and stress-tolerant crop varieties to combat climate change to ensure Climate Resilience.
- 10) To support and strengthen agricultural research, extension services, and digital data collection from farmers for institutional modernization in Bangladesh.
- 11) To achieve putting 200,000 hectares under high-yielding, climate-resilient rice, providing digital services to 5 million farmers and achieving a 10% yearly increase in agricultural research.

3. Economics of the PARTNER in Bangladesh

The economics of agricultural and rural transformation has been shifted from subsistence farming to commercialized, high-productivity systems, driving poverty reduction and food security in Bangladesh for few years now ([International Fund for Agricultural Development, 2023](#); [World Bank, 2023](#); [Willett et al., 2019](#)). These transformations in multi-facets in rural areas in Bangladesh today encourage farmers, *particularly* small farmers moving beyond just rice toward pulses, oilseeds, and vegetables due to higher profitability. In these practices, most farmers are not hesitant utilizing modern agricultural practices and mechanization for enhancing productivity ([Tasnim et al., 2025](#); [Palli Karma-Sahayak Foundation, 2026](#)). Because of improved rural road facilities, markets, and electrification (via Bangladesh Rural Electrification Board—BREB) have boosted economic connectivity. But sometime climate vulnerability such as floods & droughts becomes challenges that require investment in resilient infrastructure ([Ranasinghe et al., 2021](#)).

The Key Aspects of Agricultural Transformation on macroeconomics perspectives:

- 1) Ensuring agricultural production booming in Bangladesh.
- 2) Ensuring high-value crops beyond just rice such as pulses, oilseeds, and vegetables due to higher profitability.

3) Modernize agricultural practices and mechanization are enhancing productivity by ensuring technological advance.

4) Ensuring better rural livelihoods by diversifying into non-farm sectors, reducing direct dependence on agriculture.

5) Reducing rural poverty in rural economy further as agricultural growth has been seen over the last two decades.

6) Focusing on promoting nutrition, food safety, and diversification.

Furthermore, in economics perspective, food, nutrition, and health condition analyzes how income, prices, and policies influence food choices, which directly impacts health outcomes and economic productivity in Bangladesh. It focuses on integrating nutrition into food security to maximize health benefits, treating food as a vital determinant of well-being. Key elements include the high returns of nutrition-focused interventions, the “dual burden” of malnutrition (simultaneous undernutrition and obesity) and the shift from agricultural to consumer-focused nutrition research (Tasnim et al., 2025).

Besides the, in this journey, agricultural growth has been a major driver in lowering poverty over the last two decades in Bangladesh (Tasnim et al., 2025). Thus, these transformations in macroeconomics perspective can be summarized categorically as follows:

Non-Farm Economy: Rural livelihoods are diversifying into non-farm sectors, reducing direct dependence on agriculture.

Infrastructure Growth: Improved rural roads, markets, and electrification (via Bangladesh Rural Electrification Board—BREB) have boosted economic connectivity.

Poverty Reduction: Agricultural growth has been a major driver in lowering poverty over the last two decades.

4. Elaboration of Nutrition, Entrepreneurship and Resilience on Analytical Perspectives

Prior to carrying out SWOT Analysis in this study, it is productive for better understanding on “Nutrition” “Entrepreneurship,” and “Resilience” (Wortman, 1990; Sikder & Jian, 2014; Rashid et al., 2021). Accordingly, this section advances with analytical meaning of “Nutrition” “Entrepreneurship,” and “Resilience” in today’s human society.

Here Nutrition, Entrepreneurship, and Resilience are analytical concepts that describe how living systems process energy, how individuals build economic value, and how people or structures recover from severe stress (IFAD, 2025) (Table 1).

For better understanding, each concept in the above table is elaborated in three perspectives namely i) Definition ii) Analytical breakdown and iii) Key components. These elaborations are as follows:

Nutrition

Definition: Nutrition is the study and biological reality of how organisms ingest, digest, and utilize nutrients.

Table 1. Comparison in table format.

Concept	Analytical Definition	Core Mechanism	Primary Outcome
Nutrition	The biochemical process of breaking down food to sustain cellular life.	Metabolic absorption of macronutrients and micronutrients.	Sustained growth, immunity, and energy.
Entrepreneurship	The systemic creation of new commercial or social value.	Resource allocation and calculated risk-taking.	Innovation, jobs, and market adaptation.
Resilience	The systemic capacity to absorb shock and recover.	Adaptive feedback loops and structural flexibility.	Long-term survival and stability.

Source: International Fund for Agricultural Development, 2023; World Bank, 2025; IFAD, 2025.

Analytical breakdown: It examines the conversion of food into cellular energy, tissue repair, and hormonal balance.

Key components: It tracks biochemical pathways involving proteins, fats, carbohydrates, vitamins, and minerals.

Entrepreneurship

Definition: Entrepreneurship is the dynamic process of identifying gaps in a market and organizing resources to fill them.

Analytical breakdown: It evaluates how an individual or group manages financial, operational, and reputational risk.

Key components: It relies on opportunity recognition, market analysis, capital deployment, and scalable innovation.

Resilience

Definition: Resilience is the functional ability of an individual, organization, or ecosystem to bounce back from adversity.

Analytical breakdown: It measures the time and resource cost required for a system to return to equilibrium after a disruption.

Key components: It depends on redundancy, adaptive capacity, learning from failure, and structural elasticity.

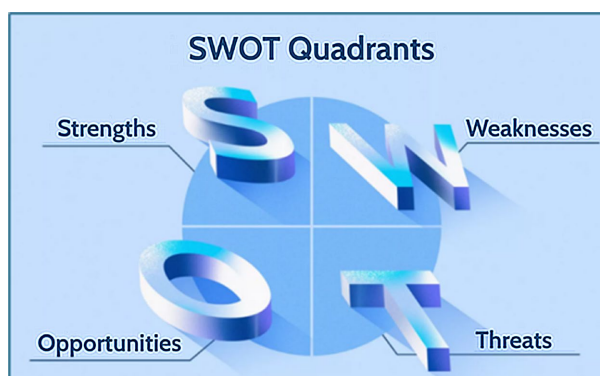
5. SWOT Analysis of the Program on Agricultural and Rural Transformation

5.1. SWOT Factors in Agricultural Transformation (AT) for Nutrition Arena

A SWOT analysis (**Figure 1**) in general is a strategic planning framework, which can be utilized by evaluating a business, project (a new or an ongoing project) or personal venture in multi-facets in any production section such as agricultural sector.

Here the SWOT analysis in Agricultural Transformation (AT) for Nutrition arena reveals strengths in diversified production and policy focus, balanced by weaknesses in infrastructure and smallholder inclusion. Opportunities lie in technological innovation and market growth, while threats include climate change and

volatile market conditions.



Source: <https://www.investopedia.com/terms/s/swot.asp>

Figure 1. SWOT Analysis of Agricultural Transformation (AT) for Nutrition.

5.2. SWOT Factor Selection and Scope

The SWOT factors were selected through a systematic review of program documentation, independent evaluations, and regional agricultural data. This process ensures the analysis reflects both internal project realities and external market dynamics.

5.2.1. Data Sources and Evidence Base

To build a credible matrix, the selection of factors was informed by two primary streams of literature:

Program-Specific Documents: The identification of internal Strengths and Weaknesses relied heavily on project implementation reports, mid-term reviews, annual monitoring data, and stakeholder workshop outputs.

Sectoral Studies: The identification of external Opportunities and Threats was informed by broader agricultural-sector studies, including macroeconomic reports from regional development banks, national agricultural policies, and peer-reviewed studies on regional climate impacts and trade conditions.

5.2.2. Boundary Setting—Program vs. Sector Conditions

To ensure analytical clarity, the framework strictly distinguishes between factors directly attributable to the program and those driven by the wider agricultural environment:

Program-Level Evidence (Internal Scope): Factors classified as Strengths or Weaknesses are bounded by the program's direct control. These include operational efficiency, budget allocations, technical expertise, and immediate outputs (e.g., number of farmers trained or seeds distributed).

Sector-Wide Conditions (External Scope): Factors classified as Opportunities or Threats represent macro-level variables that exist independently of the program. These include fluctuating global commodity prices, national infrastructure deficits, climate-induced weather patterns, and shifting regulatory frameworks. While these sector conditions heavily influence program outcomes, they remain external to the program's operational boundary.

5.2.3. The Way Factors of SWOT Selected

The Selection and Methodology Process are as follows:

Stakeholder Consultation: Engaging cross-sector groups including farmers, women's cooperatives, youth entrepreneurs, researchers (e.g., BARI), and government bodies—through workshops and surveys.

Internal Factor Evaluation (Strengths & Weaknesses): Assessing internal capacities like arable land availability, traditional farming skills, institutional frameworks, yield gaps, and financial/infrastructure constraints.

External Factor Evaluation (Opportunities & Threats): Scanning macro-level trends such as climate change vulnerability, global market demands, digital transformation potential, and supply chain bottlenecks.

Strategic Alignment: Grouping these findings to prioritize intervention areas—like food safety, climate resilience, and value-chain commercialization ensuring the program directly tackles identified gaps.

5.2.4. Selection Process of SWOT Factors

Stakeholder Mapping: Engage ministries of agriculture and health, local farmers, nutritionists, and market actors to identify relevant local *priorities* in Bangladesh.

Brainstorming & Clustering: Participants list specific local assets, market needs, and climatic challenges, then group related ideas into categories.

Core Nutritional Lenses: Screen agricultural inputs, crop diversity, and post-harvest handling specifically for their impact on nutrient availability, accessibility, and consumer utilization.

Internal Factor Evaluation (Strengths & Weaknesses): Assess controllable elements like existing crop varieties, local farming skills, post-harvest storage losses, and access to local extension services.

External Factor Evaluation (Opportunities & Threats): Analyze broader conditions such as climate variability, market demand for nutrient-dense foods, trade policies, and economic access for vulnerable groups.

A Factor's Immediate Impact: Factors are filtered based on immediate impact on food security, economic viability, and climate resilience.

5.2.5. Strength (S)

The strengths are as follows:

Diversification of Food Sources: The program focuses on shifting from staple-only crops to nutrient-dense crops, improving dietary variety.

Policy and Structural Support: Often supported by national policies aiming for long-term modernization, infrastructure development, and improved research linkages.

Grassroots Potential: Potential to improve rural livelihoods and nutrition through local agricultural interventions.

Entrepreneurship: Entrepreneurship in Bangladesh's agricultural sector can drive economic growth (GDP contribution) and rural employment, leveraging high labor availability and a vast local market.

Abundant Labor Force: A huge portion of the population is engaged in agriculture, providing a steady labor supply.

5.2.6. Weaknesses (W)

The weaknesses are as follows:

Inadequate Infrastructure: Lack of storage, processing, and transportation infrastructure hinders product quality and reach.

Smallholder Exclusion: Risk of marginalizing small-scale farmers if adoption of technology requires high capital, causing social tensions.

Weak Information Dissemination: Limited reach of agricultural extension services to educate farmers on new nutritional techniques.

5.2.7. Opportunities (O)

The opportunities are as follows:

Technological Advancements: Opportunities for utilizing biotechnology for high-value nutrient-dense products.

Market Growth and Value Addition: Increased demand for organic, nutritious foods allows for increased revenue via local processing.

Donor and Partner Funding: High potential for funding and technical support from international development partners.

5.2.8. Threats (T)

The threats are as follows:

Climate Change: Increased frequency of climate-related disasters can significantly reduce yields and disrupt food systems.

Market Instability: Inconsistent prices and high logistics costs can hinder farmers' ability to transition to more nutritious crops.

Institutional Constraints: Lack of political will or inconsistent policy implementation, often leading to funding gaps, can compromise the sustainability of the transformation.

6. Supports of the Aforementioned Findings in Bangladesh Perspective

Agricultural transformations in Bangladesh have fundamentally altered the country's rural economy, shifting labor dynamics, lowering poverty rates, modifying crop profitability, driving mechanization, and elevating the significance of infrastructure.

A synthesis of findings directly addressing the five specific outcomes in Bangladesh, which is shown in table formatted and then elaboration below (**Table 2**).

Elaboration on Agricultural Impacts

1) Agricultural Employment Dynamics

Agriculture remains a vital cornerstone of rural livelihoods, but the nature of employment is changing rapidly:

Income Diversification: While over 87% of rural residents continue to derive at

least some income from farming, two-thirds of rural households now rely on a dual strategy of both farm and non-farm income streams.

Table 2. Overview of agricultural impacts in Bangladesh (in table formatted).

Focus Area	Core Outcomes & Mechanisms	Key Evidence & Data Points
Agricultural Employment	Shift from pure farm-based labor to mixed and non-farm employment in rural areas	Over 87% of rural people derive income from agriculture. A 10% rise in farm income spurs a 6% rise in non-farm income.
Poverty Reduction	Pro-poor growth driven by technology, though localized by eco-system and constrained by rising inequality.	Agricultural interventions significantly lower poverty levels ($p < 0.05$). High-value agriculture reduces poverty most in favorable regions.
Crop Profitability	Higher incomes are achieved by optimizing production efficiency, though offset by market risks and input costs.	Mechanization increases output and cuts production costs, but smallholders face high start-up costs and risky financing.
Mechanization Effects	Widespread adoption of small-scale machinery via custom hiring networks rather than outright ownership.	Power tillers, pumps, and tractors reduce labor requirements and input waste but raise seasonal worker displacement risks.
Infrastructure Effects	Road networks, market connectivity, and irrigation expand access to secondary cities and bolster climate resilience.	Infrastructure links secondary markets, optimizes logistics, and strengthens climate resilience in vulnerable zones like haor wetlands.

The Rise of Mixed Households: Longitudinal data from the Labor Force Survey (LFS) reveals a structural shift from pure farming to “mixed households”. This pattern is accelerating among younger demographics; the share of mixed households among heads aged 15 - 30 grew from 17% to 30% over a 13-year period.

Localized Transformation: This employment shift does not necessarily trigger massive permanent migration to major urban hubs. Instead, diversification occurs locally within rural boundaries, particularly within 2.5 kilometers of cities where the share of pure farm households dropped significantly.

2) Poverty Reduction Pathways

Agricultural growth in Bangladesh is historically recognized as a powerful “pro-poor” catalyst, though it faces modern structural challenges:

The Non-Farm Multiplier Effect: Gains in agricultural productivity spill over into the broader local economy. A 10% increase in farm income generates a 6% increase in non-farm income, predominantly in services like the processing and marketing of agricultural items.

Targeted Interventions: Studies on agricultural interventions in climate-vulnerable ecosystems (such as the haor wetlands of Sylhet and Sunamganj) show a sta-

tistically significant relationship ($p < 0.05$) between intensive agricultural programs and measurable poverty reduction.

The Inequality Bottleneck: While productivity growth drives up wages and benefits the rural poor, post-trade-liberalization data indicates that the wealthiest households often capture a disproportionate share of economic growth. This rising inequality slows down potential poverty alleviation.

3) Crop Profitability

Profitability in Bangladeshi agriculture is increasingly dictated by technology adoption, input efficiency, and financing constraints:

Cost Efficiency: Mechanization directly impacts profitability by reducing production costs and input waste while boosting overall crop yields. Technologies like GPS-guided tractor systems allow for precision fertilizing and planting.

The High-Value Shift: Diversification into high-value agriculture (like livestock, fisheries, and non-rice crops) substantially increases household net revenues, though its effectiveness varies based on geographic and regional favorability.

Capital Restrictions: Maintaining profitability is difficult for smallholders due to high initial machinery costs. Because institutional commercial banks finance only about 10% of start-up agricultural ventures, many farmers turn to high-risk, high-interest informal financing that erodes profit margins.

4) Agricultural Mechanization Effects

Bangladesh stands as a unique success story for smallholder-driven mechanization, though it presents a double-edged sword for the workforce:

The Service Rental Model: Most small-scale farmers in regions like the South-West coastal delta do not own machinery. Instead, empirical research reveals that farmers extensively utilize custom hiring services to access irrigation pumps, threshers, and power tillers.

Labor Displacement Risks: Mechanization increases national GDP and efficiency across all major farming phases (seedbed preparation, harvesting, sowing). However, this rapid shift has raised valid concerns regarding the displacement of seasonal, landless agricultural workers who depend on manual harvest labor.

5) Infrastructure Effects

Investments in public infrastructure have dramatically reshaped market access and environmental resilience:

Market Connectivity: Upgrading rural road networks and logistics facilities has successfully linked secondary cities to remote rural farmlands. This smooths supply chains, reduces transport losses, and stabilizes producer prices.

Proximity to Urban Centers: Improved physical infrastructure dictates labor movement. Better connectivity near urban zones allows farm families to easily tap into diverse off-farm income opportunities without uprooting their households.

Climate Resilience Infrastructure: In flood-prone regions, infrastructure like water reservoirs and mechanization-driven water management systems mitigate climate shocks, reducing crop failure risks from unpredictable rainfall and surface

runoff (Tasnim et al., 2025; Rozario et.al., 2021).

7. How Do SWOT Factors Affect PARTNER's Objectives?

Here the objectives are linked to:

- i) Inadequate Storage Infrastructure for Nutrition;
- ii) Farmer Income;
- iii) Food Safety, or Adoption of High-Value Crops?

Here is how each SWOT quadrant can be mapped directly to key program objectives like nutrition, farmer income, food safety and the adoption of high-value crops.

1) Strengths (Internal, Helpful)

Objective. Improving Farmer Income

Strength: Established farmer cooperatives

Direct Link: Strong cooperatives allow farmers to aggregate their produce, giving them collective bargaining power to negotiate higher market prices and bypass predatory middlemen, directly increasing their take-home income.

Objective. Accelerating High-Value Crop Adoption

Strength: An in-house team of skilled agricultural extension workers.

Direct Link: Field agents can provide hands-on technical training directly to farmers, lowering the perceived risk and technical barriers of switching from subsistence crops to complex, high-value crops.

2) Weaknesses (Internal, Harmful)

Weaknesses are internal liabilities. You must mitigate them, so they do not derail your objectives.

Objective. Ensuring Food Safety

Weakness: Inadequate cold storage infrastructure.

Direct Link: Without temperature-controlled storage, perishable goods rapidly harvest harmful bacteria and molds (like aflatoxins). This directly compromises food safety, making the food dangerous for consumers and liable to be rejected at market checkpoints.

Objective. Enhancing Community Nutrition

Weakness: Limited budget for community outreach and education.

Direct Link: A lack of educational resources prevents the program from running dietary diversity campaigns. As a result, families continue relying on single-crop staples, stalling any improvements in household nutrition.

3) Opportunities (External, Helpful)

Opportunities are external trends or shifts. You should capitalize on them to achieve your goals faster.

Objective. Accelerating High-Value Crop Adoption

Opportunity: Rising urban demand for organic and exotic produce.

Direct Link: This shift in consumer preference creates a highly lucrative, ready-made market. Program managers can use this guaranteed market demand to incentivize farmers to switch to high-value crop cultivation.

Objective: Improving Farmer Income

Opportunity: New government subsidies for solar-powered irrigation kits.

Direct Link: External subsidies lower the upfront cost of critical technology. Farmers can transition to year-round farming and double-cropping, drastically increasing their annual yields and income.

4) Threats (External, Harmful)

Threats are external risks. You must build defenses against them to protect your objectives.

Objective: Improving Household Nutrition

Threat: Unpredictable drought cycles driven by climate change.

Direct Link: Severe droughts cause widespread crop failures of nutrient-dense vegetables. This forces communities back into survival mode, where they rely solely on shelf-stable, low-nutrient emergency grains, reversing nutritional gains.

Objective: Ensuring Food Safety

Threat: Lax national enforcement of pesticide residue regulations at local markets.

Direct Link: Weak external regulation allows contaminated produce to flow freely into the food supply. This undermines the program's clean-farming initiatives, as safe produce is financially undercut by cheaper, chemical-heavy alternatives.

8. Suggestions

Directly addressing PARTNER's weaknesses and threats, the organization must transition from a passive service provider to an active, tech-enabled ecosystem orchestrator. Specifically, they are as follows:

1) Extension-Service Coverage

Weakness: Limited physical reach and excessive cost of traditional in-person training for scattered smallholders.

Digital Extension Models: Deploy interactive voice response (IVR) and SMS-based advisory services like Precision Development to deliver hyper-local, crop-specific agronomic advice at near-zero marginal cost.

Hub-and-Spoke Lead Farmer Networks: Establish a "Train the Trainer" framework. Equip local lead farmers with smartphones and digital diagnostic tools to serve as localized knowledge hubs for 50 - 100 neighboring peers.

Video-Based Peer Learning: Partner with organizations like Digital Green to produce short, localized videos featuring successful community farmers demonstrating climate-smart techniques, which increase adoption rates by over 20%.

2) Storage Facilities & Post-Harvest Losses

Weakness: Severe crop spoilage and forced selling immediately after harvest due to lack of infrastructure.

Hermetic Storage Distribution: Subsidize and distribute low-cost hermetic storage bags (e.g., PICS bags) and plastic silos. This eliminates insect pests without chemicals, safely extending shelf life for over a year.

Community-Based Micro-Warehousing: Co-invest in localized, solar-powered cold-storage pods (e.g., Cold Hubs) managed via a pay-as-you-store fee structure, minimizing immediate spoilage of high-value perishable crops.

Warehouse Receipt System (WRS): Partner with formal collateral managers to issue digital warehouse receipts. This allows smallholders to use stored commodities as collateral to secure loans, preventing distressed crop sales during post-harvest price dips.

3) Smallholder Finance & Capital Access

Threat/Weakness: Elevated risk profiles causing traditional banks to deny credit to smallholders.

Alternative Credit Scoring: Utilize non-traditional data—such as historical mobile money transactions, satellite-verified crop yields, and input purchase history—via ag-fintech platforms like Apollo Agriculture to build reliable credit profiles.

Blended Finance Vehicles: Establish a first-loss capital pool funded by philanthropic grants or development finance institutions (DFIs) to de-risk commercial bank lending, unlocking lower-interest agricultural loans for farmers.

Digital Input Financing Triangulation: Direct-disburse loans as digital vouchers restricted to high-quality seeds and fertilizers at partner ag dealers. Deduct repayment directly from the farmer's crop sales at harvest via off-taker partnerships.

4) Market Access & Value Chain Integration

Weakness: Exploitation by predatory middlemen and lack of price transparency.

Agri-Marketplace Integration: Onboard farmer groups onto digital business-to-business marketplaces like Twiga Foods or Ninjacart to bypass multiple tiers of middlemen and connect directly with bulk urban retailers, processors, or exporters.

Forward Contracting & Aggregate Processing: Formalize pre-harvest forward contracts with anchor buyers. Group smallholders into formal cooperatives to aggregate volumes, achieving the quality standards and scale required by corporate off takers.

SMS Price Information Systems: Implement a real-time market price broadcasting system to give smallholders daily regional market data, restoring negotiating leverage during farmgate sales.

5) Climate-Risk Management

Threat: Increasing frequency of droughts, floods, and volatile weather patterns destroying yields.

Index-Based Weather Insurance: Embed micro-insurance policies directly into input packages or loans. Use satellite-monitored rainfall data via providers like Acre Africa to trigger automatic mobile money payouts when a drought or flood threshold is crossed, eliminating complex claims processes.

Climate-Smart Agriculture (CSA) Bundles: Incentivize the adoption of drought-tolerant seed varieties (e.g., Water Efficient Maize for Africa), minimal-tillage farming, and solar-powered drip irrigation kits through targeted input subsidies.

Macro-Risk Diversification: Advise and fund alternative, climate-resilient livelihoods—such as poultry, apiculture, or heat-resistant cash crops—alongside primary staples to buffer smallholder households against total crop failure.

9. Conclusion

The agricultural sector in Bangladesh has undergone a remarkable transformation from traditional, low-yield subsistence farming to a more modernized, high-yield system. Despite its contribution to GDP recently, FY 2023-2024, declined, it remains a vital economic pillar in multi-facets. This sector is experiencing a shift toward commercialization, agro-processing and the adoption of climate-resilient technologies. Along with this progression, the Program PARTNER is a flagship initiative in today's Bangladesh by the DAE, Ministry of Agriculture, Government of Bangladesh. It was launched in 2023 and scheduled to run through 2028 underpinning a collaboration between the Government of Bangladesh, the World Bank, and the International Fund for Agricultural Development (IFAD). Since the field data-statistics relating to the PARTNER are not available at this stage, this study carried out SWOT analysis theoretically in Bangladesh. On SWOT (Strength, Weakness, Opportunity and Threat) aspects, the findings of this study are i) *on strength aspect*, the program facilitated diversification of food sources, policy & structural support, grassroots potentials, entrepreneurship and abundant labor force, ii) *on weakness aspect*, the program identified weaknesses such as inadequate infrastructure, smallholder exclusion and weak information dissemination in practice, iii) *on opportunity aspect*, the program has facilitated technological advancements, market growth & value addition and donor & partner funding and iv) *on threats aspect*, the program informed in advance about the climate change, market instability and institutional constraints. Based on the findings, this study suggested to utilize the strengths and opportunities properly in today's agricultural rural transformation in Bangladesh. Furthermore, through this study, the researcher tries to discuss the effect of various macroeconomic factors of strength, opportunity, weakness, and threat on Nutrition, Entrepreneurship, and Resilience in rural agricultural transformational efforts. Also, the PARTNER brings to light some valuable suggestions to overcome the weaknesses and threats in practice.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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