IFAD AGRI-PDB PLATFORM LEARNING EVENT

Financing Nature-Positive Agriculture

PKSF's Integrated Approach to Biodiversity & Climate Resilience in Rural Finance

Palli Karma-Sahayak Foundation (PKSF)
Bangladesh's Apex Development Institution

Agricultural Landscape of Bangladesh-National Scenario

12%

Contribution to GDP

FY 2024-25

47%

Labor Force

3.21%

Sector Growth Rate

FY 2024-25

Key Land & Labor Facts

- Total agricultural land: 3.69 crore acres
- Cultivable land: 59% of total agricultural land
- 58% of total labor force are women
- Irrigation coverage grown from 15% (1972) to 58% (2023)
- Agri subsidy: USD 195.6 mill (~BDT 24,0000 mill) in FY 2024-25 (75% on chemical fertilizer)

1 USD = BDT 122.70 (April 2026)

Global Rankings

- 4th largest producer of Black Bengal goats
- 2nd in inland freshwater fish capture
- 5th largest milk producer in Asia (19th globally)
- 12th in world cattle population
- 3rd in rice production globally
- 700+ fish species in inland water
- Global hub for native small indigenous species (SIS) fish

Source: BBS 2023-24, FY 2024-25 Economy Report, IRBD, CPD; DAE/MoA, DoF & DLS/MoFL

PKSF-A Unique Second-Tier Apex Organization

Bangladesh's Apex Development Institution | Government-owned since 1990

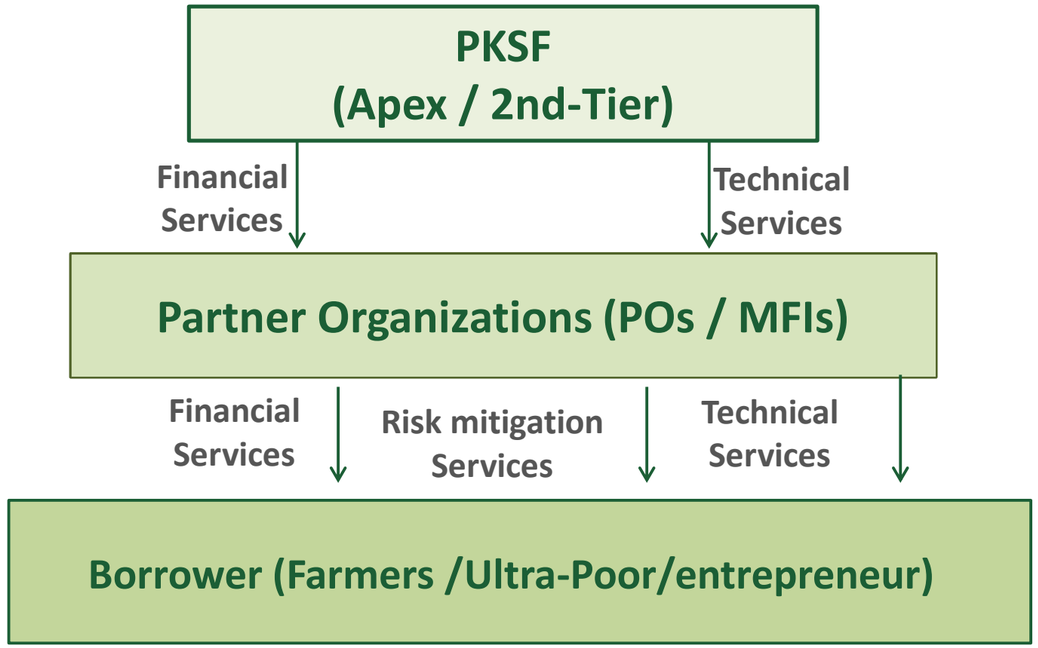
PKSF MIS January 2026

~$6.35 Billion
Total Loan Disbursement (USD)

289
Partner Organisations (NGO-MFIs) Nationwide

21.6 Million
Members

16 Million+ (93% women)
Borrowers -Majority Women & Marginalised



Agricultural Focus: ~50% of annual portfolio directed to agriculture sector

Mandate & Climate Vision

- **Government-owned apex body providing wholesale funds to NGO-MFIs — reaching extreme poor, small marginal farmers, micro-entrepreneurs.**
- **Mandated to integrate climate resilience, sustainable livelihoods, and inclusive green finance.**
- **Serves as Bangladesh's primary channel for International Financial Institutions (IFI) funding into pro-poor climate-smart agriculture and rural finance.**
- **Strategic Plan 2025–2030 explicitly centres biodiversity-positive, nature-based livelihoods as core institutional objectives.**

The core differentiator is blending appropriate financing with non-financial services like technology transfer, capacity budling training.

The Three Biological Pillars of Agricultural Stability

Species Diversity

The variety of distinct plants, animals, insects, and microbes in an ecosystem.

Preserving the distinct ecological roles of indigenous fish and beneficial soil microbes.

Genetic Diversity

The crucial variation within a single species.

Financing native, stress-tolerant rice varieties that inherently resist disease, salinity, and drought without chemical intervention.

Ecosystem Diversity

The variety of distinct habitats sustaining unique communities of organisms.

Protecting macro-environments, from the floating-cage fisheries in open rivers to the coastal mangroves of the south.

Understanding

Climate Resilience

The ability of communities, ecosystems, and institutions to anticipate, absorb, adapt to, and recover from climate shocks without compromising long-term development.

FLOODING

~20–30%

of landmass floods annually, threatening crop cycles.

CYCLONES

2–3

severe events per year, destroying rural infrastructure.

DROUGHT

Barind & Haor Regions

Impacting northern agricultural zones, stressing water tables.

SALINIZATION

Coastal Intrusion

Expanding degradation of arable land and potable water sources.

Why Biodiversity Matters for Agricultural Finance

Bangladesh's Agriculture Context

Threats Affecting

- **68,760 ha farmland lost/year** *to non-agricultural use*
- **78% farmland** *has soil organic matter below 1%*
- **56% of farmland** *is economically unsustainable*
- **94 % farmers used** *chemical fertilizer*
- **13% of GDP** *= hidden costs in Bangladesh food systems (FAO 2023)*
- **15–40% post-harvest losses** *in crops, vegetables & fruits*

PKSF recognizes biodiversity loss as a core credit risk investing in nature-positive agriculture protects farmer livelihoods and MFI portfolio quality.

Sources: BBS 2023–24, SRDI 2025, FAO 2023, IFPRI 2023, DAE Bangladesh

IFAD–PKSF Partnership: Key Lessons & Proven Approaches

From Project to Scale: A Proven Development Finance Model | Decades of Collaborative Learning

Pilot to Scale-Up

Proven Innovation Path

- ✓ ***MFTS → MFMSFP → FEDEC → PACE → RMTP***: sequential, building on prior projects
- ✓ Pilots evolved into scalable models
- ✓ Enabled seasonal agri-lending, cattle microinsurance, and microenterprise value chains

Value Chain Approach

Systemic Market Change

- ✓ Analyze constraints and opportunities across value chains
- ✓ Drive business growth, jobs, and profitability
- ✓ Enable wider technology adoption beyond direct beneficiaries

Finance + Non-Finance

PKSF's Unique Model

- ✓ Integrate finance with technology, services, and market access
- ✓ Link farmers to markets, e-commerce, and real-time information

Micro-Environmental Solutions

Business-Led Sustainability

- ✓ Apply IPM to reduce pesticide use
- ✓ Control pollution in the Halda River
- ✓ Promote commercial composting of cow dung
- ✓ Solve environmental problems through viable business models

Climate Adaptation & Mitigation

Embedded in Value Chains

- ✓ Integrate climate considerations into value chain analysis and design
- ✓ Make resilience a built-in outcome, not an add-on

Microenterprise as Engine

Critical Value Chain Role

- ✓ Promote micro-processors and traders as key market actors
- ✓ Enable sourcing from small and marginal farmers
- ✓ Add local value and create employment
- ✓ Strengthen competition with larger firms.

Ecological Farming System (EFS) — Restoring Soil Biodiversity

North Channel Char, Faridpur | PO: Amra Kaj Kory (AKK) | IFAD-FEDEC / PKSF-EFS Programme

BIODIVERSITY IMPACT: BASELINE → ENDLINE

0.72% → 0.90% Soil Organic Matter (SOM)	**1/m² → 216/m²** Macro-organism density (earthworms)
1.2×10^6 → 2.8×10^6 Soil bacteria (cfu/g soil)	**0% → 35%** Demand for safe ecological vegetables
80% Farmers adopted biological technologies	**300** IPM demonstrations in local areas

ECONOMIC RESILIENCE FOR FARMERS

+31.03% Net profit per bigha	**-11.21%** Production cost reduction	**+20%** Average veg productivity	**0→35%** Market demand for safe food

KEY BIODIVERSITY PRACTICES

- Mixed cropping: 75% of entrepreneurs — natural pest control
- Organic inputs: vermicompost, tricho-compost, cow dung
- IPM: local organic pesticides, mechanical pest control (300 demos)
- Zero chemical residues in tested vegetables (Bitter gourd, Okra, Eggplant)
- Native variety seed banks maintained at community level

"Join the 80% of farmers in North Channel Char who have successfully transitioned to EFS! The entire char is now green." — M.A. Jalil, Executive Director, AKK

Farm Mechanization: Use of Aerator & IoT in Aquaculture

CASE 2 , Fisheries

Smart Aquaculture Solutions under RMTP | 975 Entrepreneurs Supported | 75 IoT Pilot Sites Across Bangladesh

IoT Pilot Programme

- ✓ **Deployed IoT-based monitoring in fish ponds of 75 entrepreneurs across Bangladesh under RMTP**
- ✓ **Piloted smart aquaculture**
- ✓ **Introduced technology-driven fish farming practices**

IoT SENSOR MEASURES

- **Dissolved Oxygen (DO)**
- **Water Temperature**
- **pH Level**
- **Ammonia Level**

Real-time alerts via mobile app for timely corrective action

Case Study: Md. Aliuzzaman , Jhenaidah District

BEFORE INTERVENTION

- Production losses from water quality deterioration & disease outbreaks
- High feed costs with no feed management system
- Water testing only after visible problems appeared
- Traditional pond management based on assumptions

AFTER INTERVENTION

Real-time water quality and feed management control through IoT sensor kit measuring DO, temperature, pH, and ammonia connected to mobile app for instant alerts.

Reduced antibiotic use & safer fish production- contributing to environmental sustainability and food safety

Impact Results

+25–30%
Stocking Density
More fish per pond area

–40%
Fish Mortality
Fewer losses per cycle

+30–40%
Overall Production
Total yield per cycle

2.0 → 1.5
FCR Improved
Feed cost down 20–25%

+BDT 60K
Net Profit/Cycle
~40% higher than before

"Safe Fish and Fish Product Production and Marketing" sub-project of PKSF's RMTP project

Closing the Loop: Circular Economy Livestock-Biodiversity through Waste Valorisation

Livestock Waste to Fertilizer

BIODIVERSITY: Soil Ecosystem

- ✓ Convert cattle manure into vermicompost
- ✓ Supply organic fertilizer to EFS farmers
- ✓ Reduce chemical fertilizer use
- ✓ Restore soil health

- Soil bacteria restored: 1.2×10^6 → 2.8×10^6 cfu/g
- Chemical fertilizer dependency reduced by 40%+
- New micro-enterprise income for 500+ women

Aquatic Waste to Industry Material

BIODIVERSITY: Aquatic Ecosystem

- ✓ Collect discarded fish scales from markets
- ✓ Clean, dry, and process into fish gelatin powder
- ✓ Produce high-value product for industrial export

- Zero-waste aquaculture model at market level
- Reduces organic effluent entering waterways
- Fish gelatin: export-quality, 4× income vs waste

Agricultural Waste to Feed

BIODIVERSITY: Ecosystem Diversity

- ✓ Convert pineapple leaf waste into cattle silage
- ✓ Scale Black Soldier Fly production
- ✓ Replace resource-intensive commercial poultry feed

- BSFL reduces soy-feed imports (deforestation driver)
- Pineapple leaf silage: zero crop waste
- Poultry productivity +25%; reduced antibiotic use

Circular Economy Impact on Biodiversity: Each waste stream eliminates a pollutant (toxic manure, organic effluent, chemical fertilizer) that degrades aquatic and soil ecosystems — protecting the biological foundation of agriculture.

Climate-Resilient Agriculture: Stress-Tolerant HYV Seeds & Smart Water Management

Khulna, Satkhira, Barisal (Coastal) | Barind, Rajshahi (Drought) | Haor (Flood) |

Saline-Tolerant Varieties

Seed Varieties:

- BRRI Dhan 61, 67, 112
- BARI Surjomukhi 3

Impact: Coastal farmers maintain yield despite rising salinity

Field Evidence:

Farmers in Khulna: income BDT 6,000/mo → BDT 25,000/mo with salt-tolerant varieties

Drought-Tolerant Varieties

Seed Varieties:

- BRRI Dhan 76, 83
- BINA Dhan 25, 26

Impact: 30% water saving via AWD, drip & sprinkler irrigation

Field Evidence:

Barind farmers sustain 2 crops/year under water stress with AWD + drought varieties

Flood/Waterlog Varieties

Seed Varieties:

- BRRI Dhan 79, 110, 111
- Zinc-enriched: BRRI Dhan 84

Impact: Haor farmers harvest before monsoon flood with sub-1 submergence tolerance

Field Evidence:

Food security improved for 500K HHs

Climate-Resilient Fisheries: Mini-Pond & Saline-Zone Aquaculture Finance

Satkhira, Khulna, Barisal, Cox's Bazar (Coastal & Saline Zones) | PKSF / IFAD

THE MINI-PUKUR MODEL — CLIMATE-ADAPTIVE AQUACULTURE

Design	Small elevated ponds built above saline tidal intrusion level-harvesting rainwater year-round even in coastal Bangladesh
Species	Freshwater fish cultured in saline-exclusion ponds using rainwater capture extending season by 6–8 months
Finance	PKSF provides pond construction loans with seasonal repayment-repaid post-harvest, not monthly
Technology	IoT soil-moisture sensors + water quality monitoring deployed at demonstration sites
Recovery	Post-Cyclone Remal recovery grants: disburse within 48hrs to affected fish farmers for stock restocking

FIELD EVIDENCE & IMPACT

Case: Lipika Rani, Satkhira

Mini-pond harvests rainwater enabling year-round cropping on previously unproductive saline land.

Income: BDT 13,000/month
Previously: BDT 3,200/month (seasonal only)

Fish variety: 4 species in rotation; 0 chemical inputs

+306%
Income increase

6-8 mo
Season extension via rainwater capture

48 hrs
Cyclone Remal recovery disbursement

0
Chemical inputs mini-pukur system

Black Soldier Fly Larvae (BSFL) Production

Case 6 : Fisheries

Eco-Friendly Alternative Protein for Aquaculture | 337 Entrepreneurs Supported | ~70 Tons/Month Production | 540 Jobs Created

RMTP supported 337 entrepreneurs for BSFL production and marketing as an environment-friendly technology and alternative protein source for fish feed.

WHY BSFL?

- High-quality protein source for fish feed
- Reduces aquaculture feed costs significantly
- Uses kitchen waste, vegetable & fruit waste
- Produces organic fertilizer — circular economy
- Reduces environmental hazards from waste

Hotel food waste → BSFL feed → larvae → fish feed + organic fertilizer

Case Study: "Insect Farmer Habib"

Md. Ahsan Habib | BSFL Farmer since 2023 | RMTP-supported

BEFORE SUPPORT (2023)

40–55 kg/mo	BDT 15,000	BDT 25,000
Production	Monthly Income	RMTP Support

AFTER EXPANSION (2024)

160–180 kg	BDT 45,000	BDT 45,000
Larvae/Month	Larvae Income	Pupae Income

Larvae: 180 kg × BDT 250 | Pupae: 100 kg × BDT 450

Total Monthly Income: ≈ BDT 90,000 / month

Hotel food waste from Tilakpur market recycled as larvae feed; local fish farmers reduced feed costs 30–40%; local youth inspired to replicate the model.

Programme Impact

~70 Tons
Total Monthly Production
Across all 337 BSFL entrepreneurs

USD ≈30,000
Monthly Market Value
Total BSFL market revenue generated

540
Jobs Created
Direct employment for rural youth

–30–40%
Feed Cost Reduction
For fish farmers using BSFL

Replication model proven -small & medium BSFL farms spreading across rural communities

Nature-Positive Finance Architecture: How PKSF Channels & Incentivises

Innovative finance instruments, microfinance partnerships & IFI integration driving biodiversity and climate outcomes

KEY FINANCE INCENTIVES FOR NATURE-POSITIVE PRACTICES

INTERNATIONAL FINANCE (IFIs & Climate Funds)	PKSF APEX (2nd-Tier Blending)	PARTNER ORGANISATIONS (POs)	FARMER / ENTREPRENEUR (End Beneficiary)
IFAD	Concessional on-lending	Last-mile disbursement	Flexible repayment
Green Climate Fund	Green Financing	Blended Finance	Risk mitigation Services
ADB, EU, World Bank	Reduced Interest Rates	Group credit mechanisms	Technology Transfer & Capacity development

Ecological Stewardship

as a Pathway from Poverty

- Mitigating Vulnerability
- Nutritional Security
- Decent Employment

> ***Nature-positive agriculture is not a luxury for the wealthy; it is a critical survival and graduation pathway for smallholder farmers and microentrepreneurs living in extreme poverty.***

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Mitigating Vulnerability	Nutritional Security	Decent Employment
Protecting fragile livelihoods by buffering the immediate impacts of climate shocks - coastal salinity, devastating floods -on the poorest households.	Improving baseline household health through dietary diversity -driven by mandatory mixed vegetable cropping and availability of nutrient-dense native fish.	Transitioning the landless from day laborers to green micro-entrepreneurs -safe working conditions and women-led enterprises in meat and dairy value chains.

Challenges in Scaling Nature-Positive Agriculture

11 Critical Bottlenecks Across the Agriculture-Finance-Nature Nexus

STRUCTURAL & FARMER-LEVEL CHALLENGES

Climate Stress:
Floods, drought, salinity & irregular rainfall destabilise crop cycles and repayment schedules

Chemical Dependency:
Decades of fertiliser & pesticide reliance degraded soil health; 75% of agri subsidies still favour chemicals

Knowledge Gap:
Limited training & extension support; PO officers lack agronomic expertise for EFS, IPM & aquaculture TA

Financial Constraints:
Limited credit & grant access; short MFI loan tenors conflict with long gestation of biodiversity investments

Small Land Holdings:
Fragmented plots (avg. <0.5 ha) make agroecological diversification and technology investment unviable

Monoculture Trap:
Heavy rice dependence; government procurement, input subsidies & market infrastructure all reinforce mono-cropping

MARKET, POLICY & INSTITUTIONAL CHALLENGES

Market Barriers:
Weak value chains; no premium pricing for organic produce or (Small Indigenous Species) SIS fish in domestic markets

Certification Gaps:
No national certification system for safe/organic agricultural products limits fair trade and export access

Policy Gaps:
Limited agroecology incentives; chemical fertiliser subsidies distort market; weak biodiversity data linkages

Labour Shortage:
Rural-to-urban migration reduces farm workforce; labour-intensive nature-positive practices become costlier

Mindset Issues:
Risk-averse farmers resist change; scepticism toward EFS/AWD/SIS compounded by gender barriers & distress-sale culture

Way Forward: Strengthening PKSF's Nature-Positive Finance Contribution

01 Break Chemical Dependency & Restore Soil Health

- Incentivize Ecological Farming System adoption
- Embed Soil Organic Matter and species-diversity metrics

02 Close Knowledge Gaps & Build Farmer Confidence

- Deploy trained agro-extension officers
- Use peer-farmer networks and replicate AKK "entire char goes green" model;

03 Blended Finance & Distress-Sale Prevention

- Blended Capital for Climate Resilience
- Extend loan tenors for biodiversity investments
- Scale up grant-based technical support funds
- Value addition at farm level to eliminate distress-sale pressure

04 Fix Market Barriers & Certification Gaps

- Advocate for a national safe certification system
- Create premium market linkages for ecological farming product
- Partner with DAE and MoA for fair-trade and export pathways for certified produce

05 Policy Reform, Labour & Land Fragmentation

- Advocate for agroecology-friendly policies
- Promote collective/ cluster based farming models
- Promote Green Micro-Enterprise practices ,
- Train rural youth as agri-digital service providers
- Agri-Tourism & Ecological Enterprise

Thank You

Together, we are financing the survival, dignity and prosperity of rural families one nature-positive loan at a time.

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