RESEARCH REPORT ON SHARIAH COMPLIANT AGRICULTURE FINANCING PRODUCT IN PAKISTAN

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CHAPTER 1: INTRODUCTION

1.1 Executive Summary

Agriculture financing continues to play a critical role in Pakistan's economic and social development, given that the sector contributes approximately one-fifth of national GDP and employs a significant share of the population. Despite its importance, access to formal financing particularly for smallholder farmers and value-chain actors remains constrained by structural inefficiencies, risk perceptions, climate vulnerability, and institutional fragmentation. While conventional agricultural finance has expanded through targeted policies and lending mandates, Shariah-compliant agriculture financing remains underdeveloped and underutilized relative to the size of Pakistan's Islamic finance industry.

This report provides a comprehensive, evidence-based assessment of Shariah agriculture financing across six core ecosystem pillars: i) regulations, ii) industry players, iii) products and services, iv) Shariah compliance, v) technology and infrastructure, and vi) people/consumers. Using a mixed-methods approach that integrates literature review, surveys, focus group discussions (FGDs), and technical Shariah and regulatory analysis, the study captures both demand-side and supply-side perspectives. The findings reflect ecosystem realities faced by regulators, Islamic banks, non-bank financial companies (NBFCs), fintech operators, Shariah scholars, and agricultural value chain operators across diverse geographic and socio-economic segments.

The overall analysis reveals that agriculture financing in Pakistan remains structurally constrained, fragmented, and insufficiently aligned with the sector's economic importance, despite strong policy intent and a growing Islamic finance industry. While regulatory frameworks, Islamic financing instruments, and pilot initiatives exist, their practical impact is limited by weak coordination among institutions, slow and manual financing processes, inadequate risk-sharing and *Takaful* coverage, low digital adoption, and the absence of standardized Shariah-compliant product models tailored to agricultural value chains. As a result, farmers and agribusinesses continue to face delayed access to finance, relying heavily on informal lenders. These underscoring the need for an integrated, ecosystem-based approach that combines regulatory coherence, product standardization, technology integration, and effective risk-mitigation mechanisms.

In response to these challenges, the report sets out a targeted roadmap to strengthen Pakistan's Shariah-compliant agriculture financing ecosystem, emphasizing harmonized regulation and Shariah governance, standardized Islamic agriculture financing models, and stronger coordination among regulators and industry players, including the effective use of Electronic Warehouse Receipt (EWR) based financing. By addressing systemic gaps and aligning policy with value-chain and on-ground agricultural realities, the study aims to support SECP and key stakeholders in scaling inclusive, resilient, and sustainable agriculture financing in Pakistan.

1.2 Objective of the Report

The primary objective of this study is to develop practical and Shariah-compliant financial products within the non-banking financial industry to support Pakistan's agriculture sector, while also introducing Shariah-compliant business models tailored for agricultural activities. In addition, the study aims to identify key challenges and recommend policy interventions, drawing on international best practices and adapting them to the local context of Pakistan.

Key Areas of Focus:

- Undertake comprehensive research on the current landscape of agricultural financing in Pakistan.
- Examine suitable Shariah structures that hold potential for application in agricultural financing by non-banking financial institutions.
- Explore global best practices, case studies, and emerging trends from at least six jurisdictions to identify Shariah-compliant financial and business solutions that can be effectively localized for Pakistan.
- Assess the role of technology and public–private partnerships in enhancing Shariah-compliant agricultural financing.
- Analyze strategic and systemic challenges within the agricultural financing ecosystem, with a focus on non-banking financial institutions.
- Propose viable product models and financial structures tailored for non-banking financial institutions in Pakistan.

- Recommend policy measures related to business models, financial products and services, and necessary legal and regulatory reforms.

1.3 Research Methodology

This study adopts a mixed-methods, exploratory research design, combining both qualitative and quantitative approaches to align with the objectives of the Securities and Exchange Commission of Pakistan (SECP). The integrated methodology enables a comprehensive understanding of the agriculture financing landscape by drawing on numerical insights from surveys and rich, contextual perspectives from the focus group discussions.

The mixed approach is structured to:

a. map the existing agriculture financing ecosystems using both quantitative survey data and qualitative stakeholder insights;
b. assess the applicability of Shariah-compliant structures for non-bank financial institutions through thematic and comparative analysis; and
c. develop Shariah-compliant agriculture financing product models supported by regulatory, financial, and legal assessments grounded in both empirical data and qualitative evidence.

1.4 Research Design

The research design integrates three complementary components that collectively provide a comprehensive understanding of the agriculture financing landscape in Pakistan. It begins with a detailed desktop review aimed at establishing a foundational understanding of the country's agriculture financing environment, including the structure of the agricultural value chain, the role of key ecosystem operators, the applicability of Shariah-compliant financial structures, and the existing regulatory frameworks governing the sector. Building upon this foundation, the study employs a mixed-methods approach that combines quantitative surveys with qualitative Focus Group Discussions (FGDs) to capture both measurable trends and nuanced stakeholder perspectives across various segments of the agricultural ecosystem. Finally, a technical analysis is conducted to evaluate the compatibility of Shariah-compliant structures and product models within Pakistan's legal and regulatory context, supported by international benchmarking and evidence drawn from both quantitative and qualitative findings. Together,

these components enable a holistic, evidence-based assessment of opportunities, challenges, and strategic pathways for advancing Shariah-compliant agriculture financing in Pakistan.

This mixed-methods design allows for triangulation of data, where numerical findings from surveys complement interpretive insights from FGDs and expert consultations. All components are integrated to ensure a comprehensive understanding of the agriculture financing ecosystem, consistent with the project objectives and the perspectives of regulators, Shariah scholars, value chain operators across the ecosystem.

Phase 1: Desktop Research and Ecosystem Mapping

A comprehensive literature review was conducted to establish the current state of agriculture financing in Pakistan. The review drew on academic publications, regulatory circulars, SECP and State Bank of Pakistan (SBP) frameworks, industry reports, recent news, and global case studies from several jurisdictions. It examined the current state, challenges, opportunities, and gaps across the agriculture financing ecosystem, regulatory landscape, institutional capabilities, Shariah governance, technology infrastructure, financial products, and sectoral Trends. This phase will be presented in Chapter 2 of the report.

Phase 2: Mixed Method Fieldwork (Surveys and FGDs)

To validate the desktop research and capture stakeholder insights, fieldwork was conducted using a mixed-methods approach consisting of (a) surveys and (b) structured FGDs involving regulators, industry participants, Shariah advisors, and digital financing providers.

The survey aimed to identify the current state, key challenges, gaps, and financing needs across Pakistan's agricultural sector, with emphasis on Shariah-compliant financing options. It assessed the accessibility, adequacy, and effectiveness of existing financial services and regulatory enforcement, with the broader goal of informing more inclusive, responsive, and sustainable financing solutions for actors within the agricultural value chain which includes Farmers, Input Supplier, Aggregators & Cooperatives, Processors & Manufacturers, Logistics & Storage Providers, Retailers & Distributors and Exporters. A purposive sample of 10–20 respondents was selected, which is appropriate for exploratory mixed-methods research focused on understanding perceptions and behavioural patterns rather than achieving statistical generalization. In mixed-methods exploratory studies, sample adequacy is driven by the

relevance and richness of insights rather than the numerical size; thus, a medium-sized sample ensures sufficient diversity while allowing depth and thematic saturation.

Three FGDs sessions were carried out to ensure comprehensive stakeholder representation. The first involved SECP as the project's implementing partner; the second brought together regulators from SECP and SBP; and the third engaged market practitioners, including banks, non-bank financial companies, fintechs, *Takaful* operators, and industry associations. Conducting separate FGDs enabled each group to contribute openly within their institutional context, reducing power imbalances and supporting more candid exchanges. Each session lasted approximately two hours, an appropriate duration for policy-focused qualitative discussions that require exploration of complex issues such as regulatory constraints, Shariah requirements, operational barriers, and product feasibility. Ensuring that all participants had the opportunity to contribute helped minimize dominance effects and strengthened the validity and reliability of the insights captured. All data from the surveys and FGDs were analysed thematically to identify systemic gaps, stakeholder concerns, operational challenges, and future aspirations across the agricultural financing ecosystem. This phase will be presented in Chapter 3 of the report.

Phase 3: Strategic and Technical Recommendations to Develop a Shariah-Compliant Agriculture Financing Ecosystem in Pakistan

Phase 3 of the research transformed the study's evidence-based findings, international benchmarking across comparable jurisdictions, and ecosystem development insights into a comprehensive set of strategic and technical recommendations aimed at advancing Shariah-compliant agriculture financing in Pakistan.

This phase synthesized knowledge from three core areas:

1. Pakistan's agricultural landscape, policy and regulatory environment, and empirical findings;
2. The assessment of structural gaps, operational constraints, and ecosystem readiness within the current agriculture financing landscape; and
3. Lessons derived from international best practices across leading Shariah-compliant agriculture and rural financing ecosystems, analysed through a six-pillar framework.

Based on these foundations, the study developed a Six-Pillar Strategic Recommendation Framework to guide coordinated ecosystem development. This framework offers a structured approach to align policy direction, Shariah governance, institutional participation, product innovation, farmer inclusion, technology adoption, and digital infrastructure readiness.

Within this framework, Phase 3 presented three key layers of recommendations:

1. Policy and Regulatory Recommendations
   Recommendations were formulated to enhance regulatory clarity, inter-agency coordination, and the harmonization of Shariah governance standards defining the respective roles of regulators, government bodies, and non-bank financial institutions involved in agriculture financing.
2. Product-Level Strategic and Technical Recommendations
   Shariah-compliant agriculture financing products were identified and structured across short-, medium-, and long-term horizons, considering Shariah compliance, value chain operators, market feasibility, and regulatory alignment. These include digital *Murabahah*-based input financing, *Salam* contracts for crop pre-financing, and *Mudarabah* partnerships for Agric-enterprise development.
3. Ecosystem Development Recommendations
   Strategic actions were proposed to foster market development, strengthen value chain partnerships, build talent and institutional capacity, enhance digital and physical infrastructure, and promote financial literacy and Shariah awareness among farmers creating the foundation for a sustainable and inclusive agriculture financing ecosystem.

For each agricultural financing mechanism, the study evaluated the Shariah compliance rationale, identified potential implementation challenges specific to Pakistan's agricultural landscape, proposed adaptation strategies considering local farming practices and institutional capacity, and assessed alignment with Pakistan's existing agricultural finance regulatory framework and provincial agricultural policies. These strategies and recommendations are presented in Chapter 4 of the report.

CHAPTER 2: DESKTOP RESEARCH FINDINGS

2.1 Agricultural Financing Landscape in Pakistan

Pakistan's agricultural sector stands at a critical juncture. While the sector achieved remarkable growth of 6.3% in FY2023-24, driving economic recovery amid global uncertainties, it continues to face a substantial financing gap that constrains its transformative potential. The State Bank of Pakistan reported a record of agricultural credit disbursements of PKR 1.78 trillion in FY2023, representing 97.6% achievement of the PKR 1.819 trillion target, a 25% increase year-on-year. Yet this apparent success masks deeper structural challenges: only one-fifth of estimated credit demand is met through formal channels, leaving millions of smallholder farmers dependent on exploitative informal financing mechanisms (State Bank of Pakistan, 2023a).

The paradox of Pakistan's agricultural finance is striking. Despite ranking as the world's 8th largest wheat producer, 10th in rice production, and 5th in milk production, approximately 50 million citizens, 25% of the population, live below the poverty line, with rural poverty rates reaching 31%. This disconnects between agricultural potential and rural prosperity underscores the critical importance of addressing financing constraints across the value chain (Food and Agriculture Organization, 2023; World Bank, 2022).

Transformative Initiatives

Several initiatives demonstrate the transformative potential of targeted agricultural financing:

- **Digital Innovation Success:** The deployment of the HBL Zarai Services model revolutionized smallholder financing by integrating digital payments, cash-flow based financing and guaranteed market linkages. This initiative enabled same-day cash payments to farmers, alleviating traditional liquidity constraints while reducing transaction costs by 40% (Pakistan Business Council, 2023).
- **Islamic Finance Breakthrough:** In 2025, the issuance of Pakistan's first agricultural infrastructure sukuk, valued at PKR 2 billion and AAA-rated with 100% credit guarantee from InfraZamin Pakistan, demonstrated the viability of Shariah-compliant capital mobilization for agricultural modernization. This landmark transaction financed renewable energy installations, modern storage facilities, and working capital for major wheat and rice processors (InfraZamin Pakistan, 2025).

- **Provincial Innovation:** Punjab's fully subsidized Crop Insurance Program, launched in 2022, successfully covered 1.48 million smallholder farmers across 27 districts, providing crucial risk mitigation against natural disasters and demonstrating the scalability of government-backed insurance mechanisms (Punjab Agriculture Department, 2025a).

Systemic Gaps

Despite these successes, systemic challenges persist:

- **Collateral Barrier:** The rigid collateral requirements continue to exclude 97% of farmers cultivating less than 12.5 acres from formal credit access (World Bank, 2021; Pakistan Bureau of Statistics, 2024). The legacy specialized agricultural bank, ZTBL, despite its mandate to serve smallholders, has struggled with low recovery rates and limited outreach, requiring repeated recapitalization (Zarai Taraqiati Bank Limited, 2023).
- **Gender Exclusion*:*** With only 6% of women maintaining formal bank accounts compared to 28% of men, and 76% of women agricultural workers classified as unpaid family labor, gender-based financial exclusion remains a critical failure of existing systems (World Bank, 2024; Malik, 2025)
- **Insurance Gap:** The agricultural insurance market's collection of merely PKR 2.8 billion in premiums, covering only 14% of the 8.2 million farmer base, represents a catastrophic gap in risk management, leaving farmers vulnerable to climate shocks and market volatility (Ali, 2024; Punjab Agriculture Department, 2025a).

Before examining the specific actors within Pakistan's agricultural ecosystem, it is essential to understand the concept of agricultural value chains. A value chain encompasses the full range of activities required to bring agricultural products from initial production through various phases of processing, delivery to final consumers, and ultimate disposal. This includes input supply, production, post-harvest handling, processing, marketing, and distribution. Each stage adds value to the product while creating interdependencies among actors that can either facilitate or constrain financing flows.

In Pakistan's context, agricultural value chains are characterized by complex relationships between multiple stakeholders: input suppliers provide essential resources such as seeds,

fertilizers, and machinery; farmers and producers cultivate raw commodities, organize and manage on-farm production for market readiness; commission agents (arthis) facilitate transactions and provide informal credit; processors add value by transforming raw commodities into finished or semi-finished goods; wholesalers distribute large volumes of products into markets; exporters channel agricultural goods to international markets; and retailers connect products directly to consumers. Understanding these interconnections is crucial for designing effective financing interventions that address bottlenecks across the entire chain rather than focusing on isolated segments.

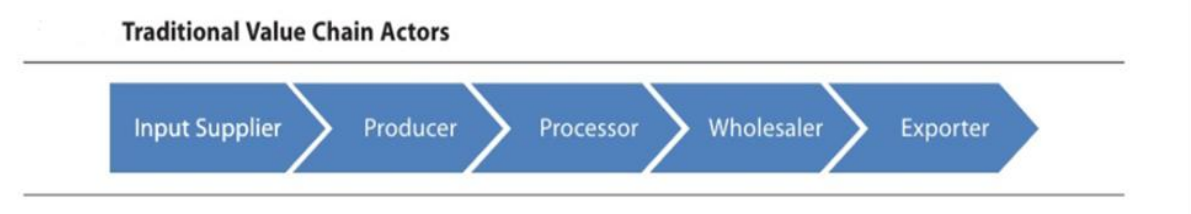

Fig 1: Traditional Value Chain in Pakistan

2.2 Action items and strategic interventions in agricultural financing

- **Enhancing Financial Inclusion and Literacy**

  Pakistan confronts a profound financial exclusion challenge that particularly impacts its agricultural sector. With only 21% of adults maintaining financial accounts according to the World Bank's Global Findex Database 2021, and women being half as likely as men to access formal banking, the agricultural sector's financing gap is as much about inclusion as it is about capital availability (World Bank, 2021).

  The State Bank of Pakistan has responded with targeted interventions including the National Financial Inclusion Strategy, which specifically prioritizes agricultural communities. The deployment of mobile banking platforms such as Raast and JazzCash has begun to penetrate rural markets, though adoption remains uneven with only 5% of digital loans targeting agricultural activities (State Bank of Pakistan, 2023c; State Bank of Pakistan, 2022). The SBP's Farmers Financial Literacy Programme, conducted through regional workshops and field demonstrations, aims to bridge the knowledge gap that prevents smallholders from accessing formal credit products.

- **Addressing Collateral Constraints through Innovation**

  Recognizing that land-based collateral requirements exclude the majority of smallholders, Pakistani authorities have pioneered alternative credit mechanisms. The

Credit Guarantee Scheme for Small and Marginalized Farmers (CGSMF), providing 50% risk coverage for collateral-free advances up to PKR 100,000, represents a paradigm shift in agricultural lending. This government-backed facility specifically targets farmers with holdings under 5 acres (canal-irrigated) or 10 acres (rain-fed), addressing the needs of the 61% of farmers cultivating less than 2.5 acres (State Bank of Pakistan, 2021; State Bank of Pakistan, 2023b).

The introduction of electronic warehouse receipt (EWR) financing, regulated under SECP's 2019 Collateral Management Company framework, enables farmers to leverage stored commodities as collateral. BankIslami's pioneering Shariah-compliant EWR financing demonstrates how Islamic finance principles can be integrated with modern collateral innovations to expand credit access while respecting religious sensitivities (Business Recorder, 2021).

- **Leveraging Technology for Agricultural Transformation**

  Digital transformation initiatives have accelerated following the COVID-19 pandemic. The Punjab government's E-Credit Scheme, integrating automated land records through the Land Record Management Information System (LRMIS), has enabled online verification and charge creation on agricultural land. As of 2024, 35 agricultural lending institutions have signed MOUs with the Punjab Land Revenue Authority, with 25 banks actively utilizing the integrated system for document verification and title generation (Government of Pakistan, 2023).

  The State Bank's Agriculture Credit Scoring Model, introduced in FY2021-22, employs data analytics to assess creditworthiness beyond traditional collateral metrics. This technology-driven approach has enabled banks to extend credit to previously excluded segments while maintaining portfolio quality. The Champion Bank Model further incentivizes financial institutions to expand into underserved regions through performance-based rankings and regulatory incentives (State Bank of Pakistan, 2022; State Bank of Pakistan, 2023a).

- **Building Climate Resilience through Risk Management**

  Following the devastating 2022 floods that affected 33 million people and caused agricultural losses exceeding $3.7 billion, Pakistan has prioritized climate-resilient financing mechanisms (Government of Pakistan, 2024; World Bank, 2022). The newly approved Risk Coverage Scheme (2025) extends subsidized insurance for loans to small

and subsistence farmers in climate-vulnerable areas, aiming to add 750,000 new borrowers within three years (State Bank of Pakistan, 2024b; Dawn, 2025).

The Crop Loan Insurance Scheme (CLIS), mandatory for five major crops since 2008, has evolved to incorporate climate risk modelling. Between July 2008 and December 2020, banks submitted premium claims of PKR 9.4 billion covering 6.54 million beneficiaries. The complementary Livestock Insurance Scheme for Borrowers (LISB) has provided coverage worth PKR 2.84 billion to 0.82 million beneficiaries, though penetration remains insufficient given the sector's exposure to climate risks (Ali, 2024; Punjab Agriculture Department, 2025a).

- **Promoting Shariah-Compliant Financial Solutions**

  Recognizing that religious considerations constitute a significant barrier to financial inclusion for Pakistan's Muslim-majority population, authorities have prioritized Islamic finance development. The Islamic banking sector's growth to PKR 9.88 trillion in assets (19% of total banking assets) and 23% of deposits by September 2024 demonstrates strong demand for Shariah-compliant products (State Bank of Pakistan, 2024c).

  Agricultural-specific Islamic financing structures have gained traction: *Murabahah* contracts facilitate input financing without interest, *Salam* agreements enable pre-harvest financing aligned with Islamic principles, and Diminishing *Musharakah* partnerships allow asset acquisition through graduated ownership transfers (Meezan Bank, 2023; State Bank of Pakistan, 2024a). The SBP's 2023 Islamic Finance Growth Strategy targets 30% market share, with agricultural finance identified as a priority sector for Shariah-compliant product innovation (State Bank of Pakistan, 2023).

Agricultural Finance Ecosystem Framework

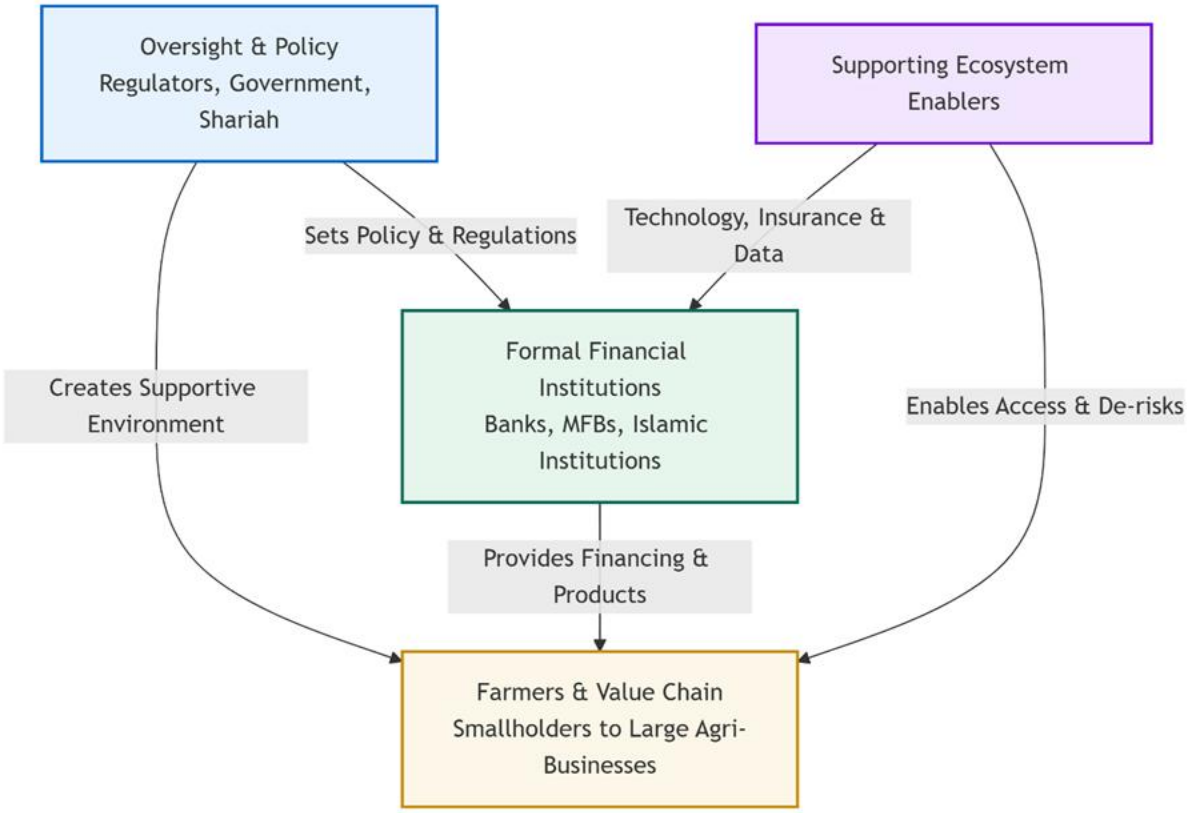

Fig 2: Ecosystem Framework

2.3 Supply-Side Architecture: Products and Initiatives

Pakistan's agriculture sector (24% of GDP and 37% of the labor force) relies on diverse funding sources. Key supply-side players include commercial banks, state-owned agri-banks, government agencies, regulators, NBFCs/microfinance, and agribusinesses. Below we detail recent initiatives and financing volumes for each.

2.3.1 Formal Credit

Commercial banks (including large private and Islamic banks) account for the bulk of agri-loans/financing under SBP's priority-sector guidelines. Although agriculture accounts for 24% of Pakistan's GDP, its share of commercial bank credit remains significantly lower than other GDP sectors. The total financing extended by commercial banks to agriculture, including forestry and fishing, stands at PKR 400.878 billion. In contrast, the manufacturing and mining sectors, which together contribute only about 12% to GDP, receive PKR 4.8 trillion in credit.

Consequently, agriculture's share of total private sector credit is just 5.7% (Smart house of Pakistan, 2025). Nearly all agricultural financing, about PKR 399 billion out of the total PKR 400 billion goes to crop and livestock production along with related services. In comparison, fishing and aquaculture receive only about 1% of the total agricultural credit, while financing for fruit cultivation, including tropical, citrus, and stone fruits, amounts to just around PKR 2.6 billion (Smart house of Pakistan, 2025).

In FY2023 banks disbursed PKR 1.776 trillion in agricultural credit (97.6% of the PKR 1,819 bn target, +25% YoY) (State Bank of Pakistan [SBP], 2023a). Outstanding agri-loans/financing grew 10% to PKR 760 bn (SBP, 2023a). Key supply initiatives include:

- **SBP Incentives:** SBP's *Champion Bank Model* and *Agriculture Credit Scoring Model* drive banks to expand rural lending/financing, especially in underserved provinces (SBP, 2023a; SBP, 2022). Banks are also ranked by SBP's scoring system (introduced FY2021-22) (SBP, 2022).
- **Innovative Products:** Many banks offer specialized agri-loans/financing. For example, electronic warehouse-receipt financing lets farmers pledge stored grain for credit, BankIslami became the first Islamic bank to offer Shariah-compliant EWR financing (Business Recorder, 2021). Meezan Bank provides Islamic Agri–finance ("Tractor Assaan", "Fasal Assaan" schemes) enabling Shariah-based tractor and crop financing (Meezan Bank, 2023).
- **Technology & Fintech:** Banks increasingly use digital processes (e-KYC, credit scoring) to speed loans/financing, and partner with fintechs for account opening and underwriting. Many large banks also introduced *Kisan Card*–type debit cards for crop input loans with agile approval.

2.3.2 Government Banks

State-owned/agriculture banks directly fund farmers. Zarai Taraqiati Bank Limited (ZTBL), Pakistan's legacy agri-development bank, remains the largest rural lender. In 2023 ZTBL disbursed PKR 93.0 billion to 300,000 farmers (ZTBL, 2023). It played a key role in the Prime Minister's Kissan Package, extending PKR 29.5 bn (2022) toward mechanization and flood relief (ZTBL, 2023). ZTBL maintains a vast rural footprint (500 branches, mobile van units) and offers schemes for smallholders. Recent initiatives include a Punjab *Agri E-Credit Scheme*

(digital loan processing) and participation in federal loan programs (e.g. PM Youth Business & Agriculture Loans) (ZTBL, 2023).

2.3.3 Government Institutions

Federal and provincial governments back agriculture credit through subsidized schemes and guarantees. Notable supply-side programs include:

- **PM Kissan/Flood Packages:** The Prime Minister's Kissan support (esp. post-2022 floods) provided *interest relief and subsidized loans* to farmers. Measures included waiving mark-up on small farm loans, offering interest-free loans to marginal farmers, subsidized financing for farm machinery, and integration of agri-SMEs into youth loan schemes (Government of Pakistan, 2022).
- **Credit Guarantee for Small Farmers:** The government funds a risk-sharing facility covering 50% of default risk on small-farmer loans (collateral-free advances up to PKR 100,000) (SBP, 2021). Launched post-2016, this Credit Guarantee Scheme (CGSMF) encourages banks to lend to land-poor cultivators.
- **Provincial Agri Cards/Schemes:** Several provinces now issue Kissan Cards for subsidized inputs and interest-free loans (e.g. Punjab's Card offers up to PKR 150,000 per season on fertilizers/seeds).
- **The Pakistan Government has launched the Green Pakistan Initiative** with objectives to end malnutrition in Pakistan, reduce imports of food grains and increase exports. The Green Pakistan Initiative is an agricultural project which is a joint effort between the Government of Pakistan and Pakistan army aimed at enhancing agricultural development in the country. GCI identifies and acquires culturable wastelands of the provinces on a 30 year lease under Joint Venture agreements and allocate lands to the interested investors to undertake corporate farming projects (Green Pakistan Initiative, 2025).
- **The Government of Pakistan has also prioritized the restoration of the Indus River Basin** as part of its climate resilience strategy. The basin, which supports nearly 90% of the country's agricultural production and provides water for millions of people, faces severe threats from climate change, over-extraction, and environmental degradation. By focusing on restoring wetlands, improving water governance, enhancing irrigation efficiency, and promoting sustainable land use, the government aims to strengthen food security, safeguard livelihoods, and reduce vulnerability to floods and droughts. This

initiative not only addresses immediate environmental challenges but also contributes to long-term resilience, sustainable agriculture, and energy security for Pakistan's growing population (UN Decade on Ecosystem Restoration, 2024).

2.3.4 Regulatory Authorities

Regulators set targets and frameworks for agri-credit. State Bank of Pakistan (SBP) mandates and monitors lending e.g. SBP set the FY2023 agriculture target at PKR 1,819 bn (97.6% achieved) (SBP, 2023a). SBP initiatives include:

- **Agriculture Credit Scoring & Champion Bank Models:** Introduced in 2022, these reward banks for outreach in lagging regions (SBP, 2022; SBP, 2023a). SBP's Agricultural Credit Advisory Committee (ACAC) guides these policies; its 2022 meeting specifically targeted Islamic agri-finance, boosting growth in Shariah financing (SBP, 2022).
- **Risk Coverage Scheme (2025):** Recently approved, this SBP-administered scheme extends subsidized insurance for loans to small/subsistence farmers in underserved areas (Dawn, 2025). It aims to add 750,000 new borrowers in 3 years by reducing bank risk (coverage differs by province).
- **Loan/financing repayment relief to dampen the effects of COVID-19:** The banks have been instructed to defer principal amount of agricultural loans/financings for one-year on customers' request. Regulatory space is also provided to facilitate banks in rescheduling/ restructuring of loans/financing for customers who cannot service markup or need deferment exceeding one year. In this regard, as of April 16, 2021, MFBs provided relief in terms of deferred/restructured/rescheduled loans/financing of Rs 121.3 billion to 1.72 million microfinance customers and relief of Rs 11.6 billion to 27,216 agricultural customers.
- **Crop Loan Insurance Scheme (CLIS):** In 2008, the Government of Pakistan (GoP) introduced the mandatory crop loan insurance scheme for five major crops i.e. wheat, rice, cotton, sugarcane and maize to mitigate the risk of losses of farmer in case of calamities. The insurance premium is borne by the government up to maximum of 2 percent per crop per season for the farmers having land holding up to 25 acres in all provinces except Balochistan where the eligibility of land holding is 32 acres. During the period July 2008 to December 2020, banks have submitted premium claims of Rs 9.4 billion against 6.54 million beneficiaries.

- **Livestock Insurance Scheme for Borrowers (LISB):** To minimize the risk of disease or death of animals due to accidents and natural calamities in livestock & dairy sector, the farmers' have improved access to LISB since 2013. The scheme covers small farmers having up to 10 animals and the government bears premium subsidy up to 4 percent per annum. During the period July 2014 to December 2020, banks have submitted premium claims of Rs 2.84 billion against 0.82 million beneficiaries.
- **Adoption of Automation of Land Record for Agriculture Financing:** SBP facilitated in creating partnerships between Punjab Land Revenue Authority (PLRA) and banks for integration of the Land Record Management Information System (LRMIS) with the banks to enable online assessment and charge creation on agricultural land for loans/financing to farmers. As many as 35 agriculture lending banks have signed MOUs with PLRA, of which 25 banks have been brought on board and are verifying revenue documents and also generating 'Fard' (title document) through this integrated online system. Further, to help other provinces gear up their land record automation efforts, SBP has facilitated peer learning of provincial and regional land revenue authorities by organizing online knowledge sharing sessions.
- **Refinance Facilities:** SBP offers low-cost refinance lines (through banks/DFIs) for agri-storage, SMEs, etc. It also issues prudential rules. Further, the maximum tenure for agriculture development loans/financing have been increased to 10 years to encourage development and mechanization for efficiency, resource conservation and yield enhancement. Additionally, Report on Indicative Credit Limits and Eligible Items for Agriculture Financing has also been revised to allow banks to provide loans/financing to farmers as per their internal policies. This will also facilitate provincial planning departments in estimating the total financial and credit requirements of provinces/regions for agriculture sector.
- **Collateral Enabling:** SECP's 2019 Collateral Management Company regulations (CMC) created a digital warehouse-receipt system. Accredited warehouses can issue e-receipts E.g. Naymat CMC, enabling banks to finance inventory (Business Recorder, 2021). Through the EWR system, farmers can store their produce in designated warehouses and obtain loans or financing from banks by using the stored commodities as collateral. The first EWR was issued in Hafizabad, Punjab, for paddy and rice.

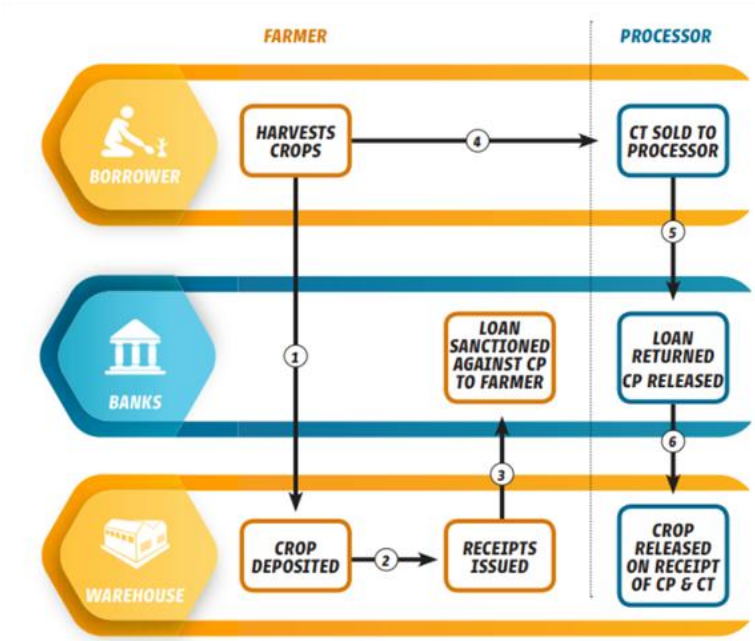

Fig 3: Electronic Warehouse Receipt System

- **Government of Punjab E-Credit Scheme:** SBP has facilitated the Government of Punjab in designing and implementing the E-Credit scheme wherein E-Passbook and other automated land revenue records, accessible through an online portal, are being used by participating financial institutions (ZTBL, NBP, Telenor Microfinance Banks, Akhuwat and NRSP) to provide interest free loans to small farmers. Up to Rabi 2019-20, total loan/ financing amount of around Rs 62 billion had been disbursed to 890,000 small farmers.
- **Workshops/Trainings/Capacity & Awareness Building:** SBP regularly organizes various training programmes and awareness sessions both on-field and virtual to meet demand and supply side capacity building requirements of agriculture finance stakeholders including banks and farmers. These training programmes include Farmers Financial Literacy Programmes and awareness sessions on Agricultural Value Chain Financing, Job Fairs for Agriculture Graduates, Warehouse Receipt Financing, Islamic Agricultural Financing etc.
- **Group Based Lending/Financing:** Group based lending is one of the most successful approaches, equally vigorous for micro, rural and agricultural financing where individuals have no collateral to offer or financial institution intends to share the burden of monitoring and recovery of loans/financing at low cost with minimum risk of non-payments. Under group-based lending/financing programs, loans/financing are made to

individuals through a peer group. In this case, group members guarantee repayment, of each other's loans/financing. Collateral is generally not used; peer pressure and collective responsibilities generated by the group take their place.

2.3.5 Non-Banking Financial Sector

Non-bank lenders and microfinance institutions reach small farmers:

- **Microfinance Banks/NGOs:** Microfinance banks (Khushhali, NRSP, Kashf, etc.) offer small loans/financing in rural areas. By Dec 2023 the microfinance industry's gross loan portfolio was PKR 547 billion (all sectors), up 11.4% YoY, servicing 9.4 million borrowers (46% women) (Pakistan Microfinance Network [PMN], 2024). Although only a modest share targets agriculture (<15% of borrowers), some products focus on farm inputs and livestock. For example, Khushhali Bank operates dedicated agricultural loan programs.
- **Islamic Microfinance and NBFCs:** Islamic microfinance windows (e.g. NRSP Islamic, Akhuwat's model) also serve rural customers. In addition, private NBFCs and leasing firms offer tractor and equipment finance. Risk-guaranteed microcredit (through SBP schemes) encourages these financiers to reach underserved farmers.

2.3.6 Other Relevant Industries

Agribusiness and allied industries increasingly provide financing:

- **Agribusiness Partnerships:** Input suppliers are extending formal credit. For instance, fertilizer giant Engro Fertilizers partnered with Bank Alfalah to launch a PKR 250 million farm-loan/financing scheme. Engro is opening rural retail outlets and using microcredit (via Bank Alfalah) so farmers can buy fertilizer on credit at planting time (Business Recorder, 2021). Such public–private initiatives reduce dependence on informal moneylenders.
- **Contract Farming/Buyers:** Major crop buyers (e.g. ginners, dairy processors) often provide advance purchases or inputs on credit, especially for cash crops. Some have tied up with banks to formalize this financing.
- **Fintech and Mobile Finance:** Digital payments platforms (Easypaisa, JazzCash) have launched small-loan services that reach millions of rural clients. These mobile

microloans, while typically small, are beginning to cover agricultural expenses (seed/fertilizer) for remote farmers.

2.4 Demand-Side Dynamics: Value Chain Analysis

Pakistan's agriculture is a cornerstone of the economy (nearly 30% of GDP and 37% of the labor force) (FAO, 2023). Major crops include wheat, rice, cotton, sugarcane, maize and fruits (mango, citrus) (Government of Pakistan, 2024). Yet the entire value chain, from input suppliers through farmers and processors to markets and consumers, faces chronic challenges. Below we identify key cross-cutting issues and then discuss specific problems faced by each actor.

2.4.1 Common Issues

- **Limited access to formal credit and collateral constraints**: Smallholder farmers and many agribusinesses struggle to obtain bank loans/financing. Pakistan's banks allocate only 3% of private-sector lending to agriculture (World Bank, 2021). Strict collateral requirements and lack of formal land titles exclude most smallholders from bank credit (Asian Development Bank [ADB], 2021; World Bank, 2021). As a result, most farmers and rural SMEs cannot finance inputs or expansion through affordable formal loans or financing (ADB, 2021). Even some input distributors or retail traders lack sufficient assets to serve as collateral.
- **Reliance on informal, high-cost finance:** With formal lending scarce, many farmers (and increasingly small retailers and market agents) depend on local moneylenders or Arhtis for seed and operating loans. These intermediaries charge exorbitant interest and tie the farmer into selling the crop at a low price. For example, rural commission agents often force farmers into debt by "offering low prices for crops and charging high-interest rates on informal loans," trapping them in a cycle of poverty (World Bank, 2021). Such exploitative practices are pervasive across the chain (especially for staple and cash crops) and keep producers unbanked (World Bank, 2021; ADB, 2021).
- **High financing costs and liquidity shortages:** Financing rates for agricultural borrowers are very high (often 20–30% annual). Small actors in the chain (farmers, processors, traders) must pay steep interest or forgo credit. Even where formal loans/financing exist, access is difficult: a review notes that "agricultural loans are available from all commercial banks, but access is difficult" and borrowers must

navigate costly, inefficient processes (ADB, 2021). Small farmers in particular suffer recurring liquidity gaps (waiting months for crop payment), which makes them credit and cash starved. For instance, banks typically require farmers' land as collateral and will quickly foreclose on defaults (World Bank, 2021), whereas local buyers maintain flexible, rapid payments. Industry pilots (e.g., HBL Zarai) highlight that enabling same-day cash payments and credit access can alleviate the "liquidity constraints that traditionally plague small farmers" (Pakistan Business Council [PBC], 2023).

- **Poor infrastructure and storage (post-harvest losses):** Weak rural infrastructure hurts every actor. Pakistan suffers very high post-harvest losses (20–40% of crops) due to inadequate cold chains, warehousing, and transport (FAO, 2023). Lack of paved rural roads, electricity for cold storage, and modern collection centers means that perishable fruits, vegetables and dairy often rot before reaching markets. This raises costs and credit risk for farmers, warehousing operators, processors and exporters alike. The Asian Development Bank notes that "farmers lack infrastructure, equipment, tools for storage, cold storage, and transportation, as a result, farmers incur heavy losses especially in fruits, vegetables, and dairy" (ADB, 2021). These losses reduce sales revenue, making loans harder to service for all value-chain actors.
- **Low technology and mechanization:** Outdated farming and processing methods limit productivity and increase costs. Only about 50% of Pakistan's cultivable area uses mechanized farming, partly because small landholdings, credit shortages and poor servicing inhibit equipment adoption (FAO, 2023). Without modern seed varieties, irrigation and machinery, yields remain low (requiring more fertilizer and labor) and inefficiencies cascade down the chain. In practical terms, farmers and field officers cannot reliably scale production, and processors often must upgrade aging mills. Targeted interventions (as in HBL's model) show that bundling credit with better inputs and advice can break this cycle, but such packages remain rare (ADB, 2021; FAO, 2023).
- **Market volatility and pricing risk:** Agricultural commodity prices in Pakistan fluctuate widely due to weather shocks, policy changes (e.g., support prices, export bans), and global markets. Price uncertainty affects farmers (who may not recover input costs) and downstream actors. For example, major crops like cotton and wheat see frequent price swings. This discourages investment by processors and exporters who cannot predict costs or demand. Conversely, consumers often face volatile food

inflation. All actors lack sufficient financial instruments (futures, insurance) to hedge these risks.

- **Regulatory and policy barriers:** Complex regulations and inconsistent policies also plague the chain. Subsidies (on seeds, fertilizer or electricity) can distort planting decisions, and sudden policy shifts (e.g., new taxes or import-export restrictions) can leave farmers, exporters and processors exposed. For example, changes in support prices may leave farmers unable to pay debts or banks unwilling to lend. While Pakistan has developed agri-finance guidelines, gaps remain in implementation. In general, weak regulation of informal credit and inadequate promotion of agricultural insurance mean all actors operate in an uncertain policy environment, increasing financing risk.
- **Land fragmentation and scale constraints:** Over 80% of Pakistani farmers work on very small plots (<12 acres), which limits economies of scale (FAO, 2023). Tiny, fragmented landholdings reduce mechanization feasibility and dilute bargaining power. This is primarily an issue for farmers (especially tenants and sharecroppers), but it also impacts input dealers (who serve many scattered clients) and warehouses (which cannot efficiently aggregate produce). The small scale of production keeps per-unit financing costs high, since bulk financing is not easily arranged.

2.5 Actor-Specific Issues

a) **Input Suppliers (seeds, fertilizer, machinery dealers):** These suppliers must stock expensive goods before the season, so they often borrow working capital. Because input dealers are typically small traders, they face the same credit and collateral constraints as farmers. If farmers cannot pay on time (due to crop failure or market delays), input suppliers absorb the losses. They also compete with subsidized products and face price pressures from larger agribusiness. In effect, input dealers suffer from tight cash flow and lack of formal financing options, making them rely on personal credit or advance payments from merchants.

b) **Farmers:** By far the most cash-strapped group, smallholder farmers confront nearly every issue above. They lack formal land titles/collateral (ADB, 2021), so banks rarely lend to them. They often have to take high-interest informal loans from Arhtis and merchants just to buy seed and fertilizer (World Bank, 2021; ADB, 2021). Poor rural infrastructure means they cannot transport or store harvests efficiently, leading to large losses (FAO, 2023). Unpredictable weather (floods, droughts) and pests further threaten their output, yet insurance coverage is minimal. The net effect is that small farmers' productivity is low and credit-

worthiness weak, perpetuating subsistence farming and food insecurity. Pilot programs have shown that linking farmers to banks with cash-flow loans and guaranteed buyers can improve this, but such programs are not yet widespread (ADB, 2021; PBC, 2023).

c) **Aggregators & Commission Agents (Arthis):** These middlemen act as both buyers and informal financiers. They suffer few credit constraints themselves, but they face regulatory scrutiny and reputational risk. Traditional arhtis in Pakistan are under pressure as banks and fintech try to cut them out. Still, commission agents must deal with volatility: if farmers default or prices collapse, agents lose money. They also lack formal access to rural finance innovations; almost by definition their operations are outside formal banking.

d) **Warehousing & Logistics Providers:** Companies or co-ops running cold storage, silos, trucking and cold-chain logistics face large capital requirements. Building a warehouse or refrigerated facility requires substantial bank financing, but such assets often lack clear title structures (warehouse receipts systems are underutilized). High interest rates and policy uncertainties make these investments risky. Without enough finance, Pakistan's warehousing sector remains small: as ADB notes, poor storage means massive crop spoilage (ADB, 2021). Logistics operators similarly suffer from poor road conditions and fuel prices, raising their costs.

e) **Processors & Millers (mills, dairies, sugar, etc.):** Medium and large processors need loans to purchase processing plants, meet safety/quality standards, and buy raw materials seasonally. They often use their fixed assets as collateral but still face difficulty if agricultural supply is erratic. Export-oriented processors also face foreign exchange volatility and financing in foreign currency. Thus, processors contend with lack of reliable bulk supply, high cost of machinery upgrades, and relatively high interest rates for working capital.

f) **Exporters / Off-takers:** Firms exporting rice, mangoes, halal meat, etc., must often advance payments or inputs to farmers to secure supplies. They therefore carry heavy trade receivables and rely on pre-export financing (which can be expensive). Exchange rate fluctuations and trade bans can make export deals risky.

g) **Retail & Wholesale Markets (agri traders, modern retailers, SME shops):** Small retailers and wholesalers typically operate on thin margins and short credit cycles. They may buy produce or inputs on credit from larger suppliers, then sell within weeks. Like other chain

actors, they often lack formal loans/financing. Modern retailers (supermarket chains) have better financing, but face issues like power outages and supply consistency.

h) **Consumers:** End consumers in Pakistan do not take "value-chain financing," but they experience the outcome of upstream issues. High food inflation and periodic shortages mean affordability is a constant concern. Consumers face limited variety and quality assurance because of gaps in the chain.

2.6 Issues–Actor Matrix

Issue	Input Suppliers	Farmers	Aggregators (Arthis)	Warehousing/Logistics	Processor/Millers	Exporters	Retail	Consumers
Limited formal credit access (collateral)	✓	✓		✓	✓	✓	✓	
Dependence on informal high-cost finance		✓	✓					
High financing costs (interest)		✓		✓	✓		✓	
Poor infrastructure/post-harvest losses	✓	✓		✓	✓	✓	✓	✓
Low mechanization/technology gap		✓		✓				

Market/price volatility	✓		✓	✓	✓	✓
Smallholder scale/fragmentation	✓	✓				
Regulatory/policy barriers	✓		✓	✓		
Lack of insurance/risk mitigation	✓					
Consumer affordability/food security						✓

2.7 Regulatory Architecture and Oversight

- **State Bank of Pakistan Leadership:** The SBP exercises comprehensive oversight through mandatory agricultural credit targets, currently set at PKR 2.1 trillion for FY2024-25. The Agricultural Credit Advisory Committee (ACAC) coordinates policy formulation, while specialized refinance schemes provide subsidized funding for priority segments. The Credit Scoring Model and Champion Bank framework create performance incentives for expanded rural outreach (State Bank of Pakistan, 2023a; State Bank of Pakistan, 2022; Government of Pakistan, 2024).
- **Provincial Regulatory Coordination:** Provincial governments implement complementary initiatives including input subsidy programs, crop procurement schemes, and agricultural extension services. The Punjab E-Credit Scheme exemplifies federal-provincial coordination in leveraging digitized land records for credit expansion (Government of Pakistan, 2023; Punjab Agriculture Department, 2025a).
- **Securities and Exchange Commission Role:** SECP's regulatory framework for NBFCs, insurance companies, and capital markets enables innovative financing

instruments. The 2019 Collateral Management Company regulations established the legal infrastructure for warehouse receipt financing, while sukuk regulations facilitate Islamic capital market development. (Ali, 2024; Securities and Exchange Commission via Business Recorder, 2021).

2.8 Shariah Governance Framework

- **Shariah Advisory Infrastructure:** Each Islamic financial institution maintains a Shariah board ensuring product compliance with Islamic principles. The SBP's Central Shariah Board provides overarching guidance, standardizing interpretations across the industry (State Bank of Pakistan, 2023; State Bank of Pakistan, 2024c).
- **Product Structuring and Innovation:** Shariah-compliant agricultural financing employs diverse contracts: *Murabahah* for input financing, *Salam* for forward sales, *Ijarah* for equipment leasing, and Diminishing *Musharakah* for asset acquisition. The standardization of documentation and processes has reduced transaction costs while maintaining Shariah integrity (Meezan Bank, 2023; State Bank of Pakistan, 2024a).
- **Takaful Development:** Islamic insurance products specifically designed for agricultural risks remain underdeveloped, with limited offerings for crop and livestock coverage. The integration of *Takaful* with Islamic financing products presents significant growth potential (Ali, 2024; State Bank of Pakistan, 2023).

2.9 Government Policy Framework

- **Federal Initiatives:** The Prime Minister's Kissan Package provides comprehensive support including interest waivers, subsidized machinery financing, and targeted interventions for flood-affected areas. The Green Pakistan Initiative, launched in 2023, mobilizes public-private partnerships for converting wastelands into productive agricultural zones through 30-year lease arrangements (Government of Pakistan, 2022; Government of Pakistan, 2023).
- **Subsidy Architecture:** Input subsidies on fertilizers, seeds, and electricity, while providing immediate relief, create market distortions. The poorly targeted nature of subsidies, with 64% of small farmers unable to access benefits due to procedural complexities, undermines their effectiveness (World Bank, 2021; Pakistan Bureau of Statistics, 2024).

- **Climate Adaptation Strategies:** The Indus River Basin restoration program addresses the watershed supporting 90% of agricultural production. Investments in irrigation efficiency, wetland restoration, and sustainable land management strengthen long-term agricultural resilience (World Bank, 2022; Government of Pakistan, 2024).

2.10 Identified Cross-Cutting Challenges

2.10.1 Gender Disparities in Financial Access: The intersection of cultural norms, legal frameworks, and institutional practices creates systematic exclusion of women from agricultural financing. With 68% of employed women working in agriculture but only 14% accessing digital financial services, gender disparities undermine sector productivity. Women's limited land ownership rights, restricted mobility, and lower literacy rates compound their exclusion from formal credit markets (World Bank, 2024; Pakistan Bureau of Statistics, 2023; Malik, 2025).

2.10.2 Climate Vulnerability and Insurance: Gaps Pakistan's ranking among the world's most climate-vulnerable nations directly impact agricultural financing. The insurance penetration rate of 14% leaves 86% of farmers exposed to catastrophic risks. The absence of parametric insurance products and weather-indexed derivatives constrains risk management options for both farmers and financial institutions (Punjab Agriculture Department, 2025a; Ali, 2024).

2.10.3 Digital Literacy and Infrastructure: Deficits Rural Pakistan's digital divide, with only 35% of the rural population having internet access and smartphone penetration below 40%, limits digital financial service adoption. The combination of low literacy rates (rural literacy at 48%) and limited digital skills create barriers to accessing technology-enabled financial products (Pakistan Bureau of Statistics, 2023; World Bank, 2021).

2.10.4 Institutional Fragmentation and Coordination Failures: The multiplicity of agencies involved in agricultural financing federal ministries, provincial departments, regulatory bodies, and development partners creates coordination challenges. Overlapping mandates, inconsistent policies, and fragmented implementation undermine program effectiveness (Amjad et al., 2023; Asian Development Bank, 2021).

2.10.5 Absence of Long-term Capital Expenditure Financing: The predominance of short-term, seasonal loan/financing constrains agricultural modernization. Less than 10% of

agricultural credit supports capital investments in mechanization, irrigation infrastructure, or processing facilities. This bias toward working capital perpetuates low productivity and technological stagnation (State Bank of Pakistan, 2019; State Bank of Pakistan, 2023a).

2.10.6 Informal Financial System Entrenchment: The arthi system's dominance, providing an estimated 70% of agricultural credit through informal channels, reflects both market failures and embedded social relationships. These informal networks, while exploitative, offer flexibility and accessibility that formal institutions struggle to match (World Bank, 2021; International Food Policy Research Institute, 2022).

2.11 Existing Targeted Initiatives

2.11.1 National Initiatives

- **Risk Mitigation Mechanisms:** The Risk Coverage Scheme (2025) represents a paradigmatic shift in agricultural lending risk management. By providing 10% first-loss government guarantee on loans up to PKR 3 million, the scheme incentivizes banks to extend credit to underserved segments. Initial projections indicate potential coverage of 750,000 new borrowers within three years (State Bank of Pakistan, 2024b; Dawn, 2025).
- **Digital Infrastructure Development:** The National Financial Inclusion Strategy's agricultural component prioritizes digital payment systems, biometric verification, and mobile banking expansion. The Raast instant payment system, processing over 350 million transactions in 2024, increasingly facilitates agricultural value chain payments (State Bank of Pakistan, 2023c; Government of Pakistan, 2024).
- **Regulatory Reforms*:*** The SBP's prudential regulations revision, extending agricultural development loan tenures to 10 years and eliminating prescriptive lending limits, provides banks flexibility in product design. The integration of environmental, social, and governance (ESG) criteria into agricultural lending guidelines promotes sustainable financing practices (State Bank of Pakistan, 2024a).

2.12 International Development Partnerships

- **IFAD's Transformative Programs:** The International Fund for Agricultural Development's portfolio of 27 projects, totalling $2.8 billion and reaching 17 million

beneficiaries, demonstrates sustained commitment to Pakistan's agricultural development. Current initiatives emphasize climate-smart agriculture, value chain development, and women's economic empowerment (International Fund for Agricultural Development, 2023).

- **World Bank Infrastructure Investments:** The $200 million Punjab Irrigation Project modernizes water management infrastructure while building institutional capacity for sustainable resource management. Complementary programs address market access, agricultural innovation, and disaster risk management (World Bank, 2022).
- **China-Pakistan Agricultural Cooperation:** Under CPEC's agricultural framework, technology transfer initiatives introduce high-yielding varieties, precision agriculture techniques, and modern irrigation systems. Joint research centers facilitate knowledge exchange and capacity building (Government of Pakistan & Government of China, 2021).

2.13 Islamic Finance Innovations

- **Sukuk Market Development:** The successful issuance of agricultural infrastructure sukuk demonstrates Islamic capital markets' potential for mobilizing long-term agricultural financing. The instrument's structure, combining asset-backing with credit enhancement, provides a replicable model for future issuances (InfraZamin Pakistan, 2025).
- **Zakat and Waqf Integration:** Pilot programs integrating Zakat funds for agricultural input distribution and *Waqf* properties for agricultural development demonstrate Islamic social finance's potential. These initiatives align religious obligations with development objectives, creating sustainable financing mechanisms (World Bank, 2024; Amjad et al., 2023).
- **Shariah-Compliant Insurance Products:** The development of *Takaful* products specifically designed for agricultural risks, including weather-indexed coverage and livestock mortality protection, addresses both religious concerns and risk management needs (Ali, 2024; State Bank of Pakistan, 2023).

CHAPTER 3: MIXED-METHOD FINDINGS

3.1 Survey Findings and Discussion

To complement the qualitative insights obtained from desktop research and stakeholder consultations during the Focus Group Discussions (FGDs) with experts, this study adopted a survey methodology to capture the demand-side perspectives of Pakistan's agriculture financing ecosystem.

This approach was designed to provide a balanced, evidence-based understanding of regulatory assessment, farmers and other value chain financing needs, institutional readiness, and financing challenges within the context of Shariah-compliant agriculture finance. By integrating insights from all ends of the ecosystem which consist of farmers, input suppliers, aggregators & cooperatives, processors and manufacturers, logistics and storage providers, retailers and distributors, and exporters the survey ensured a comprehensive analysis of the opportunities and constraints shaping the growth of Agriculture financing in Pakistan.

The survey seeks to evaluate access, effectiveness, and regulatory support for Shariah-compliant agriculture financing in Pakistan. It captures both demand and supply side perspectives on financing adequacy, process efficiency, and future expectations. Overall, it aimed to identify gaps and opportunities for strengthening Shariah agriculture financing in Pakistan. A total of 16 respondents participated in this survey, conducted between 6th November and 21st December 2025.

This survey enabled a comprehensive assessment of market demand, regulatory assessment, and financing needs to strengthen the empirical foundation for the report to recommend strategic, policy, and product recommendations aimed at advancing a sustainable and scalable Shariah-compliant agriculture financing ecosystem in Pakistan.

The survey is quantified into 1-5 Likert scale where 1 shows strongly disagree, 2 indicates normal disagreement, 3 shows neutrality, 4 reflects normal agreement and 5 illustrates significant agreement to the close-ended statements deliberated in the survey statements section.

1. Survey Set (Demand Side of Shariah Compliant Digital Financing)	1. Respondents profile: the survey was designed for agriculture ecosystem value chain operators which includes Farmers, Input suppliers, Aggregators, processors, manufacturers, logistics and storage providers, retailers and exporters who have experience with or have sought financing for their agriculture business in Pakistan. 2. Survey objective: It explores their awareness, preferences, sufficiency, adequacy, effectiveness, efficiency, motivations, satisfaction, trust, and future development for agriculture financing. 3. Research respondents: 16 respondents 4. Timeframe: 6 November – 21st December 2025

Survey Close-Ended Statements to Respondents (Demand Side)

To facilitate a structured assessment of Shariah-compliant agriculture financing in Pakistan, the demand-side survey which targets farmers, and value chain operators was organized using a six-pillar analytical framework. This framework captures the key dimensions that shape operators' confidence, adoption behaviour, and trust in the Shariah-compliant agriculture financing ecosystem.

Each survey statement was examined and classified based on its dominant thematic focus. Statements addressing regulatory clarity, supervisory efficiency, sufficiency and adequacy of financing, level of efficiency and effectiveness of financing.

Pillar	Statement Number	Demand Side Survey Statement
1. Regulations	26	Government policies on agriculture financing are effectively enforced by relevant authorities in my region
	28	There are adequate regulatory mechanisms in place to address complaints and disputes related to agriculture financing
	29	Regulatory bodies regularly monitor and audit agricultural lending practices to ensure transparency and fairness
	30	Enforcement of regulations has improved access to financing for small-scale farmers and value chain participants
2.Shariah Compliance	6	How did you obtain your most recent financing for agricultural operations/business? Do you access from Islamic banks (Shariah-compliant financing).
	21	Which of these are your biggest needs? Availability of Shariah-compliant/Islamic financing options.
3. Product and Services	5	Have you or your business ever accessed formal financing (loans, credit, trade finance) for your agricultural operations/business.
	6	How did you obtain your most recent financing for agricultural operations/business.
	9	I am aware of where to access financing for my agricultural needs

	10	Financial products available meet the specific needs of my type of agricultural business.
	11	The financing available allows me to scale or expand my agricultural business
	15	The financing available allows me to scale or expand my agricultural business
	16	The financing available allows me to scale or expand my agricultural business
	18	Overall, the financing was effective for my business goals
	19-25	Which of these are your biggest needs? • Quick access to financing within 1 week of application • Simple application process with minimal documentation • Availability of Shariah-compliant/Islamic financing options • Financing for both working capital (inputs) and long-term investment (equipment) • Digital/mobile access to apply and manage loans • No collateral requirement or acceptance of alternative collateral • Larger loan amounts to meet my full business needs

4. Key Industry Players	19	How did you obtain your most recent financing for agricultural operations/business? (Commercial bank (conventional), Government program or subsidy scheme, Family or friends, Microfinance institution, Loan sharks, Arthis, Islamic bank.
	20	There are sufficient financial institutions offering agricultural financing in my area (on accessibility of financing)
	13	Based on your experience (or knowledge), how long does the entire process take from application to receiving funds? Is this timeframe acceptable for your agricultural business needs?
5. Technology and Infrastructure	15	How did you obtain your most recent financing for agricultural operations/business? To understand the rate of accessibility via Online/mobile app application.
	16	Based on your experience (or knowledge), how long does the entire process take from application to receiving funds? To understand how the adoption of technology and digital agric financing will facilitate quick access to financing.
	20/23	Which of these are your biggest needs? Simple application process with minimal documentation. Digital/mobile access to apply and manage loans.
6. People (Consumers and End Users)	5	Have you or your business ever accessed formal financing (loans, credit, trade finance) for your agricultural operations/business

	6	How did you obtain your most recent financing for agricultural operations/business?
	7	Understanding the Application Process: Either through a value chain partner (input supplier, buyer, etc.), walked into a bank/institution branch, online/mobile app application, government facilitation or through an agent or field officer.
	10	Financial products available meet the specific needs of my type of agricultural business.

3.1.1 Survey Findings - Regulations

This demand-side assessment draws on survey responses from a broad spectrum of agriculture ecosystem value chain participants in Pakistan, including farmers, input suppliers, aggregators, processors, manufacturers, logistics and storage providers, retailers, and exporters. All respondents have either engaged with or actively sought financing for their agriculture-related business activities, providing a grounded view of financing realities across upstream, midstream, and downstream segments of the sector.

The findings indicate notable concerns regarding the sufficiency and effectiveness of government policy enforcement related to agriculture financing. Only 13 percent of respondents expressed agreement that existing government policies are enforced effectively in practice. In contrast, 56 percent of respondents disagreed with this view, suggesting that a significant portion of stakeholders experience tangible gaps between policy intent and on-the-ground implementation. A further 31 percent of respondents remained neutral, reflecting uncertainty or inconsistent exposure to enforcement mechanisms across different regions and value chain roles.

From an industry perspective, this distribution of responses points to structural weaknesses rather than isolated implementation issues. The relatively low level of confidence in policy enforcement is closely linked to three recurring challenges highlighted by respondents. First, there is a persistent lack of transparency and limited access to clear, reliable information regarding applicable policies, financing schemes, and compliance requirements. This creates

uncertainty for agriculture businesses, particularly smaller operators and farmers, when assessing eligibility for Shariah-compliant financing.

Second, respondents identified weak visibility of monitoring and enforcement processes. While policies and guidelines may exist at the regulatory or institutional level, their application is not consistently observable at the field or transaction level. This weakens credibility and reduces the perceived effectiveness of Shariah-aligned agriculture financing frameworks.

Third, these factors collectively contribute to low stakeholder confidence. When enforcement is perceived as inconsistent and information remains fragmented, agriculture value chain actors become hesitant to engage with formal financing channels, including Shariah-compliant products. This hesitation is especially pronounced among primary producers and smaller enterprises, for whom financing certainty and clarity are critical to operational planning.

Overall, the demand-side evidence underscores the need for stronger policy communication, more visible enforcement mechanisms, and improved transparency across the agriculture financing ecosystem. Addressing these gaps is essential to strengthening trust, improving uptake of Shariah-compliant agriculture financing, and ensuring that policy objectives translate into meaningful outcomes for value chain participants.

Dimension	Key Points
Survey Analysis	• 29% of respondents agreed that government policies are effectively enforced. • 43% disagreed, indicating a significant proportion of stakeholders perceive gaps or weaknesses in enforcement. • 29% remained neutral, neither agreeing nor disagreeing with the statement.

Areas of concern	• Enhanced transparency and data accessibility • Improved regulatory oversight, introduce digital tracking systems • Awareness campaigns, training programs, and value-chain consultations to ensure farmers, institutions, and policymakers understand the importance of mandatory agricultural credit and how it supports national development.

To strengthen the future of agricultural financing in Pakistan, stakeholders envision greater transparency, stronger monitoring and enforcement, and improved public access to compliance data. They also hope for enhanced stakeholder awareness, adoption of digital tracking systems, and increased innovation in Shariah-compliant and farmer-friendly financial products. Integrating climate-smart financing tools and modernizing institutional practices will further support a more resilient and sustainable agricultural sector.

3.1.2 Survey Finding - Key Industry Players

The survey findings indicate that agriculture sector participants in Pakistan access financing through a diverse range of sources. Approximately 27% of respondents reported obtaining funds from conventional commercial banks, while another 27% relied on microfinance institutions. Around 20% benefited from government programs and subsidy schemes, reflecting the role of public sector interventions in agricultural finance. Smaller proportions of respondents sought support from family and friends (7%), loan sharks (7%), Arthis (7%), and Islamic banks (7%) offering Shariah-compliant financing. These results highlight a continued reliance on conventional and informal financing channels, with limited yet emerging engagement with Islamic financial institutions for agriculture-focused Shariah-compliant solutions.

Survey findings from the perspective of key market players, including non-bank financial companies, Islamic banks, and dedicated Shariah-compliant agriculture finance providers, reveal similar concerns regarding the effectiveness of policy enforcement, though viewed through an institutional and operational lens. Only 29 percent of respondents agreed that government policies related to agriculture financing are enforced effectively, while 43 percent

disagreed. The remaining 29 percent neither agreed nor disagreed, indicating uncertainty and uneven regulatory experiences across institutions.

From the standpoint of financial institutions, the lack of consistent and transparent policy enforcement directly affects product structuring, risk assessment, and portfolio expansion in the agriculture sector. Respondents highlighted persistent information gaps between policy announcements, regulatory guidelines, and practical implementation at the operational level. This misalignment complicates internal compliance processes and increases reliance on conservative interpretations, which in turn limits innovation and scalability of Shariah-compliant agriculture financing products.

Weak visibility of monitoring and enforcement mechanisms was also identified as a material challenge. Financial institutions noted that unclear supervisory practices reduce regulatory predictability, making it difficult to assess long-term policy stability. As a result, institutions often adopt a cautious stance toward agriculture financing, particularly for smallholder-focused or value chain-based structures that require close coordination with multiple stakeholders.

These conditions contribute to subdued institutional confidence in expanding Shariah-compliant agriculture finance portfolios. When enforcement is perceived as inconsistent, institutions face heightened reputational, Shariah compliance, and credit risks. This constrains their willingness to deepen engagement across the agriculture value chain, despite strong underlying demand and the strategic importance of the sector. Strengthening transparency, improving regulatory communication, and enhancing the visibility of enforcement processes are therefore critical to enabling financial institutions to play a more active and sustainable role in supporting Shariah-compliant agriculture financing in Pakistan.

Survey responses highlight material inefficiencies in the financing application and disbursement process from the perspective of key market players, including Islamic banks, non-bank financial companies, and Shariah-compliant agriculture finance providers. Only 16.7 percent of respondents indicated that financing could be processed within one to two weeks, while 23 percent reported timelines of three to four weeks. A larger proportion experienced significantly longer durations, with 25 percent requiring one to two months, 8.3 percent waiting up to three months, and 16.7 percent indicating that financing took more than three months to be received.

These timelines are widely viewed as misaligned with the operational realities of agriculture value chains. Notably, 41.7 percent of respondents explicitly stated that such processing durations are unacceptable for their business needs. For agriculture-related activities, particularly those linked to storage, aggregation, and trade, delays in financing directly affect inventory turnover, price risk exposure, and the ability to respond to seasonal demand fluctuations.

Respondents consistently emphasized the need for financing processes that are simple, fast, and operationally responsive. This concern was particularly strong among warehouse operators who play a critical role in supporting agricultural value chains. Despite the availability of Electronic Warehouse Receipts as collateral, banks are often reported to require 30 to 40 days to process financing requests, coupled with extensive documentation and repetitive verification procedures. From an institutional standpoint, this reflects risk-averse internal processes that have not yet fully adapted to value chain-based or collateral-backed Shariah financing structures.

The practical consequence of these delays is a gradual exclusion of operators and farmers from formal financing channels. When financing timelines do not match business cycles, value chain actors are left with limited alternatives other than informal lenders and loan sharks, often at significantly higher cost and without Shariah compliance. This dynamic undermines the broader objectives of Shariah-compliant agriculture finance, which aims to promote fairness, financial inclusion, and real economic activity. Improving process efficiency, streamlining documentation requirements, and strengthening institutional acceptance of instruments such as Electronic Warehouse Receipts are therefore critical to restoring confidence and relevance among key market players.

Dimension	Key Points/ Researchers' Interpretation
Survey Analysis	• 25% of respondents stated that the financing application process takes 1-2 months • 23% indicated that the financing application process takes 3-4 weeks • 16.7% indicated 1-2 weeks for financing application process • 8.3% stated 2-3 months before financing is received • 16.7% indicated more than 3 months • 41.7% of the participants stated that this timeline is unacceptable for their business
Areas of concerns	• Respondents emphasized that the financing process must be simple and fast, particularly for warehouse operators supporting agricultural value chains. • Banks often require 30–40 days to process financing requests and demand extensive documentation even when Electronic Warehouse Receipts (EWRs) are provided as collateral. • Leaves operators and farmers with limited alternatives other than informal lenders and loan sharks

Survey responses indicate lengthy and uneven disbursement timelines for agricultural financing. Only 25% of respondents reported receiving funds within two weeks, suggesting limited efficiency for a minority of cases. The largest share of respondents (50%) indicated that the process takes between one and three months, highlighting significant procedural and operational delays. A further 16.7% reported waiting more than three months, underscoring persistent bottlenecks in approvals, documentation, and risk assessment.

3.1.3 Survey Finding - Products & Services

Survey findings related to products and services suggest a moderate level of alignment between existing Shariah-compliant financing offerings and the practical needs of agriculture businesses. A majority of respondents, representing 57 percent, agreed that financial products currently offered by financial institutions are generally able to meet the specific requirements of their agricultural operations. However, this positive assessment is not uniform across the market. Fourteen percent of respondents strongly disagreed with this statement, pointing to gaps in access, limited outreach, or insufficient information regarding available Shariah-compliant products. A further 29 percent remained neutral, reflecting uncertainty or limited engagement with formal product offerings.

A similar pattern emerges when assessing the role of financing in supporting business growth and expansion. While 57 percent of respondents agreed that available financing enables them to scale or expand their agricultural activities, 29 percent disagreed, and 14 percent neither agreed nor disagreed. This divergence indicates that, although products exist, their structure, eligibility criteria, or delivery mechanisms may not consistently align with the operational and cash flow realities of all value chain participants.

From an industry standpoint, these results point to a moderate product–market fit rather than a fully effective financing ecosystem. The presence of neutral and negative responses suggests that access and awareness remain key constraints. Many agriculture operators are uncertain about which Shariah-compliant products are available, how they can be applied, and whether they are suitable for their specific position within the value chain.

This uncertainty weakens uptake and limits the developmental impact of Shariah-compliant agriculture financing. Without clear product positioning, targeted outreach, and practical guidance, even well-designed financing instruments may fail to reach intended beneficiaries. Addressing these challenges requires not only product innovation, but also improved communication, stronger advisory support, and clearer articulation of how Shariah-compliant products can support working capital needs, asset financing, and long-term expansion across the agriculture sector.

Dimension	Key Points
Survey Analysis	• 57% of respondents agreed that financial products available at financial institutions meet the specific needs of their agricultural business • While 14% strongly disagreed, indicating lack of access or information to available products • 29% remained neutral, neither agreeing nor disagreeing with the statement. • 57% agreed that financing available allows to scale or expand their agricultural business • 29% disagreed and 14% remained neutral
Areas of concern	• Data indicates Moderate product–market fit • Access and awareness gaps regarding Shariah compliant products • Uncertainty regarding available products

The findings indicate that while the majority of respondents recognize the availability of financial products that broadly address agricultural needs, significant gaps remain in accessibility, awareness, and scalability. Over half of participants acknowledge that existing financing supports their operations and growth; however, a substantial minority either disagree or remain uncertain, signalling uneven product suitability and delivery across the sector.

3.1.4 Survey Finding - Shariah Compliance

The survey results indicate that the availability of Shariah-compliant or Islamic financing options is generally recognized within the market. A significant majority of respondents, representing 71 percent, agreed that Shariah-compliant financing products are accessible through existing financial institutions. This reflects meaningful progress in the institutionalization of Islamic finance within the agriculture sector and demonstrates that supply-side availability is no longer the primary constraint.

Despite this positive perception, material gaps remain in the practical delivery and depth of Shariah-compliant financing. Financing timelines continue to pose challenges, with only 16.7 percent of respondents receiving financing within one to two weeks. While 23 percent reported processing periods of three to four weeks, a considerable proportion experienced extended delays, including 8.3 percent waiting up to two to three months and 16.7 percent indicating more than three months before financing was disbursed. These delays reduce the effectiveness of otherwise Shariah-compliant products, particularly in agriculture where timeliness is critical to production and trading cycles.

From a Shariah compliance and product development and innovation integrity standpoint, the findings point to substantial untapped potential that has yet to be fully realized by Islamic banks and Islamic finance institutions. Respondents highlighted the limited practical use of *Salam*-based financing (one of unique Shariah contracts that are designed for agriculture sectors), despite its strong Shariah foundations and natural suitability for agriculture. The underutilization of *Salam* suggests a preference for operational convenience over contract structures that more directly support real economic activity and risk-sharing principles.

In addition, crop and livestock Shariah compliant insurance (*Takaful*) penetration remains extremely low, leaving farmers and value chain operators exposed to climate, price, and production risks. This gap undermines the holistic application of Shariah principles, which emphasize risk mitigation and mutual protection alongside financing.

The survey also reveals insufficient literacy among stakeholders regarding Shariah contracts, both on the customer side and within institutional interfaces. This contributes to a high dependency on *Tawarruq*-based structures, which, while permissible, are often applied as standardized solutions rather than as purpose-driven instruments aligned with the underlying agricultural activity.

Overall, the Shariah compliance findings suggest that the market has moved beyond basic availability toward a phase where depth, appropriateness, and quality of implementation matter most. Strengthening Shariah literacy, expanding the use of agriculture-specific contracts such as *Salam*, reducing overreliance on *Tawarruq*, and integrating *Takaful* solutions are critical next steps to enhance the credibility, impact, and sustainability of Shariah-compliant agriculture financing.

Dimension	Key Points
Survey Analysis	• 71% agreed that there are availability of Shariah-compliant/Islamic financing options • 23% indicated that the financing application process takes 3-4 weeks • 16.7% indicated 1-2 weeks • 8.3% stated 2-3 months before financing is received • 16.7% indicated more than 3 months
Areas of concerns	• Untapped potential and opportunities to be tapped by Islamic banks and Islamic finance institutions through *Salam* • Crop and livestock *Takaful* penetration is extremely low • Insufficient literacy of Shariah contracts • High dependency on *Tawarruq*

In a nutshell, Islamic banking accounts for 20–25% of Pakistan's total banking assets, yet its share in agricultural financing is estimated at below 10%, indicating a significant sectoral mismatch between Islamic finance growth and agriculture outreach. Salam remains underutilized in practice, with most Islamic banks relying heavily on debt-like instruments (e.g., *Tawarruq*) even for agri use cases. Provincial initiatives (notably Punjab's EWR program) show government willingness to support Shariah-compatible infrastructure, yet national-level Shariah coordination remains absent.

3.1.5 Survey Finding - Technology & Infrastructure

Survey findings related to technology and infrastructure reveal that process inefficiencies remain a significant constraint in the delivery of Shariah-compliant agriculture financing. A substantial proportion of respondents continue to experience lengthy financing timelines, with 21 percent reporting application processes that take one to two months and 23 percent

indicating three to four weeks. More critically, 29 percent stated that the period from assessment through to financing disbursement may extend beyond three months, while a further 8.3 percent experienced delays of two to three months. These timelines suggest structural bottlenecks that extend beyond credit assessment alone and point to limitations in supporting systems and infrastructure.

The data further highlights the limited role of digital channels in facilitating access to Shariah-compliant agriculture financing. Only 8.3 percent of respondents reported accessing financing through mobile-based platforms. The overwhelming majority relied on physical branch visits or engagement through field officers to initiate and process financing applications. This heavy dependence on manual and face-to-face processes contributes directly to extended turnaround times, higher operational costs, and inconsistent customer experience across regions.

From an industry perspective, the low adoption of digital channels reflects gaps in end-to-end digital integration rather than a lack of demand. Core processes such as customer onboarding, documentation, Shariah review, credit assessment, and collateral verification remain largely fragmented and paper-based. In the context of agriculture financing, where transactions are time-sensitive and often geographically dispersed, these limitations significantly reduce responsiveness and scalability.

The findings indicate that technology and infrastructure have yet to be effectively leveraged to support Shariah-compliant agriculture financing at scale. Strengthening digital onboarding, enabling remote verification, integrating Electronic Warehouse Receipts and value chain data, and expanding mobile-based access are essential to improving efficiency and outreach. Without such improvements, Shariah-compliant products risk remaining operationally constrained, despite strong underlying demand and growing institutional commitment to the sector.

Dimension	Key Points
Survey Analysis	• 21% of respondents stated that the financing application process takes 1-2 months • 23% indicated that the financing application process takes 3-4 weeks • 29% stated that from the assessment stage till receiving financing may take more than 3 months • 8.3% stated 2-3 months before financing is received • Only 8.3% of participants accessed financing via mobile phone while others walked into a bank or through a field officer.
Areas of concerns	• Lengthy processing and approval times • High reliance on manual and physical processes • Low adoption of digital channels

In summary, the findings indicate that financing applications often experience long processing and approval times, with many respondents waiting several months to receive funds. Lenders rely heavily on manual and physical processes, as most applicants must visit bank branches or interact with field officers. Additionally, the low use of mobile channels highlights limited digital adoption. Implementing digital solutions such as online and mobile applications, automated credit assessment, real-time. The survey findings from the perspective of people, consumers, and end users highlight persistent frustrations related to the speed and practicality of accessing Shariah-compliant agriculture financing. Financing timelines remain a core concern across user segments. While 16.7 percent of respondents reported receiving financing

within one to two weeks and 23 percent within three to four weeks, a significant proportion experienced much longer delays. Specifically, 25 percent indicated that the process took one to two months, 8.3 percent reported waiting two to three months, and 16.7 percent stated that financing was only received after more than three months.

3.1.6 Survey Finding - People / Consumers / Users

These timelines are widely perceived as incompatible with the operational realities of agriculture-related activities. A notable 41.7 percent of participants explicitly stated that such delays are unacceptable for their business. For farmers, warehouse operators, and other value chain participants, access to timely financing is critical to managing harvest cycles, storage decisions, and market price movements. Delays in financing often translate directly into lost income opportunities and increased operational risk.

Respondents consistently emphasized that financing processes must be simple, fast, and responsive, particularly for warehouse operators who support aggregation, storage, and trade across agricultural value chains. Despite the use of Electronic Warehouse Receipts as collateral, banks are frequently reported to require 30 to 40 days to process financing applications, accompanied by extensive and repetitive documentation requirements. From the user perspective, these practices suggest limited trust in recognized collateral mechanisms and an overreliance on manual verification processes.

As a result, many operators and farmers are left with limited practical alternatives other than informal lenders and illegal loan sharks, often at significantly higher cost and without Shariah compliance. This outcome runs counter to the objectives of Islamic finance, which seek to promote fairness, financial inclusion, and protection of vulnerable economic actors.

In addition to procedural challenges, respondents also raised concerns regarding perceived fraud and the ingenuity of loan practices by bank officers. These perceptions, whether driven by isolated incidents or broader systemic issues, further erode trust between users and formal financial institutions. Collectively, the findings underscore the need to simplify processes, strengthen transparency, improve accountability, and align financing delivery more closely with the real-world needs of agriculture value chain participants.me notifications, and digital disbursement systems can reduce delays, improve efficiency, and enhance access to financing.

Dimension	Key Points
Survey Analysis	• 25% of respondents stated that the financing application process takes 1-2 months • 23% indicated that the financing application process takes 3-4 weeks • 16.7% indicated 1-2 weeks • 8.3% stated 2-3 months before financing is received • 16.7% indicated more than 3 months
Areas of concerns	• 41.7% of the participants stated that this timeline is unacceptable for their business • Respondents emphasized that the financing process must be simple and fast, particularly for warehouse operators supporting agricultural value chains. • Banks often require 30–40 days to process financing requests and demand extensive documentation even when Electronic Warehouse Receipts (EWRs) are provided as collateral. • Leaves operators and farmers with limited alternatives other than informal lenders and loan sharks • Perceived Fraud and ingenuity of financing by bank officers

3.1.7 Survey Findings (Summary)

In a nutshell, respondents stated that Agricultural financing should be promoted with immediate effects and impact. Stating that access to financing remains challenging for many

small farmers due to limited education and low awareness of financing procedures. To address this, field staff should be empowered to guide farmers clearly through the financing process, provide proper awareness on how to obtain financing, and ensure that adequate checks are in place so that the funds are used solely for agricultural purposes.

Several respondents provided additional comments at the conclusion of the survey, offering valuable qualitative insights into the current state and future potential of Shariah-compliant agriculture financing in Pakistan.

One group of respondents emphasized the urgent need to promote Shariah-compliant agriculture financing, noting that such initiatives should be implemented without delay to strengthen financial inclusion and ethical financing options for farmers. Stating that:

"*Shariah compliant Agriculture financing should be promoted with immediate effects*"

Another respondent highlighted significant accessibility challenges, observing that "*Agricultural financing is not easier because most of the small farmers are not educated nor do they have sufficient awareness about the loan procedure*". The respondent further stressed the importance of enhancing field staff capacity to clearly guide farmers through loan application processes, raise awareness about available financing options, and ensure that loan utilization is restricted to genuine agricultural purposes. He stated: "*Kindly make sure that access of farmers to obtain the financing facility is easier, for this purpose the field staff have the ability to guide the farmers about loan clearly and provide proper awareness on how to obtain loan and also have proper checks that loan is used for only agricultural purposes*".

Additionally, one respondent pointed to the untapped potential for Islamic banks and financial institutions to expand their role in the agriculture sector, particularly through the adoption of *Salam*-based financing models, which align well with the seasonal and pre-harvest financing needs of farmers by stating that: "*Untapped potential and opportunities to be tapped by Islamic banks and Islamic finance institutions through Salam financing*".

These comments collectively underscore a strong demand for simpler processes, better farmer education, and greater institutional engagement in scaling Shariah-compliant agriculture finance across Pakistan.

3.2 Focus Group Discussion (FGD)

FGD Rationale

Pakistan's digital and agricultural financial ecosystem are jointly shaped by regulators, government agencies, and industry players. FGDs with SECP, ministries, govt agencies, Islamic Banks, NBFCs, Islamic Financial Institutions, and fintech actors allow a holistic view of how regulations and market practices align in practice. Since policies evolve through interpretation, coordination, and industry experience, structured discussions offer deeper insights than surveys. These FGDs help identify adequacy, gaps, current action, opportunities, implementation challenges, and aspirational development especially in advancing Shariah Compliant Agriculture Financing (SAF) in Pakistan.

FGD Objective

1. To assess the readiness, alignment, and clarity of regulatory frameworks governing agricultural financing, non-bank financial institutions (NBFCs), and Islamic finance mechanisms that support the development and acceleration of Pakistan's agriculture finance ecosystem.
2. To understand regulators and policymakers' perspectives on enabling accessible, Shariah-compliant, and inclusive agricultural financing solutions.
3. To identify institutional coordination gaps and collaboration opportunities among the SECP, State Bank of Pakistan, relevant ministries, provincial departments, government institutions, and industry players involved in agricultural finance.
4. To gather industry-level insights on operational challenges, compliance requirements, market readiness, and technology adoption influencing agricultural credit delivery and outreach.
5. To synthesize collective viewpoints from multi-sector stakeholders to inform actionable recommendations for accelerating inclusive, Shariah-compliant, and technology-enabled agricultural financing solutions in Pakistan.

FGD Mechanism

As a core research methodology to generate practical and real-time insights, a Focus Group Discussion (FGD) was conducted to obtain in-depth qualitative perspectives on the development of Pakistan's agricultural financing ecosystem. The objective of the FGD was to

capture institutional and industry-level perspectives on regulatory readiness, operational realities, and future development pathways for enhancing agricultural financing particularly within the Shariah-compliant and digital finance domains.

The FGD brought together a representative group of key stakeholders involved in the design, regulation, and implementation of agricultural finance. Participants included representatives from the Securities and Exchange Commission of Pakistan (SECP), the State Bank of Pakistan (SBP), relevant federal and provincial ministries, agriculture departments, non-bank financial companies (NBFCs), Islamic banks, microfinance institutions, fintech providers, and agribusiness representatives across the value chain. This multi-stakeholder participation ensured a balanced discussion integrating regulatory, supervisory, and industry perspectives.

Discussions were conducted through semi-structured, facilitator-led sessions focusing on key themes such as the adequacy of current agricultural financing frameworks, operational bottlenecks in credit access and distribution, compliance and governance issues, and the potential of digital and Shariah-compliant instruments to enhance outreach and impact.

The sessions were structured around four analytical dimensions reflecting different stages of maturity within the agricultural financing landscape in Pakistan:

1. Dimension 1 – Readiness, Adequacy, and Sufficiency
2. Dimension 2 – Perception, Current Effectiveness, and Efficiency
3. Dimension 3 – Implementation, Governance, and Institutional Coordination
4. Dimension 4 – Way Forward, Aspirations, and Future Development

This structured approach enabled participants to assess existing conditions, identify systemic constraints, and propose actionable pathways for strengthening Pakistan's agricultural finance ecosystem.

To ensure comprehensive coverage, the FGD was organized into three discussion segments, engaging regulators, government agencies, and key industry players through both joint and segmented sessions. This design encouraged open dialogue, candid reflection on institutional and market-level challenges, and evidence-based discussions on policy directions.

The primary output of the FGD was a consolidated thematic summary, synthesizing key regulatory insights, institutional challenges, and recommended interventions. These insights

informed practical policy recommendations aimed at enhancing the effectiveness, inclusivity, and sustainability of agricultural financing in Pakistan while promoting innovation, digital integration, and Shariah-compliance aligned with national financial inclusion and rural development objectives.

FGD Sessions Summary

No	Focus Group Discussion	Date	Time	Participants
1	FGD with SECP Management	27th November 2025	12.30 p.m to 2.30 p.m	Securities and Exchange Commission of Pakistan cross departmental representatives, management officials, and ISRA Consulting
2	FGD with Government Institutions and Associations	1st December 2025	1.00 p.m to 3.00 p.m	State Bank of Pakistan, Securities and Exchange Commission of Pakistan, Agriculture Department Government of Khyber Pakhtunkhwa, World Bank consultant, Asian Development Bank consultant, Pakistan Mercantile Exchange, Naymat Collateral Management Company, Pakistan Stock Exchange, Central Depository Company, National Clearing Company, National Rural Support Programme, and ISRA Consulting

3	FGD with Industry Players	1st December 2025	5.00 p.m to 7.00 p.m	Meezan Bank, Bank Islami Pakistan, Salaam Takaful, Jubilee General Insurance, JazzCash, Walee Financial, Abhi, Qist Bazaar, Pakistan Microfinance Network, Pakistan Fintech Network, Securities and Exchange Commission of Pakistan, and ISRA Consulting

Research Questions

The research questions for the Focus Group Discussions (FGDs) were structured to evaluate the development of Shariah-compliant Agriculture financing in Pakistan through a holistic, multi-dimensional, and ecosystem-based framework. The questions were organized around four analytical dimensions; readiness, effectiveness, implementation, and future development examined across six key ecosystem pillars encompassing regulatory, institutional, market, technological, human capital, and Shariah governance aspects.

This approach allowed for a comprehensive assessment of the current strengths, capability gaps, and implementation challenges within the agriculture financing ecosystem. It also helped identify forward-looking policy, institutional, and technological priorities essential for advancing Pakistan's goal of building a sustainable and fully integrated Shariah-compliant agriculture finance ecosystem by 2030.

Collectively, the research questions were designed to generate practical insights to inform regulatory reforms, identify current state and challenges towards fostering product innovation tailored to farmers' needs, enhance coordination among ecosystem stakeholders, and promote inclusive and sustainable growth of Shariah-compliant agriculture financing across Pakistan.

FGD Questions Set 1 designed for Regulators (SECP/SBP/Relevant Government Agencies) of Supply Side

Dimension 1 (Readiness, Adequacy and Sufficiency)

1. How sufficient and adequate is the current agricultural financing landscape in Pakistan in meeting the needs of the entire value chain, from smallholder farmers to exporters?
2. What specific gaps exist in terms of financial product availability, credit penetration rates, and the adequacy of Islamic finance options for agriculture?

Dimension 2 (Perception and Current Effectiveness & Efficiency)

3. How do you perceive the current effectiveness of Pakistan's agricultural finance ecosystem in terms of stakeholder coordination, risk management, and financial inclusion?
4. What are the main strengths and weaknesses you observe among financial institutions, government programs, and value chain actors in delivering agricultural finance

Dimension 3 (Implementation and Enforcement)

What are the major challenges your organization faces in implementing and enforcing agricultural finance regulations and policies?

5. How effective are current enforcement mechanisms, and what compliance issues are most prevalent among financial institutions operating in the agricultural sector?

Dimension 4 (Future Development Plan)

7. Looking ahead to 2030, what is your vision for transforming Pakistan's agricultural finance ecosystem?
8. What specific regulatory reforms, policy interventions, and innovations (including Islamic finance, fintech, and climate-smart finance) should be prioritized to significantly improve agricultural credit access, affordability, and effectiveness?

FGD Questions Set 2: Islamic Financial Institutions/Islamic Banks in Shariah Compliant Agriculture Financing

Dimension 1. Ecosystem Readiness – Sufficiency and Adequacy

1. To what extent does your bank's current agricultural financing portfolio meet the actual demand from farmers and agribusinesses across the value chain?
2. How adequate are your product offerings, credit limits, and financing structures in addressing the diverse needs of smallholder farmers, input suppliers, processors, and exporters?

Dimension 2. Perception and Current Effectiveness

3. How does your bank perceive agricultural lending/financing as a business opportunity and risk proposition? What is your assessment of the current challenges, barriers, and enabling factors affecting your ability to expand agricultural finance?
4. How do you view the agricultural sector's creditworthiness and potential compared to other sectors?
5. What Shariah compliant contracts are utilized? which is most utilized and preferred and what challenges do you experience specifically in the use of *Salam?*
6. How are the operationality and the use of EWR?

Dimension 3. Implementation and Enforcement

7. Walk us through your agricultural lending/financing process from application to disbursement and recovery.
8. What operational challenges do you face in implementing your agricultural finance products, and how effectively are you managing credit risk, customer service, and portfolio performance in this sector

Dimension 4. Future Development Plan – The Way Forward

9. What is your bank's strategic vision for agricultural finance over the next 5 years? What innovations, partnerships, product developments, and operational improvements are you planning to significantly expand and improve your agricultural lending/financing?
10. What support do you need from regulators, government, and ecosystem partners to achieve this vision?

Research Questions Set 3: NBFC (Non-Banking Financial Companies) in Shariah Compliant Agriculture Financing

Dimension 1. Ecosystem Readiness – Sufficiency and Adequacy

1. How adequate is your NBFC's current agricultural financing in reaching and serving the last-mile farmers and agribusinesses that traditional banks typically don not serve?
2. What is the scale of your operations, and how well do your products, ticket sizes, and delivery mechanisms meet the needs of smallholder farmers, marginalized communities, and underserved agricultural segments?

Dimension 2. Perception and Current Effectiveness

3. As an NBFC operating in agricultural finance, how do you perceive your competitive advantages and unique challenges compared to traditional banks?
4. What is your assessment of the current agricultural lending/financing landscape, the opportunities, gaps, risks, and your role in filling the financial inclusion gap that banks leave behind?

Dimension 3. Implementation and Enforcement

5. Walk us through your agricultural lending/financing operations from customer acquisition to loan recovery.

6. What innovative approaches, alternative methodologies, or technology solutions have you implemented to overcome the traditional barriers of collateral, credit history, and last-mile delivery? What operational challenges persist?

Dimension 4. Future Development Plan – The Way Forward

7. What is your NBFC's vision for scaling agricultural finance over the next 3-5 years? What innovations, partnerships, technology investments, and business model adaptations are you planning to dramatically expand your reach and impact?

8. What ecosystem support (regulatory, funding, capacity building) is critical to achieving this vision?

Research Questions Set 4: Takaful Operators in Shariah Compliant Agriculture Financing

Dimension 1. Ecosystem Readiness – Sufficiency and Adequacy

1. How sufficient and adequate is the current agricultural insurance/*Takaful* coverage in Pakistan in protecting farmers and agribusinesses against production, price, and climate risks?
2. What is the scale of your operations, and how well do your products, premium structures, and sum insured levels meet the diverse risk management needs across the agricultural value chain from smallholder farmers to exporters?

Dimension 2. Perception and Current Effectiveness

3. How do you perceive the current state of agricultural insurance/*Takaful* awareness, demand, and uptake among Pakistani farmers and agribusinesses?
4. What is your assessment of the main barriers preventing higher penetration, are they related to affordability, awareness, trust, product design, distribution, or other factors?

Dimension 3. Implementation and Enforcement

5. Walk us through your agricultural insurance/*Takaful* operations from product design and distribution to claims assessment and settlement. What innovations have you implemented in risk assessment, claims verification, and service delivery?
6. What are your biggest operational challenges, and how effectively are you managing loss ratios, customer satisfaction, and business sustainability?

Dimension 4. Future Development Plan – The Way Forward

7. What is your vision for transforming and scaling agricultural insurance/*Takaful* in Pakistan over the next 5 years? What innovations in product design, technology, distribution, and risk assessment are you planning to significantly increase penetration and farmer protection?
8. What ecosystem support from government, regulators, technology providers, and financial institutions is critical to achieving universal or near-universal agricultural insurance coverage?

3.2.1 FGD Finding - Regulations

The Focus Group Discussion examined the current state of Shariah-compliant agricultural financing in Pakistan, with particular attention to policy sufficiency, institutional coordination, regulatory effectiveness, and ecosystem readiness. Agriculture remains a critical pillar of Pakistan's economy, contributing approximately one fifth of national GDP and supporting a large share of livelihoods. Despite this significance, the penetration of Shariah-compliant agricultural financing remains limited relative to both the size of the sector and the country's broader Islamic finance ambitions. The FGD aimed to identify why Islamic agricultural finance has not scaled in line with policy intent and market potential, and what regulatory and institutional interventions are required to unlock inclusive, resilient, and sustainable Shariah-compliant financing for the agriculture sector.

Sufficiency of Regulation

Participants of the FGD broadly agreed that while Islamic finance policies exist at a general level, Shariah-compliant agricultural financing has not received equivalent depth of policy focus or structural support. This gap is reflected in market outcomes. Although agriculture contributes around 20 percent of GDP, Shariah-compliant agricultural financing accounts for only a small fraction of total agricultural finance.

Regulators and industry participants noted the absence of dedicated Shariah-compliant contract templates and standardized frameworks tailored to agricultural use cases. Financing structures for crops, livestock, inputs, storage, and post-harvest activities remain largely adapted from conventional models, limiting suitability and scalability.

There was also limited clarity on Shariah rulings for blended finance and digital agricultural products. This uncertainty has constrained innovation and discouraged institutions from deploying Shariah-compliant financing at scale in higher-risk agricultural segments.

A regulator participating in the FGD observed:

> *"The footprint of Shariah-compliant agricultural financing remains low. Supply chains are weakly connected, and the ecosystem has not yet been structured to support scale."*

Perceived Effectiveness and Efficiency of The Regulations

From an effectiveness perspective, FGD participants highlighted significant coordination and implementation weaknesses. There is no harmonized framework that integrates Islamic finance policy, agricultural policy, digital finance initiatives, and climate-risk mitigation strategies. Responsibilities are fragmented across federal regulators, provincial governments, financial institutions, and agri-tech players, resulting in duplicated efforts and limited impact.

Collaboration between Islamic banks, NBFCs, agri-tech firms, regulators, and provincial agriculture departments was described as ad hoc and uneven, with particularly weak alignment at the provincial level where agricultural execution takes place.

Participants also highlighted structural weaknesses in key supporting mechanisms. The Electronic Warehouse Receipt system remains at an early stage, with only one accredited operator and limited accredited storage capacity. Current storage capacity is small relative to national agricultural output, creating bottlenecks for scale, price stabilization, and Shariah-compliant collateralization.

Slow integration of *takaful* and agricultural insurance was another recurring concern. Approval pathways are perceived as lengthy, penetration remains low, and risk mitigation tools are insufficient for banks and NBFCs to confidently expand Shariah-compliant agricultural financing.

An industry participant emphasized:

> *"Eighty percent of smallholder farmers still have no access to formal financing, while only large farmers benefit from credit. Without risk-sharing and ecosystem alignment, Islamic finance cannot expand into agriculture meaningfully."*

Future Development

Looking ahead, FGD participants strongly supported the establishment of structured institutional and incentive frameworks to unlock Shariah-compliant agricultural financing. There was broad consensus on the need to form inter-agency coordination mechanisms involving financial regulators, agriculture ministries, digital authorities, and provincial governments to harmonize policies and execution.

Participants supported the creation of a National Shariah Agricultural Finance Council to serve as a central platform for policy alignment, product development, risk-sharing design, and stakeholder coordination. Such a body would help bridge gaps between regulators, financial institutions, agri-tech providers, insurers, and development partners.

On incentives, participants emphasized that agriculture's higher risk profile requires dedicated regulatory and fiscal support. Risk-sharing guarantees, Shariah-compliant derisking facilities, subsidized *takaful* premiums, and climate-related guarantee mechanisms were identified as essential to encourage Islamic banks and NBFCs to expand agricultural portfolios.

The development of Shariah-compliant blended finance mechanisms was also highlighted as a priority. Combining government funding, donor support, Islamic social finance instruments, and private capital was seen as critical to reaching smallholders, mitigating climate risks, and improving resilience.

Participants also stressed the importance of strengthening the EWR ecosystem through expanded accreditation, increased storage capacity, incentives for warehouse development, and formal recognition of EWRs as acceptable collateral for Shariah-compliant financing products. Integration with agri-tech platforms and digital systems was viewed as key to improving transparency and efficiency.

A regulator concluded:

> *"If incentives, risk-sharing tools, and coordination mechanisms are put in place, Islamic banks and NBFCs are willing to expand Shariah-compliant agricultural financing. What is needed now is alignment and enforcement."*

Sufficiency (Frustration/Gaps)	Perceived Effectiveness/Efficiency (Challenges)	Future Development (Wish List/Way Forward)
Policy & Framework Gaps 1. Despite agriculture contributing 20% to GDP, Islamic agricultural financing lags at only 8% of total agricultural finance 2. Regulatory and policy environments perceived as less enabling for Islamic agriculture finance compared to conventional 3. No dedicated Shariah-compliant contract templates or standardized frameworks for agricultural use cases 4. Lack of clarity on Shariah rulings for blended finance, and digital agri products.	**Coordination and Implementation Weaknesses** 1. No harmonized framework integrating Islamic finance, agricultural policies, digital finance, and climate-risk mitigation 2. Weak collaboration between Banks, NBFCs, Agri-techs, SECP and SBP, and Provincial governments (especially Punjab) 3. Absence of unified governance for outreach, risk-sharing, and product development 4. Fragmented stakeholder responsibilities leading to duplicated efforts and limited scale	**Institutional Framework** 1. Form an inter-agency working group (SBP-SECP-MinAgri-Digital Authority) to harmonize policies 2. Create a National Shariah Agri-Finance Council (SECP, SBP, Ministry of Agriculture, provincial reps, agri-tech reps, *takaful*/insurers, donor partners) 3. Develop inter-government synchronization framework for alignment among SECP, SBP, Ministry of Agriculture, Provincial agriculture departments, Microfinance regulators

Incentive & Support Mechanisms 1. Weak regulatory incentives for Islamic banks to increase agricultural financing especially because Agriculture financing has a higher credit risk 2. Lack of blended finance mechanisms combining government, donors, Islamic social finance, and private capital	**Regulatory Capacity** 1. Low traction despite policy intent, transaction volumes and accredited warehouses for EWR remain small 2. Slow insurer/*takaful* integration - *Takaful* penetration and approval pathways for agri-insurance are slow	**Incentive Structures** 1. Develop incentives: risk-sharing guarantees, tax support, subsidized *Takaful* premiums 2. Create Shariah-compliant agricultural risk-sharing funds, derisking facilities and climate guarantee facilities
Regulation 1. EWR system still at early innovative stage with only one accredited company and limited accredited warehouses 2. Current storage capacity needs expansion from around 300,000 MT to potentially 1 million MT+	**EWR System Maturity** 1. EWR accreditation is limited, and storage capacity (~300,000 MT) is small relative to potential creating scalability bottlenecks 2. Requires incentives for storage cost bearing, financing cost reduction, and warehouse accreditation expansion	**EWR Ecosystem Development** 1. Accreditation expansion, Storage infrastructure development, Incentives for banks and NBFCs 2. Allow EWR as collateral for Islamic products and integrate with agri-techs

Third-Party Integration 1. Insufficient structured partnerships with NBFCs, agritech companies, telcos, fertilizer companies, cooperatives, and digital platforms	**Multi-Stakeholder Coordination** 1. Lack of an integrated agri-value-chain ecosystem involving banks, NBFCs, regulators, agri-tech players, and provincial governments 2. Weak coordination results in fragmented outreach, duplicated efforts, and low scalability	**Catalytic Capital Framework** 1. Develop third-party integration framework incorporating grant programs, impact investors, donor agencies, technical assistance platforms 2.Create guidance for catalytic capital for first-loss and blended finance

The FGD highlighted that the limited scale of Shariah-compliant agricultural financing in Pakistan is not due to lack of demand, but rather fragmented policies, weak coordination, insufficient risk mitigation, and underdeveloped supporting ecosystems. Addressing these challenges will require integrated regulatory leadership, targeted incentives, strengthened institutional frameworks, and closer collaboration across the agricultural value chain. Strengthening Shariah-compliant agricultural financing has the potential to improve financial inclusion for smallholders, enhance food security, and align Islamic finance with climate resilience and sustainable development objectives.

3.2.2 FGD Findings - Key Industry Players

The Focus Group Discussion revealed that the limited scale of Shariah-compliant agricultural financing is driven less by the absence of intent and more by structural, behavioral, and ecosystem-level constraints within Islamic financial institutions and their operating environment, be it Islamic banks, Islamic multifinance, and Islamic non-banking financial institutions contributing to the development and acceleration of Shariah compliant digital financing ecosystems. These constraints interact to reinforce conservative risk perceptions, narrow product offerings, and fragmented delivery models, ultimately limiting outreach to smallholders and agri-value-chain actors.

Sufficiency of Key Institutions - Risk Perception as a Binding Constraint

Participants highlighted that risk perception remains a primary deterrent shaping institutional behavior. Islamic banks and NBFCs continue to view agriculture, particularly smallholder farming, as a high-risk, low-return segment due to climate volatility, nature risks, weak repayment capacity, and limited formal documentation. These risks are further amplified by weak collateral mechanisms and high monitoring costs, making agricultural portfolios less attractive relative to urban retail or corporate financing.

As a result, agricultural exposure is often kept minimal, not because of Shariah constraints, but due to institutional risk frameworks that are not calibrated to agricultural realities. Without differentiated risk-sharing, insurance, or guarantee mechanisms, agriculture remains structurally disadvantaged within portfolio allocation decisions.

A regulator summarized this challenge during the FGD:

> *"Agriculture needs to be treated as a priority sector with a clear roadmap and targets. Without that signal, institutions will continue to avoid exposure despite high demand."*

Gaps and Challenges - Capability Gaps and Organizational Mindset

Beyond risk perception, the FGD surfaced internal capability constraints within financial institutions. Many institutions lack specialized teams, tools, and methodologies to design Shariah-compliant agricultural products that reflect crop cycles, seasonal cash flows, and value-chain dynamics. Serving informal and semi-formal farmers remains costly due to manual processes, limited digital records, and the absence of reliable data for credit assessment.

These operational frictions reinforce a risk-averse organizational mindset. Staff incentives and performance metrics are typically aligned with low-touch, high-volume portfolios, discouraging proactive engagement with agriculture. As transaction and monitoring costs rise, agriculture is deprioritized, even where demand is strong.

Participants emphasized that changing outcomes will require deliberate capacity building and incentive realignment within institutions, rather than relying solely on product innovation.

Gaps and Challenges - Product Misalignment with Agricultural Realities

The FGD indicated that existing Islamic agricultural finance products are often generic and insufficiently adapted to the realities of farming. Financing structures frequently overlook seasonal cycles, input financing needs, post-harvest liquidity gaps, and market price volatility. The over-reliance on *Tawarruq* structures, combined with limited use of *Salam* and other risk-sharing instruments, has reduced the relevance of Islamic finance for agriculture.

Takaful offerings were also seen as poorly aligned with agricultural risks, with limited availability of crop, livestock, or weather-indexed protection. The absence of bundled solutions, combining financing, advisory support, insurance, logistics, and market access, further weakens product suitability and repayment outcomes.

Industry participants noted that, in contrast, conventional agricultural financing has been gaining ground due to more pragmatic structures and stronger ecosystem linkages.

Gaps and Challenges - Fragmented Partnerships and Weak Ecosystem Integration

A recurring theme across the FGD was the fragmented nature of the agricultural finance ecosystem. Structured partnerships between banks, NBFCs, fintechs, telcos, agri-tech platforms, fertilizer companies, cooperatives, and off-takers remain limited. Where NBFCs and MFIs have stronger rural reach, they often lack sufficient capital to scale Shariah-compliant portfolios, while banks lack last-mile distribution capabilities.

Weak supply-chain integration further constrains financing effectiveness. Limited aggregation infrastructure, persistent information asymmetries, and insufficient cold-chain and storage investments leave smallholders exposed to intermediaries and price volatility. Financing, therefore, remains disconnected from actual production, demand, and market flows.

An industry participant highlighted:

> *"Digital Shariah agriculture financing will only work if the supply chain itself is digitized and formalized. Financing alone cannot fix informality."*

Future Development - Value Chain Driven Pathways Forward

FGD participants converged on the view that scaling Shariah-compliant agricultural financing requires a shift from standalone products to value-chain-anchored models. Financing linked to

processors, warehouses, off-takers, and input providers can reduce risk, improve traceability, and align repayment with actual cash flows. Structured *Salam*-based financing, warehouse-receipt-backed models, and Wakala-based aggregation were identified as promising pathways.

Participants also emphasized the role of digital financing solutions in accelerating formalization, lowering origination costs, and improving monitoring, provided these solutions are embedded within broader ecosystem partnerships rather than deployed in isolation.

Capacity building for farmers, bundled with technical assistance and digital tools, was viewed as essential to improving bankability and repayment performance, particularly for informal and smallholder segments.

Sufficiency (Frustration/Gaps)	**Perceived Effectiveness/Efficiency (Challenges)**	**Future Development (Wish List/Way Forward)**
Risk Perception & Portfolio Exposure 1. Islamic banks maintain minimal agricultural exposure due to perceived high climate risks (flood, drought), nature risks, low repayment capacity, and limited formal documentation 2. Many institutions view smallholder agriculture as high-risk, low-return 3. Banks/NBFCs frustrated by weak collateralization and high monitoring costs	**Capacity & Capability Constraints** 1. Limited internal capacity to design Shariah-compliant, risk-sharing agricultural models 2. High cost & risk to serve smallholders - informality and lack of digital records make origination and monitoring expensive	**Strategic Positioning** 1. Position agriculture as a strategic sector to drive national development agenda aligned with Sustainable Development Goals 2. Strengthen institutional capability in Shariah-based agri financing

Partnership & Ecosystem Integration 1. Insufficient structured partnerships with NBFCs, agritech companies, telcos, fertilizer companies, cooperatives, and digital platform	**Collaboration Deficits** 1. Fragmented ecosystem - few structured collaborations between banks, telcos, fintechs, agritechs, fertilizer companies, and cooperatives 2. NBFCs and MFIs lack adequate capital to scale Islamic agri portfolios	**Partnership Development** 1. Build integrated partnerships development among banks, NBFCs, fintechs, telcos, agritech platforms, fertilizer companies, supply-chain players 2. Initiate joint bank-NBFC-fintech programs using shared digital rails to accelerate the inclusion of Shariah agriculture financing industry 3. Establish co-distribution channels with telcos, agritechs
Workforce & Incentives 1. Workforce lacks incentives to promote agriculture portfolios; mindset remains traditional and risk-averse	**Organizational Mindset** 1. High transaction costs and monitoring costs reduce banks' interest 2. Limited eligibility for commercial financing; many require seed grants, TA, and catalytic capital	**Capacity Building** 1. Build agricultural-Shariah expertise through structured training and literacy programs

Product Innovation & Delivery 1. Islamic agricultural products remain generic and not aligned with seasonal cycles, crop cycles, input financing needs, post-harvest requirements 2. Lack of bundled offerings integrating financing + advisory + insurance + logistics 3. Limited adoption of *Salam* and over use of *Tawarruq* 4. Takaful offerings do not match agricultural realities (e.g., few crop/weather *Takaful* option)	**Product Suitability Gaps** 1. Conventional agric financing gaining more grounds than Islamic credit models 2. Lack of climate-indexed products, crop-based financing, supply chain Islamic financing, yield-based repayment options 3. Absence of Shariah-based bundled financing linked with advisory, mechanization, warehousing, and logistics 4. Weak linkage between *Takaful* operators and banks/NBFIs to offer integrated solutions	**Product Development & Bundling** 1. Deliver bundled offerings: advisory, mechanization, logistics, insurance and market development platform 2. Bundle Takaful with Shariah agriculture financing (crop, livestock, weather) 3. Introduce ESG and climate-linked Shariah products: flood guarantees, government-backed land-compensation schemes, climate-indexed products, and women entrepreneurs / women farmers empowerment

Weak Agricultural Supply Chain Integration 1. Supply chain integration remains weak and insufficient to support effective smallholder commercialization. Critical interventions such as comprehensive market analyses, structured contract farming arrangements, and targeted strategies to attract and strengthen value chain investments are either limited in scope or poorly implemented. As a result, smallholders continue to operate in fragmented and poorly coordinated markets.	**Supply Chain Integration Weakness** 1. Interventions to support smallholder commercialization such as market analyses, contract farming, and strategies to strengthen value chain investment have been deficient, limited producer collection centres and aggregation infrastructure 2. Information asymmetry persists; exploitation of smallholders through intermediaries 3. Insufficient investment in cold chains and storage	**Value Chain Optimization** 1. Integrate processors, input providers, warehouses, off-takers to enable financing tied to actual production and demand 2. Develop more structured *Salam*-based financing, more warehouse-receipt-backed financing and value-chain partnerships 3. Create *Wakala* aggregator models for market linkage

The FGD analysis indicates that Shariah-compliant agricultural financing in Pakistan is constrained by a mutually reinforcing cycle of risk aversion, limited capability, product misalignment, and ecosystem fragmentation. Breaking this cycle will require strategic prioritization of agriculture, targeted institutional capacity building, integrated partnerships across the value chain, and product innovation anchored in real agricultural and market dynamics. Digital Shariah financing can act as a catalyst, but only if deployed as part of a coordinated value-chain transformation rather than as a standalone financial intervention.

3.2.3 FGD Finding - Products and Service

The Focus Group Discussion highlighted that product-related constraints remain a central bottleneck in scaling Shariah-compliant agricultural financing in Pakistan. While Islamic finance principles are well established, their translation into practical, agriculture-specific products has remained limited, resulting in weak market penetration and declining competitiveness relative to conventional financing.

Sufficiency of Products and Services - Shariah Compliant Agriculture Financing

Product Design Misalignment with Agricultural Realities

Participants consistently noted that most Islamic agricultural financing products remain generic and insufficiently aligned with the operational realities of farming. Existing structures often fail to reflect seasonal cash flows, crop cycles, input procurement timelines, and post-harvest liquidity needs. As a result, farmers frequently experience mismatches between financing disbursement schedules and actual production requirements, increasing default risk and reducing product attractiveness.

The absence of bundled offerings further weakens product effectiveness. Financing is typically offered as a standalone instrument, without integration with advisory services, mechanization support, insurance, warehousing, or logistics. This fragmented approach limits productivity gains and undermines repayment capacity, particularly among smallholders.

An industry participant observed during the discussion:

> *"Most Islamic agriculture financing products look good on paper, but they do not follow how farming actually works across the season."*

Gaps and Challenges - Product Market Fit and Competitive Pressure

The FGD revealed growing concern that conventional agricultural financing is gaining stronger market acceptance due to simpler structures, clearer pricing, and better alignment with value-chain operations. Islamic financing, by contrast, remains underrepresented in supply-chain financing, yield-based repayment models, and post-harvest solutions.

Participants emphasized that this is not due to Shariah limitations, but rather to underutilization of appropriate Islamic instruments. Empirical evidence supports the suitability of *Salam* for

addressing agricultural liquidity needs, yet its deployment remains limited due to documentation complexity, risk management concerns, and lack of standardized implementation frameworks.

A regulator noted:

> *"Salam is theoretically ideal for agriculture, but without standard templates and risk mitigation, institutions hesitate to use it."*

Gaps and Challenges - Limited Institutionalization of Islamic Finance Instruments

The discussion highlighted that adoption of *Salam*, *Istisna*, *Musawamah*, and *Musharakah* remains inconsistent and fragmented across institutions. Where these instruments are used, structures often vary significantly, creating uncertainty for regulators, institutions, and clients alike. Weak Shariah frameworks for value-chain financing, climate-risk mitigation, and blended social-commercial finance further constrain innovation.

Participants stressed the need for a unified Shariah rulebook and product playbook to reduce interpretation risk, accelerate approvals, and enable scalable deployment across banks and NBFCs.

An industry expert stated:

> "Without standardized contracts and pricing rules, every institution is reinventing the wheel, and that slows the whole industry."

Gaps and Challenges, Derisking Instrument, Risk Coverage and Takaful Gaps

Risk management emerged as a critical weakness in current product offerings. *Takaful* products do not adequately reflect agricultural risk profiles, with limited availability of crop, livestock, and weather-based coverage. Approval pathways for agricultural *Takaful* were described as slow and complex, contributing to low uptake and leaving financing portfolios exposed to systemic climate risks.

Participants highlighted that rising climate vulnerability has increased the urgency for integrated risk-sharing instruments. Without bundled *Takaful* or index-based risk transfers, Islamic agricultural credit remains structurally riskier, discouraging portfolio expansion.

A regulator emphasized:

> *"Climate risk is no longer theoretical. Financing agriculture without embedded risk-sharing is becoming unsustainable."*

Gaps and Challenges - Warehouse Receipt Financing and Collateral Innovation

The FGD underscored that warehouse receipt financing remains underdeveloped despite its strong potential to address post-harvest liquidity and collateral constraints. The current Electronic Warehouse Receipt system is still at a nascent stage, characterized by limited accreditation, small storage capacity, and dominance by a few players. This restricts scalability and limits the ability of Islamic institutions to use EWRs as effective collateral.

Participants agreed that mainstreaming EWR-based Islamic products would require regulatory incentives, expanded accreditation, and clearer Shariah guidance on integrating EWRs into financing structures such as *Salam* and *Murabahah*-based post-harvest financing.

Future Development - Pathways for Product Innovation and Standardization

The FGD concluded that sustainable growth in Shariah agriculture financing will depend on moving from isolated product offerings toward a standardized, ecosystem-centric product development framework. This includes issuing unified Shariah agriculture financing guidelines, standardized templates for *Salam, Istisna,* and *Musawamah*, and clear guidance on climate-risk tools and blended finance structures.

Sufficiency (Frustration/Gaps)	Perceived Effectiveness/Efficiency (Challenges)	Future Development (Wish List/Way Forward)
Product Design & Alignment 1. Islamic agricultural products remain generic and not aligned with seasonal cycles, crop cycles, input financing needs, post-harvest requirements 2. Lack of bundled offerings integrating financing + advisory + insurance + logistics	**Product-Market Fit Issues** 1. Conventional Financing gaining more grounds in the market 2. Lack of supply chain Islamic financing, yield-based repayment options	**Ecosystem-Centric Product Development** 1.Develop ecosystem-centric Islamic agri models by cooperating with end-to-end value chains and cross-sector industry

Islamic Finance Instruments	**Product Adoption & Deployment**	**Shariah Product Innovation and Development**
1. Limited adoption of *Salam, Istisna, Musawamah* Models 2. Weak Shariah frameworks for value-chain financing, climate-risk mitigation, and blended social-commercial finance	1. Absence of Shariah-based bundled financing linked with advisory, mechanization, warehousing, and logistics 2. Empirical studies show *Salam*'s suitability for agricultural liquidity but deployment remains limited	1. Standardized and Unified Rulebook and Playbook for Shariah Agriculture Financing: Issue a comprehensive, standardized Shariah agriculture financing rulebook with unified templates, contracts, reporting standards, and terminologies. 2. Institutionalize *Salam*, *Istisna*, Musharakah & Shariah Compliant Value-chain Product Templates with standard documentation, price determination rules, delivery/quality clauses, and dispute mechanisms 3. Develop standard *Salam* and parallel-*Salam* documentation for banks/NBFCs to adopt 4. Create parallel-*Salam* for risk mitigation and *Musharakah* for value-chain partnerships

Insurance & Risk Products 1) Takaful offerings do not match agricultural realities (e.g., few crop/weather *Takaful* options) 2) Lack of Shariah-compliant risk-sharing instruments, crop *Takaful*, or climate guarantees	**Risk Coverage Inadequacy** 1) Low *takaful* uptake; increasing climate vulnerability without integrated risk-sharing instruments 2) Takaful penetration and approval pathways for agri-insurance are slow, leaving climate risks unmitigated 3) Agricultural credit portfolios face higher systemic climate risk without integrated risk-sharing instruments	**Shariah Digital Financing Integrated Risk Solutions** 1) Bundle *Takaful* with financing (crop, livestock, weather) 2) Explore climate-linked Shariah products: flood guarantees, government-backed land-compensation schemes 3) Design blended instruments to lower cost of capital for smallholders 4) Mandate *takaful* or index-based risk transfers in high-climate zones.
Warehouse Receipt Financing 1. Warehouse receipt financing underdeveloped with limited scale	**EWR Product Maturity** 1. EWR system nascent - while EWRs can convert stored produce into collateral, accreditation is limited and storage capacity is small 2. EWR uptake is early stage and dominated by a few player	**EWR-Based Product Scaling** 1. Mainstream EWR as collateral for Islamic products 2. Create pricing incentives for storage to reduce post-harvest loss and enable EWR financing

Product Standardization	Product Approval & Deployment	Product Development Framework
1. Weak Shariah frameworks for value-chain financing, climate-risk mitigation, and blended social-commercial finance	1. Approval for agricultural insurance/*takaful* frameworks is slow and complex 2. Lack of alignment between climate-risk strategies and government priorities	1. Create Standardised and Unified Shariah Agriculture Financing Product Development Framework and Guideline for Islamic Financial Institutions in Pakistan 2. Issue standardized templates for *Salam* (crop financing), *Istisna* (value-added production), *Musawamah* (input financing) 3. Develop Shariah guidance for climate-risk tools and templates for blended finance

FGD Participants also emphasized the importance of integrating *Takaful,* digital monitoring, and value-chain partnerships into product design, rather than treating them as add-ons. Such an approach would enhance product relevance, improve risk management, and strengthen the competitiveness of Shariah-compliant solutions in Pakistan's agricultural sector.

3.2.4 FGD Finding - Shariah Compliance

Sufficiency (Frustration / Gaps)

The FGD discussions revealed that product-level Shariah compliance in agricultural financing remains underdeveloped and fragmented, with current offerings insufficiently aligned to agricultural production realities. Participants observed that most Islamic agricultural products

remain generic and do not adequately reflect seasonal crop cycles, input financing needs, or post-harvest liquidity requirements. This structural misalignment weakens both uptake and repayment performance among farmers and agribusinesses.

Moreover, Islamic agricultural products are rarely designed as integrated or bundled solutions. Financing is typically provided as a standalone instrument without complementary services such as advisory support, crop insurance, mechanization, warehousing, or logistics integration. The absence of such bundled offerings restricts value-chain efficiency and limits productivity improvements, particularly for smallholders.

Participants further noted that product-market fit challenges have contributed to the growing dominance of conventional financing. Conventional banks offer simpler structures, more transparent pricing, and value-chain-aligned repayment models giving them a competitive advantage over Islamic offerings.

Islamic financial institutions also face difficulty in adopting and scaling key Shariah-compliant contracts such as *Salam, Istisna, Musawamah*, and *Musharakah*, due to a lack of standardized documentation, pricing rules, and regulatory clarity. Consequently, the deployment of theoretically ideal instruments such as *Salam* for pre-harvest liquidity remains limited despite strong empirical evidence supporting its suitability for agriculture.

Weak Shariah governance frameworks for value-chain financing, climate-risk mitigation, and blended social-commercial finance further compound these limitations, constraining the industry's capacity for innovation and scale.

Perceived Effectiveness / Efficiency (Challenges)

The discussions highlighted gaps in Shariah governance and compliance oversight, which undermine the operational effectiveness of Islamic agricultural financing. A recurrent concern was the disconnect between product development teams, Shariah advisors, and ground-level agricultural realities. This disconnect leads to financing products that are compliant in form but not in function, failing to address the practical needs of the sector.

Participants emphasized the inadequacy of governance mechanisms for verifying the genuineness of agricultural activities, commodity traceability, and on-farm transactions.

Additionally, there is limited coordination between *Takaful* operators and financial institutions, which restricts the availability of integrated financing and insurance solutions.

The lack of standardized Shariah frameworks for Shariah compliant agricultural financing ecosystems, including electronic warehouse receipt systems and farm-level verification mechanisms, further reduces efficiency and slows product deployment.

FGD participants also drew attention to the overdependence on *Tawarruq*-based structures, which dominate Islamic agricultural financing due to their simplicity and ease of execution. While *Tawarruq* provides liquidity management convenience for financial institutions, its excessive use weakens the linkage with real economic activities and limits genuine risk-sharing undermining the developmental objectives of Islamic finance in agriculture.

This overreliance not only constrains product diversity but also raises Shariah perception risks, reduces authenticity, and could expose institutions to future compliance challenges if regulatory or interpretive standards evolve.

The absence of a national Shariah standard-setting body has resulted in fragmented interpretations, inconsistent practices, and duplication of efforts among financial institutions. Divergent rulings from individual Shariah boards have increased approval timelines, compliance costs, and uncertainty in product implementation, thereby eroding efficiency and market confidence.

Future Development (Wish List / Way Forward)

Participants proposed a comprehensive set of forward-looking interventions aimed at strengthening Shariah compliance, governance, and product innovation across Pakistan's agricultural finance ecosystem.

1. Standardization and Institutional Frameworks

- Develop a Standardized and Unified Shariah Agriculture Financing Product Development Framework, providing end-to-end guidance for Islamic financial institutions.
- Issue comprehensive Shariah rulebooks and standardized templates for *Salam, Istisna, and Musawamah.*

- Institutionalize the use of *Salam, Istisna, Musharakah*, and *Musawamah* through standardized contracts, price determination rules, delivery and quality clauses, and dispute resolution mechanisms.
- Establish a National Shariah Advisory Council or central standard-setting authority aligned with AAOIFI to harmonize rulings, accelerate product approvals, and improve sector-wide governance consistency.

2. Product Diversification and Value-Chain Integration

- Gradually diversify Islamic agricultural financing away from *Tawarruq* toward real-sector, value-chain-linked instruments, such as:
    - Input-based *Murabahah* for seeds and fertilizers
    - *Salam* for pre-harvest crop financing
    - *Istisna* for agricultural infrastructure
    - *Musharakah/Mudarabah* for farmer cooperatives and agribusiness ventures
- Promote ecosystem-centric product models that integrate financing with advisory, mechanization, warehousing, logistics, and insurance services.

3. Risk Management and *Takaful* Integration

- Strengthen *Takaful* coverage for agricultural risks, including crop, livestock, and weather-based products.
- Introduce climate-linked Shariah-compliant instruments such as flood guarantees and land-compensation schemes.
- Mandate *Takaful* or index-based risk transfer mechanisms for high-climate-vulnerability zones.
- Bundle *Takaful* with financing products to ensure comprehensive protection and improve portfolio resilience.

4. Warehouse Receipt Financing and Collateral Innovation

- Mainstream the use of Electronic Warehouse Receipts (EWRs) as collateral for Islamic products.
- Expand EWR accreditation and storage capacity to enable scale.
- Introduce pricing incentives for warehouse storage and develop EWR-linked *Salam* and *Murabahah* structures for post-harvest financing.

5. Capacity Building and Shariah Governance Strengthening

- Establish a Centralized Shariah Agricultural Advisory Board to provide sector-specific rulings.
- Train Shariah advisors, auditors, and product developers in agricultural processes, value-chain operations, and climate-risk management.
- Strengthen Shariah audit and review mechanisms for agricultural value-chain financing.

FGD participants underscored that Shariah compliance and product innovation must move beyond mere certification toward functional alignment with agricultural realities. Integrating *Takaful*, digital monitoring tools, and value-chain partnerships into product design not as add-ons but as core components will enhance product relevance, strengthen risk management, and boost the competitiveness of Shariah-compliant agricultural finance in Pakistan.

Sufficiency (Frustration/Gaps)	Perceived Effectiveness/Efficiency (Challenges)	Future Development (Wish List/Way Forward)
Shariah Governance 1. Disconnect between product teams, Shariah advisors, and on-ground agricultural realities 2. Lack of Shariah-compliant risk-sharing instruments, crop *Takaful*, or climate guarantees	**Compliance Oversight** 1. Inadequate governance for verifying genuineness of agri activities and commodity traceability 2. Weak linkage between *Takaful* operators and banks/NBFIs to offer integrated solutions 3. No standardized Shariah framework for digital agri ecosystems and farm-level verification	**Shariah Standards & Capacity** 1. Create unified Shariah governance and compliance guidelines for agricultural financing 2. Strengthen Shariah audit functions for agri value-chains 3. Train Shariah advisors in agricultural processes, climate risk, and digital systems 4. Establish a Centralized Shariah

		Agricultural Advisory Board for uniform rulings
Over dependency on *Tawarruq* 1. Agricultural Islamic financing in Pakistan remains heavily dependent on *Tawarruq*-based structures, primarily due to their simplicity, quick deployment, and suitability for short-term liquidity needs. However, this over-reliance limits meaningful linkage with agricultural production cycles and real farm activities. As a result, product diversity is constrained, innovation in Shariah-compliant agri-financing remains weak, and the developmental role of Islamic finance in supporting smallholder farmers and agribusiness value chains is diluted	**Limiting Effective Agricultural Value Chain Financing** 1. Although *Tawarruq* provides operational efficiency and predictable cash-flow management for financial institutions, its dominance undermines risk-sharing and asset-backed financing principles critical to agriculture. The limited integration with farming inputs, production, and post-harvest processes reduces value-chain financing opportunities. Continued overuse also raises Shariah perception risks, weakens stakeholder confidence, and exposes agricultural finance portfolios to structural vulnerabilities if regulatory guidance or Shariah interpretations evolve	**Diversification** 1. There is a need to gradually diversify agricultural Islamic financing toward real-sector, value-chain-linked instruments such as input-based *Murabahah*, *Salam* for crop financing, *Istisna'* for agricultural infrastructure, and *Musharakah* and *Mudarabah* for agribusiness and farmer cooperatives. Regulatory incentives, targeted capacity building for financial institutions, and pilot programs aligned with Pakistan's crop cycles and rural realities should be introduced. Reducing dependency on *Tawarruq* will enhance authenticity, resilience, and the

		developmental impact of Islamic finance in Pakistan's agricultural sector.
No National Standard Setter 1. The absence of a national Shariah standard-setting authority creates fragmentation in interpretation, product structuring, and compliance across Islamic financial institutions. This gap results in inconsistent practices, regulatory uncertainty, and duplication of efforts at the institutional level. Without harmonized standards, product development lacks uniformity, limiting scalability and cross-institutional confidence.	**Standardized Efficiency** 1. The lack of standardized guidance reduces operational efficiency as institutions rely on individual Shariah boards, leading to delays in approvals and higher compliance costs. Divergent rulings weaken market confidence, complicate regulatory oversight, and reduce the credibility of Islamic finance products among stakeholders, investors, and international partners.	**National Shariah Advisory council** 1. Establish a centralized national Shariah advisory council or standard-setting body aligned with international best practices (e.g., AAOIFI, IFSB). This body should issue binding standards, provide product approval frameworks, and support capacity building for Shariah governance. Harmonization would improve consistency, market integrity, and long-term sector development.

3.2.5 FGD Finding - Technology and Infrastructure

Sufficiency (Frustration / Gaps)

The Focus Group Discussion (FGD) revealed that the technological backbone supporting agricultural financing in Pakistan remains fragmented, underutilized, and inadequately integrated across key ecosystem actors. Participants observed that while several digital

initiatives exist spanning government programs, banking operations, and fintech innovations the overall level of technological convergence remains insufficient to support scale, inclusivity, and efficiency in agricultural finance.

A critical gap identified was the lack of interoperability and integration between key players including banks, agritech firms, telecom operators, cooperatives, and value-chain stakeholders. This disconnect prevents the seamless flow of data and capital, limiting the ability to track production cycles, verify collateral, and monitor credit utilization in real time.

Despite significant progress in financial digitization nationwide, digital adoption remains uneven and heavily concentrated in urban and peri-urban centers, leaving rural communities where the majority of Pakistan's farmers and agricultural operators reside largely underserved. Most smallholder farmers still rely on manual, cash-based transactions due to limited internet connectivity, inadequate smartphone penetration, and low digital literacy. The absence of localized digital infrastructure and language-friendly applications further widens this divide, preventing rural users from fully accessing or benefiting from online financing platforms, e-wallets, and mobile banking services.

Additionally, participants highlighted that state-funded and budget-driven agricultural programs often operate outside the digital ecosystem, relying on manual data entry, paper-based records, and physical verification processes. This not only increases administrative costs but also slows down disbursement timelines and reduces transparency**.**

From a technological innovation standpoint, tools such as satellite imaging, drone-based monitoring, digital crop scoring, and alternative data analytics remain underutilized, despite their potential to improve risk assessment, crop insurance design, and credit decisioning. The limited adoption of these technologies reflects both capacity and regulatory constraints, as existing frameworks have not fully accommodated technology-enabled financing models.

Perceived Effectiveness / Efficiency (Challenges)

FGD participants emphasized that the current operational and digital infrastructure does not adequately support large-scale, data-driven agricultural financing. Most financial institutions continue to rely on semi-manual processes for farmer onboarding, credit appraisal,

disbursement, and post-disbursement monitoring. This increases transaction costs and restricts the outreach of formal financing, especially in remote and underserved rural areas.

Although digital tools such as mobile banking applications, digital wallets, and e-KYC mechanisms have enhanced transaction speed and transparency, their impact remains uneven across regions due to limited network coverage, inconsistent data quality, and digital literacy gaps among smallholders.

Participants further noted that the integration of farm-level data, such as crop patterns, yield histories, and weather or satellite data, is minimal within the credit assessment processes of most financial institutions. This reduces the precision of digital credit scoring models and weakens the ability to build predictive, risk-sensitive lending portfolios.

Moreover, financial institutions face operational and technical barriers when attempting to integrate new digital solutions into existing core banking systems. Compliance and data protection requirements add complexity, further delaying technological adaptation and reducing efficiency.

An industry representative summarized this challenge:

> *"We have digital tools, but not a digital ecosystem. Until data, systems, and stakeholders connect, scalability will remain a dream."*

Future Development (Wish List / Way Forward)

Participants agreed that Pakistan's agricultural financing system requires a transformative shift toward a fully integrated digital ecosystem. Such an ecosystem should connect financial institutions, agritech providers, telcos, input suppliers, off-takers, and government databases through interoperable digital platforms and shared data standards.

1. Regulatory and Policy Enablement

- Develop a balanced digital regulatory framework that clearly distinguishes between technology-enabled agricultural lending and traditional non-digital financing models.
- Introduce sandbox environments for testing agri-fintech pilots under the oversight of SECP and SBP, allowing controlled innovation in areas like blockchain-based collateral management and satellite-linked credit verification

- Issue licensing guidelines for digital agricultural NBFCs, enabling specialized entities to leverage technology for last-mile financing.

2. Digital Infrastructure and Data Integration

- Invest in national digital farmer registries linked to NADRA and provincial land records to support identity verification and credit traceability.
- Encourage interoperability between banking systems, agritech platforms, and government databases, ensuring real-time access to crop and transaction data.
- Promote alternative data-driven credit scoring models using mobile transaction histories, farm input records, and satellite imagery for smallholder risk profiling.

3. Connectivity and Capacity Building

- Expand rural broadband and mobile connectivity to bridge the digital divide between urban and rural borrowers.
- Conduct capacity-building programs for both financial institutions and farmers on digital literacy, data security, and fintech adoption.
- Support public–private partnerships (PPPs) to deploy technology demonstration projects tailored to Pakistan's diverse agricultural zones and crop cycles.

4. Integration of Global Best Practices

- Emulate models like Tarfin (Turkey) and M-Kopa (Kenya), which successfully integrate technology, value-chain finance, and risk management into scalable digital ecosystems.
- Develop local adaptation strategies that align international innovations with Pakistan's regulatory, climatic, and socio-economic context.

5. Sustainability and Climate Intelligence

- Embed climate-smart technologies including weather forecasting tools, satellite analytics, and geospatial crop mapping into financing platforms.
- Integrate these tools with Shariah-compliant risk-sharing instruments, such as crop *Takaful* or climate guarantees, to reduce exposure and enhance portfolio resilience.

Sufficiency (Frustration/Gaps)	Perceived Effectiveness/Efficiency (Challenges)	Future Development (Wish List/Way Forward)
Technology Regulation 1. Lack of integration between banks, agritech firms, telcos, cooperatives, and supply-chain actors	**Tech-Finance Integration** 1. State-funded or budget-funded programs lack integration with digital ecosystems 2. Underutilization of satellite imaging, drone monitoring, alternative data, and digital crop scoring	**Digital Regulatory Framework** 1. Create balanced regulatory regime distinguishing technology-enabled lending vs. non-technology conventional agricultural financing 2. Develop sandbox frameworks for agri-fintech pilots 3. Issue licensing guidelines for digital agricultural NBFCs
Scalability of Agricultural Financing through Digital Integration 1. The current level of digital integration in agricultural financing is insufficient to support large-scale outreach and sustainable growth. Fragmented digital platforms, limited interoperability between banks, fintechs, agritech	**Operational, Data, and Connectivity Constraints** 1. While digital tools such as mobile banking, digital wallets, and e-KYC have improved transaction speed and transparency, their effectiveness is uneven across regions. Connectivity gaps, unreliable data quality, and limited integration of farm-level data (crop patterns, yield history, satellite or weather data)	**Building an Integrated Digital Ecosystem** 1. A fully integrated digital ecosystem is possible as seen in Tarfin, Turkey. This includes interoperable platforms linking financial institutions, agritech service providers, input suppliers, off-takers, and government systems. Investment in

providers, and government databases, and low digital literacy among smallholder farmers constrain scalability. Many financing processes farmer onboarding, credit assessment, disbursement, and monitoring remain semi-manual, increasing costs and limiting the ability to reach remote and underserved rural population	reduce the accuracy of credit scoring and risk management. Financial institutions also face operational challenges in aligning digital solutions with existing core banking systems and regulatory compliance requirements, limiting efficiency	digital farmer registries, alternative data-driven credit scoring, and mobile-based value chain financing solutions should be prioritized. Capacity building for both financial institutions and farmers, supportive regulatory frameworks, and public–private pilot programs tailored to local agricultural cycles will be essential. Strengthening digital integration will significantly enhance outreach, reduce costs, and enable sustainable scaling of agricultural finance.

3.2.6 FGD Finding - People/Consumers/Users

Sufficiency (Frustration / Gaps)

The FGD revealed that the needs, behaviours, and constraints of farmers and rural consumers are not sufficiently reflected in the design and delivery of Shariah-compliant agricultural finance. While Islamic finance principles resonate strongly with farmers at value levels, financing solutions do not adequately account for farmers lived realities, including seasonal income volatility, dependence on informal networks, and limited risk-bearing capacity.

Smallholders, women farmers, and youth were consistently identified as underserved segments. Financing processes are perceived as complex, distant, and urban-centric, discouraging

engagement by rural consumers. Many farmers lack access to bundled non-financial support such as advisory services, input linkages, and post-harvest market access which limits their productivity and weakens their ability to fully benefit from formal financing.

Participants noted that farmers often struggle to understand how Shariah-compliant contracts apply in practice, leading to confusion, mistrust, and reliance on informal or conventional alternatives also leading to over-dependence on *Tawarruq*.

It was further noted during the FDG the credit risk for formal financing is too high hence the reason for low agriculture financing in the formal sector.

"……the perceived credit risk associated with agricultural lending remains excessively high, which has significantly constrained the willingness of formal financial institutions to expand financing to the agriculture sector".

There are also concerns regarding the involvement of some financial institution staff in fraudulent practices, including fake, ingenious, and fictitious transactions, which further undermine the integrity of agricultural financing.

Perceived Effectiveness / Efficiency (Challenges)

From a people and consumer perspective, the effectiveness of Islamic agricultural financing is constrained by low financial and Shariah literacy, documentation barriers, and limited rural engagement. Farmers perceive formal Islamic finance as procedurally rigid and difficult to navigate, with insufficient human interaction at the village level. This weakens trust and reduces uptake, even where financing options exist.

The lack of standardized explanations and simplified communication of Islamic contracts further reduces consumer confidence. Farmers are often unaware of alternatives beyond *Tawarruq*, with limited understanding of *Salam, Musharakah*, or value-chain-linked structures that could better serve their needs.

Gender-related barriers persist, as women farmers face restricted access due to lack of tailored outreach, digital access gaps, and limited recognition of non-land assets. Youth farmers similarly struggle to engage due to collateral constraints and absence of entry-level financing pathways. Climate risks and income shocks further exacerbate farmer vulnerability, with

limited *Takaful* coverage leaving households exposed to systemic shocks and reinforcing risk aversion.

Future Development (Wish List / Way Forward)

Building Trust, Literacy, and Inclusion through People-Centered Delivery Models

The FGD emphasized that future progress in Shariah-compliant agricultural finance must be anchored in people-centered and consumer-focused delivery models. This includes expanding village-level Shariah financial literacy programs that explain Islamic financing concepts in practical, agriculture-relevant terms and build trust through transparency and simplicity.

Participants advocated for greater use of local agents, cooperatives, farmer organizations, and digital-assisted channels to improve accessibility and human engagement. Tailored financing pathways for women and youth, supported by simplified digital onboarding, alternative collateral mechanisms, and group-based models, were highlighted as critical for inclusion.

Integrating risk-sharing mechanisms, such as bundled agricultural *Takaful* and climate-index solutions, was seen as essential to protect farmer livelihoods and enhance resilience. Over time, these approaches can help formalize farmer participation, improve consumer confidence, and position Shariah-compliant finance as a trusted, inclusive solution for rural communities.

Sufficiency (Frustration/Gaps)	Perceived Effectiveness/Efficiency (Challenges)	Future Development (Wish List/Way Forward)
Limited Access to Formal Financing for Smallholders 1. Despite smallholders constituting approximately 80% of the farming population, access to formal agricultural financing remains extremely limited. Only about 34% of low-income farmers are able to access credit compared to 61% of high-income farmers. Existing financial products are not designed for the realities of smallholder agriculture, particularly those with irregular incomes and seasonal cash flows.	**Structural Exclusion of Smallholders under Conventional Credit Models** 1. Formal financial institutions prioritize scale, documentation, and collateral, which systematically excludes smallholders. Credit assessment models fail to capture farm-level realities, resulting in high rejection rates and limited outreach. Consequently, financing mechanisms are ineffective in reaching the majority of farmers who require small-ticket, flexible financing.	**Mobile-Enabled, Smallholder-Focused Financing Solutions for Inclusive Access** 1. Establish mobile-based farmer financing programs with simplified customer journeys tailored to smallholders. 2. Introduce dedicated microfinancing products with reduced collateral requirements and flexible repayment aligned with crop cycles to expand access at scale.

Low Trust in Formal Finance and Dominance of Informal Lending 1. Farmers exhibit low trust in formal financial institutions, while informal lenders continue to dominate rural credit markets due to their familiarity, speed, and personal relationships. High informality reduces farmer bankability and reinforces dependence on non-institutional credit sources.	**Low Trust and Limited Rural Engagement in Formal Financial Services** 1. Formal finance is perceived as complex, distant, and rigid, with limited human engagement at the village level. This perception undermines uptake even where products are available, reducing the effectiveness of outreach efforts and increasing customer acquisition costs for financial institutions.	**Building Trust through Village-Level Shariah-Compliant Literacy and Localized Delivery Models** 1. Promote Shariah-compliant financial literacy programs at the village level and build trust through transparent, simplified, and farmer-friendly processes. Leveraging local agents, cooperatives, and digital channels can bridge trust gaps and gradually formalize farmer participation.
Documentation, Literacy, and Digital Access Barriers 1. Many farmers face significant barriers related to documentation, literacy, and digital access. Complex application procedures, paper-heavy requirements, and limited understanding of digital tools discourage farmers	**Documentation Bottlenecks and Digital Literacy Barriers** 1. The reliance on manual documentation increases processing times and operational costs for financial institutions while excluding farmers who lack formal records. Limited digital literacy and uneven connectivity further reduce	**Digital Onboarding and Simplified Platforms** 1. Enable instant digital onboarding through e-KYC, biometric verification, and simplified documentation processes. User-friendly mobile platforms supported by

from pursuing formal credit, even when financing options exist.	the efficiency and scalability of digital financing initiatives.	assisted digital services can significantly reduce friction and improve uptake among low-literacy farmers
Knowledge Gaps, Gender Exclusion, and Collateral Constraints 1. Farmers have limited understanding of Islamic financing concepts beyond *Tawarruq*, with minimal awareness of *Salam*, *Musharakah*, and other value-chain-linked instruments. Gender gaps persist, with women farmers facing restricted access due to lack of tailored products. Additionally, smallholders lack acceptable collateral, as land ownership is often limited or informal.	**Limited Financing Structures** 1. The narrow use of financing structures limits alignment with agricultural production and risk-sharing. Women and youth remain underserved, reducing overall sector productivity. Dependence on land-based collateral constrains portfolio growth and excludes otherwise viable farmers**.**	**Inclusive Financing through Shariah Literacy, Digital Solutions, and Alternative Collateral** 1. Promote Shariah-compliant financial literacy focused on practical agricultural applications at the village level. Foster inclusion of women and youth through tailored digital products and delivery channels. Develop Electronic Warehouse Receipt (EWR) backed financing and other alternative collateral mechanisms to reduce dependence on land ownership.

3.3 Consolidated Summary of Findings across 6 Core Ecosystem Pillars

Key Challenges & Impediments

a. Regulations

Fragmented regulatory oversight, weak enforcement, lack of national Shariah standards, and limited coordination among regulators hinder consistency and scalability.

b. Key Industry Players

High risk perception, weak partnerships, limited institutional capacity, and fragmented value-chain collaboration constrain outreach and scale.

c. Products & Services

Generic, non-seasonal products, over-reliance on *Tawarruq*, weak adoption of *Salam* and risk-sharing instruments, and limited *Takaful* and EWR integration reduce impact.

d. Shariah Compliance

The absence of a national Shariah database makes compliance verification difficult. Shariah governance in fintechs is poorly communicated, and documentation workflows for digital contracts offer, acceptance, ownership transfer remain inconsistent or unclear. Public literacy on Shariah rules is low.

e. Technology & Infrastructure

Low digital adoption, manual processes, poor interoperability, and underuse of alternative data lead to long processing times and high costs.

f. People / Consumers

Low trust in formal finance, documentation and literacy barriers, gender exclusion, collateral constraints, and dependence on informal lenders persist.

3.4 Heatmap and Prioritisation Matrix to Structure the Recommendation

Methodology

The prioritization and heatmap analysis were developed using a structured, evidence-based methodology combining:

(1) FGD insights,

(2) Survey inputs, and

(3) Credible Pakistan-based regulatory and market sources (SBP, SECP, NADRA, provincial EWR initiatives, World Bank/PBS/Punjab programs).

1. Identification of Pillars

The analysis began by grouping issues into eight ecosystem pillars commonly referenced in digital and Shariah-compliant agriculture finance frameworks: Regulation, Coordination, Capacity, Product Standardization, Catalytic Capital, Shariah Governance, Technology Integration, and *Takaful*/Climate Risk.

These pillars reflect the Pakistan institutional landscape and the barriers highlighted during FGDs.

2. Scoring Framework (Impact × Urgency × Feasibility)

Each pillar was assigned a priority score using a simple but rigorous tri-factor model:

- Impact (1–3): Potential to unlock system-wide progress.
- Urgency (1–3): How quickly the issue must be addressed based on farmer needs, policy momentum, and market failures.
- Feasibility (1–3): Practicality of near-term implementation given regulatory authority, institutional readiness, and available partners.

Scores were multiplied to produce a 9–27 range, then color-coded into:

🔴 Top priority, 🟠 High priority, 🟡 Medium/Lower.

The scoring was benchmarked against Pakistan-specific evidence (regulatory gaps, existing pilots, institutional capacities).

3. Evidence Anchoring Using Pakistan Sources

After scoring, each pillar was validated against primary, credible sources, including:

- SBP Islamic Agriculture Finance Guidelines
- SBP Regulatory Sandbox
- SECP Islamic Finance Guidelines & Shariah Governance
- NADRA digital ID and eKYC infrastructure
- Punjab Multi-year EWR program & Bank of Punjab EWR initiative
- Pakistan macroeconomic statistics (PBS, Finance Ministry, World Bank)

These citations grounded the heatmap in country realities, ensuring each priority reflects both stakeholder views and official data.

4. Deriving Actions Tied to Responsible Institutions

For each pillar, specific, actionable interventions were generated by aligning:

- Mandates of national regulators (SBP, SECP)
- Digital infrastructure owners (NADRA, PTA)
- Provincial agricultural agencies (Punjab/Sindh)
- Market players (Islamic banks, *Takaful* operators, agritech firms)

This produced a 12-month implementation roadmap that is both structured and institutionally feasible.

5. Synthesis Into a Heatmap for Presentation- Finally, the scores and evidence were converted into a visual one-row heatmap, illustrating relative priorities clearly for policymakers and donors. This creates a consolidated, data-driven representation of where Pakistan must act first.

B. Heatmap – Priority Table

Pillar	Impact (1–3)	Urgency (1–3)	Feasibility (1–3)	Score (I×U×F)	Colour/ Priority
Regulations & Governance	3	3	2	18	🔴 Top
Institutional Coordination / Council	3	3	2	18	🔴 Top
Industry Capacity & Partnerships	3	2	2	12	🟠 High
Product Standardization & EWR Enablement	3	2	2	12	🟠 High
Shariah Governance (agri-specific)	3	2	1	6	🟡 Medium
Tech & Digital Integration	3	2	1	6	🟡 Medium
Takaful / Climate Risk Transfer	2	2	1	4	🟡 Lower

Interpretation.

A score of 18 reflects pillars with the highest combined urgency and impact, where constraints are well understood and moderate feasibility allows for immediate, coordinated action. These areas represent binding system-wide constraints, and progress here is critical to unlocking reforms across the broader ecosystem. A score of 12 indicates high-impact opportunities that are strategically important but less time-critical. While these pillars can deliver significant value, they typically depend on prior regulatory clarity, institutional coordination, or industry capacity before they can be implemented effectively at scale.

C. Evidence & Pakistan-based citations (by pillar)

1) Regulations & Governance (Score 18) 🔴

Key Pakistan facts:

- Pakistan's agriculture is a large economic sector (PBS / Finance Ministry reporting agriculture contribution ~20–24% of GDP by various sources).
- SBP has published longstanding Guidelines on Islamic Financing for Agriculture (trade-based modes such as *Salam*, *Istisna* are recognized) but practical uptake is limited highlighting a gap between policy guidance and scale.
- SBP publicly issued Regulatory Sandbox Guidelines and is actively developing sandbox models that could host agri-digital pilots signalling a regulatory entry point for Sandbox.

Evidence-based action for Pakistan:

- Fast-track an inter-agency regulatory note clarifying EWR collateral for Islamic products and publish standardized *Salam/Istisna* templates (Lead: SBP + SECP). (Support: SBP / SBP sandbox guidance + Islamic agriculture guidelines).

2) Institutional Coordination & Council (Score 18) 🔴

Key Pakistan facts:

- Current institutional fragmentation is visible in practice; multiple regulators (SBP, SECP, provincial agri departments, and digital authorities) have roles but no single coordinating council for Shariah agri-finance. SECP's 2023 Islamic finance guidelines call for broader sectoral adaptation but stop short of creating a national agri council.
- Punjab government has already piloted EWR adoption programs (Multi-year Adoption of Electronic Warehouse Receipt program for wheat), showing provincial willingness to act but national coordination is needed to scale.

Evidence-based action:

- Create a National Shariah Agri-Finance Council (SBP, SECP, Ministry of Agriculture, provincial reps, PDA) to align policy, EWR accreditation, and blended finance pipelines (Lead: Ministry of Agriculture + SBP + SECP).

3) Industry Capacity & Partnerships (Score 12) 🟠

Key Pakistan facts:

- SBP/SECP regulatory instruments exist, yet banks show low agri exposure (policy papers & research on Islamic agri finance show limited practical scaling; academic and market literature highlight capacity gaps).
- EWR pilots and collateral frameworks are nascent, the Bank of Punjab and other actors have promoted EWR adoption which requires bank–agribusiness cooperation for scale.

Evidence-based action:

- Launch a Product Development Lab and bank–NBFC–agritech partnership pilots (Lead: major Islamic banks + Pakistan Fintech Association + provincial agri agencies). Use Punjab EWR corridor as an initial testbed.

4) Product Standardization & EWR Enablement (Score 12) 🟠

Key Pakistan facts:

- SBP's 2008 Islamic Agriculture guidelines describe Salam, Istisna and other trade modes but standardized, bank-ready templates and contemporary digital adaptations are not widely published/used
- EWR infrastructure is expanding but capacity remains limited (300k MT cited in the FGD; Punjab's multi-year EWR push shows government action to scale storage/collateralization).

Evidence-based action:

- Issue a national product playbook: standardized Salam/Istisna/Musawamah documentation, EWR-as-collateral rules, and price-determination/quality clauses (Lead: SECP + SBP + warehousing operators).

5) Catalytic Capital & De-risking (Score 12) 🟠

Key Pakistan facts:

- Development partners (World Bank, IFIs) remain active in Pakistan agriculture and inclusion programs; blended finance windows can be mobilized to address first-loss positions given clear policy anchors. Pakistan's development updates and World Bank engagement indicate a channel for catalytic funds.

Evidence-based action:

- Set up a first-loss / guarantee facility (Ministry of Finance + Development Partners + SBP) to underwrite pilot corridors and subsidize *Takaful* premiums for early seasons.

6) Shariah Governance (agric-specific) (Score 6)

Key Pakistan facts:

- SECP published Shariah Governance Regulations and broader Islamic offerings guidance (2023), demonstrating regulatory attention to Shariah governance but a dedicated agricultural Shariah advisory body does not yet exist.

Evidence-based action:

- Create a Centralized Shariah Agricultural Advisory Board and roll out training for Shariah advisors on agri-specific issues (Lead: SECP + SBP + universities).

7) Technology & Digital Integration (Score 6)

Key Pakistan facts:

- NADRA provides a robust digital ID / eKYC platform (PAK ID) that can be integrated for onboarding; Pakistan also has a national push to digitize public services, enabling eKYC for agric finance**.**

- SBP regulatory sandbox guidelines exist and are being used to pilot fintech models, these provide a channel for agri-tech + bank integration pilots.

Evidence-based action:

- Pilot eKYC + digital crop verification (NADRA + agritech satellite/drone proof-of-yield) in an EWR corridor (Lead: NADRA + PDA + agritech firms + banks). Use SBP sandbox for controlled tests.

8) Takaful / Climate Risk Transfer (Score 4)

Key Pakistan facts:

- Takaful market and crop insurance penetration are low and approvals can be slow; current *takaful* frameworks may not yet be fully adapted to rapid scale-up of crop/weather products. SECP guidelines on Islamic services and market reporting indicate the regulatory environment is evolving.

Evidence-based action:

- Fast-track index/parametric *takaful* pilots for selected corridors with premium subsidies and regulatory fast-track approvals (Lead: SECP + *Takaful* operators + donor).

CHAPTER 4: KEY RECOMMENDATIONS AND INTERVENTIONS

4.1 Rationale and Methodology in Formulating Policy, Product, and Ecosystem Recommendations

(Phase 3: Final Phase of the Research)

Phase 3 represents the concluding stage of this research, translating insights obtained from desktop review (Phase 1), stakeholder engagements through surveys and interviews (Phase 2), and international benchmarking across comparable across global nations (Phase 3) into a coherent set of strategic, operational, and policy recommendations for strengthening the Shariah-compliant agricultural financing ecosystem.

The rationale behind Phase 3 stems from the need to transition beyond diagnostic understanding toward actionable solutions capable of addressing structural gaps that constrain agriculture finance. Considering the complexity of agriculture financing which spans across seasonal production cycles, climate vulnerabilities, land-tenure structures, and digital innovations intersecting with Shariah-compliant frameworks to sustain rural livelihoods and ensure national food security, the recommendation methodology adopts a systems-based approach, ensuring policy reforms, product innovation, and ecosystem capacity development towards long-term sustainability.

The development of final recommendations followed a structured five-step methodology, detailed below.

Step 1: Consolidation of Challenges, Gaps, and Problem Statements

The process began with the synthesis of findings from desktop research, sector data, industry reports, and focused group discussions with banks, Islamic financial institutions, agri-input providers, cooperatives, processors, fintech players and farmer groups. These insights were organized using a six-pillar ecosystem framework which includes; Regulation & Policy, Key Industry players, Shariah Governance & Standardization, product and operational models, technology and infrastructure, and people and Agriculture Value chain Operators.

Through this triangulated review, twelve critical problem statements were identified, each representing key constraints limiting access, scalability, development, and market resilience within Islamic agriculture finance in Pakistan.

Step 2: International Benchmarking Across Selected Jurisdictions

The second step involved benchmarking Pakistan's challenges against global experiences in Malaysia, Indonesia, Saudi Arabia, Turkey, Ethiopia, and Kenya selected based on their success in smallholder financing, digital agriculture adoption, or cooperative-based models. For each identified problem statement, policy frameworks, institutional models, Shariah-compliant structures, value-chain financing programs, and risk-mitigation approaches from these jurisdictions were analyzed.

The objective was not direct replication, but to extract practical, adaptable lessons relevant to Pakistan's agricultural market landscape.

Step 3: Contextual Alignment for Pakistan

Benchmark insights were then evaluated against Pakistan's regulatory mandates, market players, Shariah governance, Value chain operators and digital infrastructure. Here is a paraphrased version of the selected statement:

These global insights were then matched to Pakistan's agricultural financing landscape, taking into account existing laws, regulatory frameworks, institutional structures, and market dynamics. The aim was to evaluate how well international models could be adapted locally by examining their Shariah suitability, alignment with the mandates of SECP and relevant authorities, the readiness of the market, and the capacity of institutions to implement such approaches.

Step 4: Development of Policy, Product and Ecosystem Recommendations

Based on aligned insights, three categories of recommendations were developed:

1. Policy & Regulatory Reforms:
   Addressing legal clarity, Shariah governance, institutional mandates, agricultural credit policy updates, incentives for Islamic agricultural financing, warehousing receipt systems, and climate-risk frameworks.
2. Product & Operational Innovation:
   Focused on designing scalable Shariah-compliant models such as *Murabahah*-based financing, *Salam* financing, *Ijarah, Mudarabah/Musharakah* for value-chain partnerships, warehouse receipt financing and digital financing.

3. Ecosystem Capacity & Market Enablement:
   Encompassing farmer training, digital literacy, rural fintech integration, agriculture-insurance adoption, cooperative strengthening, data systems, and multi-stakeholder collaboration platforms.

Step 5: Consolidation of Recommendations into an Actionable Framework

Finally, all recommendations were integrated into a structured roadmap. The final output consolidates policy redesign, product blueprints, and ecosystem strengthening into three core interventions:

- **4.5 Key Recommendation Set 1 – Policy & Institutional Reform**
  Focused on regulatory incentives, unified Shariah standards, warehouse receipt legislation, risk-sharing frameworks, and enabling schemes for Islamic agriculture financing.
- **4.6 Key Recommendation Set 2 – Product & Model Development**
  Prioritizing scalable contract models for smallholders, digital financing, EWR operationality, equipment leasing, value-chain financing, digital supply-chain financing, and Islamic micro-Sukuk for agribusinesses.
- **4.7 Key Recommendation Set 3 – Ecosystem & Market Development**
  Targeting farmer capacity, fintech-cooperative integration, extension services, Literacy, insurance uptake, data platforms, rural agent networks, and industry coordination.

Through this structured methodology, Phase 3 transforms analytical findings into clear, implementable and impact-oriented strategies that can support public and private sector stakeholders in scaling inclusive, resilient and Shariah-compliant agricultural financing across Pakistan.

4.2 Systematic Consolidation of Top 12 Problem Statements for Islamic Agriculture Financing in Pakistan

Findings gathered across desktop research, survey questionnaires distribution, expert consultations through FGD, and comparative ecosystem observation reveal twelve core structural constraints inhibiting the growth of Islamic agriculture financing in Pakistan. These are summarised under a six-pillar framework covering regulation & policy, key industry

players, people & operators, products & services, Shariah governance, and technology & infrastructure. Each pillar contains two interconnected problem statements representing the most binding obstacles limiting access, scale, and impact of Shariah-compliant agriculture finance.

Pillar 1: Regulations & Policy

Problem Statement 1

Regulatory coordination remains fragmented across Islamic finance, agriculture, digital finance, and climate-risk frameworks, resulting in slow policy execution and inconsistent implementation. Collaboration between federal regulators, provincial departments, banks/NBFCs, cooperatives, and agri-tech stakeholders is largely ad-hoc, limiting the emergence of a unified Islamic agriculture finance framework.

Problem Statement 2

There is an absence of clear policy encouragement, national targets, success metrics, incentives, and enforcement mechanisms for Islamic agricultural financing despite agriculture's sizable contribution to GDP. Without directional policy signals, sector players lack guidance and motivation to scale Shariah-compliant agriculture portfolios.

Pillar 2: Key Industry Players (Banks, NBFCs, Cooperatives, Agri-Fintechs)

Problem Statement 3

High risk perception driven by climate volatility, weak collateral availability, informal production systems, and high monitoring/field verification costs discourages financial institutions from lending to agriculture, particularly through Shariah-compliant structures.

Problem Statement 4

Institutional capacity remains limited, with risk-averse organizational cultures, lack of agriculture-specialized teams, and misaligned incentives. This restricts product innovation and slows the transition from conventional to Islamic agriculture financing models.

Pillar 3: People /Value Chain Operators

Problem Statement 5

Low farmer trust in financial institutions, lack of collateral combined with limited Shariah and financial literacy reduces confidence and uptake of Islamic agricultural products. Awareness campaigns remain insufficient to drive behavioural acceptance.

Problem Statement 6

Documentation barriers, complex procedures, and paper-heavy onboarding requirements disproportionately exclude smallholder farmers who often have limited literacy and digital access.

Pillar 4: Products & Services

Problem Statement 7

Innovation in Islamic agriculture products remains limited, with many offerings mimicking conventional structures rather than being built around agricultural cashflow cycles. Lack of integrated value-chain design weakens adoption and scalability.

Problem Statement 8

Agricultural de-risking instruments such as *Takaful*, weather-index coverage, and warehouse receipt financing remain underdeveloped. Weak risk-sharing mechanisms discourage both lenders and farmers, reducing capital flow into the sector.

Pillar 5: Shariah Governance

Problem Statement 9

Fragmented Shariah governance frameworks and absence of unified national standards lead to inconsistent rulings, longer approval timelines, and increased compliance cost for institutions attempting to structure agriculture-linked Islamic products.

Problem Statement 10

The ecosystem remains over-reliant on *Tawarruq* for liquidity generation, limiting connection to real agriculture activity. This reduces socio-economic value creation and undermines the

developmental role of Islamic finance in farming communities.

Pillar 6: Technology & Infrastructure

Problem Statement 11

Weak interoperability between banks, NBFCs, agri-tech platforms, telcos, cooperatives, warehouses, logistics networks, and market boards restricts data sharing and capital flow along agricultural value chains, constraining scale of Islamic financing.

Problem Statement 12

Digital adoption in rural areas is uneven, with gaps in smartphone penetration, broadband access, and digital literacy. These limitations hinder farmer onboarding and usage of technology-enabled Islamic finance solutions, particularly for remote smallholders.

Consolidated Problem Statements Table, I-Benchmark and Localised Workable Recommendation

Top 12 Shariah Compliant Agriculture Financing in Pakistan

No.	Pillar	Problem Statement / Gap (Pakistan) extracted from desktop research, FGD and survey	International Benchmarking Practices	Localized & Workable Recommendations for Pakistan
1	Regulations	Fragmented regulatory coordination and weak implementation across Islamic finance, agriculture, digital finance, and climate-risk policies; ad hoc collaboration between federal	Indonesia and Malaysia apply integrated agri-finance coordination; Saudi aligns agri-finance with Vision 2030; Turkey integrates agri-credit with	Establish a National Shariah Agricultural Finance Coordination Framework led jointly by SBP, SECP, and Ministry of National Food Security with enforceable provincial alignment

		regulators, provinces, banks, NBFCs, and agri-tech players	national development banks	
2	Regulations	Absence of clear encouragement, targets,key success metrics, roadmap, incentivisation and enforcement for Shariah-compliant agricultural financing despite agriculture's large GDP contribution	Malaysia and Iran set sectoral targets; Nigeria mandates agri-finance quotas; Saudi uses incentive-based directed financing	Introduce Shariah agri-financing targets and supervisory tracking, supported by incentives and phased enforcement
3	Key Industry Players	Risk perception as a binding constraint due to climate volatility, weak collateral, informal farming structures, and high monitoring costs	Nigeria and Indonesia deploy blended finance and guarantees; Turkey uses state-backed agri-credit; Saudi operates risk-sharing funds	Implement government-backed risk-sharing and first-loss mechanisms using Islamic social finance and climate funds
4	Key Industry Players	Institutional capability gaps and risk-averse organizational mindset; lack of agri-specialized teams and misaligned incentives	Malaysia and Indonesia establish dedicated agri-finance units; Iran embeds sector expertise in Islamic banks	Mandate dedicated Shariah agri-finance units, revise KPIs, and fund structured capacity-building programs

5	People / Farmers	Low farmer trust, limited Shariah and financial literacy, and weak rural engagement reduce uptake of Islamic agricultural financing	Indonesia and Nigeria use cooperatives and field officers; Turkey links finance with extension services	Scale village-level engagement models through cooperatives, extension officers, and Shariah-aware field agents
6	People / Farmers	Documentation, literacy, and digital access barriers caused by complex procedures and paper-heavy requirements	Indonesia leverages digital ID; Nigeria expands agent banking; Saudi applies assisted-digital onboarding	Introduce simplified KYC, assisted onboarding, and alternative documentation via cooperatives and value-chain verification
7	Products & Services	Limited innovation in Islamic agricultural products; excessive mimicking of conventional structures and weak ecosystem anchoring	Iran and Turkey deploy *Salam* and *Istisna* at scale; Indonesia blends Islamic social finance with agri-finance	Promote *Salam*, *Istisna,* and blended Islamic finance models, anchored to value chains and ecosystem partners
8	Products & Services	Weak derisking instruments, limited agricultural *Takaful* penetration, and underdeveloped warehouse receipt financing	Turkey and Iran integrate crop insurance; Nigeria scales warehouse receipt systems; Malaysia links *Takaful* with agri-credit	Fast-track agricultural *Takaful* approvals, expand EWR accreditation, and issue Shariah guidance for EWR-based financing

9	Shariah Compliance	Fragmented Shariah governance and absence of national standards cause inconsistent rulings, long approval timelines, and higher costs	Malaysia centralizes Shariah standards; Iran applies national Shariah oversight; Saudi issues regulator-led guidance	Establish a national Shariah standard-setting mechanism, starting with agricultural finance contracts
10	Shariah Compliance	Over-dependence on *Tawarruq* limits linkage to real agricultural activity and reduces developmental impact	Iran, Turkey, and Indonesia emphasize asset- and production-linked contracts	Gradually rebalance portfolios toward production-linked contracts through incentives and supervisory guidance
11	Technology & Infrastructure	Lack of interoperability among banks, agri-tech firms, telcos, cooperatives, and value-chain actors restricts data and capital flow	Saudi and Indonesia invest in integrated agri-finance platforms; Turkey links banks with agri-databases	Develop interoperable agri-finance platforms integrating payments, data, warehouse systems, and financing
12	Technology & Infrastructure	Uneven digital adoption and weak rural connectivity leave smallholders excluded from digital Islamic finance	Nigeria and Indonesia use agent-based and offline models; Saudi invests in rural digital infrastructure	Scale agent-assisted, low-tech digital solutions, improve rural connectivity, and deploy local-language applications

4.3 International Benchmarking: Leading Generic and Shariah-Compliant Agriculture Finance from Eight (8) Jurisdictions

4.3.1 Benchmarking Methodology and Criteria

To ensure that the final recommendations for Pakistan's Shariah-compliant agriculture financing framework are grounded in practical experience and proven models, the study conducted a structured international benchmarking exercise. This analysis focused on jurisdictions that have demonstrated measurable success in integrating Islamic finance principles with agricultural development, digital innovation, and inclusive financial ecosystems.

Six countries were selected for the benchmarking exercise based on their institutional maturity, policy innovation, agri-financing innovative models and infusion of digital technology to agriculture financing. Six of these are Indonesia, Malaysia, Turkey, Saudi Arabia, Ethiopia, and Netherlands which were selected for benchmarking because they collectively represent the strongest global examples of inclusive, technology-driven, and Shariah-aligned agricultural financing ecosystems, offering diverse yet practical models adaptable to Pakistan's institutional and market context.

In addition, Nigeria was included because it has successfully developed innovative agricultural financing mechanisms notably the Warehouse Receipt System (WRS) and the AFEX Commodity Exchange that provide farmers with post-harvest liquidity, price stability, and digital collateralization, offering a practical model for NBFC-led, Shariah-compliant warehouse and value-chain financing that can be effectively adapted within Pakistan's Electronic Warehouse Receipt (EWR) framework.

Kenya is included because it has developed one of Africa's most innovative agriculture financing ecosystems, driven by digital platforms like Apollo Agriculture and M-Pesa, which successfully combine data analytics, mobile technology, and bundled credit–input models to reach smallholder farmers offering valuable lessons for scalable, inclusive, and technology-enabled agri-finance applicable to Pakistan.

Collectively, these eight jurisdictions represent a spectrum of integrated systems, institutional frameworks, and technological capabilities from Shariah-dominant ecosystems (Indonesia, Malaysia, Turkey, Saudi Arabia) to secular markets with strong agriculture financing

capabilities (Kenya, Ethiopia, Nigeria and Netherlands). This diversity allows Pakistan to identify contextually adaptable lessons to strengthen its own Shariah-compliant agriculture financing ecosystem.

Benchmarking Framework

Each jurisdiction was analysed across six core pillars relevant to agriculture and rural Islamic finance:

1. **Regulation and Policy:** Enabling frameworks for Islamic and agri-finance integration, including NBFC licensing, warehouse receipt systems, and fintech participation in agriculture credit.
2. **Shariah Governance and Compliance:** Models for embedding Shariah assurance in agricultural supply chains, product certification, and digital contract execution.
3. **Institutional Players:** Role of Islamic NBFCs, fintechs, cooperatives, and commodity exchanges in delivering asset-backed agri-financing.
4. **Products and Services:** Range of *Murabahah, Salam, Istisna, and Mudarabah* applications in financing and post-harvest processing.
5. **Capacity Development:** Initiatives for farmer literacy, Islamic finance awareness, and training for NBFC and fintech staff in Shariah-compliant product design.
6. **Technology and Infrastructure:** Adoption of blockchain, e-warehouse receipts, crop data analytics, and interoperable payment platforms to enhance financing efficiency and transparency.

Criteria for Assessment

Each country's approach was assessed against three key dimensions of policy and operational strength:

- Clarity and consistency of Islamic and agricultural financing regulations
- Integration of Shariah governance into financing operations, supply chain transactions, and digital platforms
- Institutional readiness and scalability of Islamic NBFCs, fintechs, and cooperatives for agri-finance delivery
- Diversity of Shariah-compliant agri-financing products
- Effectiveness of literacy and trust-building programmes for smallholder farmers

- Technological maturity, including blockchain-based traceability and real-time digital payment systems for crop settlements

4.3.2 Use of Benchmarking to Address Pakistan's Agricultural Challenges

The international benchmarks were not treated as models but used as structured best-practice references to address Pakistan's twelve agricultural financing constraints, identified in earlier sections.

Each lesson was systematically aligned with Pakistan's regulatory, institutional, and Shariah realities, focusing on transferability and minimal regulatory friction. For example.

The benchmarking exercise resulted in a contextually grounded framework that combines global best practices with Pakistan's agricultural realities. It highlights the regulatory and policy enablers necessary for developing Shariah-compliant agri-NBFCs. It further emphasizes the role of technology-driven governance tools, including blockchain-enabled contracts and electronic warehouse receipts, as well as the importance of farmer and NBFC capacity-building to strengthen trust and literacy around Islamic contracts. Overall, the benchmarking translates international lessons into practical, implementable models, ensuring that Pakistan's proposed Shariah-compliant agriculture financing system is not only theoretically sound, but also operationally viable, digitally integrated, and well aligned with global standards positioned to foster inclusive, sustainable, and ethical agricultural growth.

4.3.2.1 Indonesia

Regulatory Framework

Indonesia operates under a unified financial regulatory framework, with the Financial Services Authority (OJK) overseeing banking, Islamic finance, fintech, and microfinance through an integrated supervisory system (Law 4/2023). This consolidated structure aims to reduce regulatory overlap and streamline licensing and compliance processes across the financial sector (OJK, 2024). This contrasts with Pakistan's multi-agency structure (SBP, SECP, provincial authorities, digital regulators), where regulatory fragmentation contributes to slow product approval and weak execution. The unified supervision model in Indonesia reduces regulatory overlap, shortens decision pathways, and provides clearer licensing and compliance processes, giving it a comparative advantage in enabling agri-finance expansion (OJK, 2024).

Government intervention further strengthens Indonesia's position through policy-driven agricultural credit programs such as Kredit Usaha Rakyat (KUR), which provides subsidized lending to micro, small, and medium enterprises including agricultural producers. This program has been instrumental in expanding rural credit access, particularly to sectors that traditionally face challenges in accessing formal finance. According to OJK, MSME credit distribution, which includes significant agricultural sector participation, continues to grow, with wholesale and retail trade and agriculture being dominant sectors in MSME lending (OJK, 2024). The government supports agricultural credit growth through formal mandates, credit guarantees, and financing incentives, though comprehensive data on agricultural lending as a specific percentage of total bank credit requires further verification from official OJK banking statistics.

In addition, Indonesia integrates Islamic agriculture financing within the same regulatory framework as conventional finance, enabling Islamic rural credit, KUR Syariah, and fintech-supported Shariah products to operate within a unified compliance environment. While participation by Islamic banks is still moderate, the existence of structured policy support, approval guidelines, and Islamic-finance recognition mechanisms places Indonesia ahead.

The Indonesian reference shows that consolidation of regulatory authority, paired with state-backed agricultural credit incentives and unified Islamic finance governance, can significantly improve sector financing outcomes. Pakistan can adopt similar models by establishing a coordinated agricultural finance regulatory platform, defining national Islamic agriculture targets, and aligning policy with these targets.

Key Industry Players

Indonesia's agricultural finance ecosystem comprises commercial banks, the Ministry of Agriculture, cooperatives, Islamic finance institutions, fintech platforms, and microfinance providers. State-linked lenders and commercial banks extend subsidized credit programs like Kredit Usaha Alsintan (agricultural machinery credit), which provides financing for farm equipment with government interest subsidies of 3-5 percent under Permenko 3/2023 and 6/2025 (Ministry of Agriculture, 2023; Pajak.com, 2025). Islamic microfinance institutions (MFIs), offer Shariah-compliant financing products to agricultural clients in Indonesia, though these institutions face challenges in serving the agricultural sector effectively. The unique characteristics of the agricultural and fisheries sectors, including seasonal income cycles and

specific capital needs, require innovative financing models that traditional MFI products may not adequately address (Nurmanaf et al., 2019). Research indicates that while Islamic MFIs play a positive role in supporting farmer income, operational constraints and the need for specialized products tailored to farm cycles remain ongoing concerns (Yoko & Prayoga, 2019).

Fintech platforms in Indonesia, both conventional and Shariah-oriented, are increasingly important for bridging access gaps, offering peer-to-peer financing, crowdfunding, and other digital credit solutions tailored to farmers and agribusinesses. These platforms often interact with cooperatives, brokers, and value chain actors to extend financing beyond traditional banks (Rufaidah, et.al, 2023).

Products and Services

Indonesia has demonstrated progress in adopting Shariah-compliant financial instruments across its Islamic financial ecosystem, which includes Islamic banks, BPRS (rural Islamic banks), Islamic cooperatives, and Baitul Maal wat Tamwil (BMT) institutions. Key Islamic contract types including *Murabahah, Salam, Istisna', Musharakah, and Mudarabah* are increasingly being explored for agricultural applications to align financing structures with production cycles and risk-sharing principles (Prayogi & Ramadhan, 2024). Studies document emerging deployment of *Salam* and *Musharakah*-based schemes for crop cultivation and agri-MSMEs in Indonesia, demonstrating the country's growing capacity to operationalize Shariah contracts in the agricultural sector (Prayogi & Ramadhan, 2024; Khasanah et al., 2013).

Furthermore, digital Islamic finance and agri-fintech platforms such as peer-to-peer Shariah-compliant crowdfunding and mobile-based microfinance are emerging in Indonesia, with platforms like Crowde and TaniFund channeling working capital and input financing to farmers, though accessibility varies between urban and rural areas due to digital literacy and infrastructure constraints (World Bank, 2020; Rufaidah et al., 2023). These developments reinforce Indonesia’s reputation as a global leader in Islamic finance, with institutional commitment and operational innovation driving the uptake of Shariah-compliant agricultural financing nationwide.

Shariah Governance

Indonesia has established a robust Shariah governance ecosystem in agricultural financing, with Islamic banks, BPRS, and Shariah microfinance providers maintaining competent internal

Shariah committees to review, approve, and monitor financing products tailored for farmers. These committees ensure that key contracts such as *Murabahah, Salam, and Musharakah* are structured in accordance with Islamic principles while remaining practical for agricultural cash-flow cycles (Prayogi & Ramadhan, 2024). While governance is institution-based rather than centrally standardized, this decentralized approach allows for flexibility and innovation across different financial providers, enabling rapid adaptation of products to diverse regional agricultural needs. Moreover, the consistent application of internal Shariah oversight and institutional Shariah Supervisory Boards has built trust among farmers and investors, supporting increased uptake of Shariah-compliant agricultural financing and demonstrating Indonesia's capacity to implement scalable, ethically aligned financial solutions in the sector (Widyastuti et al., 2020; Wardhany & Arshad, 2012).

Technology and Infrastructure

Digital technology is beginning to reshape agricultural finance in Indonesia. A growing number of fintech platforms provide digital lending, payment solutions, and crowd-funded capital tailored to agribusiness needs, helping to mitigate traditional barriers such as geographical remoteness and documentation requirements. Indonesia’s rising fintech ecosystem integrates landowners, suppliers, farmers, brokers, retailers, and investors into Islamic value-chain finance concepts, although uptake and infrastructure readiness vary across regions (Rufaidah, et.al, 2023). Despite progress, mobile coverage, financial literacy, and integration with formal financial institutions remain inconsistent, limiting the full potential of digital and Shariah-compliant agricultural financing in Indonesia (World Bank, 2024; Suswadi & Irawan, 2023). However, many sustainable agri-tech solutions have been deployed, examples of which are shown in the recommendation phase of this paper.

Farmer Engagement and Financial Inclusion

Farmers and value chain actors in Indonesia are increasingly benefiting from emerging Shariah-compliant financing options that provide ethical, risk-sharing aligned capital for agriculture. While formal banking penetration has historically been limited, recent years have seen growing adoption of Shariah-based products through Islamic banks, BPRS, and fintech platforms, with Islamic financial industry assets reaching IDR 2,582.25 trillion in 2023, demonstrating significant growth potential particularly in regions where community-based financing and cooperative linkages are strong (Abid & Jie, 2023). Smallholder farmers

demonstrate preference for Shariah-compliant financing options, as these products align with their religious and ethical principles while providing transparent, interest-free financing structures such as profit-sharing arrangements (Obaidullah, 2008). Moreover, innovative fintech and digital platforms are beginning to bridge gaps in affordability, timeliness, and accessibility, offering working capital, invoice financing, and crowd-funded solutions that expand financial inclusion (Ningrat & Nurzaman, 2019). While challenges remain in literacy, technology adoption, and partnership frameworks, the current trajectory highlights Indonesia's proactive efforts to scale Shariah-compliant agricultural finance and enhance farmer access to sustainable, ethically aligned capital.

4.3.2.2 Malaysia

Regulatory Framework

Malaysia operates one of the most institutionally advanced and Shariah-integrated agricultural finance frameworks in the world. Oversight is jointly exercised by Bank Negara Malaysia (BNM) and the Ministry of Agriculture and Food Security, with clearly defined mandates covering agricultural credit, crop insurance, value chain financing, and Shariah-compliant investment in agribusiness. In Malaysia, agricultural financing embeds Shariah compliance through formal institutional mechanisms such as the full-Islamic banking model of Agrobank and Bank Negara Malaysia's promotion of value-based intermediation ensuring that financing products are guided by ethical and Maqasid-aligned principles rather than ad-hoc pilots or temporary subsidies, and are integrated into mainstream agricultural credit programs with clear regulatory backing and long-term operational frameworks (Bank Negara Malaysia, 2017; Nor Shamsiah, 2018; Agrobank, 2015).

Key Industry Players

Malaysia's agricultural finance ecosystem comprises diverse yet coordinated actors, including government agencies, Finance Companies, Merchant Banks, Sabah Development Bank, Malaysia Agro Bank, Bank Rakyat, Islamic banks, fintech platforms, and cooperative unions. The Agricultural Development Fund (ADF) and the Small Farmers Fund remain central, providing long-term capital, working capital, and risk mitigation instruments. Islamic banks such as Bank Islam Malaysia, CIMB Islamic, and Maybank Islamic provide Shariah-compliant financing and leasing solutions, often collaborating with fintechs or cooperatives to improve distribution and monitoring.

Licensed fintech platforms and P2P agricultural lenders are increasingly active, delivering microcredit, input financing, and digital pre-harvest funding using *Murabahah, Salam, and Ijarah* structures.

Products and Services

Malaysia offers a broad and structurally diverse portfolio of Shariah-compliant agricultural finance products. These include working capital loans, equipment and machinery financing, crop pre-financing, livestock finance, value chain financing, and cooperative-based microcredit. P2P agricultural platforms provide short-term financing, invoice discounting, and expansion capital for SMEs, while larger Islamic banks provide medium- to long-term credit and asset-based leasing.

Crucially, Shariah compliance is integrated into product design. *Murabahah and Ijarah* structures dominate asset and input financing, *Salam/Istisna* contracts are used for forward crop or livestock financing, and however limited use of *Musharakah* or *Mudarabah* arrangements which are often deployed for value chain investment projects. Digital and fintech platforms leverage workflow automation, digital onboarding, and monitoring tools to ensure contracts, repayments, and risk-sharing arrangements are fully Shariah-compliant from inception (BNM, 2024).

Malaysia provides several financial support mechanisms to promote agricultural mechanization. Under the matching-grant scheme, eligible farmers can receive a subsidy covering 50% of the cost of machinery and equipment, with the remaining 50% funded by the farmers themselves. In addition, the government offers a 100% sales tax exemption on imported agricultural machinery and equipment, reducing the upfront cost burden for farmers. Beyond these measures, government grants are available to farmers' organizations, allowing them to acquire and own heavy machinery such as tractors and combine harvesters without incurring interest, thereby enhancing mechanization, productivity, and efficiency in the agricultural sector.

Shariah Governance

Shariah governance in Malaysia's agricultural finance is centralized, standardized, and highly institutionalized. Both BNM and the SC operate central Shariah advisory councils whose rulings are binding on regulated entities. These councils provide guidance on financing

structures, contract standardization, and dispute resolution. At the institutional level, Islamic banks, cooperatives, and fintechs are required to maintain internal Shariah committees with ongoing audits and compliance reporting.

This layered governance framework ensures Shariah compliance is embedded across the financing lifecycle product design, approval, disbursement, monitoring, and reporting rather than applied as a symbolic requirement. Malaysia's model demonstrates how strong Shariah governance can coexist with scalability, innovation, and inclusion across the industry including the agricultural sector.

Technology and Infrastructure

The country's agricultural finance ecosystem is supported by robust digital infrastructure, including high smartphone penetration, broadband access, and mature payment systems. From a Shariah perspective, technology reinforces compliance and traceability by documenting Shariah contracts, profit calculations, and risk-sharing arrangements. Open API frameworks and e-KYC protocols enable controlled data sharing between banks, fintechs, and regulators, supporting accurate credit scoring, risk assessment, and Shariah adherence across all products.

People/ Consumer

Farmers, cooperatives, and other value chain participants in Malaysia generally perceive Shariah-compliant agricultural finance as accessible, reliable, and aligned with ethical principles. Many smallholders and SMEs appreciate the availability of P2P and fintech platforms, which provide credit even to those lacking collateral or formal credit histories, while co-investment schemes and government-backed programs reduce the perceived risk for financiers, increasing trust in the system. Cooperative networks and digital distribution channels are viewed positively for their ability to extend financing and technical support to rural areas, enhancing both participation and productivity. Stakeholders consistently highlight the clarity and transparency of financing arrangements, including repayment terms, contract structures, and Shariah compliance, which reinforces confidence and encourages engagement. Overall, farmers and value chain players regard Malaysia's approach as scalable, dependable, and supportive of long-term agricultural development, offering ethical and practical alternatives to conventional lending while strengthening financial inclusion.

The Malaysian Ministry of Agriculture and Agro-Based Industry has implemented initiatives to encourage farmers, particularly members of farmers' organizations, to own machinery and equipment. By promoting the use of mechanized tools in farm management, these measures aim to reduce operational costs, improve efficiency, and enhance productivity, enabling farmers to carry out agricultural projects more systematically. Ultimately, this support is designed to accelerate farming operations, boost crop output, and increase farmers' incomes.

4.3.2.3 Turkey

Regulatory Framework

Turkey's agricultural financing framework is guided by broad financial sector oversight and targeted agricultural support policies rather than a specialized rural finance regime. Agricultural credit and financial services to the sector are delivered through a combination of public banks, cooperatives, and private lenders under the supervision of the Banking Regulation and Supervision Agency (BDDK) and coordinated with the Ministry of Agriculture and Forestry. The country also implements area-based payments and production planning systems, dividing agricultural land into strategic basins with targeted support for certified seeds, organic farming, and good agricultural practices to enhance sustainable production. State-supported agricultural insurance (TARSİM) operates as a public–private partnership to reduce risk exposure for farmers, with the government providing a significant share of insurance premiums. Although formal frameworks exist to support access to finance and risk mitigation, Turkey's structure is less centralized and less Shariah-specific compared with jurisdictions that embed Islamic finance principles into their agricultural regulatory frameworks.

Key Industry Players

The agricultural finance ecosystem includes state-owned banks, private commercial banks, agricultural cooperatives, and international financial partners. The Agricultural Credit Cooperatives and Ziraat Bank have historically been the principal sources of agricultural credit, offering subsidized and preferential loans to farmers for inputs, mechanization, and production expansion. Private banks such as Şekerbank and DenizBank also play growing roles in sustainable agriculture financing, often supported by international partners like the European Bank for Reconstruction and Development (EBRD) and the International Finance Corporation (IFC) to expand credit availability to rural clients and agribusiness MSMEs. For example,

Şekerbank received €25 million from the EBRD to promote sustainable agriculture and energy-efficient farming solutions. Additional international Islamic financing arrangements, such as a US$100 million *Murabahah*-based facility from the International Islamic Trade Finance Corporation (ITFC), support working capital and trade finance for agricultural supply chains. These multi-actor partnerships reflect a blend of domestic capacity and external support for diversified agricultural finance solutions.

Products and Services

Agricultural financing in Turkey includes credit products for inputs, machinery, greenhouse investment, livestock expansion, and infrastructure projects, most often offered by public banks (e.g., Ziraat Bank) and cooperatives with preferential terms. Government programs also provide longer-term loans with grace periods and extended maturities to support greenhouse and livestock projects, including TL10 million loans with up to 10-year terms and principal holidays in select initiatives aimed at enhancing food security and sustainable production. State-supported agricultural insurance (TARSİM) offers risk mitigation for crop and livestock production. Digital platforms and fintech lenders, such as Tarfin, issue Islamic-principle instruments like Sukuk and lease certificates to channel capital to farmers for inputs like seeds and fertilizers on terms aligned with cash-flow cycles. These products help farmers diversify financing sources beyond traditional collateral-based loans and expand access to capital for smallholders and MSMEs.

Shariah Governance

Turkey does not have a nationally centralized Shariah governance framework specifically for agricultural finance. However, Shariah-compliant models are emerging through Islamic finance instruments and partnerships, such as *Murabahah*-based trade finance from institutions like ITFC and Sukuk issuances by agritech platforms (e.g., Tarfin) that adhere to Islamic financial principles. These instruments are developed through internal governance structures within participating financial institutions, but they are not yet mainstream or nationally standardized in the agricultural finance landscape, meaning uptake remains selective and driven primarily by market-led initiatives rather than regulated Shariah policy directives.

Technology and Infrastructure

Turkey's agricultural finance infrastructure includes modern credit assessment tools such as the Agricultural Loan Assessment System (TARDES) developed by the Turkish Credit Bureau, which enables faster and more accurate loan evaluations and broadens access to credit by automating risk assessments. Digital financing and data-driven platforms are increasingly used by both banks and fintech lenders to extend services deeper into rural areas. While digital adoption is advancing, regional connectivity and digital literacy remain constraints in some rural farming communities, affecting uniform uptake of digital finance solutions.

Farmer Engagement and Financial Inclusion

Farmers in Turkey generally value formal credit access due to its role in securing inputs, stabilizing operations, and enabling modernization, but they often face constraints related to documentation requirements, risk perceptions, and eligibility criteria, especially among smallholders. Government-supported credit lines, insurance programs, and subsidized loan conditions have improved inclusion, while private sector partnerships and international finance interventions have expanded long-term financing for agribusinesses and rural SMEs. Agricultural insurance under TARSİM has helped reduce risk exposure, increasing confidence among farmers to seek formal financing. Hence, while access to formal credit is still low, the NBFC as well as external support have helped deepen financial inclusion particularly for smallholder farmers and regions with limited institutional lending presence.

4.3.2.4 Saudi Arabia

Regulatory Environment

Saudi Arabia's agricultural financing architecture is largely state-directed with strong alignment between the Ministry of Environment, Water and Agriculture (MEWA), the Agricultural Development Fund (ADF) and financial regulators. Policy frameworks are designed to channel subsidized and concessionary financing into priority value chains, while simultaneously incentivizing private-sector participation through guarantees and co-financing schemes. Recent policy shifts (2023–2025) increased focus on climate-smart agriculture, value chain competitiveness, and integration of risk-management tools such as insurance and water-use compliance. The regulatory stance prioritizes scale and food-security outcomes, supported by compliance-based oversight rather than purely market-led allocation of credit.

Key Industry Players

The Agricultural Development Fund remains the anchor financier of the sector, providing long-term capital for livestock, greenhouse farming, irrigation systems, and agri-processing facilities. Commercial Islamic banks supplement ADF lending through subsidized credit lines and guarantee-backed SME facilities. Parallel to formal finance, agribusinesses and cooperative unions play an expanding role in input credit, contract farming and market-embedded financing. State involvement accelerates capital deployment but also concentrates decision-making, limiting diversity of financing channels outside government-supported programs.

The Agricultural Development Fund (ADF), commercial Islamic banks, agribusinesses, and cooperative unions operate through a closely linked financing structure in which each player complements the other. ADF serves as the primary source of long-term and concessionary capital, often channeling funds to banks through refinancing windows and guarantee schemes to reduce lending risk. Commercial Islamic banks then distribute credit to farmers and agri-processors using this capital, expanding outreach while relying on ADF-backed risk mitigation. Agribusinesses and off-takers support this flow by offering input credit and contract farming arrangements that enhance farmer creditworthiness and ensure market access, while cooperative unions aggregate smallholders, streamline loan distribution, and facilitate monitoring and repayment. This interdependence creates an integrated value-chain financing ecosystem where risks are shared, access barriers are reduced, and capital deployment becomes more efficient and scalable.

Products and Financing Instruments

Agricultural financing products in Saudi Arabia are largely asset-backed, with dominant instruments including machinery and equipment *Murabahah* financing, *Ijarah*-based leasing for tractors, greenhouses and irrigation systems, livestock production finance, and medium-term expansion credit for commercial farms (Saudi Agricultural Development Fund, 2024). Concessionary working-capital *Murabahah* schemes are commonly deployed for feedstock, fertilizers, and irrigation supplies, while government-linked sustainability initiatives are increasingly supporting hydroponics, climate-smart greenhouses, and solar-powered irrigation projects. In the Saudi Arabian context, Islamic financial institutions employ several Sharia-compliant contracts to support agricultural development: *Murabahah* (cost-plus financing) for

purchasing inputs and equipment, *Ijarah* (leasing) for agricultural machinery and greenhouse infrastructure, and *Salam* contracts for forward financing of agricultural produce**.** Saudi banks and the Agricultural Development Fund utilize these Islamic financing modes under regulatory frameworks that require Sharia board approval and compliance with Islamic principles, while the Agricultural Development Fund provides Sharia-compliant financing support to farmers across the Kingdom (Chambers and Partners, 2025). The Saudi Agricultural Development Fund provides interest-free Shariah-compliant loans directly to farmers, companies, and cooperatives across various agricultural sectors. The fund has supported over 500,000 beneficiaries since its establishment, with particular emphasis on empowering small-scale farmers through targeted programs for coffee cultivation, beekeeping, rainfed agriculture, and fisheries (Argaam, 2025; MEWA, 2025). Despite the breadth of Islamic instruments, equity-based financing such as *Musharakah* and *Mudarabah* remains limited, indicating a system still largely dominated by subsidized, collateral-based Islamic debt rather than risk-sharing agricultural finance.

Shariah Governance

Shariah governance in Saudi Arabia's agricultural financing is institution-centric and jurisprudentially conservative. Islamic banks, cooperative unions, and the Agricultural Development Fund (ADF) are required to maintain internal Shariah boards responsible for approving financing products, monitoring compliance, and auditing contracts. Regulatory authorities do not impose a centralized Shariah framework specifically for agriculture finance, instead relying on existing Islamic finance governance structures and recognized scholarly opinions.

This decentralized model promotes consistency and predictability, as institutions adhere to well-established contract forms such as *Murabahah, Ijarah, Salam, and Istisna*. However, it also limits diversity in Shariah interpretation and discourages innovation in agriculture-specific financing models. Shariah compliance is typically applied through ex-ante product approval and ex-post audit, rather than as a design driver for farmer experience, platform architecture, or financial inclusion objectives.

The absence of centralized agricultural Shariah standard-setting bodies means that compliance oversight relies primarily on institution-level Shariah boards (Grassa, 2013). Critics argue that many Shariah-compliant agricultural finance products mirror conventional lending in economic substance, differentiated primarily by contract form rather than genuine risk-sharing

logic, with profit-and-loss sharing modes being infrequently used in practice (Khan, 2010; Obaidullah & Mohamed-Saleem, 2008).

Technology, Infrastructure & Distribution

Saudi Arabia leverages advanced digital infrastructure to scale agriculture financing. National farmer registries, digital land records and remote monitoring tools are used to verify farm activity and track financing utilization. IoT-based yield monitoring systems and water-usage tracking are increasingly integrated into loan performance assessment. Nonetheless, data access remains centralized and regulator gate-kept, constraining open-innovation ecosystems that could enable alternative scoring models or private agrifinance platforms.

People and Consumers

Agricultural finance uptake has grown steadily among commercial farms and formal agribusinesses, with strong adoption in greenhouse horticulture, date value chains, dairy and poultry sectors. However, access remains more favorable to medium/large farmers with demonstrated output records. Smallholders, pastoralists and remote-region farmers still face eligibility thresholds tied to farm size, irrigation systems, or formal documentation. Inclusion outcomes are therefore progressive but not yet transformative, with efforts concentrated on productivity scaling rather than grassroots micro-farm financing.

4.3.2.5 Ethiopia

Regulatory Framework

Ethiopia's agricultural financing framework is shaped by a combination of government policy directives, financial regulation by the National Bank of Ethiopia (NBE), and strategic planning under the Ministry of Agriculture, but the system remains under-developed compared with peers like Malaysia. Ethiopia has recently launched the National Agri-Finance Implementation Roadmap (NAFIR) 2025–2030, a coordinated effort between NBE and the Ministry of Agriculture to systematically scale up agri-finance, improve rural credit access, and strengthen institutional coordination across stakeholders. NAFIR outlines comprehensive measures such as wholesale finance facilities, streamlined financial services, and an Agri-Finance Centre of Excellence to address structural barriers that have historically limited formal financing to farmers. Agriculture contributes approximately 32% of GDP and 64% reflecting economic dependence on the sector.

Key Industry Players

Ethiopia's agricultural finance ecosystem consists of state banks, microfinance institutions (MFIs), cooperatives, and emerging digital channels, each playing distinct but interrelated roles. The Commercial Bank of Ethiopia (CBE), the nation's largest lender, has introduced targeted smallholder agri-loan programs that support crop production, livestock, mechanization, and value-chain activities, signaling an expanded focus on rural outreach. Microfinance institutions and rural savings cooperatives serve a significant portion of smallholder credit but have seen a decline in agricultural lending share in recent years. Cooperatives and agricultural unions also act as intermediaries, linking farmers with credit and input supply channels. Development partners including donor projects supporting SME access to finance complement governmental actors by building capacity and improving financial inclusion for agricultural enterprises beyond traditional banking.

Products and Services

The country's agricultural finance currently includes commercial bank loans, subsidized public credit schemes, microfinance products, and emerging digital lending platforms. Programs such as Commercial Bank of Ethiopia's (CBE) smallholder loan facility provide targeted finance for inputs, machinery, storage, livestock, and horticulture, aiming to improve productivity and rural livelihoods. Microfinance institutions extend short-term working capital and small enterprise credit, though their share of overall agricultural lending has declined in recent years. Warehouse receipt systems, agro-dealer credit arrangements, and fintech-enabled lending channels (e.g., digital platforms linking farmers to credit via secure produce collateral) are referenced in national strategy documents as mechanisms to improve rural access. Despite formal product availability, the majority of smallholder farmers still rely heavily on informal credit or limited microfinance.

Governance & Risk Management

Shariah-specific governance frameworks are not a formal feature of Ethiopia's agricultural finance system due to the secular nature of its regulatory institutions. Instead, governance is guided by state-driven strategic planning (e.g., NAFIR) and regulatory oversight from NBE. Recent partnerships between the Ministry of Agriculture, UNDP, and industry actors aim to establish a more resilient agricultural insurance ecosystem through pooled risk mechanisms, standardized product design, and expanded coverage for climate and price risks. Such

collaborative frameworks seek to foster both financial protection for farmers and improved risk-sharing structures, though uptake is still nascent.

Technology and Infrastructure

Digital finance and infrastructure remain emerging components of Ethiopia's agricultural finance landscape. While formal banking penetration is limited in rural regions, mobile money, digital identification, and fintech lending platforms are gradually gaining ground as channels to connect farmers with credit and payments solutions. National efforts under NAFIR include proposals for digital financial services and streamlined loan application processes to reduce transaction costs and expand outreach. However, low digital literacy, variable connectivity in rural areas, and limited integration with formal financial institutions continue to constrain the potential of technology to scale agricultural financing widely.

Farmer Engagement and Financial Inclusion

Stakeholder feedback and national credit data indicate that formal financial institutions meet only a small share of agricultural credit demand, with estimates showing that banks and MFIs provide only about 2–5% of the estimated annual demand for agricultural credit. Smallholder farmers often lack collateral, stable cash flows, and financial literacy, which diminishes both their access to finance and their perceived creditworthiness. NAFIR envisions expanded inclusion through diversified channels, cooperatives, digital platforms, and warehouse receipt financing to reduce barriers. Support from development partners also aims to strengthen SME access to finance and farmer organizational capacity. With alot of progress under way, there is significant room to grow in inclusivity, responsiveness to smallholder needs, and integration of risk-sharing models.

3.4.2.6 Netherlands

Regulation & Policy

The Netherlands maintains a robust, transparent, and predictable regulatory framework for agriculture finance. National policies integrate climate-smart agriculture, risk-sharing, and subsidy programs into financial regulation, supported by institutions like the Dutch Ministry of Agriculture and Rabobank, which historically specializes in cooperative and farm-focused financing (OECD, 2023). Clear regulatory guidance ensures that financing is efficient, aligned with production cycles, and sustainable.

Key Industry Players

Dutch agricultural finance benefits from a highly cooperative ecosystem. Rabobank, along with cooperatives and private agribusiness lenders, delivers credit, leasing, and equity-based products to farmers, emphasizing risk-sharing and long-term partnership. Banks coordinate with insurers, commodity buyers, and government programs to ensure integrated value-chain financing, reducing perceived risk for lenders (Průša et al., 2022).

Shariah Governance

Although Shariah-compliant finance is less common in the Netherlands due to a secular market context, the governance framework for ethical and sustainable finance is highly developed. Principles of transparency, disclosure, and ethical oversight are embedded in cooperative banking structures, providing a useful parallel for structuring Shariah-aligned agriculture finance in emerging markets (OECD, 2023).

Products & Services

Dutch agriculture finance offers a diverse range of instruments, including investment loans, working capital loans, leasing, and climate-focused financing. Financial products are closely aligned with farm production cycles and market realities. Risk-sharing is further supported by crop insurance, commodity-based hedging, and guarantee funds, ensuring resilience for both conventional and emerging agri-finance innovations.

Technology & Infrastructure

Advanced digital platforms support farm management, financing, and traceability. Integration of digital advisory tools, e-payments, and farm monitoring systems enables timely access to capital and operational efficiency. The Netherlands' use of technology ensures interoperability among lenders, cooperatives, insurers, and farmers, facilitating scalable, data-driven financing solutions (Průša et al., 2022).

People / Farmers

The Netherlands has a well-developed agricultural advisory system through its Agricultural Knowledge and Innovation System (AKIS), which includes farm advisors, cooperatives like

Rabobank, and digital platforms that support farmers in adopting innovations and improving sustainability practices (OECD, 2023).

4.3.2.7 Nigeria

Regulation & Policy

Nigeria has developed regulatory frameworks for agricultural financing through initiatives such as the Central Bank of Nigeria's Anchor Borrowers' Programme (ABP), launched in 2015, and the Nigeria Incentive-Based Risk Sharing System for Agricultural Lending (NIRSAL), established in 2011, which provide policy guidance and risk-sharing mechanisms to improve credit access for smallholder farmers (Adegbite, O. O., & Machethe, C. L. (2020).These programs provide clear credit guidelines, performance metrics, and institutional support, demonstrating a structured approach that reduces execution uncertainty for financiers and encourages adoption at scale.

Key Industry Players

Nigerian banks, microfinance institutions, and agri-tech platforms actively participate in innovative partnerships to serve smallholder farmers. Islamic banks and NBFCs have started offering *Salam* and *Musharakah*-based products, while conventional banks leverage risk-sharing instruments like credit guarantees through NIRSAL. Collaborative value-chain financing models involving input suppliers, cooperatives, and buyers enhance access to working capital and reduce default risk.

Shariah Governance

Shariah compliance in Nigeria is institution-driven, with internal Shariah boards in Islamic banks and microfinance institutions overseeing product design and monitoring. While national-level standardization is developing, internal governance frameworks effectively ensure that products adhere to Islamic principles, particularly for smallholder-oriented contracts like *Salam* and *Musharakah* (AbdulKareem et.al, 2022).

Products & Services

Nigeria demonstrates notable product diversity, including *Salam, Musharakah*, and lease-to-own schemes tailored to farm production cycles. Digital agri-finance platforms provide working capital, input financing, and forward sales arrangements, integrating both

conventional and Shariah-compliant structures. Risk-mitigating instruments, such as agricultural insurance and NIRSAL guarantees, strengthen product adoption and improve scalability (Olateju, 2024).

Technology & Infrastructure

Mobile banking, fintech platforms, and digital payment systems are increasingly leveraged to expand reach into rural farming areas. Nigeria's deployment of mobile wallets and e-wallet integration for farm loans has improved onboarding, payment collection, and monitoring, demonstrating how digital infrastructure can accelerate adoption of Shariah-compliant agricultural finance (Fowowe, 2020).

People / Farmers

Farmers in Nigeria increasingly access both conventional and Shariah-compliant finance. Structured education campaigns, farmer cooperatives, and mobile advisory services have improved financial literacy and trust in formal institutions. Islamic financing products, particularly *Murabahah* and *Salam* contracts, are viewed favorably, supporting ethical financing preferences among Muslim farming communities (Ogunbado & Ahmed, 2015).

4.3.2.8 Kenya

Regulatory Framework

Kenya's agricultural financing system is guided by a combination of financial sector policies under the Central Bank of Kenya (CBK), agricultural strategies by the Ministry of Agriculture, Livestock, Fisheries and Cooperatives, and sector financing initiatives from public and private stakeholders. Despite agriculture contributing significantly to the economy (over 20% of GDP and employing roughly 40% of the population), financing is hindered by perceptions of high risk, inadequate collateral, and volatility in farm incomes. Government policy frameworks such as the Draft Policy Framework for Sustainable Financing and Subsidy Management in Agriculture all aim to address these gaps by improving coordination of subsidies and enhancing agricultural lending structures. Formal agricultural credit penetration is further constrained by high documentation and appraisal costs, and limited rural capital markets, which collectively suppress credit supply despite ongoing reform efforts.

Key Industry Players

Kenya's agricultural finance ecosystem includes commercial banks, specialized financiers, cooperatives/SACCOs, agritech firms, and county government initiatives. Traditional lenders have typically under-served the sector, but specialized actors like Apollo Agriculture are actively providing targeted financing to smallholder farmers, including those with as little as half an acre of land through input and working capital loans, often paired with agronomic support and digital facilitation. Savings and Credit Cooperative Societies (*SACCOs*) have also emerged as important credit sources, with a significant share of farmer borrowing channeled through these member-based institutions. At the policy level, institutions such as the Agricultural Finance Corporation (AFC) are being reformed and recapitalised to improve access to longer-term, affordable agricultural credit, underlining a renewed push by government actors to strengthen financing infrastructure for farmers.

Products and Services

Financial products for Kenyan agriculture include commercial bank loans, SACCO credit lines, agritech-enabled digital financing, asset-based mechanization lending, and blended finance arrangements. While conventional bank loans typically involve standard interest structures and collateral requirements, digital and agritech platforms offer more flexible, often unsecured or asset-linked credit products tailored to smallholder cash-flow cycles. Initiatives like Apollo Agriculture's loan kits provide modest input financing alongside agronomic support, helping farmers procure improved seeds, fertiliser, and other essentials. Fintech lending has also expanded access for remote or underserved farmers, reducing reliance on physical branches and improving speed of credit delivery. Despite these advances, affordable long-term financing options (with grace periods aligned to crop cycles) remain limited, and the "missing middle" persists, with loans often too large for microfinance and too risky for banks without guarantees.

Shariah Governance

Shariah-compliant agricultural financing in Kenya exists but is nascent and largely product-specific, with limited integration into the mainstream agricultural credit landscape. A few Islamic banks such as National Bank of Kenya's Amanah division offer Shariah-aligned products, including the *Amanah Jenga Kilimo* loan for farm equipment and inputs, which feature flexible repayment terms and grace periods to align with agribusiness cash flows.

However, there is no unified national framework or central Shariah standard specifically for agricultural finance, and uptake among farmers remains constrained by awareness, product variety, and the small scale of issuance relative to total agricultural credit. This decentralized approach means Shariah governance relies on individual institutional boards and product approvals rather than a nationally harmonized standard, limiting broader penetration of Islamic finance modalities in the sector.

Technology and Infrastructure

Digital innovation is playing an increasingly important role in Kenyan agricultural finance. Mobile-enabled credit platforms, digital profiling, and agritech solutions are lowering barriers to access, particularly for smallholder farmers in rural regions. Collaborations between banks and mobile platforms have resulted in digital credit access for farmers to purchase inputs and obtain insurance cover, while agritech firms use data analytics and remote support to assess risk and tailor products for smallholder needs. Nonetheless, uneven digital literacy and connectivity remain challenges, especially in remote farming areas, and technology adoption varies widely across regions.

Farmer Engagement and Financial Inclusion

Despite ongoing innovations, many Kenyan farmers still face significant barriers to formal finance. Formal agricultural lending as a share of total credit remains low, and smallholders often rely on informal credit, SACCO borrowing, and agritech micro-loans, rather than traditional bank credit. Government and private stakeholders recognise this gap, with calls for long-term, affordable financing facilities that reflect the cyclical nature of farming and extend beyond short-term credit structures. Initiatives like blended finance models and asset-based lending have shown promise, suggesting that with appropriate risk-sharing mechanisms and targeted products, financial inclusion for agriculture can expand, improving productivity and rural livelihoods.

4.3.2.9 Benchmark Key Global Use Case of Shariah Compliant and Generic Agriculture Financing Agriculture Technology and Operating Model in Worldwide Basis

Tarfin (Turkey)

Turkey possesses vast agricultural potential, with millions of small and medium-sized producers contributing significantly to food security and export earnings. In recent years, the country has increasingly integrated Islamic finance and fintech solutions into the agricultural

sector to address farmers' financing needs and reduce reliance on interest-based lending. A notable example is Tarfin, a pioneering digital agriculture platform that operates as a non-bank fintech intermediary (Tarfin, 2025). Tarfin provides agricultural inputs such as fertilizers, seeds, and animal feed to farmers under Shariah-compliant financing structures, primarily using *Murabahah* (cost-plus sale) contracts.

Tarfin obtained a certificate of compliance with Islamic principles for its model and became one of the first agri-fintechs globally to issue Shariah-compliant sukuk (lease certificates) to finance its operations. The company's sukuk issuances of TL 40 million in the first round and TL 50 million in the second round, while mobilizing investor funds for agricultural production through Islamic capital markets (Tarfin, 2022; Tarfin, 2023). This structure demonstrates how technology-driven non-bank entities can link farmers directly with investors while adhering to Shariah principles which is directly applicable to Pakistan.

Using the Buy Now Pay Later (BNPL), thousands of farmers partnering with Tarfin can conveniently access seeds, fertilizers, feed, and equipment whenever they need them without upfront cash concerns and settle payments after harvest. By downloading the Tarfin Mobile App, users can compare prices across more than 1,200 sales locations throughout Turkey and easily fulfill their agricultural needs through Tarfin's trusted platform.

Tarfin operates across 75 cities in Türkiye, providing thousands of farmers with easy access to fertilizers, seeds, feed, and a wide range of other agricultural essentials, ensuring their farming requirements are met efficiently and on time. Applications submitted via the Tarfin Mobile App or through authorized Tarfin dealers are evaluated and processed within just 4 to 6 minutes.

Operational Model

The Tarfin model functions as a digital supply-chain financing platform, connecting farmers, input suppliers, and investors in one ecosystem. Farmers order agricultural inputs such as fertilizers and seeds via the Tarfin mobile app, with deferred payment terms typically extended until harvest time. The financing is structured on *Murabahah* contracts, whereby Tarfin purchases the input from suppliers and sells it to the farmer at a disclosed markup, payable later (Tarfin, 2022b).

To evaluate credit risk, Tarfin employs machine-learning algorithms and satellite data analytics to develop digital agricultural risk scores, enabling financing decisions without traditional collateral (Tarfin, 2025b). This technology-driven risk assessment enhances transparency and

allows inclusion of smallholder farmers who might otherwise be excluded from conventional credit systems.

To fund its operations, Tarfin issues Islamic sukuk or lease certificates, backed by receivables from farmers' *Murabahah* contracts. These instruments are traded in the capital market, providing a private investment channel into agriculture through Shariah-compliant means. The model thereby connects non-bank investors, fintech infrastructure, and rural producers in a circular financing ecosystem.

Impact on Beneficiaries

- **Expanded reach**: Over 47,000 farmers across 80 provinces in Turkey have accessed Tarfin's platform, enabling broad geographic coverage.
- **Affordable input access:** Farmers acquire essential inputs at competitive prices with deferred payment until harvest, avoiding interest-bearing loans.
- **Capital mobilization:** Sukuk issuances link private investors directly to agriculture, diversifying funding sources and strengthening agricultural value chains.
- **Financial inclusion:** The digital platform allows smallholder farmers, including those without collateral, to gain financing through data-based risk assessments.
- **Food security and productivity:** Increased access to inputs and liquidity supports higher yields and contributes to national food security goals.

  Link: Tarfin

TAGUVESTASI: Blockchain-Integrated Shariah P2P Platform for Halal Agriculture Financing (Indonesia)

Indonesia has a very large, small-holder agriculture sector, yet many farmers continue to struggle with limited access to formal finance, thereby constraining productivity, value-chain integration and income growth. According to a recent study, around 29.8% of the workforce is engaged in agriculture, and yet farmers face persistent poverty due largely to insufficient capital access and marketing constraints. In response, Indonesia has seen a rise in Shariah-compliant fintech, and crowd-investing platforms aimed at bridging this gap: for example, the platform Taguvestasi, which is an innovative blockchain-integrated digital platform designed to revolutionize halal agriculture financing in Indonesia. It bridges the persistent financing gap faced by millions of smallholder farmers by enabling Shariah-compliant peer-to-peer (P2P) financing between farmers and investors.

The platform operates at the intersection of Islamic finance, agritech, and the green economy, providing a transparent, ethical, and sustainable channel for agricultural investment. TAGUVESTASI's innovation lies in combining blockchain technology with Shariah-based contracts (e.g., *Mudarabah*, *Musharakah*, *Murabaha*, *Wakalah*, *Wakalah bil Ujrah*), which allows smart contract automation, full traceability of funds, and real-time transparency in financing agricultural projects.

Operational Model

The workflow of TAGUVESTASI can be summarized as follows:

1. Farmer Registration: Farmers apply for funding via the Taguvestasi platform or mobile app, providing details on their agricultural projects, input requirements, and estimated yields.
2. Verification: Applications are reviewed and validated by Taguvestasi's internal team and external agencies, including potential verification through Majelis Ulama Indonesia (MUI) for Shariah compliance.
3. Campaigning & Funding: Once approved, the project is uploaded to the Taguvestasi marketplace for crowdfunding. Interested investors can fund projects directly through a Shariah contract chosen by both parties (*Musharakah*, *Mudarabah*, or *Murabaha*).
4. Smart Contract Execution: Blockchain-based smart contracts automatically govern the terms, profit-sharing ratios, and disbursement schedules, ensuring secure, tamper-proof, and transparent transactions.
5. Profit Distribution: Upon harvest and sales, profits are distributed among the investor, farmer, and Taguvestasi platform according to the pre-agreed Shariah structure.
6. Supervision and Audit: The process is monitored by the Otoritas Jasa Keuangan (OJK), Indonesia's Financial Services Authority and Dewan Syariah Nasional Majelis Ulama Indonesia (DSN–MUI) to ensure regulatory and Shariah compliance.

As of 2025, Taguvestasi remains under prototype development with licensing applications pending at OJK and Kominfo, and is expected to launch its public platform upon regulatory approval (Indriani & Nur, 2025) with several notable remarks and objective as the following:

- Improved access to finance for smallholder farmers who typically cannot meet conventional bank loan criteria; technology-platforms reduce barriers and transaction costs.
- Promotion of sustainable agricultural practices and halal-agriculture orientation: for example, Taguvestasi emphasizes "halal agriculture" and green economy principles.

- Use of technology enables greater transparency and monitoring (blockchain smart contracts, digital platform dashboards), reducing risk of misuse and improving accountability.
- Mobilization of private investor capital into agriculture, thus bridging the financing gap, and allowing farmers to obtain inputs, expand operations, or integrate into value chains.
- While large-scale empirical data (e.g., on income increases or productivity gains) remains limited publicly, these models signal new potential pathways for non-bank, technology-driven Shariah-compliant agri-finance in Indonesia.

TaniFund (Indonesia)

Additionally, TaniFund is a fintech platform under the umbrella of TaniHub Group, designed to provide financing to small-holder farmers in Indonesia through a non-bank, tech-enabled mechanism (RIFLC, 2025). This reflects a broader trend of fintech innovation in Indonesia's agri-sector where digital platforms are being used to reach underserved farmers, and the regulatory environment is increasingly supportive of alternative (non-bank) financing paths (Fintech News, 2018).

Operational Model

An alternative model seen in Indonesia is the Islamic crowd-investing / crowdfunding model for agriculture. For example, research shows that Islamic crowd-investing platforms allow investors to fund agricultural projects under Shariah-compliant structures, thereby supporting sustainable agriculture, and enabling private capital to flow into farming ventures via non-bank digital channels. A typical example is TaniFund, which operates by linking digital supply-chain and market-access infrastructure (via TaniHub) with financing (via TaniFund) to reduce barriers for farmers and match them with lenders/investors. For example, TaniFund uses data derived from TaniHub's e-commerce marketplace (sales history, produce volumes, farmer performance) to build a credit-risk assessment for funding agricultural cultivation programmes (RIFLC, 2022).

The financing model is typically structured as peer-to-peer (P2P) lending or crowd-funding for specific cultivation projects. Farmers (often groups) apply for capital to cover costs (inputs, seeds, labour) through the platform. The investors (individuals or institutions) choose projects listed on TaniFund, review the project proposals, risk and returns, and then commit funds. Once the project is financed TaniFund monitors progress (often disburses funds in stages tied to

milestones) and when harvest occurs the produce is sold through TaniHub's marketplace, thereby creating a built-in off-take/market access channel (TechCrunch, 2021). In summary, TaniFund's model uses a tech-enabled non-bank financing platform, embedded in a broader agritech value chain via TaniHub, tapping private-sector capital through crowdfunding/P2P, and aligning farmer incentives with market demand and investor interests, all while using data/technology to mitigate risk and monitor performance.

Across these models, the alignment is clear: technology (blockchain, smart contracts, digital platforms, mobile interfaces) which enables efficient, inclusive access; private-partnerships (investors via fintech, agritech start-ups and marketplaces) bring new capital and innovation; and Shariah-compliant structuring ensures alignment with Islamic finance principles (avoiding interest-based loans, enabling profit-sharing/risk-sharing or Halal returns). These models occupy the non-bank financial sector (fintech/crowd-investing) rather than relying solely on traditional banking institutions, thus offering scalable, modern solutions for smallholders.

Impact on Beneficiaries (TaniFund Model)

- Smallholder farmer groups gain access to capital that they may not receive through traditional banks, because of lack of collateral, fragmented supply chains, and risk perception in agriculture.
- Financed farmers can sell their produce through TaniHub, reducing dependency on middlemen, improving pricing and reducing waste.
- Embedded logistics (via TaniSupply) and digital ordering/distribution reduce transaction costs, increase speed to market, improve quality control, thereby benefitting farmers (TechCrunch, 2021).
- Investors and lenders have diversified investment opportunities tied directly to agriculture value-chain projects, which can drive more capital into rural sectors and thereby benefit production/expansion of farming business (Inclusive Fintech, 2019).
- One source cited that farmers funded via TaniFund reported yield increases and income improvements (e.g., "increases of over 30% to their average incomes and 30% increases in yields" for certain projects) though data remain limited (RIFLC, 2022).
- Innovation spill-over: Use of digital platforms builds capacity among farmers (data literacy, digital procurement, traceability), which may have longer-term benefits in resilience and scaling agribusiness.

  Link: TaniFund

ALAMI (Indonesia)

ALAMI Sharia functions as a regulated Islamic fintech platform offering Shariah-compliant, invoice-based and receivable-backed financing to MSMEs and agribusinesses. The platform applies digital KYC, alternative-data scoring, and automated risk assessment, enabling farmers and cooperatives to access credit without traditional collateral barriers (A Adisaputra & Muttaqien, 2023). ALAMI partners with cooperatives, agritech firms, and input suppliers to structure *Murabahah and Salam* working capital financing aligned with crop cycles. A key operational strength is ALAMI's ecosystem-based verification, where invoices, supplier contracts, and cooperative records are validated through digital channels before financing is released. The use of escrow-controlled disbursement ensures that funds are directed toward genuine agricultural inputs, minimizing misuse risk. The platform also integrates agronomic advisory and digital monitoring through partner agritech services, improving both productivity and repayment reliability.

Impact on the Customer/People (Pillar 6)

- Improved access to collateral-free financing during planting seasons, enabling timely input procurement and higher productivity.
- Reduced dependence on high-interest informal lenders due to fast, digital credit approvals.
- Better price realization through invoice-linked financing tied to verified off-takers.
- Lower administrative burden on farmers as digital processes replace paperwork and field visits.
- Higher technical efficiency and financial literacy through integrated advisory and cooperative-based engagement.

Link: Alamisharia

Kifiya Financial Technology (Ethiopia)

Kifiya Financial Technology (Kifiya) is a fintech and ag-tech company based in Addis Ababa, Ethiopia, which has developed digital-platform infrastructure to deliver financial services, embedded credit, and agricultural value-chain support in underserved segments (Kifiya, 2025). The company has evolved from payments and branchless banking into a broader ecosystem provider of AI-powered alternative credit scoring, un-collateralised digital lending, agri-value-chain services (inputs, market linkages, micro-insurance) and embedded finance products. Against the backdrop of Ethiopia's large rural population, heavy reliance on agriculture, high

number of unbanked individuals and farmers, and the government's Digital Agriculture Roadmap, Kifiya's model presents a compelling example of how technology and private partnership in the non-banking/fintech domain can support agri-financing. Additionally, they offer a Shariah-compliant Intelligent Financial Services (IFS) platform that empowers MSMEs and individuals with streamlined access to ethical financial solutions. By integrating Shariah-compliant financing rails, a global halal marketplace, and a versatile agency model, the platform provides tailored financial services for farmers and businesses (Kifiya, 2025).

Operational Model

The model adopted by Kifiya combines several inter-linked elements:

Recognizing that many smallholder farmers and MSMEs lack conventional collateral or formal credit history, Kifiya uses alternative data (mobile transaction data, business performance, digital footprints) along with machine-learning models (for prediction, prescriptive modelling, early warning) to assess creditworthiness and enable un-collateralised lending (Kifiya, 2025). Additionally, Kifiya partners with banks, fintechs and other value-chain actors to embed finance solutions within the agrifood ecosystem, for example, inventory credit, marketplace linkage of inputs/outputs, micro-insurance for climate risk. The platform enables lenders to originate, manage and collect digital credit, also enabling "Shariah-compliant financial products relevant and appropriate" to agrifood systems.

In collaboration with the International Finance Corporation (IFC) and other partners, Kifiya is undertaking a "Digitizing Smallholder Farmers" project to map, profile and onboard 1 million smallholder farmers into its platform, enabling them access to digital financial services, and building backbone data-infrastructure to support finance, markets and risk mitigation (IFC, 2025).

Kifiya works through partnerships with banks (e.g., the Cooperative Bank of Oromia), fintechs, insurers, market-actors and donor/private foundations (e.g., the Mastercard Foundation) for talent/training, product innovation, scale-up of digital lending and agri-services. For example, the SAFEE programme supported more than 600 000 MSMEs with un-collateralized loans via Kifiya-partners (Mastercard Foundation, 2025).

On the agri side, Kifiya offers smallholder-friendly digital services: access to agricultural inputs (seed, fertiliser), market linkages, micro-insurance to build resilience, digital credit aligned with agricultural cycles, and risk mitigation via data/insights. For instance, more than 1.5 million smallholder farmers in Ethiopia have accessed agricultural inputs via Kifiya's platform (Kifiya, 2024). In sum, the model situates technology at the heart: AI and alternative

data turn previously non-bankable clients into financeable ones; digital platforms embed financing into agricultural/value-chain ecosystems; private partnerships provide scale, capacity, and market access; the non-bank channel (fintech, value chain, and inputs/market linkage) complements traditional banking.

Impact on the Beneficiary

- Increased access to un-collateralized digital credit for MSMEs and smallholder farmers: 382 000 MSMEs have accessed about US$150 million in un-collateralised digital credit via Kifiya's platform/partnerships. Also, 75 000 smallholder farmers have accessed US$92 million in agricultural inputs/credit via the agri-finance component (Kifiya, 2025).
- Improved integration of smallholders into agricultural value chains: Through digital profiling, market linkages and inputs provision, farmers are better connected to buyers, suppliers and financiers, reducing reliance on informal finance.
- Enhanced financial inclusion: Many farmers and MSMEs in rural or underserved segments which previously lacked formal credit or banking access are now able to participate in digital finance services, reducing exclusion.
- Increased resilience and risk mitigation: Micro-insurance offerings, digital monitoring and the platform's data-driven insights help beneficiaries manage climate, production and market risks better.
- Empowerment of underserved demographics: The model supports women-led MSMEs (e.g., via SAFEE programme) and rural farmers, thereby promoting inclusivity.
- Productivity/operational improvements: By providing inputs, linking to markets, and enabling financing aligned with agri cycles, beneficiaries can invest in improved seeds, fertilizers, better practices, thus potentially improving yields and incomes.
- Reduced transaction costs & better transparency: Digital onboarding, scoring and credit disbursal mean faster processing, lower cost of credit, fewer intermediaries, and better traceability for the beneficiary.

  Link: Kifiya

Bagh-E (Pakistan)

Bagh-E operates on a profit-sharing financing structure, where farmers receive working capital for inputs, labor, and crop maintenance, and returns are shared proportionately after harvest.

This eliminates fixed repayment obligations and reduces cash-flow stress, making the model particularly suited to smallholder agriculture.

Bagh-E negotiates produce sales directly with mills, wholesalers, and formal buyers, ensuring that farmers secure better prices and that the financier receives repayment through structured post-harvest flows.

The platform incorporates digital agronomic monitoring, where field consultants conduct periodic checks and update crop data through the app. These records serve as performance indicators, creating a digital footprint that substitutes for conventional collateral. It also functions as an aggregator, negotiating bulk produce sales with mills, exporters, and large buyers. This improves farmer bargaining power and aligns repayment with actual harvest outcomes. Partnerships with input suppliers and off-takers such as Syngenta-linked pilots documented in the pitch material further strengthen delivery assurance and market access. By connecting financing with advisory and off-take agreements, the model reduces repayment risk and enhances farmer income stability.

Impact on the Beneficiary

- Higher productivity through expert guidance: Regular field visits and digital advisory tools improve crop management, resulting in higher yields and reduced vulnerability to pests, disease, and climate shocks.
- Better price realization and income stability: Aggregated sales to formal buyers eliminate middlemen exploitation and help farmers secure premium prices for their produce.
- Stronger financial inclusion for rural communities: Shariah-compliant structures encourage participation from farmers who traditionally avoided formal credit due to interest-related concerns.
- Lower operational and monitoring costs: Digital reporting and consultant oversight reduce the need for costly field supervision, making smallholder financing more scalable.
- Improved long-term asset-building: Structured sales records and digital histories create pathways for farmers to eventually access larger Islamic financial instruments such as *Salam, Murabahah*, or warehouse-receipt financing

  Link: Bagh

DigiFarm Mobile Agriculture Platform (Kenya)

Kenya's DigiFarm connects farmers to buyers, inputs, and microfinance through a mobile platform that operates in coordination with agribusiness and telecom partners. The platform's success highlights how PPP-driven digital ecosystems can strengthen financial inclusion and value-chain integration (Mercycorps, 2021).

DigiFarm integrates mobile credit, input supply, training, and off-take contracts through partnerships between Safaricom, agribusiness firms, and financial institutions. Although not Islamic in origin, its structure aligns well with the principles required for digital *Salam* and *Murabahah* systems, making it a relevant benchmark for Pakistan. DigiFarm's success shows how digital platforms can unify finance, inputs, and production services at scale.

Link: DigiFarm

Apollo Agriculture (Kenya/Zambia)

Apollo Agriculture, founded in 2016 in Nairobi, Kenya, is an agri-fintech company that helps smallholder farmers increase their productivity and profitability through a digitally integrated input financing model. One of the most widely cited and effective agri-financing innovations in Africa, particularly for smallholder inclusion. Its "Bundled Input Financing Model" integrates credit, insurance, input supply, and training in a digital ecosystem that drastically improves productivity, repayment, and farmer resilience.

It leverages satellite data, machine learning, mobile technology, and automated operations to deliver a full suite of agricultural support combining credit, insurance, quality inputs, and agronomic advisory in one affordable package.

Apollo's model addresses two fundamental challenges in smallholder agriculture:

1. Access to finance and inputs, and
2. Access to knowledge and markets.

It currently serves over 300,000 farmers across Kenya, with expansion into Rwanda, Zambia, and Nigeria. The model is often described as "Agriculture-as-a-Service for smallholders," reducing default risk through data-driven lending and bundled support.

Operational Model

Apollo Agriculture's Bundled Input Financing Model operates through a five-component system, designed to minimize risk and maximize productivity.

Step 1: Farmer Onboarding & Profiling

- Farmers apply via mobile phone (USSD) or through Apollo field agents.

- Apollo uses satellite imagery, historical yield data, mobile money records, and GPS-based mapping to assess creditworthiness.
- A digital profile is created for each farmer, assigning a risk score using machine learning algorithms.

Step 2: Bundled Credit + Input Package

- Once approved, farmers receive a complete package that includes:
  - Certified seeds and fertilizers,
  - Crop insurance (through partners like Pula Advisors),
  - Training and agronomic support, and
  - Access to digital advisory tools via SMS.
- The input packages are delivered locally through Apollo's network of agro-dealers.

Step 3: Financing and Payment

- Inputs are financed on credit at the beginning of the planting season.
- Farmers repay after harvest, usually through M-Pesa mobile money.
- The repayment structure is flexible and aligned to seasonal crop cycles.

Step 4: Risk Management and Data Integration

- Satellite monitoring tracks farm performance and rainfall conditions.
- If crop failure occurs due to weather, index-based insurance automatically compensates, reducing default risk.
- Apollo's system updates each farmer's profile annually to refine future lending decisions.

Step 5: Digital Advisory and Support

- Farmers receive SMS-based farming tips, reminders, and market updates.
- A network of Apollo field agents provides localized technical support.

Impact on Customer/ People (Pillar 6)

- Farmers experience 2–3× higher yields and incomes per acre (Apollo Impact Report, 2024).
- 80% of Apollo's clients are first-time borrowers from formal institutions.
- Average maize yield increased from 1.8 to 4.2 tons per hectare
- Maintains repayment rates above 85%, far higher than rural microfinance averages
- 38% of Apollo's customers are women farmers.
- Insurance cushions income shocks, enabling continuity after droughts or floods

Although Apollo operates on a conventional credit framework, its value-chain-based, asset-backed, and impact-oriented design makes it highly adaptable to Shariah-compliant agriculture finance. Pakistan NBFC can adopt this model on the basis of *Murabahah / Salam*, *Mudarabah / Musharakah*, *Takaful* (Crop Protection), Deferred payment (*Bai Muajjal*).
Link: Apollo

AFEX (Nigeria)

AFEX Commodities Exchange Limited (AFEX), founded in 2014, is Nigeria's leading private commodities exchange and agri-financing institution, operating as both a market infrastructure provider and a non-bank financial company (NBFC).

The model was developed to address one of the most pressing agricultural challenges across Africa, post-harvest losses and distress sales caused by limited liquidity among smallholder farmers.

Through its Warehouse Receipt Financing (WRF) system, AFEX allows farmers to store their produce securely, receive a digital warehouse receipt (WR) as proof of ownership, and use that receipt as collateral for instant credit. This ensures farmers can delay sales until prices stabilize, reducing losses and increasing incomes. By 2024, AFEX had reached over 450,000 farmers across 26 Nigerian states, with 150+ certified warehouses and ₦100 billion (USD 130 million) in commodity-backed financing facilitated (AFEX Impact Report, 2024).

Operational Model

AFEX's Warehouse Receipt Financing Model operates through a closed-loop ecosystem, integrating physical infrastructure, digital finance, and market access.

Step 1: Aggregation and Storage

- Farmers bring harvested crops (e.g., maize, sorghum, rice, soybeans) to AFEX-certified warehouses.
- Produce is graded, cleaned, weighed, and quality-tested to international standards.
- Farmers receive a digital warehouse receipt (e-WR) confirming quantity, quality, and ownership.

Step 2: Issuance of Digital Receipt

- The Warehouse Receipt is registered on AFEX's ComX digital platform, a blockchain-secured commodities trading and financing portal.
- The receipt becomes a tradeable asset and serves as collateral for credit.

Step 3: Financing via NBFC / AFEX Investment Subsidiary

- AFEX's financing arm or partner institutions (e.g., Access Bank, Sterling Bank) offer instant short-term loans (30–120 days) against the stored commodity value.
- The loan-to-value (LTV) ratio typically ranges between 60–70%.
- Farmers repay upon selling their produce when prices improve, and the warehouse releases the commodity accordingly.

Step 4: Price Hedging and Market Linkage

- AFEX operates a commodity trading exchange, enabling farmers and aggregators to sell their stored produce directly to processors, exporters, or large buyers.
- The system integrates forward contracts, commodity derivatives, and insurance for risk management.

Step 5: Settlement and Digital Traceability

- All transactions are recorded digitally through the AFEX platform, ensuring full traceability and transparency.
- Farmers build digital credit histories, enabling access to larger future loans.

Impact on Beneficiaries

- Farmers earn 25–40% higher incomes by avoiding "distress sales" during harvest gluts.
- Losses reduced by up to 20% due to improved storage and market timing.
- Over 450,000 farmers integrated into formal finance systems
- Warehouse receipts create verifiable transaction data, enabling future borrowing.
- Real-time digital exchange ensures fair pricing and market access.
- 30% of users are youth and women-led farms, accessing finance independently.

Pakistan already has an enabling framework, the Electronic Warehouse Receipt (EWR) System, regulated by the Securities and Exchange Commission of Pakistan (SECP) and operated through Pakistan Mercantile Exchange (PMEX) and Collateral Management Companies (CMCs) such as Naymat Repository Services. By combining EWR regulation, Shariah compliance, and private NBFC capital, Pakistan can operationalize a national warehouse-based agri-financing system reducing post-harvest losses and improving liquidity in rural markets.

Link: Afex

Agro.Club (Spain)

Founded in 2018 and operating across Europe, North America, and Latin America (including Brazil) as a B2B2C digital agri-fintech marketplace, AgroClub's innovation lies in embedding finance into existing agricultural supply chains connecting input manufacturers, retailers (agro-dealers), and farmers on a single digital platform. Unlike traditional models where a lender or NBFC interacts directly with smallholders, Agro.Club channels finance through local input dealers, who already have trusted relationships with farmers. This structure simultaneously digitizes the agri-input ecosystem, ensures liquidity for dealers, and provides Buy Now, Pay Later (BNPL) credit to farmers for inputs like fertilizer, seed, and crop protection.

Agro.Club's global grain marketplace has expanded significantly, with more than 35,000 registered farmers and thousands of grain companies globally, and the platform has facilitated over USD 200 million in annualized grain transaction volume through digital trade execution and embedded financing (Agro.Club News, 2023).

Operational Model

Agro.Club's Embedded Finance Model operates as a digital bridge between manufacturers, retailers, farmers, and financing partners (NBFCs and banks).

Step 1: Digital Onboarding

- Input suppliers and dealers register on the Agro.Club platform, which provides digital inventory, order management, and transaction tracking tools.
- Farmers are onboarded by dealers or sales representatives during routine purchases.

Step 2: Embedded Transaction Financing

- When a farmer purchases inputs (e.g., fertilizer, seed, pesticide), the Agro.Club NBFC instantly pays the dealer for the goods.
- The farmer receives the inputs immediately but pays back Agro.Club after harvest typically within 90 to 180 days.
- The BNPL financing is embedded automatically into the digital transaction, without requiring a separate loan application.

Step 3: Risk Assessment & Data Analytics

- Agro.Club uses AI-driven data analytics combining:
    - Dealer sales records,
    - Farmer purchase histories,
    - Regional yield and satellite data, and

- Payment performance scores.
- This data is used to manage credit risk, set repayment schedules, and determine dealer limits.

Step 4: Repayment & Revenue Cycle

- After harvest, farmers repay via digital payments or dealer collections, and Agro.Club reconciles accounts digitally.
- Dealers gain higher sales and immediate liquidity; farmers gain credit flexibility.

Step 5: Platform Integration

- Agro.Club integrates with manufacturers and agribusinesses for wholesale procurement, traceability, and market intelligence.
- This model transforms input dealers into digital financial intermediaries within a regulated ecosystem.

Impact on Beneficiaries

- Dealers receive instant payment for sales, improving working capital turnover by up to 60%
- Farmers access quality inputs without upfront cash, ensuring timely planting.
- Partner retailers report up to 40% increase in sales volume due to improved credit access.
- Farmers build digital credit histories without visiting banks or MFIs.
- Real-time data improves input planning and reduces counterfeit product circulation.

In Pakistan, where more than 60,000 agri-input shops (commonly known as *Arthis* or dealers) cater to smallholder farmers, the embedded finance model offers a transformative opportunity to digitize and formalize rural credit within a Shariah-compliant NBFC framework. Under this system, the NBFC provides financing to dealers, who then sell agricultural inputs to farmers on a *Murabahah* basis at a pre-agreed markup, payable after harvest while acting as agents (Wakil) of the NBFC to ensure compliance with Islamic principles. The model embeds real-time digital data for input planning and fraud prevention, secures credit risk through *Takaful*, and generates income for the platform through fixed service fees (Ujrah) rather than interest. By leveraging existing dealer networks, this approach converts informal *Arthis* into regulated, Shariah-compliant retail financiers, enhancing transparency, trust, and governance in Pakistan's agricultural value chain while preserving vital local relationships.

Link: Agro.Club

Jai Kisan (India)

Jai Kisan is a fintech enterprise originally focused on rural India's agricultural and MSME financing ecosystem, designed to bridge the gap between traditional financial institutions and underserved rural customers. Founded in 2017, it operates as a technology-enabled credit distribution platform that partners with banks, NBFCs, and rural retail networks to deliver affordable credit, financial services, and embedded commerce via digital tools and physical touchpoints. Jai Kisan secured an NBFC licence by acquiring majority equity in Kushal Finnovation Capital in 2024, enabling it to originate and distribute tailored loan products directly alongside partner institutions (Jai Kisan, 2025)

Operational Model

Jai Kisan's model is *phygital* (*physical* + *digital*) system that works through the following main components:

1. **Digital Platform:** The company offers platforms such as the *Jai Kisan Farmer app* and *Bharat Khata* (a digital ledger for rural retailers). These tools help merchants, farmers, and MSMEs manage sales, credit, and transactions digitally (Focus Agrictech)
2. **Channel Partners:** Jai Kisan partners with local rural vendors, input dealers, and "Arthis" (middlemen) to act as on-ground distribution points. These intermediaries use digital tools to extend financing and transactional services directly to farmers and rural enterprises, effectively turning them into Point of Sale (POS) financiers within the rural value chain.
3. **NBFC Enablement & Co-Lending:** With its NBFC licence, Jai Kisan can now co-lend with banks and design customized credit products. It blends fintech agility with regulatory compliance to deliver loans faster and at lower cost than traditional channels
4. **Data-Driven Credit:** The platform uses digital transaction histories, partner network data, and AI-assisted risk profiling to underwrite credit, enhancing affordability and reach for previously excluded customers.

   While Jai Kisan itself is a conventional fintech platform, the operational logic aligns with key Shariah principles that can be adapted for Islamic finance applications.

Impact on Beneficiaries

Jai Kisan's model has demonstrated substantial impacts, including:

- It has enabled affordable credit for over 1 million farmers and 150,000 rural enterprises across thousands of pin codes, delivering hundreds of millions in loans and catalyzing financial inclusion.
- Lower Costs & Faster Delivery: Loans are delivered quickly (often within days) and at competitive rates (12% p.a.) compared with traditional rural credit channels, reducing reliance on informal, high-cost lenders.
- Formalization of Rural Finance: Digital ledgers and partner networks formalize previously informal credit flows, enhancing trust, record-keeping, and repayment discipline among farmers and retailers.
- Economic Empowerment: Farmers have used these financial tools to invest in farm equipment, inputs, and working capital leading to productivity improvements and income growth.

  Link: Jai Kisan

4.4 Systematic Alignment of International Benchmarks Recommendation to Pakistan's Shariah-Compliant Agriculture Financing Top 12 Problem Statement and Challenges

This section presents a structured, problem-centric alignment of international benchmarking insights with Pakistan's twelve priority challenges in Shariah-compliant agricultural financing. For each constraint, agricultural finance models across Indonesia, Malaysia, Turkey, Saudi Arabia, Ethiopia, Netherlands, Kenya, and Nigeria. These jurisdictions were selected to represent diverse regulatory traditions, levels of Islamic finance maturity, rural transformation strategies, and digital adoption for agriculture financing.

Following the cross-jurisdictional mapping, the analysis identifies the strongest reference countries whose frameworks demonstrate the highest degree of applicability and transferability to Pakistan's agricultural realities. Each issue is then contextualised into Pakistan-specific policy, product and ecosystem recommendations, maintaining a clear distinction between policy formulation, operational implementation, and capacity development.

Pillar 1: Regulation and Policy

Problem Statement 1: Fragmented regulatory coordination across Islamic finance, agriculture, climate-risk, digital infrastructure, and rural development authorities, resulting in slow execution and policy dilution.

a. Systematic Alignment Across International Benchmarks

Malaysia and Indonesia demonstrate structured regulatory coordination through joint steering committees that align central banks, agriculture ministries, commodity boards and digital identity infrastructures. Turkey integrates agriculture financing policy through a unified agricultural credit coordination unit enabling coherent support to smallholders under Islamic structures. Saudi Arabia historically operationalised agricultural *Salam* and *Murabahah* at national scale through state-backed agricultural banks. Saudi Arabia further centralises agriculture financing oversight under national food security strategy, enabling faster execution but within governance contexts different from Pakistan. Kenya and Ethiopia rely on agriculture-focused financial inclusion mandates supported by microfinancing and Agric-tech.

b. Strongest Reference Jurisdictions

Malaysia, Indonesia, and Turkey are most relevant. Malaysia offers a multi-regulator coordination model without statutory consolidation. Indonesia demonstrates collaboration between agriculture, finance and fintech regulators enabling smallholder inclusion. Turkey adds direct relevance through Islamic agriculture financing programmes embedded within national agricultural credit policy.

c. Contextual Alignment for Pakistan

Policy formulation should establish a formal Agriculture-Islamic Finance Coordination Framework anchored jointly by SBP, SECP, Ministry of National Food Security & Research, provincial agriculture departments and climate-infrastructure bodies. Operationalisation should harmonise licensing, product approval, e-KYC, dispute resolution, warehouse collateralisation and climate-risk protocols across departments. Capacity development should strengthen inter-agency skills in Shariah-compliant agricultural markets, risk-sharing supervision, and climate-smart agriculture financing.

Problem Statement 2: Absence of clear policy incentives, targets, and regulatory roadmaps for Islamic agricultural financing despite agriculture's GDP weight.

a. Systematic Alignment Across International Benchmarks

Malaysia and Indonesia set measurable Islamic agricultural finance targets supported by policy-based incentives and priority-sector mandates. Turkey links subsidised Islamic financing with yield-based repayment cycles. Kenya and Ethiopia embed agri-finance within national inclusion strategies supported by blended finance and guarantee schemes. Saudi Arabia supports farms through subsidised Islamic credit lines and risk-sharing funds.

b. Strongest Reference Jurisdictions

Malaysia, Indonesia and Kenya form the most relevant composite model. Malaysia offers a structured Islamic finance regulatory roadmap. Indonesia translates policy signals into product innovation for smallholders. Kenya demonstrates how incentive frameworks can accelerate formal agricultural lending.

c. Contextual Alignment for Pakistan

Pakistan should introduce a national Islamic Agriculture Finance Roadmap with financing targets, innovation incentives and climate-linked subsidy frameworks. Operationalisation should establish outcome-linked incentives for banks/NBFCs based on smallholder financing volume, productivity gains and climate adaptation outcomes. Capacity development should include regulatory toolkits, standard operating procedures, and aligned Shariah-product templates enabling institutions to convert policy direction into executable products.

Pillar 2: Key Industry Players

Problem Statement 3: High climate risk perception, weak collateral structures, informal value chains and elevated monitoring costs restrict institutional willingness to lend.

a. Systematic Alignment Across International Benchmarks

Indonesia deploys value-chain anchored financing where off-takers and cooperatives serve as natural risk mitigants. Malaysia integrates *Takaful*, warehouse receipts and digital crop monitoring to reduce capital risk. Kenya operationalises climate-index insurance enabling smallholder lendability. Turkey applies yield-based and subsidy-linked Islamic financing

models tied to government procurement guarantees.

b. Strongest Reference Jurisdictions

Indonesia, Malaysia and Kenya are most transferable. Indonesia anchors financing through markets rather than land collateral. Malaysia integrates risk-sharing tools including *Takaful* and warehouse receipts. Kenya adds climate adaptation financing maturity.

c. Contextual Alignment for Pakistan

Pakistan should prioritise value-chain anchored risk sharing instead of collateral-dependent financing. Implementation should scale *Salam/Wakalah* contracting tied to procurement guarantees, digital monitoring and climate-index *Takaful*. Capacity building should enable Islamic lenders to underwrite crop risk using yield data, satellite imagery and community verification rather than land security alone.

Problem Statement 4: Institutional capability gaps, risk-averse culture and lack of agriculture-specialised Islamic finance teams.

a. Systematic Alignment Across International Benchmarks

Malaysia maintains professional Shariah-agriculture training streams integrated with banking academies. Indonesia embeds agricultural finance competencies within Islamic fintech development. Turkey trains credit officers in agronomy and risk-sharing structures. Saudi Arabia develops agriculture-focused credit institutions with Islamic operations

b. Strongest Reference Jurisdictions

Malaysia and Turkey emerge as the strongest reference jurisdictions due to their success in embedding agricultural expertise directly within Islamic finance institutions. Both countries have moved beyond ad hoc training towards structured, institutionalised capability development, ensuring agricultural finance is supported by skilled human capital, tailored credit methodologies, and Shariah-informed product design. Indonesia provides an important complementary lesson by demonstrating how such agricultural ecosystem and capabilities can be scaled through digital and fintech ecosystems, particularly for fragmented smallholder segments. Its experience shows that institutional capacity building does not need to be confined to banks alone, but can be distributed across fintechs, cooperatives, and agri-platforms while remaining Shariah-compliant.

c. Contextual Alignment for Pakistan

Pakistan should establish specialist agri-Islamic finance accreditation for bankers, NBFCs and *takaful* providers. Operationalisation should integrate agricultural extension officers into credit assessment workflows. Capacity building should expand joint Shariah agriculture curricula across IBP, NIBAF and agricultural universities.

Pillar 3: People and Farmers

Problem Statement 5: Low farmer trust, weak Shariah literacy and limited awareness of financing rights reduce adoption.

a. Systematic Alignment Across International Benchmarks

Indonesia leverages pesantren networks, cooperatives and rural based village agents for Islamic financial awareness. Malaysia integrates farmer education into product disclosure standards. Kenya operationalises community extension centres for credit education.

b. Strongest Reference Jurisdictions

Indonesia and Malaysia are the most relevant reference jurisdictions for Pakistan due to their success in addressing farmer trust and Shariah literacy through culturally embedded approaches. Indonesia leverages faith-based networks and community institutions to build grassroots understanding and legitimacy of Islamic finance, while Malaysia institutionalises Shariah literacy through clear disclosure standards and farmer-focused education. Together, they demonstrate how community trust-building and formal consumer protection can jointly drive adoption in rural Islamic agricultural finance.

c. Contextual Alignment for Pakistan

Policy formulation should embed Shariah-agri awareness in provincial extension programs. Operationalisation should deploy cooperative-led onboarding, mobile clerics awareness campaigns and simple contract explanations in local languages. Capacity development should train field agents as Shariah-agri finance educators.

Problem Statement 6: Documentation burden and low digital literacy restrict onboarding into formal Islamic agriculture finance channels.

a. Systematic Alignment Across International Benchmarks

Kenya combines USSD onboarding with agent-assisted submissions. Indonesia employs simplified e-KYC via national identity. Malaysia digitises warehouse receipts enabling low-document collateral substitutes.

b. Strongest Reference Jurisdictions (with justification)

Indonesia and Kenya are the most relevant reference jurisdictions for Pakistan as they directly address rural constraints such as limited documentation, low digital literacy, and poor connectivity. Indonesia shows how national ID–based e-KYC can simplify onboarding without excluding small farmers, while Kenya demonstrates the effectiveness of agent-assisted and USSD-based models for farmers using basic mobile phones. Together, they offer practical, inclusion-focused lessons that align well with Pakistan's rural.

c. Contextual Alignment for Pakistan

Pakistan should simplify agri-finance onboarding through NADRA-based e-KYC, Urdu/Pashto/Sindhi Punjabi contract formats and agent-assisted data capture. Capacity building should train lenders in inclusion-centric documentation alternatives.

Pillar 4: Products and Services

Problem Statement 7: Limited product innovation with overdependence on quasi-debt *Tawarruq* and poor alignment to crop cycles.

a. Systematic Alignment Across International Benchmarks

Indonesia operationalises *Salam, Musharakah and Murabahah* tied to harvest cycles. Turkey finances seasonal inputs through Islamic subsidised credit. Malaysia deploys hybrid structures combining *Wakalah* and *Murabahah* for production financing.

b. **Strongest Reference Jurisdictions (with justification)**

Indonesia offers strong application of classical agricultural contracts in Islamic finance such as using *Murabahah, Ijarah, Mudharabah, Musharakah, Musharakah Muthanaqisah* and

Wakalah Bil Ujroh with *Qard.* Malaysia supports scalable hybridisation for modern systems.

c. Contextual Alignment for Pakistan

Policy should guide banks toward crop-cycle-based contracts (*Salam/Wakalah/Musharakah*) over *Tawarruq* lending. Operationalisation should link repayments to harvest schedules. Capacity development must train product teams in contract sequencing, risk pricing and inventory-based Islamic finance.

Problem Statement 8: Weak risk-sharing instruments, low *Takaful* penetration and underdeveloped warehouse receipt financing.

a. Systematic Alignment Across International Benchmarks

Kenya applies weather-index crop insurance facilitating credit. Malaysia integrates *Takaful* subsidies and WRS-backed financing. Turkey embeds government procurement guarantees.

b. Strongest Reference Jurisdictions

Malaysia and Kenya offer the most relevant benchmarks for risk-transfer and mitigation, particularly through structured *takaful* integration and portfolio-level risk-sharing mechanisms that reduce financier exposure in agricultural financing. Turkey adds value by demonstrating procurement-backed settlement assurance, where off-taker-linked payment mechanisms improve cash-flow certainty and lower default risk. Together, these jurisdictions illustrate complementary approaches to managing agricultural risk beyond collateral dependence.

c. Contextual Alignment for Pakistan

Pakistan must scale Warehouse Receipt System (WRS) Shariah models, link premiums to climate-index *takaful* and partner with Pakistan Agricultural Storage & Services Corporation Limited (PASSCO) for *Salam* settlement guarantees. Capacity building should enable insurers and banks to price yield/crop weather risk effectively.

Pillar 5: Shariah Governance

Problem Statement 9: Fragmented Shariah oversight causing inconsistent rulings and prolonged product approval timelines.

a. Systematic Alignment Across International Benchmarks

Malaysia centralises Shariah rulings with enforceability. Indonesia manages fatwa issuance centrally for Islamic rural banks. Saudi Arabia integrates Shariah oversight institutionally.

b. Strongest Reference Jurisdictions

Malaysia and Bahrain offer the most transferable Shariah governance frameworks for scalable Islamic finance, with strong centralised Shariah oversight, standard-setting, and clear institutional accountability. Indonesia complements this by adding practical agricultural finance relevance, demonstrating how Shariah governance can be applied flexibly to agri-finance products and rural delivery models.

c. Contextual Alignment for Pakistan

Pakistan should establish national Shariah agriculture standards endorsed jointly by SBP/SECP Shariah boards. Implementation must integrate Shariah review directly into product licensing and supervisory audits. Capacity building should enhance Shariah-agri audit capability.

Problem Statement 10: Lack of operational manuals, contract templates and Shariah guidance for agriculture products.

a. Systematic Alignment Across International Benchmarks

Malaysia provides structured templates and operational toolkits. Indonesia publishes fatwa implementation guidelines for the agriculture ecosystem sector. Saudi Arabia emphasises institutional documentation discipline.

b. Strongest Reference Jurisdictions

Malaysia provides replicable documentation frameworks. Indonesia adds context for real agricultural transactions.

c. Contextual Alignment for Pakistan

Pakistan should develop agriculture Shariah product toolkits with sample contracts, warehouse receipts, *takaful* addendums and SOPs. Capacity development should train industry on operationalising contracts rather than checking post-fact compliance.

Pillar 6: Technology and Infrastructure

Problem Statement 11: Lack of interoperability among banks, agri-tech, telcos, cooperatives and value-chain actors restricts integration and data flow.

a. Systematic Alignment Across International Benchmarks

Malaysia interlinks crop supply chains with financing data. Indonesia integrates fintechs with farmer registries. Turkey links subsidies, procurement and finance digitally. Kenya connects agriculture finance to mobile money rails. Saudi Arabia deploys centralised agriculture data hubs.

b. Strongest Reference Jurisdictions

Malaysia and Indonesia best reflect Pakistan's multi-actor system. Kenya demonstrates interoperability via mobile-led rails.

c. Contextual Alignment for Pakistan

Pakistan should mandate data API integration across Raast, PARC crop registries, warehousing information systems and Islamic lenders. Capacity development must strengthen API governance, agri-fintech integration and data-risk supervision.

Problem Statement 12: Uneven rural connectivity and digital adoption limit outreach and scalability.

a. Systematic Alignment Across International Benchmarks

Indonesia uses hybrid physical-digital field agent models. Malaysia aligns agri-finance to national broadband roll-out. Kenya operates offline USSD based financing.

b. Strongest Reference Jurisdictions

Indonesia and Kenya are directly transferable. Malaysia adds structural planning relevance.

c. Contextual Alignment for Pakistan

Pakistan should deploy hybrid delivery models combining agent-assisted financing, offline onboarding and USSD channels. Capacity development should train agri-fintechs in low-connectivity operation models.

Table 4.4: Consolidated Table of Integrated Policy Recommendation from Systematic Alignment of International Benchmarks to Pakistan's Shariah-Agriculture Financing – Consolidated Assessment

Pillar	Problem Statement	Consolidated Gaps (Policy, Operational, Capacity)	Strongest Reference Country from 8 Benchmarked Jurisdictions (Rationale)	Integrated Policy Formulation, Operational Development & Capacity Building Recommendations
1. Regulation & Policy	Fragmented regulatory coordination across Islamic finance, agriculture, climate-risk, digital infrastructure, and rural development authorities,	**Policy:** No formal Agriculture-Islamic Finance Coordination Framework. **Operational:** Licensing, product approval, e-KYC, warehouse, and climate-risk protocols are fragmented. **Capacity:**	Malaysia, Indonesia, Turkey, Malaysia has multi-regulator coordination without statutory consolidation; Indonesia demonstrates collaboration between agriculture, finance, and fintech	**Policy Formulation:** Establish formal Agriculture-Islamic Finance Coordination Framework anchored by SBP, SECP, Ministry of National Food Security & Research, provincial agriculture departments,

		Limited inter-agency expertise in Shariah-compliant agri-financing and climate-smart risk assessment.	regulators; Turkey embeds Islamic agriculture financing into national agricultural credit policy.	and climate-infrastructure bodies. **Operational:** Harmonise licensing, product approval, e-KYC, dispute resolution, warehouse collateralisation, and climate-risk protocols. **Capacity:** Strengthen inter-agency skills in Shariah-compliant agricultural markets, risk-sharing supervision, and climate-smart agriculture financing.
	Absence of clear policy incentives, targets, and regulatory	**Policy:** No national Islamic agri-finance roadmap or financing	Malaysia, Indonesia, Kenya – Malaysia offers structured	**Policy:** Introduce national Islamic Agriculture Finance

	roadmaps for Islamic agricultural financing despite agriculture's GDP weight.	targets. **Operational:** Banks and NBFCs lack outcome-linked incentives. **Capacity:** Limited tools and templates to convert policy into Shariah-compliant products.	Islamic finance roadmap; Indonesia translates policy signals into smallholder innovation; Kenya demonstrates incentive frameworks accelerating formal agricultural lending.	Roadmap with financing targets, innovation incentives, and climate-linked subsidy frameworks. **Operational:** Outcome-linked incentives for smallholder financing volume, productivity gains, and climate adaptation outcomes. **Capacity:** Provide regulatory toolkits, SOPs, and Shariah-product templates to enable execution.
2.Key Industry Players	High climate risk perception, weak collateral structures,	**Policy:** Lack of risk-sharing or value-chain-linked financing	Indonesia, Malaysia, Kenya – Indonesia	**Policy:** Promote value-chain anchored risk-sharing

	informal value chains, and elevated monitoring costs restrict institutional willingness to lend.	mandates. **Operational:** Reliance on land collateral and traditional lending channels. **Capacity:** Banks/NBFCs under-equipped to underwrite yield, climate, and crop risk digitally.	anchors financing through markets rather than land; Malaysia integrates risk-sharing tools; Kenya demonstrates climate adaptation finance.	financing**.** **Operational:** Scale *Salam/Wakalah* contracts tied to procurement guarantees, digital monitoring, and climate-index *Takaful*. **Capacity:** Train lenders in crop risk underwriting using yield data, satellite imagery, and community verification**.**
	Institutional capability gaps, risk-averse culture, and lack of agriculture-specialised Islamic finance teams.	**Policy:** No specialist agri-Islamic finance accreditation. **Operational:** Credit assessment lacks integration with agronomy knowledge. **Capacity:** Limited	Malaysia, Turkey – Malaysia builds professional agri-finance capacity; Turkey integrates credit officer agronomy training; Indonesia	**Policy:** Establish specialist agri-Islamic finance accreditation. **Operational:** Integrate agricultural extension officers into credit assessment

		technical expertise in Shariah-compliant agri financing.	extends to fintech ecosystems.	workflows. **Capacity:** Expand joint Shariah-agriculture curricula across IBP, NIBAF, and agricultural universities.
3. People / Farmers	Low farmer trust, weak Shariah literacy, and limited awareness of financing rights reduce adoption.	**Policy:** Shariah-agri awareness not embedded in national extension programs. **Operational:** Low cooperative-led onboarding, limited outreach. **Capacity:** Field agents lack Shariah-finance education.	Indonesia, Malaysia – culturally and socially closest to Pakistan context.	**Policy:** Embed Shariah-agri awareness in provincial extension programs. **Operational:** Deploy cooperative-led onboarding, mobile clerics campaigns, simple local-language contracts. **Capacity:** Train field agents as Shariah-agri finance educators.
	Documentation burden and low digital literacy	**Policy:** No simplified e-KYC or	Indonesia, Kenya – direct relevance to	**Policy:** Simplify onboarding via

	restrict onboarding into formal Islamic finance channels.	multilingual templates. **Operational:** Rural onboarding processes are complex and paper-heavy. **Capacity:** Banks/NBFCs lack inclusive design expertise.	rural Pakistan	NADRA-based e-KYC, **multilingual** contracts. **Operational:** Implement agent-assisted data capture. **Capacity:** Train lenders in inclusion-centric documentation alternatives.
4. Products & Services	Limited product innovation with overdependence on quasi-debt *Tawarruq* and poor alignment to crop cycles.	**Policy:** Insufficient crop-cycle aligned contract guidance. **Operational:** Conventional credit replication. **Capacity:** Weak product structuring and risk-pricing skills.	Indonesia – strong use of classical agri contracts; Malaysia, scalable hybrid models.	**Policy:** Guide NBFC toward crop-cycle-based contracts (*Salam/Wakalah /Musharakah*). **Operational:** Link repayments to harvest schedules**.** **Capacity:** Train product teams in contract sequencing, risk pricing, and inventory-based Islamic finance.

	Weak risk-sharing instruments, low *Takaful* penetration, and underdeveloped warehouse receipt financing.	**Policy:** No integrated risk-sharing framework. **Operational:** Limited WRS and *Takaful* linkages. **Capacity:** Weak insurer-bank collaboration.	Malaysia, Kenya, Turkey risk-transfer and procurement-backed models.	**Policy:** Scale WRS Shariah models, link premiums to climate-index *Takaful*. **Operational:** Partner with PASSCO for *Salam* settlement guarantees. **Capacity:** Enable insurers and banks to price yield/weather risk.
5. Shariah Governance	Fragmented Shariah oversight causing inconsistent rulings and prolonged product approval timelines.	**Policy:** Lack of national Shariah agriculture standards. **Operational:** Product licensing not integrated with Shariah review. **Capacity:** Limited Shariah-audit capability.	Malaysia, Indonesia – centralised Shariah governance models.	**Policy:** Establish national Shariah agriculture standards endorsed by SBP/SECP. **Operational:** Integrate Shariah review into licensing and audits. **Capacity:** Build Shariah-agri

				audit capability.
	Lack of operational manuals, contract templates, and Shariah guidance for agriculture products.	**Policy:** No standardized manuals or templates. **Operational:** Non-uniform workflows. **Capacity:** Limited applied implementation expertise.	Malaysia and Indonesia full end to end agric financing guidance.	**Policy:** Develop agriculture Shariah product toolkits with sample contracts, WRS, *Takaful* addendums, SOPs. **Operational:** Standardise workflows and documentation. **Capacity:** Train industry to operationalise contracts.
6. Technology & Infrastructure	Lack of interoperability among banks, agri-tech, telcos, cooperatives, and value-chain actors restricting integration and data flow.	**Policy:** No interoperability governance. **Operational:** Fragmented digital platforms. **Capacity:** Weak technical supervision skills.	Malaysia, Indonesia, Kenya: multi-actor integration; mobile-money interoperability.	**Policy:** Mandate API integration across Raast, PARC crop registries, warehousing, and lenders. **Operational:** Enable cross-platform integration**.** **Capacity:** Strengthen API

				governance, agri-fintech integration, and data-risk supervision.
	Uneven rural connectivity and digital adoption limit outreach and scalability.	**Policy:** No inclusion-aligned digital infrastructure strategy. **Operational:** Urban-centric delivery. **Capacity:** Limited low-connectivity delivery expertise.	Indonesia, Kenya: hybrid agent/digital models; Malaysia: broadband strategy alignment.	**Policy:** Deploy hybrid delivery combining agent-assisted financing, offline onboarding **Operational:** Support last-mile connectivity operations. **Capacity:** Train agri-fintechs in low-connectivity service delivery.

4.5 Key Recommendation 1 - Policy Intervention (Regulatory, Shariah and Legal Development)

Key Policy Intervention Recommendations Pillar 1: Regulatory Frameworks, Policy, and Legal Development

Shariah-compliant agricultural financing in Pakistan currently faces structural and operational constraints that limit its scale, efficiency, and credibility. Two interlinked challenges dominate the landscape. First, regulatory fragmentation across multiple authorities including the State Bank of Pakistan (SBP), Securities and Exchange Commission of Pakistan (SECP), Ministry of National Food Security & Research (MNFSR), provincial agriculture departments, and

digital infrastructure providers, leads to inconsistent oversight, delayed approvals, and diluted policy implementation. Secondly, there is an absence of clear policy encouragement, national targets, success metrics, incentives, and enforcement mechanisms for Islamic agricultural financing despite agriculture's sizable contribution to GDP. Without directional policy signals, sector players lack guidance and motivation to scale Shariah-compliant agriculture portfolios.

Success hinges on deliberate policy design that aligns regulatory mandates, clarifies institutional pathways, codifies Shariah governance expectations, and builds sustained execution capacity. Benchmarked jurisdictions such as Malaysia, Indonesia, Turkey, and Saudi Arabia illustrate that structured inter-agency coordination, clear legal frameworks, and operational milestone management are critical enablers for scaling Islamic agricultural finance while maintaining Shariah integrity.

The following recommendations for Pakistan are structured across policy formulation, operational development, and capacity building, reflecting lessons from these jurisdictions while being calibrated to Pakistan's legal, institutional, and rural market realities.

Policy Domain	Strategic Focus	Key Policy Intervention Recommendation (Consolidated)	Why This Is Well-Fitted for Pakistan
Policy Formulation	Regulatory coherence and institutional clarity	Establish a formal inter-agency coordination framework for Shariah-compliant agricultural financing among SBP, SECP, MNFSR, provincial agriculture departments, NADRA, PTA, and	Pakistan's current challenge is fragmented oversight across finance, agriculture, and digital infrastructure authorities. Functional coordination avoids complex legislative restructuring while materially improving

		PDA, without altering existing statutory mandates. Issue explicit guidance defining permissible models for Islamic NBFCs, agri-finance fintechs, and other Shariah-compliant entities, including regulatory end-state clarity, transitional governance arrangements, Shariah oversight expectations, and disclosure requirements.	regulatory coherence. Clear guidance reduces uncertainty for boards, investors, and supervisors, creating confidence for long-term participation in Shariah-compliant agricultural finance.
	Incentives and national roadmap for inclusion	Develop a National Islamic Agricultural Finance Roadmap with measurable lending targets, innovation incentives, priority-sector mandates, and climate-linked subsidy frameworks.	Pakistan lacks structured incentives for agricultural financing despite agriculture's GDP importance. A roadmap with clear targets aligns institutions to national priorities, encourages innovation, and promotes

			smallholder inclusion.
Operational Development	Predictable and aligned supervisory execution	Translate policy coordination into harmonised regulatory processes, including aligned licensing workflows for Islamic agricultural NBFCs and fintechs, sandbox entry and exit criteria, digital onboarding and e-KYC standards, and supervisory reporting requirements. Introduce milestone-based supervisory oversight for Islamic agricultural NBFC conversion and onboarding, treating transition as a structured operational journey rather than a one-off approval.	Operational misalignment is a major bottleneck for agricultural Shariah finance. Process harmonisation shortens time-to-market, reduces duplication, and improves supervisory transparency. Milestone-based oversight preserves Shariah integrity while accommodating institutional readiness, avoiding excessive rigidity or discretionary uncertainty.
	Outcome-linked financing and conversion	Implement milestone-based incentives and	Operational alignment ensures that policy objectives

	supervision	supervisory oversight for banks and NBFCs, linking financing volumes, productivity gains, and climate adaptation results to performance metrics.	translate into actionable financing outcomes. Milestone supervision reduces uncertainty and encourages compliance.
Capacity Building	Sustained regulatory effectiveness and market credibility	Invest in inter-agency capacity development through joint training programs, shared analytical frameworks, and structured knowledge exchange on Shariah-compliant agricultural finance, climate-smart risk assessment, and value-chain monitoring. Complement this with industry-facing toolkits, operational manuals, and applied training programs for boards, senior management, and Shariah committees	Without shared expertise, coordination mechanisms risk being procedural rather than effective. Targeted capacity building ensures consistent regulatory interpretation, improves compliance quality, and reduces supervisory friction. Strengthening board- and Shariah-level capability ensures agricultural NBFC establishment or conversion is treated as strategic transformation rather than mere compliance.

		involved in agricultural finance establishment or conversion.	
	Applied Shariah and agri-finance expertise	Establish specialist training and certification programs for bankers, NBFCs, *Takaful* providers, and fintechs, integrating Shariah, agricultural knowledge, and risk-sharing principles. Include agricultural extension officers in lending workflows.	Pakistan's talent gap in agri-Islamic finance limits adoption. Integrated capacity development strengthens both regulator and industry capabilities, enabling credible and scalable deployment of Shariah-compliant agricultural finance.

A. Policy Formulation: Establishing Regulatory Coherence and Institutional Clarity

Pakistan's primary policy challenge is fragmented oversight of agricultural finance at the intersection of Shariah governance, banking supervision, rural development, and climate-resilient agriculture. Without a unifying policy framework, regulatory expectations diverge, licensing procedures vary, and stakeholders are left uncertain about permissible product structures, risk-sharing mechanisms, and governance requirements.

Policy Intervention Recommendation:

1. **Establish a National Islamic Agricultural Finance Coordination Framework**: anchored jointly by SBP, SECP, MNFSR, provincial agriculture departments, and relevant digital and infrastructure authorities (e.g., NADRA, PTA, PDA). This framework should coordinate policy, supervision, and enforcement across all entities

involved in Shariah-compliant agricultural financing without altering statutory mandates.

2. **Issue explicit legal and regulatory guidance on Islamic agricultural finance entity establishment and transition**, including:
    - Licensing criteria for new Islamic NBFCs focused on agriculture, smallholders, and value-chain actors.
    - Governance expectations, including Shariah board composition, risk-sharing oversight, and internal audit requirements.
    - Standardised disclosure and reporting requirements for both lenders and agribusiness clients.

Regulatory fragmentation, rather than absence, is the core challenge. Formal coordination avoids complex legal restructuring while materially improving clarity, enabling boards, investors, and supervisors to make informed, long-term commitments. Malaysia demonstrates the effectiveness of formal coordination across multiple regulators, Indonesia reinforces the need for collaboration even under unified regulation, and Turkey shows direct applicability through integrated Islamic agriculture credit programs.

B. Operational Development: Translating Policy into Coherent and Predictable Practices

Policy coherence requires aligned operational execution to ensure timely approvals, consistent supervision, and efficient market access for Shariah-compliant agricultural finance. Current operational gaps in Pakistan include fragmented licensing, inconsistent digital onboarding and e-KYC processes, lack of standardized credit and risk assessment frameworks, and uncoordinated supervision of NBFC conversion.

Policy Intervention Recommendation:

1. **Harmonise regulatory workflows** for agricultural finance:
    - Licensing and product approval processes across SBP, SECP, and provincial authorities.
    - Standardized sandbox participation criteria and exit protocols for digital and NBFC-based agricultural finance pilots.
    - Unified digital onboarding, e-KYC, and warehouse receipt registration standards to facilitate smallholder inclusion.

2. **Introduce milestone-based supervisory oversight for entity conversion and product launches**, ensuring that transition to Shariah-compliant operations occurs as a managed operational journey, with checkpoints covering:
    - Governance readiness and internal Shariah review capacity.
    - Segregation of conventional and Shariah-compliant portfolios.
    - Progressive integration of risk-sharing and climate-smart agricultural lending practices.

Operational fragmentation is the major friction point in digital and Shariah-compliant agricultural finance. Evidence from Indonesia's phased conversion models and Malaysia's hybrid hybridized supervision demonstrates that milestone-based operational guidance preserves Shariah integrity, reduces supervisory discretion, and accelerates market entry while maintaining compliance quality.

C. Capacity Building: Sustaining Regulatory Effectiveness and Market Credibility

Even well-articulated policies and operational processes will not be effective without strong regulatory and industry capacity. Pakistan currently suffers from uneven expertise across regulators, limited applied Shariah interpretation skills for agriculture, and a shortage of trained personnel capable of managing value-chain, risk-sharing, and climate-adapted financing models.

Policy Intervention Recommendation:

1. **Inter-agency capacity development**:
    - Joint training programs on Shariah-compliant agricultural finance, risk-sharing instruments, climate-smart agriculture, and digital integration.
    - Structured knowledge exchange, simulation exercises, and applied scenario analysis across regulators.
2. **Industry-focused capacity building**:
    - Toolkits, operational manuals, and applied training programs for boards, management, and Shariah committees of Islamic agricultural NBFCs and banks.
    - Certification and skill-building programs integrating agricultural science, digital finance, and Shariah-compliant product design.

- Practical guidance on warehouse receipt finance, *Takaful*-linked lending, *Salam/Musharakah* contract structuring, and integration with fintech platforms for smallholder inclusion.

Without shared expertise, inter-agency coordination risks remaining procedural, and industry adoption of Shariah-compliant agricultural finance remains shallow. Malaysia and Bahrain demonstrate that structured training, applied toolkits, and practitioner-oriented guidance significantly improve compliance, operational execution, and market credibility.

Why This Intervention Set Fits Pakistan

Collectively, these policies, operational, and capacity interventions are well-fitted to Pakistan because they:

- Build on existing institutions rather than imposing disruptive restructuring.
- Draw on proven international practice in Malaysia, Indonesia, Turkey, and Bahrain.
- Address structural bottlenecks in Shariah-compliant agricultural financing: fragmentation, operational misalignment, and skill gaps.
- Enable predictable, credible, and scalable financing for smallholders and value-chain actors, safeguarding Shariah integrity, reducing transition risk, and promoting innovation in climate-smart, ethical agriculture financing.

By strengthening regulatory coherence, clarifying institutional pathways, and building execution capacity, Pakistan can move from fragmented oversight and discretionary approvals toward a robust, integrated Shariah-compliant agricultural finance ecosystem capable of supporting smallholder inclusion, value-chain efficiency, and sustainable agricultural development.

Key Policy Intervention Recommendations Pillar 2: Shariah Governance and Compliance in Shariah-Compliant Agricultural Financing

From a Shariah governance perspective, policy interventions in agricultural finance should prioritise template unification to suit different categories of the ecosystem. This requires strengthening coordinated Shariah governance under regulatory oversight while preserving scholarly diversity. Pakistan should adopt a phased approach, enhancing transparency, standardisation, and supervisory integration. Interventions include development of public

repositories of approved agricultural Shariah structures, standard disclosure templates, and regulator-endorsed operational guidance for agricultural financing products. Over time, this framework can evolve toward greater harmonisation as institutional capacity, trust, and adoption mature.

Policy Domain	Strategic Focus	Key Policy Intervention Recommendation (Consolidated)	Why This Is Well-Fitted for Pakistan
Policy Formulation	Integrated Shariah governance for agricultural finance	Strengthen regulatory oversight of Shariah governance by linking fatwas and Shariah rulings directly to licensing, product approval, and supervisory expectations. Develop agriculture-specific Shariah operational standards covering *Murabahah, Salam, Musharakah, Wakalah*, and *Takaful* integration.	Pakistan has strong scholarly resources, but Shariah rulings are often disconnected from regulatory supervision. Integrated governance ensures consistent interpretation and application in agricultural finance without undermining scholarly diversity.
Operational Development	Embedding Shariah review into the agricultural finance lifecycle	Embed Shariah supervision into licensing, product approval, and ongoing monitoring for agricultural	Embedding Shariah oversight reduces duplication, ensures compliance is proactive, and integrates ethical

		financing. Standardise workflows, document templates, reporting formats, and contract libraries tailored to crop-cycle, livestock, and value-chain financing. Include Shariah checkpoints aligned with prudential, consumer protection, and climate-risk oversight.	finance principles into operational workflows. This is crucial for agriculture, where seasonal cycles, off-taker agreements, and yield-based repayments require real-time oversight.
Capacity Building	Applied Shariah audit and supervisory expertise	Build regulator and industry capacity in agricultural Shariah governance, including Shariah audit, operational review, and risk-based compliance supervision. Provide joint training, practical manuals, and structured engagement between regulators, banks, NBFCs, and *Takaful* providers.	Pakistan currently lacks applied Shariah audit skills in agricultural financing. Capacity development ensures governance translates from form-based compliance into actionable, risk-sensitive, and ethically aligned supervision.

Policy Formulation	Standardisation and transparency	Develop public repositories of approved Shariah agricultural structures, contract templates, and disclosure frameworks for financial products including warehouse receipt-backed financing, *Salam, Musharakah*, and *Takaful*-linked credit.	Standardisation reduces ambiguity for institutions and farmers, improves adoption, and supports consistent market practice without centralising scholarly authority.
Operational Development	Integrated Shariah-risk management	Align Shariah oversight with climate-index insurance, crop monitoring, warehouse receipt systems, and off-taker guarantees. Incorporate supervisory review of Shariah compliance into risk assessment and loan approval workflows.	Agricultural finance involves multi-dimensional risks (production, climate, counterparty). Integrating Shariah oversight with risk management ensures ethical, viable, and scalable financing.
Capacity Building	Continuous professional development and	Implement ongoing training programs for Shariah committees,	Enhances sustainability of Shariah governance,

	knowledge sharing	boards, and operational teams on practical application of Shariah principles in agricultural finance, including digital agriculture platforms. Promote knowledge-sharing forums across regulators, banks, and agricultural stakeholders.	strengthens institutional memory, and enables rapid adaptation to innovative agricultural financing models, including digital delivery and fintech solutions.

A. Policy Formulation: Reconnecting Shariah Rulings with Agricultural Finance Supervision

Pakistan's Shariah governance framework is strong in scholarship but fragmented in supervision. Agricultural finance presents additional complexity due to crop cycles, value-chain dependencies, and climate risk. Policy should explicitly link Shariah rulings to regulatory licensing, product approval, and supervisory reviews for agricultural products. International benchmarks show:

- **Malaysia**: Treats Shariah governance as a supervisory domain rather than purely institutional.
- **Indonesia**: Publishes operational guidance for agriculture-linked Islamic finance.

Policy action in Pakistan should therefore provide practical operational standards for *Murabahah, Salam, Musharakah, Wakalah, Takaful* integration, and warehouse receipt financing to create a shared interpretive reference for regulators and institutions.

B. Operational Development: Embedding Shariah Review in Agricultural Finance Processes

Shariah review must be operationally embedded throughout agricultural finance processes:

- **Licensing**: Include Shariah assessment in NBFC and fintech approvals for agri-finance products.
- **Product Approval**: Check Shariah compliance alongside prudential soundness, climate-risk assessment, and off-taker agreements.
- **Ongoing Supervision**: Monitor compliance dynamically, considering seasonal repayment schedules, yield fluctuations, and off-taker contract performance.

This integration ensures that Shariah compliance is proactive and operationally relevant, preventing ex-post corrections and reducing supervisory friction.

C. Capacity Building: Strengthening Agricultural Shariah Audit and Supervision

Capacity building should focus on:

- Developing applied audit skills for regulators and institutions.
- Training boards, Shariah committees, and operational staff on operationalising Shariah for crop-cycle, value-chain, and climate-smart financing.
- Facilitating joint regulator-industry workshops, knowledge-sharing, and scenario-based training on agricultural finance risk and Shariah compliance.

These measures ensure Shariah governance in agricultural finance is credible, consistent, and value-adding, rather than a procedural exercise.

Why This Intervention Set Fits Pakistan

This policy intervention strengthens Shariah governance in Pakistan's agricultural financing by enhancing oversight and integration without centralising scholarly authority. It ensures that Shariah compliance is embedded throughout operational and supervisory processes, aligning product design, licensing, and monitoring with ethical principles. At the same time, it builds institutional capacity to manage complex agricultural financing structures, including digital delivery models, climate-smart initiatives, and value-chain-based risk-sharing mechanisms. By moving from form-based checklist compliance toward principle-based supervision, this

approach promotes credible, ethical, and scalable Shariah-compliant agricultural finance capable of supporting innovation and sustainable rural development.

Key Policy Intervention Recommendations Pillar 3: Key Islamic NBFC Industry Players

The development of a resilient and scalable Shariah-compliant agricultural financing ecosystem in Pakistan depends critically on the strategic orientation and capability of Islamic NBFCs and other non-bank financial intermediaries. These institutions occupy a pivotal position in bridging gaps left by conventional banks, particularly in providing financing to smallholder farmers, cooperatives, agritech platforms, and value-chain actors. Despite their strategic importance, the sector currently faces constraints that limit its ability to deliver widespread, sustainable, and ecosystem-integrated agricultural finance.

This underperformance is primarily structural rather than demand-driven. Key challenges include misaligned growth incentives, limited operationalisation of partnerships, and insufficient institutional capacity to manage complex agricultural financing models, including climate-smart and digital solutions. Policy and supervisory frameworks have traditionally emphasised standalone balance-sheet expansion rather than ecosystem participation, co-origination, and integration with agritech platforms or value-chain actors. In capital-constrained rural and agricultural markets, such asset-heavy growth models are both unsustainable and suboptimal for inclusive impact.

Global experience indicates that sustainable scale in agricultural Islamic finance is increasingly ecosystem-driven rather than institution-centric. Integration with digital agritech platforms, cooperatives, off-takers, and climate-smart insurance providers allows Islamic NBFCs to expand outreach, mitigate risk, and optimize capital utilisation. These models are particularly relevant for Pakistan, where financing demand is dispersed across smallholders, documentation is limited, and the economic viability of farms often depends on seasonal and climate-related factors.

For Pakistan, advancing Islamic NBFC-led agricultural finance therefore requires deliberate policy, operational, and capacity interventions that shift focus from isolated institutional growth to ecosystem integration. This involves reorienting incentives, operationalising partnerships across agricultural value chains, and strengthening institutional capability to

manage complex, risk-sharing, and digitally enabled agricultural finance structures. The following table summarises the integrated recommendations.

Policy Domain	Strategic Focus	Key Policy Intervention Recommendation (Consolidated)	Why This Is Well-Fitted for Pakistan
Policy Formulation	Incentive alignment and ecosystem-driven growth	Reframe Islamic NBFC policy incentives to prioritise outcome-linked, value-chain integrated, and ecosystem-oriented objectives. Recognise and reward platform-based, partnership-led scaling models for agricultural finance. Introduce measurable targets for smallholder inclusion, climate-smart investment, and digital delivery.	Pakistan's agricultural finance sector is capital-constrained and fragmented. Outcome-linked, partnership-focused incentives encourage innovation, scale, and inclusion, aligning institutional growth with national agricultural development priorities.
Operational Development	Partnership-driven execution and integration	Enable co-origination, risk-sharing, and value-chain collaboration between Islamic NBFCs, Islamic banks, agritech	Pakistan's agricultural finance ecosystem is diverse and distributed. Operational support for partnerships unlocks scale

		platforms, cooperatives, off-takers, and digital finance providers. Establish clear regulatory guidance for partnership structures, third-party risk allocation, and supervisory expectations. Operationalise repeatable, scalable, and Shariah-compliant agricultural financing workflows.	without excessive balance-sheet risk, ensures Shariah compliance in collaborative structures, and integrates financing into real economic activity such as farm inputs, storage, and marketing
Capacity Building	Institutional scalability and execution readiness	Strengthen institutional capabilities in partnership management, agritech integration, digital operations, risk-sharing structuring, and climate-smart financing. Build boards' and management teams' competencies in governance for	Many Islamic NBFCs have the intent but lack the skills to execute complex agricultural financing at scale. Capacity building equips institutions to operationalise partnerships, manage risk, implement Shariah-compliant contracts, and deliver inclusive, digitally enabled

		shared platforms, third-party oversight, and value-chain risk assessment. Provide applied training, operational manuals, and scenario-based capacity development programmes.	agricultural finance sustainably.

A. Policy Formulation: Reorienting Incentives Toward Ecosystem-Enabled Agricultural Finance

Pakistan's Islamic NBFCs are strategically positioned to address financing gaps in agriculture, particularly for smallholders, cooperatives, and digital agritech platforms. However, existing policy incentives largely favour balance-sheet growth and institution-centric models, which are ill-suited to the distributed, high-friction agricultural sector.

International benchmarks highlight ecosystem-driven approaches as superior for sustainable scale. Indonesia has successfully integrated Islamic NBFCs with smallholder cooperatives and digital platforms, enabling risk mitigation and outreach without capital-intensive expansion. Malaysia reinforces outcome-oriented regulatory support, rewarding innovation and integration over mere asset accumulation.

Pakistan should therefore explicitly recognise platform-based, partnership-led scaling models as legitimate pathways for agricultural Islamic finance. Outcome-linked incentives should target smallholder inclusion, value-chain participation, climate adaptation, and digital integration, providing a clear policy signal that these models are valued, feasible, and compliant with Shariah principles. This alignment reduces pressure on NBFCs to pursue unsustainable, asset-heavy strategies and channels investment toward high-impact agricultural finance outcomes.

B. Operational Development: Enabling Partnership-Led Execution Across Agricultural Value Chains

Policy clarity must be matched with operational guidance that facilitates partnerships rather than treating them as exceptional arrangements. Pakistan's Islamic NBFCs currently face uncertainty in structuring co-origination, risk-sharing, or embedded finance arrangements with banks, cooperatives, agritech firms, and off-takers. This friction increases transaction costs and slows scale.

Operational development should embed partnership enablement into supervisory and approval frameworks. Benchmarks demonstrate that clear guidance on governance, risk allocation, and accountability enables scalable collaboration while maintaining Shariah integrity. Indonesia's value-chain financing models illustrate how NBFCs can extend financing to farmers and cooperatives with minimal balance-sheet exposure, while Malaysia shows that supervisory clarity accelerates adoption of innovative structures.

In Pakistan, co-origination, risk-sharing, and embedded finance arrangements should be supported through transparent approvals, standardised partnership templates, and integrated supervisory reporting. Operationalising these collaborations ensures financing is linked to productive agricultural activity, including input supply, harvesting, storage, and market access. By focusing on repeatable, partnership-led delivery, Islamic NBFCs can achieve scale, efficiency, and Shariah compliance simultaneously.

C. Capacity Building: Developing Institutional Readiness for Scalable Agricultural Finance

Even with aligned policy and operational frameworks, institutional capacity remains a decisive factor. Many Islamic NBFCs lack experience in managing partnership networks, integrating digital platforms, or structuring complex agricultural financing products, including climate-indexed instruments, *Salam/Wakalah* contracts, and warehouse receipt-backed financing.

Capacity building should prioritise:

- Governance and oversight of third-party partnerships, including risk-sharing and compliance management
- Operational management of platform-based and digitally enabled agricultural finance
- Structuring and pricing of Shariah-compliant contracts tailored to smallholders, cooperatives, and value-chain participants

- Climate-smart and digital finance integration, including remote monitoring, data analytics, and e-warehouse management

Applied training programmes, operational manuals, and scenario-based workshops will equip boards, management, and operational teams to scale agricultural finance sustainably, reduce supervisory reliance, and ensure Shariah integrity in all processes.

Why This Intervention Set Fits Pakistan

This integrated set of interventions is particularly well-suited to Pakistan's agricultural finance landscape as it fundamentally shifts the focus from capital-heavy growth to outcome-driven, ecosystem-oriented development. By operationalising collaboration across agricultural value chains, these measures unlock scale, enhance efficiency, and ensure Shariah compliance throughout financing processes. At the same time, they build institutional capacity to manage complex agricultural financing structures, including climate-smart initiatives, digitally enabled solutions, and risk-sharing mechanisms. Implementing this framework will enable Pakistan to cultivate a credible, scalable, and ethical Shariah-compliant agricultural financing sector, positioning Islamic NBFCs as active integrators within the broader agricultural ecosystem rather than isolated lenders, while promoting inclusive rural development and sustainable growth.

4.6 Key Recommendation 2 – Shariah Compliant Agriculture Financing Product Development, Operating Model and Shariah Contract

4.6.1 Key Policy Intervention Recommendations Pillar 4: Products and Services in Shariah-Compliant Agricultural Financing

From a products and services perspective, policy interventions in Shariah-compliant agricultural finance must address structural overreliance on quasi-debt instruments, weak risk-sharing mechanisms, and insufficient integration with agricultural production cycles. Current practices in Pakistan remain heavily skewed toward *Tawarruq*-based financing, offering limited responsiveness to seasonal cash flows, climate volatility, and value-chain dependencies. To unlock scale, resilience, and ethical alignment, policy should guide a transition toward crop-cycle-based contracts, embedded risk mitigation instruments, and ecosystem-linked financing models.

This requires coordinated product reform that aligns Shariah contracts with agronomic realities, integrates *Takaful* and warehouse receipt systems, and embeds off-taker and government-

backed settlement mechanisms. Interventions should focus on reorienting product design, strengthening operational linkages across the agricultural ecosystem, and building institutional capacity to structure, price, and manage risk-sharing Islamic finance instruments effectively.

Consolidated Policy Intervention Framework – Pillar 4

Policy Domain	Strategic Focus	Key Policy Intervention Recommendation (Consolidated)	Why This Is Well-Fitted for Pakistan
Policy Formulation	Crop-cycle-aligned Shariah product design	Issue regulatory guidance encouraging crop-cycle-based Shariah contracts such as *Salam, Wakalah, Musharakah*, and *Ijarah* over balance-sheet-driven *Tawarruq.* Define permissible hybrid structures aligned to seasonal cash flows and agricultural value chains.	Pakistan's agriculture is highly seasonal and cash-flow dependent. Crop-cycle-aligned contracts reduce repayment stress, improve default outcomes, and better reflect real economic activity in line with Shariah principles.
Policy Formulation	Risk-sharing and risk-transfer integration	Mandate integration pathways for *Takaful*, warehouse receipt systems (WRS), and off-taker guarantees within Shariah agricultural products. Provide enabling rules for climate-index *Takaful* and portfolio-level risk sharing.	Agricultural risk in Pakistan is driven by weather, yield volatility, and price shocks. Integrated risk-transfer mechanisms reduce financier exposure and farmer vulnerability without reliance on collateral-heavy lending.
Operational Development	Embedded agricultural financing models	Promote ecosystem-based financing models linking farmers, aggregators, warehouses, insurers, and	Pakistan's fragmented agricultural markets require coordination across actors. Embedded

		off-takers through embedded Shariah financing structures. Encourage digital enablement for monitoring, settlement, and repayment alignment.	financing improves transparency, reduces transaction costs, and enables scalable outreach to smallholders.
Operational Development	Warehouse receipt and inventory-backed financing	Scale Shariah-compliant WRS financing by standardising *Salam*- and *Murabahah*-based inventory funding linked to certified warehouses and PASSCO-backed settlement mechanisms.	Pakistan already has institutional infrastructure such as PASSCO, but financing linkages remain weak. WRS-based financing improves liquidity, price discovery, and post-harvest loss management.
Capacity Building	Product structuring and pricing capability	Build institutional capacity in structuring hybrid Islamic contracts, pricing seasonal risk, and managing inventory.	Strengthening Warehouse Receipt System (WRS), based financing can bridge this gap by enabling farmers and aggregators to convert stored produce into bankable collateral, thereby improving liquidity, enhancing price discovery, and reducing post-harvest losses through better storage and deferred selling.

A. Policy Formulation: Reorienting Agricultural Finance Toward Crop-Cycle and Risk-Sharing Products

Pakistan's Shariah-compliant agricultural finance remains dominated by *Tawarruq* structures that prioritise balance-sheet certainty over economic substance. This limits product innovation

and weakens alignment with agricultural realities. International experience demonstrates viable alternatives:

- **Indonesia** operationalises *Salam, Musharakah, Murabahah, and Wakalah* contracts explicitly tied to planting and harvest cycles.
- **Malaysia** enables scalable hybrid structures combining *Wakalah, Murabahah*, and *Takaful* for modern agricultural systems.
- **Turkey** complements Islamic financing with subsidized seasonal credit and procurement-backed settlement assurance.

Policy action in Pakistan should therefore guide institutions toward crop-cycle-based contracts, define acceptable hybridization, and encourage integration with risk-transfer mechanisms. Regulatory clarity reduces uncertainty, promotes consistency, and signals a strategic shift away from quasi-debt dominance.

B. Operational Development: Embedding Risk Mitigation and Ecosystem Linkages in Product Design

Operational reform should focus on embedding financing within the agricultural ecosystem rather than treating credit as a standalone transaction. Key priorities include:

- **Risk Mitigation**: Integrating climate-index *Takaful*, yield-based coverage, and portfolio-level risk sharing, drawing on Kenya and Malaysia's models.
- **Settlement Assurance**: Linking *Salam* and *Murabahah* financing with off-taker contracts and PASSCO-backed procurement to improve cash-flow certainty.
- **Inventory Financing**: Scaling warehouse receipt-backed financing to enable post-harvest liquidity while reducing distress sales.

These measures move agricultural finance beyond collateral dependence toward structured, ecosystem-driven solutions that are both Shariah-aligned and operationally viable.

C. Capacity Building: Enabling Innovation Beyond *Tawarruq* Replication

Sustainable product reform requires deep institutional capability. Capacity building should therefore prioritise:

- Training product teams in sequencing and combining Islamic contracts for agricultural use cases.
- Developing expertise in pricing seasonal, climate, and yield risk.
- Strengthening collaboration between banks, *Takaful* operators, warehouses, and agricultural agencies through joint training and pilots.

Without these capabilities, policy reform risks remaining declarative rather than transformative.

Why This Intervention Set Fits Pakistan

This policy intervention framework directly addresses Pakistan's structural challenges in Shariah-compliant agricultural finance: overdependence on *Tawarruq*, weak risk-sharing, and limited product responsiveness to agricultural realities. By reorienting products toward crop cycles, embedding risk mitigation instruments, and strengthening ecosystem linkages, the framework enhances both Shariah authenticity and financial resilience.

At the same time, it respects institutional diversity and market readiness by enabling gradual transition through hybrid structures and capacity building. The result is a product ecosystem capable of supporting smallholders, managing climate risk, and scaling ethical, value-chain-based agricultural finance aligned with Pakistan's development priorities and Shariah objectives.

4.6.2 Key Policy Intervention Recommendations Pillar 4: Product Development and Services - Product Design and Operating Structure

4.6.2.1 Conceptual Foundation

The international case studies reviewed demonstrate that effective Shariah-compliant agricultural financing for smallholder farmers is increasingly delivered through non-bank, technology-enabled NBFC models that embed finance within agricultural value chains. These models depart from standalone credit provision and instead integrate input supply, production monitoring, market access, and risk mitigation into a unified operating framework.

Across jurisdictions including Turkey, Indonesia, Ethiopia, Kenya, Nigeria, Netherlands, India, and Pakistan, successful platforms share three defining characteristics. First, financing is asset-backed or activity-linked, aligned with real agricultural production rather than cash financing. Second, technology and alternative data substitute for conventional collateral, enabling inclusion of smallholder farmers. Third, ecosystem partnerships distribute risk, lower transaction costs, and enhance repayment discipline.

Building on these lessons, this section proposes a generic, modular operating model and product suite that can be adopted by Shariah-compliant NBFCs in Pakistan under SECP oversight.

4.6.2.2 Proposed Generic Operating Model for Islamic Agriculture Financing NBFCs

The proposed operating model follows a closed-loop, value-chain-embedded structure, ensuring that financing, production, and repayment are tightly linked.

(a) Farmer Onboarding and Profiling

NBFCs onboard farmers individually or in groups through digital channels, agents, cooperatives, input dealers, or aggregators. Farmer profiles are constructed using alternative data sources such as land records, cropping history, satellite imagery, mobile usage, transaction records, cooperative data, and past sales performance. This approach, observed in Tarfin, Apollo Agriculture, Kifiya, and TaniFund, enables credit assessment without reliance on physical collateral.

In Pakistan, this function can be aligned with NADRA identity systems, provincial land data, cooperative records, and agri-extension datasets, while maintaining data protection and consent standards.

(b) Financing Origination Embedded in Agricultural Activity

Rather than disbursing unrestricted cash, financing is embedded into specific agricultural activities. NBFCs finance inputs, cultivation cycles, storage, or market delivery depending on the product type. Funds are either paid directly to suppliers, dealers, or service providers, or released in tranches linked to production milestones.

This embedded approach reduces misuse risk, strengthens Shariah compliance, and improves repayment performance, as demonstrated across Tarfin, Agro.Club, ALAMI, and AFEX.

(c) Shariah-Compliant Contract Structuring

Financing is structured using Shariah contracts aligned with the underlying agricultural activity. *Murabaha* and *Salam* dominate pre-harvest and input financing, while *Musharakah* and *Mudarabah* support profit-sharing production models. *Wakalah* structures allow dealers, cooperatives, or platforms to act as agents. Takaful provides crop and climate risk protection, and warehouse receipt structures enable post-harvest liquidity.

Contracts are standardized, transparent, and supported by operational manuals and disclosure templates to ensure consistent application.

(d) Monitoring, Risk Management, and Advisory Integration

Production monitoring is conducted through a combination of satellite data, mobile reporting, field agents, and agronomic advisory partners. This function is critical in reducing default risk and improving productivity, as evidenced in Apollo Agriculture, Kifiya, and Bagh-E.

Data generated during monitoring feeds back into credit scoring models, enabling dynamic risk management and progressive limit enhancement for repeat farmers.

(e) Market Linkage and Repayment Mechanism

Repayment is aligned with harvest and sale outcomes. NBFCs facilitate off-take arrangements with mills, processors, exporters, or digital marketplaces. In warehouse-based models, commodities are stored under regulated systems and financed through electronic warehouse receipts.

This design ensures repayment discipline by linking cash flows directly to verified sales, reducing reliance on enforcement mechanisms.

(f) Funding and Liquidity Management

NBFCs mobilise funding through a mix of equity, Islamic capital market instruments (such as sukuk backed by receivables), institutional investors, and co-financing arrangements. Tarfin's sukuk issuances and AFEX's commodity-backed financing demonstrate how non-bank entities can channel private capital into agriculture in a Shariah-compliant manner.

4.6.3 Proposal of Product Development Structures of Shariah Agricultural Financing Operating Model in Pakistan

This subsection translates international best practices in digital agriculture financing into operationally viable, Shariah-compliant product structures suitable for Pakistan's NBFC ecosystem, while accounting for regulatory constraints, farmer risk profiles, and institutional capacity.

1. Digital Input-Based Agriculture Financing (*Murabahah / Bai Muajjal*)

Policy Rationale

Smallholder farmers in Pakistan face chronic liquidity shortages during planting seasons, forcing reliance on informal lenders. Digital, asset-backed input financing reduces misuse risk, improves productivity, and aligns repayment with crop cycles.

Proposed Product Structure

Parameter	Description
Financing Name	Digital Shariah-Compliant Input Financing
Purpose	Financing seeds, fertilizer, pesticides, feed, and small equipment
Aqad Used	*Murabahah / Tawarruq*
Financing Value	PKR 50,000 – PKR 2 million per crop cycle
Profit Margin	10%–16% per season (input-linked, not cash-based)
Fees	Platform & dealer service fee (Ujrah) 1%–2%
Tenure	4–9 months (aligned with crop cycle)
Disbursement	In-kind via approved dealers (no cash)
Repayment	Bullet or staged repayment post-harvest
Security	Crop assignment, personal guarantee, *Takaful*
Digital Features	E-KYC, satellite monitoring, dealer POS integration
Shariah & Regulatory Basis	SECP NBFC Regs (2023); AAOIFI *Murabaha* Std. Basis

Ecosystem & Community Variant

- **Dealer-Anchored Financing** who operates through input dealers who serve as *Wakil* (agents) on behalf of the Shariah-compliant NBFC to facilitate sales of agricultural

inputs such as seeds, fertilizers, and equipment. The dealer executes *Murabahah* or *Musawamah* contracts directly with farmers at pre-agreed markups, payable after harvest. This structure leverages existing dealer networks for efficient last-mile delivery while maintaining Shariah compliance through agency-based execution and transparency in cost-plus pricing.

- **Farmer Group Financing** applies a Joint *Murabahah* model targeting cooperatives or Farmer Producer Organizations (FPOs), enabling collective purchasing of inputs or equipment on deferred payment terms. By aggregating demand and sharing risk across the group, this model enhances creditworthiness, reduces transaction costs, and ensures equitable profit-sharing under Shariah principles. It is particularly effective for empowering smallholders through cooperative structures while maintaining operational efficiency and Shariah integrity.

Key Lessons Applied

Asset-Backed and Embedded Financing Models present practical, Shariah-compliant approaches to strengthen agricultural finance and reduce default risk. In an Asset-Backed Financing model, financing is tied to identifiable, tangible assets such as farm machinery, livestock, or inputs purchased under *Murabahah, Ijarah, or Salam* contracts, ensuring that credit remains directly linked to productive use rather than cash-based lending. Complementing this, Embedded Credit at the Point of Transaction integrates Shariah-compliant financing seamlessly within existing agri-value chains such as through dealers, cooperatives, or digital marketplaces where farmers receive inputs or services on deferred payment terms facilitated by an Islamic NBFC or fintech platform. This "credit-at-sale" model ensures transparency, convenience, and traceability of transactions. Meanwhile, Risk Reduction through In-Kind Disbursement further strengthens these mechanisms by disbursing financing in the form of inputs or equipment rather than cash, minimizing misuse and aligning capital deployment with on-farm productivity. Together, these models create a self-reinforcing ecosystem that promotes financial discipline, reduces credit risk, and drives inclusive agricultural growth under Shariah principles.

2. Harvest-Linked Forward Financing (*Salam*-Based Model)

Policy Rationale

Salam contracts are uniquely suited to agriculture but remain underutilized in Pakistan due to operational complexity. Digital platforms can mitigate delivery and price risk.

Proposed Product Structure

Parameter	Description
Financing Name	Digital *Salam* Crop Financing
Purpose	Pre-harvest financing for cultivation costs
Aqad Used	*Bai Salam*
Financing Value	PKR 100,000 – PKR 3 million
Pricing	Discounted pre-agreed commodity price
Fees	Monitoring & advisory fee (Ujrah)
Tenure	3–6 months
Delivery Mechanism	Aggregated collection via off-taker
Repayment	Physical delivery or cash-settled *Salam*
Risk Mitigation	Takaful, off-take contracts
Transparency	Digital crop registry & delivery tracking
Regulatory Basis	SBP Shariah Standards; AAOIFI *Salam* Std.

Anchor Buyer *Salam* and Community *Salam* Pools represent innovative Shariah-compliant models designed to enhance pre-harvest financing for farmers through partnership-based and community-driven mechanisms.

In the Anchor Buyer *Salam* model, a Shariah-compliant NBFC partners with an anchor buyer such as a miller, processor, or exporter to provide advance payment to farmers for future delivery of crops under *Salam* contracts. The NBFC disburses funds to farmers on behalf of the anchor buyer, with the future produce serving as the underlying asset. Upon harvest, the produce is delivered directly to the buyer, ensuring transparent settlement and mitigating default risk. This model strengthens value-chain integration, guarantees market access, and provides farmers with Shariah-compliant working capital while enabling buyers to secure supply at predictable prices.

In contrast, Community *Salam* Pools operate at the village or cooperative level, where smallholder farmers collectively participate in a pooled *Salam* arrangement managed by a Shariah-compliant NBFC, Islamic microfinance institution, or community-based fund. Farmers receive input financing in advance, with repayment structured through the collective sale of produce at harvest. This model leverages social trust and local governance to manage risk, enhances bargaining power, and promotes financial inclusion in remote areas. Both approaches align with Shariah principles by linking financing to real economic activity, fostering equitable trade relationships, and reducing dependency on informal credit networks.

Key Lessons Applied

Output-Linked Repayment, Advisory Integration, and Off-Take Backed Risk Reduction are key innovations in structuring sustainable and Shariah-compliant agricultural financing models.

In an Output-Linked Payment model, farmers' financing payments are tied directly to the volume or value of harvested produce rather than fixed monetary installments. This approach, compatible with contracts that aligns repayment capacity with actual production outcomes, reducing pressure on farmers during low-yield seasons and ensuring fairness under Shariah's principle of shared risk and reward.

Advisory and Monitoring Integration complements this by embedding agronomic advisory, digital monitoring, and technical support within the financing process. Through mobile applications, satellite imagery, and field agents, NBFCs or Islamic fintechs can track crop progress, provide real-time advice, and ensure that financing is used productively. This dual approach not only mitigates credit and operational risk but also improves productivity and sustainability outcomes.

Finally, Off-Take Backed Risk Reduction secures financing payment through pre-arranged purchase agreements between farmers and off-takers such as millers, exporters, or cooperatives who commit to buying the produce at harvest. The NBFC finances the farmer knowing that proceeds from the confirmed sale will service the financing obligation. Together, these mechanisms create a closed-loop, Shariah-compliant financing ecosystem that integrates finance, production, and market access ensuring traceability, minimizing default risk, and enhancing farmer resilience.

3. Profit-and-Loss Sharing Agriculture Financing

Policy Rationale

Risk-sharing models enhance resilience but require strong governance and transparency. Digital crowd-investing platforms reduce information asymmetry.

Proposed Product Structure

Parameter	Description
Financing Name	Islamic Agriculture Venture Financing
Purpose	Expansion, value-added farming, agri-SMEs
Aqad Used	*Mudarabah / Musharakah*
Ticket Size	PKR 200,000 – PKR 5 million
Return	PKR 200,000 – PKR 5 million
Fees	Platform management fee
Tenure	6–18 months
Governance	Digital reporting & third-party audits
Exit	Harvest profit distribution
Investor Type	Individuals, institutions, *Waqf* funds
Regulatory Basis	SECP P2P & NBFC Regs; Shariah Governance

Ecosystem & Community Variant

***Waqf*-Based Agriculture Funds** and **Village Investment Cooperatives** are two complementary Shariah-compliant financing structures that can significantly enhance

agricultural development and financial inclusion in Pakistan's rural economy under the proposed Islamic Agriculture Venture Financing framework.

Waqf-Based Agriculture Funds mobilize dormant or underutilized *waqf* (endowment) assets and channel them into productive agricultural ventures. Under this model, *waqf* institutions or *waqf*-linked investment entities act as impact investors, providing capital to farmers, agri-SMEs, or cooperatives under *Mudarabah* or *Musharakah* contracts. The profits generated from the financed farming activities are then shared between the *waqf* fund and the beneficiaries based on a pre-agreed ratio (e.g., 60:40 or 70:30). These funds are typically managed by Islamic NBFCs or digital P2P platforms regulated by SECP, ensuring transparency, Shariah compliance, and professional management.

Governance mechanisms include digital reporting, third-party audits, and social impact tracking, ensuring that both financial and socio-economic objectives such as food security, job creation, and rural empowerment are achieved. The *waqf* nature ensures that capital remains perpetual, with profits reinvested into future agricultural ventures, making it a self-sustaining, ethically grounded financing mechanism aligned with Pakistan's Islamic finance roadmap and SECP's NBFC and P2P frameworks.

Village Investment Cooperatives operate as community-level investment vehicles, pooling savings and contributions from local members and external Islamic investors to finance agricultural production, processing, or value-added activities. Using *Mudarabah* or *Musharakah* contracts, these cooperatives jointly invest in projects such as mechanization, irrigation, or organic farming, with profits distributed according to agreed ratios after harvest. Each cooperative is governed democratically by its members and overseen by regional Shariah advisors to ensure compliance. Financing is disbursed in-kind such as seeds, fertilizers, or equipment to reduce misuse, while repayment is output-linked, tied to actual yield and market prices. The cooperative model embeds advisory services, monitoring, and group accountability, minimizing default risk and building long-term resilience.

Lesson Learned

Indonesia's Shariah-compliant crowdfunding and peer-to-peer (P2P) financing models notably exemplified by platforms such as *Taguvestasi*, *Ethis Indonesia*, and *Alami* provide a strong reference framework for Pakistan's agricultural financing transformation. These platforms leverage digital marketplaces and blockchain-enabled smart contracts to connect smallholder

farmers and agri-SMEs directly with investors while ensuring full adherence to Islamic principles.

Under this model, investors and farmers engage through Shariah-based contracts such as *Mudarabah* (profit-sharing) and *Musharakah* (joint venture), where profits are distributed according to pre-agreed ratios (e.g., 60:40 or 70:30), and losses are shared based on capital contribution. Financing is used for productive agricultural activities such as seed purchase, mechanization, and farm expansion ensuring that funds are asset-backed and purpose-specific, in line with Islamic finance standards.

The introduction of smart contract transparency through blockchain ensures that all transactions, fund flows, and profit-sharing calculations are immutable, traceable, and verifiable by all parties. This not only strengthens investor confidence but also minimizes information asymmetry and fraud risks. Each project's terms, repayment timelines, and Shariah structures are publicly disclosed on the platform, promoting accountability and ethical governance. Importantly, these crowdfunding models are aligned with the Maqasid al-Shariah, as they promote risk-sharing, social justice, financial inclusion, and sustainable livelihood creation. Farmers gain equitable access to capital without riba or collateral barriers, while investors contribute to productive, socially beneficial ventures that strengthen food security and rural development. In Pakistan's context, adapting Indonesia's P2P model under SECP's Islamic NBFC and P2P regulatory framework can enable community-driven agricultural finance, powered by digital trust, Shariah governance, and smart-contract-based transparency, ensuring that every transaction contributes to both economic value and ethical impact.

4. Invoice & Receivable-Based Agriculture Financing

Policy Rationale

Farmers supplying formal buyers face delayed payments. Invoice-backed Islamic financing reduces working capital stress.

Proposed Product Structure

Parameter	Description
Financing Name	Shariah-Compliant Agri Receivable Financing
Purpose	Bridge financing for verified sales

Aqad Used	*Bai' al-Dayn bi al-Sila*' (Sale of receivables with commodity)
Facility Size	PKR 300,000 – PKR 10 million
Margin	12%–18% p.a. (pro-rated)
Tenure	30–120 days
Security	Assigned receivables
Controls	Escrow & buyer confirmation
Regulatory Basis	SECP NBFC Regs; Islamic factoring guidance

Ecosystem Variant

a. Cooperative-Based Invoice Financing

Under this model, smallholder farmers and producer groups aggregate their sales through registered cooperatives or Farmer Producer Organizations (FPOs). Once the cooperative supplies produce to verified buyers (e.g., mills, exporters, or processors), it issues invoices that serve as trade receivables. These receivables are then assigned to the NBFC, which provides *Bay al-Dayn bi al-Sila'* or *Wakalah*-based bridge financing against the verified sale value.

The NBFC purchases the receivable with commodity at discount, or acts as a financing agent (*Wakil*) on behalf of the cooperative to collect payment. Proceeds from the end buyer flow into a designated escrow account, ensuring settlement integrity. This approach allows cooperatives to access working capital immediately after delivery, rather than waiting 30–120 days for payment, thus improving liquidity and cash flow management.

Shariah compliance is maintained by ensuring that all financing is asset- or receivable-backed, avoiding interest. The NBFC earns a fixed, pre-agreed profit margin, while the cooperative retains its share of the sale proceeds upon buyer payment. Digital verification of invoices, buyer confirmations, and payment tracking ensures transparency, minimizes default risk, and reduces administrative overhead.

b. Anchor Buyer–NBFC Co-Financing

In this variant, the NBFC partners directly with large agri-offtakers or anchor buyers (such as sugar mills, rice exporters, or food processors) to jointly finance their supplier networks. Once the anchor buyer confirms purchase orders or deliveries, the NBFC extends short-term *Murabahah*-based financing to the supplier (farmer or aggregator), backed by the buyer's payment guarantee.

This arrangement creates a triangular Shariah-compliant structure, where:

- The NBFC provides financing to the supplier for verified goods,
- The anchor buyer confirms the receivable and commits to pay into an escrow account, and
- The NBFC recovers its capital and profit upon payment release.

The co-financing partnership aligns incentives across the value chain buyers secure consistent supply, farmers receive timely payments, and the NBFC mitigates credit risk through verified off-take. This model also facilitates supply chain digitization, with all invoices, delivery notes, and payment instructions validated electronically through the NBFC platform.

Both variants align with Islamic factoring guidance and SECP's NBFC regulations, ensuring that financing remains trade-based, Shariah-compliant, and transparent. Together, they provide a practical framework for Pakistan's agriculture sector enabling structured liquidity, trust-based receivable financing, and scalable digital integration across the entire agri value chain.

5. Warehouse Receipt–Based Agriculture Financing

Policy Rationale

Pakistan's EWR system remains underutilized. Islamic NBFCs can unlock post-harvest liquidity while reducing distress sales.

Proposed Product Structure

Parameter	Description
Financing Name	Islamic Warehouse Receipt Financing

Aqad Used	*Murabahah / Rahn*
LTV	60%–70% of commodity value
Tenure	30–180 days
Collateral	Electronic Warehouse Receipt
Market Linkage	PMEX / formal buyers
Risk Tools	Price hedging, *Takaful*
Regulatory Basis	SECP EWR Framework; PMEX

Community Variant

The Islamic Warehouse Receipt Financing (IWRF) model structured on *Murabahah* and *Rahn* contracts can be decentralized through two powerful community-based variants: Community Warehouses and Cooperative Storage & Financing Pools. These models extend the benefits of warehouse receipt financing to smallholder farmers and rural cooperatives, addressing both access and trust barriers within Pakistan's agricultural ecosystem. The Community Warehouse model decentralizes the traditional warehouse receipt system by establishing locally managed, Shariah-compliant mini-warehouses owned or governed by farmer groups, cooperatives, or local councils (*tanzeem-e-zarai*). These warehouses are linked to a central electronic registry under the SECP's Electronic Warehouse Receipt (EWR) Framework, ensuring formal recognition and tradability of receipts.

Farmers deposit their harvested commodities such as wheat, maize, or rice into these certified facilities. The warehouse operator issues a digital Warehouse Receipt (WR) representing ownership and quantity, which the farmer can then use as collateral for Islamic financing. The NBFC or Islamic bank provides a *Murabahah*-based financing facility (by purchasing the stored commodity at a discounted price and reselling it at an agreed markup) or a *Rahn*-based secured financing (where the WR serves as collateral).

The LTV ratio (60–70%) ensures risk management, while price hedging through PMEX (Pakistan Mercantile Exchange) and *Takaful* protection against loss or damage safeguard both

farmer and financier. Upon sale of the commodity to formal buyers or PMEX-linked markets, proceeds are credited into an escrow account, automatically settling the financing.

This community warehouse system reduces post-harvest losses, enables better price realization, and provides instant liquidity to farmers without distress sales, promoting Shariah-compliant, asset-backed financing directly tied to tangible commodities.

Cooperative Storage & Financing Pools

In the Cooperative Storage & Financing Pool variant, groups of farmers form agriculture cooperatives that jointly manage both storage facilities and financing access. Each cooperative aggregates produce from its members into a shared warehouse and collectively obtains a Warehouse Receipt issued in the cooperative's name.

This receipt serves as a pooled collateral asset for *Murabahah* or *Rahn*-based financing from an Islamic NBFC. The financing is then distributed among members in proportion to their stored commodities, or used collectively to purchase inputs, machinery, or logistics services. Profits from commodity sales facilitated through formal buyers or exchange platforms are then distributed after settling the financing obligations.

This model enables risk pooling, collective bargaining, and Shariah-compliant asset monetization at the grassroots level. It also supports financial inclusion, as smallholder farmers who might not qualify individually for collateralized financing can access credit through their cooperative membership. Digital governance tools such as blockchain-based receipt registries, mobile-linked cooperative ledgers, and automated profit-sharing templates ensure transparency, compliance, and equitable distribution.

6. Embedded Dealer & Community Financing Model

Policy Rationale

Pakistan's agri-input dealers (Arthis) are trusted intermediaries. Formalizing them as Wakil unlocks scale and governance.

Proposed Product Structure

Parameter	Description
Financing Name	Dealer-Embedded Islamic Agri Financing
Aqad Used	*Murabahah* + *Wakalah*
Beneficiary	Smallholder farmers
Channel	Input dealers as agents
Repayment	Post-harvest
Risk Sharing	*Takaful* + dealer performance scoring
Governance	Digital POS & transaction logs

Ecosystem Partnerships (Dealers, Off-takers, Warehouses)

Scaling agricultural finance requires collaboration rather than isolated product design. Dealers supply inputs, off-takers purchase outputs, and warehouses provide storage and collateralisation pathways. When linked digitally, these actors create a closed-loop value chain, enabling traceable *Murabahah* transactions and structured recovery points.

- **Dealers as Wakil:** They handle last-mile delivery, ensuring inputs reach verified farmers.
- **Off-takers as repayment nodes:** Harvest sales can automatically settle farmer dues.
- **Warehouses as collateral hubs:** Grain stored in certified silos can back deferred settlements.

This partnership ecosystem converts agriculture finance from cash financing to an asset-anchored commercial cycle, enhancing integrity, reducing leakage, and improving repayment behaviour.

Community & Cooperative Aggregation

Individual farmer onboarding is costly, slow and risk-heavy. Community aggregation reduces default risk through social guarantees, peer accountability, and group negotiation power. Cooperatives and farmer organisations also streamline logistics by bulk-ordering inputs, leasing shared machinery, or storing produce collectively. This model not only lowers transaction costs but also empowers rural communities and democratizes access to Islamic finance.

Financial Inclusion & Smallholder Empowerment

Traditional financing systems exclude millions of farmers without collateral or credit history. Dealer-embedded Islamic financing extends formal access through channels farmers already trust, using asset-based *Murabahah* instead of cash lending and repayment linked to harvest outcomes rather than monthly instalments.

Impact expectations include:

- Lower entry barriers for first-time borrowers
- Increased access for women, tenant farmers and youth
- Data-driven farmer scoring models for future products
- Gradual formalization of the informal credit economy

7. In-Kind Asset-Based Agriculture Financing Model

A. Conceptual Overview

In-kind asset-based agriculture financing is a Shariah-compliant model designed to provide farmers with physical agricultural inputs or productive farm assets instead of cash. Unlike conventional working capital loans, this structure ensures that financing is directly tied to real economic activity, thereby minimising diversion of funds, reducing credit misuse, and supporting input productivity at the farm level. Consumable agricultural inputs such as seeds and fertilizers are financed using *Murabahah* (cost-plus sale), while durable assets such as machinery and irrigation systems are facilitated through *Ijarah* (leasing) contracts.

The model is particularly relevant in Pakistan where a large proportion of smallholder farmers lack formal credit history, have low financial literacy, and demonstrate preference for Shariah-

aligned financing that avoids interest-bearing loans. In-kind asset financing also solves a critical behavioural challenge – even when farmers receive funds, the liquidity may be diverted to personal or household consumption. Providing inputs directly eliminates this risk and strengthens value-chain accountability.

Globally, several successful use-cases validate the scalability of this approach. Models such as Tarfin (Turkey), Apollo Agriculture (Kenya), DigiFarm (Kenya), Agro.Club (Europe/Brazil) and other agri-fintech ecosystems demonstrate how input financing embedded within supply chains improves repayment behaviour, increases yield outcomes, and builds long-term financial trust with farmers. Their experience shows that non-cash Shariah-compliant financing is not only viable but can scale rapidly when supported by digital monitoring, dealer networks, and cooperative-based distribution.

B. Eligible Assets and Financing Use-Cases

Under this model, financing is strictly linked to identifiable agricultural assets that contribute directly to production. The asset classification is as follows:

Target Beneficiaries include: Smallholder farmers, tenant farmers, women and youth farmers, cooperatives, village farming groups, and contract-farming clusters linked to buyers or processors.

This model is strongly suited to cereal production, horticulture, vegetables, livestock, dairy, and mechanization adoption programs where inputs and equipment directly determine productivity.

C. Business and Operational Flow

The financing process is structured to maintain Shariah integrity, traceability, and operational discipline. The proposed flow is as follows:

1. **Farmer Onboarding & Needs Assessment**
   Farmers register through the NBFC, cooperative, extension service, or authorised dealer network. Basic profiling includes land size, cropping cycle, input requirement, and verification through village records or digital KYC.

2. **Asset Selection and Price Quotation**

   Farmers choose required inputs or equipment from pre-approved suppliers. Cost, specifications, and delivery timelines are disclosed transparently to avoid gharar (uncertainty).

3. **Credit Suitability Assessment**

   Instead of collateral-based underwriting, eligibility may draw from alternative data sources historical yields, previous purchase records, satellite imagery, warehouse receipts, water usage, or cooperative guarantees.

4. **Procurement by NBFC**

   Upon approval, the NBFC directly purchases the goods from the supplier, taking ownership prior to sale or lease to the farmer. Possession must transfer before any rental or deferred installment becomes due.

5. **Delivery and Acknowledgement**

   Inputs or equipment are delivered to the farmer physically or through a logistics-enabled distribution channel with digital proof-of-delivery.

6. **Usage Monitoring and Support**

   Field officers, extension partners, or mobile apps monitor usage. Advisory services improve crop outcomes, while *Takaful* coverage mitigates production risk.

7. **Deferred Payments or Lease Rentals**

   Murabahah instalments or *Ijarah* rental payments are structured around harvest periods rather than monthly schedules, improving repayment capacity.

8. **Completion or Transfer of Ownership**

   - *Murabahah* ends upon full deferred settlement.
   - *Ijarah* concludes with asset return or ownership transfer under *Ijarah Muntahia Bittamleek*, documented through a separate sale or gift contract.

This operational cycle embeds discipline throughout the value chain, ensuring that financing translates into tangible farm productivity.

D. Detailed Shariah Contract Structure

1. *Murabahah* – Consumable Inputs

- **Stage 1 – *Wa'd* (Promise to Purchase)**

  Farmer issues a binding or unilateral promise to purchase specified goods.

- **Stage 2 – Procurement by NBFC**
  NBFC purchases inputs from supplier and assumes ownership risk.
- **Stage 3 – Cost-Plus Sale Agreement**
  NBFC sells inputs to farmer disclosing cost and profit margin transparently.
- **Stage 4 – Delivery and Possession**
  Constructive/physical possession is transferred before financing begins.
- **Stage 5 – Deferred Instalment Settlement**

Shariah Controls

- No cash transfer to farmer
- Ownership must precede sale
- Profit rate is fixed and pre-agreed (not interest-indexed)
- No penalty compounding on late payments (only actual loss or charity-based penalties permitted)

2. *Ijarah* – Equipment Leasing

- Asset Acquisition by NBFC with full legal/beneficial ownership
- Lease Contract specifying rental, tenure, usage conditions
- Use and Maintenance arrangements defined contractually
- Rental Payments Linked to Usufruct, not asset financing value
- End-of-Lease Options: Return, renewal, or transfer through a separate sale/gift contract

Shariah Controls

- Rental can be charged after delivery
- Ownership risks remain with lessor
- Transfer-of-ownership to the customer shall not be executed concurrently with lease contract, it can only be executed after the maturity of lease contract.

Both structures strengthen Shariah authenticity and asset linkage, aligning with AAOIFI and global Islamic finance standards.

E. Ecosystem Operational Variants and Enhancements

This model may be deployed through various delivery channels:

1. **Dealer / Supplier *Wakalah* Model**
   Input dealers act as agents for procurement or delivery, earning *Ujrah* (service fees). This improves distribution and lowers logistics costs for NBFCs.
2. **Cooperative or Farmer Group Financing Model**
   Inputs provided to groups rather than individuals reduces credit risk, supports shared machinery usage, and encourages collective repayment guarantees.
3. **Waqf, Impact or Blended Finance Integration**
   Donor funds or government support may subsidize profit margins for vulnerable farmers, enabling equity-focused access without compromising Shariah structure.
4. **Crop & Asset *Takaful* Integration**
   Weather-index or yield-loss *Takaful* is added to protect both the NBFC and farmer from crop failure, drought, flood or pest shocks.

This modularity allows scalable nationwide implementation through hybrid NBFC–coop–fintech–dealer models.

F. Regulatory and Policy Relevance for Pakistan

This financing model aligns directly with Pakistan's strategic financial inclusion priorities. It supports:

- SECP Islamic NBFC growth agenda
- Value-chain and asset-backed financing principles
- Warehouse receipt and digital agriculture initiatives
- National shift toward real-economy Islamic finance

By eliminating cash disbursement and ensuring real asset transfer, the model reduces moral hazard, enhances traceability, strengthens credit discipline, and creates developmental impact in line with Shariah objectives (Maqasid-al-Shariah).

At scale, this product could become one of the flagship instruments for Islamic agricultural financing, enabling smallholder transformation through productivity-enhancing capital rather than consumption-based borrowing.

In-kind asset-based agriculture financing offers Pakistan a practical, scalable, and deeply Shariah-rooted mechanism to close the input financing gap for millions of farmers. By restructuring agriculture finance around real assets, digital monitoring, value-chain linkages and instalment mechanisms aligned with harvest cycles, this model directly addresses operational risks, Shariah sensitivities, and financial inclusion barriers. The model is not theoretical global precedents prove its commercial viability and social impact. With structured product rollout and regulatory support, it can serve as a core pillar of the proposed Islamic agricultural finance ecosystem and a catalyst for national rural development.

4.6.4 Proposal of Ordinary Crop *Takaful* Proposed Product Structure

Crop *Takaful* is a Shariah-compliant mutual risk protection scheme where farmers contribute (Tabarru') into a pooled fund to protect against actual crop losses arising from defined perils such as floods, droughts, pests, or diseases. Claims are assessed based on verified physical loss, making it suitable for financing-linked crop protection.

Parameter	Description
Product Name	Crop *Takaful* for Shariah Agri Financing
Purpose	Protection of farmers and Islamic financiers against crop yield loss or damage
Applicable Use Case	Input financing, seasonal crop financing, value-chain financing, working capital financing, capital expenditure financing
Shariah Contract (Akad)	*Tabarru*' (donation) + *Wakalah bil Ujrah* (operator fee)
Coverage Perils	Flood, drought, pest infestation, disease, hailstorm, fire
Coverage Basis	Indemnity-based (actual loss assessment)

Sum Covered	PKR 50,000 – PKR 5 million per crop cycle
Contribution (Premium)	2%–6% of sum covered (crop, region & risk-based)
Tenure	4–9 months (aligned with crop cycle)
Claim Trigger	Verified crop damage or yield loss
Loss Assessment	Physical inspection, satellite imagery, agronomist report
Payout Method	Direct payment to farmer or financier (loss-based)
Linkage with Financing	Mandatory or bundled with *Murabaha* / *Salam* financing
Risk Sharing	Mutual risk pool among participants
Surplus Treatment	Shared with participants or retained in fund (Shariah-approved)
Digital Features	E-KYC, satellite crop monitoring, mobile claims submission
Shariah & Regulatory Basis	SECP *Takaful* Rules (2012), AAOIFI Takaful

Ordinary Crop *Takaful* -Business Operational Flow Narrative (Indemnity-Based)

1. Farmer Onboarding

   The farmer applies for Shariah-compliant agri financing through an Islamic bank, NBFC, or digital agri platform and is simultaneously enrolled into the Crop *Takaful* scheme.

2. Risk Profiling and Coverage Setup

   Crop type, location, acreage, season, and financing value are assessed to determine the sum covered, applicable perils, and contribution amount.

3. Contribution Collection

   The *Takaful* contribution is collected upfront or embedded within the financing disbursement and credited into the *Takaful* risk fund under the *Tabarru*' arrangement.

4. Fund Management

   The *Takaful* operator manages the pooled fund under *Wakalah bil Ujrah*, charging a disclosed management fee and maintaining separate participant and operator accounts.

5. Crop Cycle Monitoring

   Throughout the crop cycle, the operator monitors crop conditions using satellite imagery, field inspections, and agronomic data in collaboration with partners.

6. Loss Occurrence

   A covered peril (e.g. flood, pest attack) occurs, resulting in physical damage or yield loss to the crop.

7. Loss Notification

   The farmer or financing partner notifies the *Takaful* operator through a mobile app, call center, or agent within the stipulated notification period.

8. Loss Assessment

   The operator conducts physical inspections supported by satellite data and expert reports to verify the extent of actual crop loss.

9. Claim Evaluation and Approval

   Verified loss reports are reviewed by the claims committee to confirm coverage eligibility and calculate indemnity payable.

10. Payout Execution

    The approved claim amount is disbursed from the *Takaful* fund to the farmer or directly to the financing institution to offset outstanding financing.

11. Post-Claim Fund Adjustment

    The *Takaful* fund is adjusted for paid claims, reserves are updated, and any surplus is managed according to the approved surplus policy.

12. End of Cycle Review

    At the end of the crop season, performance data is reviewed to recalibrate risk pricing and coverage terms for future cycles.

Best Practice Country Examples (Crop *Takaful*)

1. Malaysia - Agrobank Paddy Crop *Takaful* Scheme: First Shariah-compliant crop insurance for paddy farmers, launched with Agrobank & Ministry of Agriculture in which enabling government subsidy improves adoption. Coverage includes natural disasters and crop diseases.
2. Pakistan - Salaam *Takaful* Limited Parametric Crop Programs: Pilots for parametric weather triggers for potato and sunflower farmers through private partnerships, extending coverage to underserved regions.

1.2 Parametric Crop *Takaful* Proposed Product Structure

Parametric *Takaful* is a Shariah-compliant index-based risk mitigation solution where payouts are triggered automatically upon pre-defined parameters (e.g. rainfall, temperature, flood index), without physical loss assessment. It is designed for speed, transparency, and scalability, especially for smallholders.

Parameter	Description
Product Name	Parametric *Takaful* for Climate-Smart Agri Financing
Purpose	Rapid income protection against climate and weather shocks
Applicable Use Case	Nano/micro agri financing, digital agri platforms, MSME farmers
Shariah Contract (Akad)	*Tabarru' + Wakalah bil Ujrah*
Coverage Perils	Rainfall deficit/excess, temperature stress, flood index
Coverage Basis	Parametric (index-triggered, not loss-based)
Trigger Source	Meteorological data, satellite data, government weather stations
Sum Covered	PKR 30,000 – PKR 1 million per season

Contribution (Premium)	1%–3% of sum covered
Tenure	Crop season (3–6 months typical)
Claim Trigger	Automatic upon breach of index threshold
Loss Assessment	Not required
Payout Method	Fixed payout (pre-agreed amount)
Disbursement Speed	3–10 days after trigger
Linkage with Financing	Embedded in digital *Murabaha* / *Salam* / input financing
Risk Sharing	Mutual pool among participants
Surplus Treatment	Managed as per Shariah-approved surplus policy
Digital Features	API-based weather data, automated payouts, mobile dashboard
Shariah & Regulatory Basis	SECP *Takaful* Rules; AAOIFI Takaful

Parametric *Takaful* – Operational Flow Narrative (Index-Based)

1. Farmer Enrollment

   The farmer enrolls into a parametric *Takaful* plan, typically bundled with digital agri financing or input financing at the point of onboarding.
2. Parameter and Trigger Definition

   Objective parameters such as rainfall levels, temperature thresholds, or flood indices are pre-defined based on crop type, region, and season.
3. Contribution Collection

   The farmer pays a fixed *Takaful* contribution, which is transferred into the Takaful risk fund under *Tabarru*', with *Wakalah* fees disclosed upfront.

4. Data Source Integration

   Independent and credible data sources (satellite data, meteorological stations) are integrated through APIs to continuously track the agreed parameters.

5. Ongoing Index Monitoring

   The system automatically monitors weather and climate indices throughout the coverage period without requiring farmer intervention.

6. Trigger Event Occurrence

   A trigger event occurs when the monitored parameter breaches the predefined threshold (e.g. rainfall falls below agreed level).

7. Automatic Trigger Validation

   The system validates the trigger using agreed data protocols and secondary data sources to reduce basis risk.

8. Claim Generation

   Upon trigger confirmation, a claim is automatically generated without requiring loss notification or physical verification.

9. Payout Determination

   The pre-agreed payout amount, as specified in the certificate, is determined based on the severity level of the trigger.

10. Payout Disbursement

    The payout is automatically disbursed from the *Takaful* fund to the farmer's wallet or bank account, or to the financier if financing linked.

11. Fund Reconciliation

    The *Takaful* operator updates the fund accounts, reserves, and reports the trigger event and payout to regulators as required.

12. Post-Season Review

    At the end of the season, trigger performance and basis risk outcomes are reviewed to refine parameter design for future cycles.

Best Practice Use Case of Crop Parametric *Takaful* and Insurance:

1. Indonesia - Zurich Syariah Parametric Crop *Takaful* Pilots - *Takaful*

   Zurich Syariah launched a Shariah Parametric Weather Index Insurance for coffee growers to address remote access issues and rapid payout needs.

2. Kenya – Weather Index Insurance Programs - Generic Conventional

Programs use satellite/weather data to automatically compensate farmers under drought triggers.

3. US & Mexico – Parametric Crop Insurance Initiatives - Generic Conventional
   Advanced parametric adoption with government support, high tech data, and public-private partnerships.
4. India – Weather Based Crop Insurance Scheme (WBICS/RWBCIS) - Generic Conventional
   India's government schemes use weather parameters as a proxy for crop loss to protect millions of farmers.

4.7 Key Recommendation 3 – Ecosystem Development in the Pillar of People (Farmers and Talent) and Technology & Infrastructure in Shariah-Compliant Agricultural Finance

Key Policy Intervention Recommendations Pillar 5: (People, Consumers and Talent) Building Trust, Literacy, and Integrated Human Capital

While regulatory, legal, and product reforms establish the foundational architecture for Shariah-compliant agricultural finance, our analysis shows that human, institutional, and societal capacity constraints are equally critical in determining adoption, sustainability, and impact. Low Shariah agricultural finance literacy among farmers, limited trust in formal financing channels, talent fragmentation across agronomy, Shariah, and finance domains, siloed organizational structures, and uneven rural connectivity collectively limit the effectiveness of policy and regulatory reforms unless addressed through a coordinated capacity-building strategy.

At the institutional level, capacity development must prioritize integrated, cross-disciplinary expertise. Pakistan possesses Shariah scholars, agronomists, rural finance professionals, and digital technologists, but rarely in combination. Regulatory authorities, Islamic NBFCs, agri-fintech providers, cooperatives, and Shariah governance boards should be supported through structured training programs, certification pathways, and applied toolkits that merge Shariah principles with agricultural finance operations, risk-sharing mechanisms, crop-cycle financing, climate-smart agricultural techniques, digital tools, and data governance. Global experience indicates that ecosystems which professionalize Shariah governance while embedding sector-

specific expertise achieve faster adoption, higher compliance quality, and more resilient operations.

Farmer-facing literacy and trust-building initiatives must be treated as core policy levers rather than ancillary outreach. Evidence from Pakistan highlights confusion around "interest-free" agricultural loans, fear of collateral loss, and lack of understanding of Shariah-compliant financing, which together suppress adoption. A national Shariah agricultural finance literacy framework should therefore be developed, integrating farmer education, simplified product disclosures, and community-oriented communication. This framework must prioritize clarity, accessibility in local languages, and practical guidance over abstract jurisprudence, ensuring that farmers and rural enterprises can make informed financing decisions with confidence.
Inclusion initiatives must account for Pakistan's uneven rural connectivity, literacy levels, and socio-economic diversity. Capacity-building programs should support hybrid service delivery models combining digital platforms with field agents, community cooperatives, mobile-based onboarding, and offline-to-online integration. International experience demonstrates that purely digital models rarely achieve inclusive scale in rural areas; instead, hybrid, context-aware approaches are needed to ensure that underserved farmers can access Shariah-compliant financing.

Finally, ecosystem-wide capacity building should emphasize collaboration, shared learning, and institutional trust. Joint training programs, regulator-industry knowledge exchanges, and cooperative innovation initiatives can break organizational silos, foster a shared understanding of Shariah agricultural finance objectives, and align stakeholders across regulatory, operational, and community levels. Over time, these coordinated efforts will enable Pakistan's agricultural finance ecosystem to move from fragmented pilot projects toward scalable, structured, and credible implementation.

In combination, these literacy, inclusion, and institutional development measures ensure that regulatory and policy reforms translate into real-world adoption, operational resilience, and sustainable rural development, establishing Shariah-compliant agricultural finance as a credible, ethical, and scalable pillar of Pakistan's rural economy.

Policy Domain	Strategic Focus	Key Policy Intervention Recommendation (Consolidated)	Why This Is Well-Fitted for Pakistan
Policy Formulation	Farmer trust, literacy, and competency standards	Develop a unified national framework for Shariah-compliant agricultural finance literacy, ethical conduct, consumer protection, and professional competency. Define cross-disciplinary standards covering Shariah, agronomy, finance, and digital tools for institutions and field operators.	Adoption is limited by systemic trust deficits and fragmented expertise. A unified framework addresses farmer literacy and aligns professional competencies across disciplines.
Operational Development	Consistent farmer experience and integrated delivery	Standardize farmer-facing disclosures, terminologies, and communication across agricultural finance platforms. Encourage integrated organizational structures combining Shariah, finance, agronomy, and	Clear communication reduces misconceptions and mis-selling, while integrated teams improve speed, accountability, and operational quality.

		technology teams for coordinated service delivery.	
Capacity Building	Talent development and ecosystem readiness	Strengthen regulatory, industry, and cooperative capacity in applied Shariah agricultural finance, risk-sharing models, digital onboarding, climate-smart finance, and cooperative engagement. Implement joint training, certification, and rotational exposure programs.	Farmer trust and operational readiness are mutually reinforcing. Building institutional depth ensures that sector growth is credible, inclusive, and sustainable.

Re-centering People in Pakistan's Shariah-Compliant Agricultural Finance Ecosystem

The sustainability and credibility of Shariah-compliant agricultural finance in Pakistan depend not only on clear policies or innovative products but fundamentally on the farmers who use the services and the professionals who design, govern, and supervise them. Low financial and Shariah literacy, limited trust in formal financing channels, and fear of collateral loss impede adoption. On the supply side, Shariah scholars, agronomists, finance professionals, and digital technologists often operate in silos, with minimal shared understanding, weakening product integrity and slowing operational execution.

Global evidence demonstrates that successful agricultural finance ecosystems treat literacy, trust, and talent development as mutually reinforcing objectives. Jurisdictions like Malaysia, Indonesia, and Kenya integrate farmer education with institutional competency development,

ensuring that Shariah governance, agronomy, digital technology, and finance operate cohesively.

For Pakistan, addressing these people-related constraints requires a holistic approach: farmer literacy, ethical conduct, fraud prevention, professional training, and integrated delivery models must be pursued in a coordinated manner. By embedding these measures into policy formulation, operational processes, and capacity-building initiatives, Pakistan can strengthen trust, improve adoption, and build the human and institutional capital required to scale Shariah-compliant agricultural finance across rural markets.

A. Policy Formulation: Integrating Trust, Literacy, and Human Capital Development

At the policy formulation level, Pakistan's primary challenge lies in fragmentation rather than absence. Consumer education, Shariah literacy, digital finance awareness, and consumer protection are often addressed through parallel initiatives led by different institutions, with limited coordination or shared objectives. This fragmentation weakens impact and leaves consumers vulnerable to misunderstanding, mis-selling, and fraud.

Policy intervention should therefore focus on integrating Shariah literacy, digital finance education, and consumer protection into a single, coherent framework for Shariah-compliant digital finance. Such integration ensures that claims of Shariah permissibility are consistently matched by clear explanations, fair disclosure, and enforceable conduct standards. International evidence shows that when literacy and protection are treated together, consumer confidence improves and market discipline strengthens. Malaysia's approach is particularly instructive in this regard, where Shariah education is embedded within broader consumer protection architecture rather than treated as a standalone religious matter.

In parallel, policy formulation must address the structural roots of talent fragmentation. Pakistan possesses a deep pool of Shariah scholars and a growing cohort of digital and fintech professionals, but the absence of cross-disciplinary competency standards allows functional silos to persist. Policy should therefore articulate baseline competency expectations that span Shariah knowledge, financial acumen, technological literacy, and data governance. These standards need not be prescriptive, but they should provide a common reference point for regulators, institutions, and training providers.

By defining what "fit for purpose" human capital looks like in a Shariah-compliant digital

finance environment, policy can guide institutional investment in talent development and signal the importance of integrated capability. This approach shifts talent development from an ad hoc, institution-specific concern to a systemic enabler of market integrity and innovation.

B. Operational Development: Delivering Consistency in Consumer Experience and Institutional Execution

Policy intent only translates into trust when reflected in consistent operational practice. In Pakistan's digital finance landscape, consumer confusion often arises not from product complexity alone, but from inconsistent terminology, unclear disclosures, and varying interpretations of Shariah concepts across platforms. In a digital environment where face-to-face explanation is limited, such inconsistency materially increases mis-selling risk and erodes confidence.

Operational development should therefore prioritise standardisation of disclosure formats, terminology, and communication practices for Shariah-compliant digital finance products. Clear, plain-language articulation of Shariah structures, rights, and obligations is essential to ensure that consumers can make informed decisions. International benchmarks show that standardised disclosures improve comparability, reduce disputes, and strengthen conduct supervision without constraining innovation.

Within institutions, operational incentives should be recalibrated to encourage integrated team structures. Too often, Shariah review, technology development, and business strategy operate sequentially rather than collaboratively, resulting in delays, redesigns, and diluted accountability. Experience from leading jurisdictions demonstrates that embedding Shariah expertise within product and technology teams rather than positioning it as an external checkpoint improves speed, coherence, and Shariah integrity.

For Pakistan, operational development should therefore promote delivery models in which Shariah scholars, technologists, and business leaders share responsibility for outcomes across the product lifecycle. This integration reduces execution risk and helps institutions respond more effectively to evolving market and regulatory expectations.

C. Capacity Building: Deepening Trust Enforcement and Professional Depth

Sustaining trust and integration requires deliberate investment in capability. Capacity building must address both the demand side through stronger consumer protection and fraud mitigation and the supply side, through development of professionals equipped to operate at the intersection of Shariah and digital finance.

On the consumer side, regulatory and industry actors need enhanced capability in fraud detection, ethical marketing oversight, complaint handling, and redress mechanisms. As digital channels expand, fraud risks evolve rapidly, and trust can be undermined quickly if enforcement capacity lags innovation. International experience, particularly from Singapore and the UK, shows that strong trust enforcement is a prerequisite for sustained digital finance adoption.

On the talent side, capacity development should focus on building dual- and multi-competency professionals rather than narrow specialists. Joint training programmes, professional certification pathways, and structured rotational exposure across Shariah, technology, and business functions can gradually dismantle silos and build shared understanding. Malaysia and Bahrain demonstrate that professionalising Shariah governance through structured training significantly improves compliance quality, while Singapore illustrates the value of interdisciplinary exposure in digital finance ecosystems.

For Pakistan, targeted capacity-building initiatives supported by regulators, industry associations, and academic institutions which can accelerate the emergence of a professional class capable of delivering Shariah-compliant digital finance with both technical excellence and ethical integrity.

Why This Intervention Set Fits Pakistan's Context

This integrated approach is well fitted to Pakistan's Shariah-compliant digital finance landscape because it addresses foundational constraints rather than surface symptoms. It recognises that trust deficits and talent fragmentation are systemic issues that cannot be resolved through isolated campaigns or ad hoc training. By aligning literacy, conduct, and competency development within a coherent framework, Pakistan can strengthen consumer confidence while building the human capital required for scale.

Importantly, these interventions work within Pakistan's existing institutional realities. They do not rely on sweeping legal reform or unrealistic assumptions about capacity, but instead focus on coordination, standardisation, and capability development areas where international evidence shows high impact at manageable cost. By investing in people as a core pillar of ecosystem development, Pakistan can create the social and professional foundations necessary for Shariah-compliant digital finance to grow credibly, inclusively, and sustainably.

Key Policy Intervention Recommendations Pillar 6: Technology and Infrastructure

Enabling Interoperability, Inclusion, and Scalable Digital Rails for Shariah-Compliant Agricultural Finance

Technology as the Enabling Layer, Not the Constraint

Technology and infrastructure form the backbone of scalable, Shariah-compliant agricultural finance. While products, institutions, and regulatory frameworks shape market behavior, it is digital rails payments, identity verification, data management, and platform connectivity that ultimately determine whether Shariah-compliant agricultural finance can reach smallholder farmers, rural cooperatives, and agribusinesses efficiently while maintaining operational integrity.

In Pakistan, the challenge is not the absence of digital infrastructure, but fragmented interoperability, uneven governance, and misalignment between agricultural finance regulations and national digital systems. Platforms such as Raast, NADRA-based e-KYC, and fintech-enabled agri-credit systems exist but are not yet fully orchestrated to support seamless, Shariah-compliant agricultural financing across geographies, crops, and value chains.

International benchmarks demonstrate that successful digital Islamic finance ecosystems treat interoperability as a governance and coordination challenge rather than purely a technical one. Malaysia and Indonesia show how coordinated regulatory mandates can align payment systems, digital identity, and financial supervision, while Singapore illustrates how API-led connectivity and open architecture can coexist with strong data governance and cybersecurity. These lessons are particularly relevant for Pakistan, where institutional plurality and infrastructure heterogeneity are structural realities.

For Pakistan, strengthening the technology and infrastructure pillar for agricultural finance

requires a shift from isolated platform development toward ecosystem-level orchestration, with policy formulation, operational development, and capacity building working together to ensure digital rails enable scale, inclusion, and Shariah integrity.

Policy Domain	Strategic Focus	Key Policy Intervention Recommendation (Consolidated)	Why This Is Well-Fitted for Pakistan
Policy Formulation	Interoperability and inclusion governance	Define clear interoperability and data governance standards covering payments, e-KYC, farm-level data, and platform connectivity, aligned with national agricultural inclusion and rural digital strategies.	Fragmented digital infrastructure is primarily a governance issue. Clear standards align innovation with inclusion, efficiency, and system stability in rural agricultural finance
Operational Development	Shared digital rails and hybrid delivery	Enable shared digital rails linking Raast, NADRA-based e-KYC, and agri-finance providers. Promote hybrid delivery models combining digital platforms, field agents, cooperatives, and offline-to-online workflows.	Connectivity gaps and uneven rural access require pragmatic hybrid solutions. Shared rails reduce duplication, lower costs, and improve operational integration across agricultural value chains.

Capacity Building	Technical supervision and inclusive design	Build regulatory and industry capacity in systems integration, API governance, cybersecurity oversight, and inclusive agricultural service design.	Without supervisory and design capability, interoperability and inclusion initiatives underperform, fragment, or fail to scale.

A. Policy Formulation: Establishing Interoperability Governance and Alignment for Agri-Finance

At the policy formulation level, Pakistan's primary challenge is the absence of a unified governance framework for digital interoperability in agricultural finance. While digital systems exist in silos, payment rails, e-KYC, farm registries, and fintech platforms they are not yet fully coordinated, creating friction for institutions and limiting rural reach.

Policy should define interoperability principles and governance expectations for Shariah-compliant agricultural finance, articulating how payment systems, e-KYC, farm-level data, and platform connectivity should align across regulators, cooperatives, and private providers. Crucially, this does not require a single technical solution; outcomes-focused governance, leaving implementation flexibility to the market, is most effective.

Malaysia's experience demonstrates how coordinated mandates align payments, digital identity, and supervision without requiring consolidation, while Singapore shows how open architecture and API connectivity support interoperability and competition. Aligning these principles with national rural inclusion and digital agriculture strategies ensures that Shariah-compliant agricultural finance reaches smallholders, cooperatives, and agribusinesses in a scalable and equitable manner.

B. Operational Development: Translating Interoperability into Usable Digital Rails

Operational effectiveness is realized only when institutions and farmers can transact seamlessly. In Pakistan, operational fragmentation manifests as inconsistent e-KYC, lack of API standardization, and limited integration across payment, financing, and farm data

platforms. These frictions increase costs, delay deployment, and disproportionately affect small NBFCs, fintechs, and rural cooperative networks.

Operational development should therefore enable shared digital rails connecting Raast, NADRA-based e-KYC, and agricultural finance providers, while embedding hybrid delivery models digital platforms combined with field agents, offline-to-online processes, and cooperative networks. This reduces onboarding friction, accelerates transactions, and strengthens end-to-end visibility.

Singapore's API-led approach and Malaysia/Indonesia's coordination across regulators and infrastructure providers demonstrate that operational alignment improves access, inclusion, and supervisory oversight without sacrificing innovation or control. In Pakistan, such operational measures are critical to ensure rural farmers, small enterprises, and remote communities can participate in Shariah-compliant agricultural finance.

C. Capacity Building: Strengthening Technical, Supervisory, and Integration Capabilities

Even with policy clarity and operational alignment, infrastructure interoperability cannot be sustained without skilled regulators and industry personnel. Current capacity gaps include technical supervision, API governance, cybersecurity oversight, and system integration expertise, especially in the context of Shariah-compliant agricultural finance.

Capacity-building interventions should therefore focus on:

- **Regulatory capability**: Supervisors trained in integrated systems, digital risk assessment, and Shariah-sensitive oversight.
- **Industry capability**: Training NBFCs, fintechs, and cooperatives to manage platform dependencies, data integrity, digital risk, and Shariah compliance across end-to-end workflows.
- **Applied collaboration**: Cross-sector knowledge exchange, technical guidance, and continuous professional development to ensure ongoing adaptation to evolving technology and agricultural finance needs.

International experience shows that such capacity investments enable regulators and institutions to manage interconnected digital systems, maintain Shariah integrity, and scale

inclusion efficiently.

Why This Intervention Set Fits Pakistan's Context

This technology and infrastructure strategy is tailored to Pakistan because it leverages existing digital assets while addressing fragmentation, interoperability, and inclusion gaps. It avoids unrealistic capital-intensive mandates and instead focuses on governance, alignment, and capability, areas with proven high impact at manageable cost.

By prioritizing shared digital rails, hybrid delivery, and integrated capacity building, Pakistan can expand Shariah-compliant agricultural finance to underserved farmers, smallholder cooperatives, and rural enterprises while preserving Shariah integrity. Treating technology as an enabling layer rather than a standalone solution ensures the ecosystem is resilient, inclusive, and scalable, supporting sustainable rural development, financial inclusion, and ethical agricultural finance at scale.

Additional Key Recommendations in Public Private Partnership:

Role of Public–Private Partnerships (PPPs) in Scaling Islamic Agri-Finance in Pakistan

Public–Private Partnerships (PPPs) can play a transformative role in developing and scaling Shariah-compliant agricultural finance in Pakistan. The agricultural sector is characterized by dispersed smallholders, fragmented value chains, and high-risk profiles, which constrain access to finance, particularly under Shariah-compliant models that avoid interest-based lending. PPPs offer a mechanism to align public policy objectives, regulatory support, and private sector efficiency, creating scalable, sustainable, and Shariah-compliant financing solutions.

1. Bridging Market Gaps Through Shared Risk and Capital

Smallholder farmers, cooperatives, and rural enterprises often lack collateral and credit history, making conventional or Islamic financing commercially challenging. PPPs allow public institutions such as the State Bank of Pakistan, provincial agricultural departments, or development banks to absorb part of the risk through credit guarantees, co-financing, or seed capital, while private Islamic banks, NBFCs, and fintech firms provide operational expertise, technology, and market access.

This risk-sharing mechanism encourages private sector participation in segments that would otherwise be perceived as high-risk, enabling the development of innovative Shariah-compliant

products, including *Murabahah*-based input financing, *Salam* contracts for crop pre-financing, and *Ijarah*-based machinery leasing.

2. Leveraging Digital Infrastructure for Rural Outreach

PPPs can integrate public digital infrastructure such as NADRA identity verification, Raast payment rails, and agricultural databases with private sector digital platforms, fintechs, and mobile-based agri-financing solutions. By combining public sector trust, verification systems, and regulatory backing with private sector technological innovation, PPPs can scale access to Shariah-compliant financing to previously underserved farmers, rural SMEs, and agricultural value-chain participants.

Digital PPP frameworks also facilitate hybrid delivery models, combining online platforms with agent-assisted onboarding and cooperative networks, ensuring inclusion for farmers in remote or low-connectivity areas.

3. Strengthening Ecosystem Governance and Shariah Compliance

Effective PPPs enable harmonization of Shariah governance across institutions. Public regulators can provide oversight frameworks, standardized operational guidance, and auditing support, while private sector partners implement day-to-day compliance within their operational models. This division of labor ensures that Shariah integrity is maintained at scale, reducing operational risk and increasing market confidence in Islamic agricultural finance products.

4. Promoting Innovation and Value-Chain Integration

Agriculture is inherently a value-chain-based activity, from input suppliers to processors, transporters, and markets. PPPs encourage platform-based financing and co-origination models, where multiple financial institutions, technology providers, and agribusiness actors collaborate to provide integrated financing solutions. Such arrangements allow capital-efficient scaling, as the financial burden is shared and risk is distributed along the value chain, enabling more farmers to participate without disproportionately increasing institutional exposure.

5. Policy Signaling and Market Confidence

Government participation in PPPs signals regulatory endorsement, creditworthiness, and institutional commitment, which can attract further investment from Islamic NBFCs, banks, and impact investors. By providing partial guarantees, subsidies, or technical support, the public sector reduces uncertainty for private partners, facilitating long-term investment in Shariah-compliant agricultural finance infrastructure and digital platforms.

Benefits of PPPs in Scaling Islamic Agri-Finance in Pakistan

Public–Private Partnerships (PPPs) offer multiple strategic benefits for scaling Shariah-compliant agricultural finance in Pakistan. By sharing risk between public institutions and private sector providers, PPPs encourage financing to smallholders and rural SMEs who would otherwise be considered high-risk. They combine public trust and infrastructure with private sector innovation, enabling inclusive reach to remote and underserved areas. At the same time, PPPs ensure Shariah integrity at scale by embedding standardized governance frameworks while maintaining operational efficiency. These partnerships also promote value-chain financing, facilitating ecosystem-based solutions rather than isolated financing, which enhances productivity and market linkages. Finally, government involvement through PPPs signals regulatory endorsement and commitment, attracting additional private investment and institutional capital, thereby strengthening the overall Islamic agricultural finance ecosystem.

In Pakistan, PPPs represent a strategic pathway to overcome the structural constraints of Shariah-compliant agricultural finance. By aligning public policy, digital infrastructure, risk-sharing mechanisms, and private sector operational capacity, PPPs can scale financing to smallholders, rural enterprises, and agri-value-chain actors efficiently. This collaborative approach not only enhances financial inclusion but also strengthens market confidence, fosters innovation, and ensures that Shariah-compliant agricultural finance contributes meaningfully to sustainable rural development.

Global Public–Private Partnerships (PPPs) in Agriculture- Illustrative Examples and Lessons

Public–Private Partnerships (PPPs) have been widely deployed around the world to boost agricultural development, improve financing access, build value chains, and integrate smallholder farmers into modern markets. These collaborations bring together government bodies, financial institutions, private agribusinesses, and occasionally civil society actors to

address structural constraints that neither sector can tackle alone. International experience demonstrates that PPPs can effectively mobilise capital, share risk, and increase access to services for farmers, providing useful precedents for Pakistan's efforts to scale Shariah-compliant agricultural finance. Examples PPP across technology includes;

1. India – Digital and Credit Disbursement Platforms

In India, large-scale programmes such as the *Pradhan Mantri Kisan Samman Nidhi (PM-KISAN)* have harnessed public financing with private fintech platforms to deliver subsidies and credit directly to farmers. Through digital payment systems supported by government institutions and private technology providers, the scheme has disbursed billions of dollars in direct support and facilitated streamlined access to finance and services for millions of farmers, illustrating how PPPs can enhance reach and reduce delivery inefficiencies, (The Agricultural Economist, 2025)

2. Kenya – AgriFin Accelerator

In Kenya, the AgriFin Accelerator programme sponsored by USAID in partnership with private banks and mobile network operators has expanded digital loans and financial services to smallholder farmers (The Agricultural Economist, 2025). This initiative combines donor support with commercial delivery channels, using mobile platforms to extend credit, savings, and advisory services to underserved rural clients. By leveraging public funding to de-risk private lending, AgriFin has demonstrated how PPPs can amplify inclusion in rural finance (The Agricultural Economist, 2025).

3. Brazil – EMBRAPA and Private Agribusiness Research

The Brazilian Agricultural Research Corporation (EMBRAPA) has established PPPs with multinational seed and agricultural technology companies to drive innovation in crop varieties and farming practices. For example, technical collaboration agreements with private firms have accelerated the development and dissemination of improved seed varieties and sustainable practices. These partnerships link public research capacity with private commercial deployment, expanding agricultural productivity and resilience (World Bank, 2024).

4. Ghana – Cocoa Sector PPPs

In Ghana, the Ghana Cocoa Board (COCOBOD) has partnered with Barry Callebaut, a global chocolate manufacturer, to strengthen cocoa production through farmer training, improved seedling distribution, and processing infrastructure development. This PPP model enhances both productivity and market access, addressing structural inefficiencies in a critical export value chain and demonstrating how coordinated public and private action can drive agricultural transformation (Laja, 2025)

5. Nigeria – Staple Crop Processing Zones (SCPZ) Initiative

Nigeria's government-led Staple Crop Processing Zones initiative exemplifies PPP deployment for agribusiness investment and infrastructure. By developing rural processing zones with roads, power supply, and water facilities, the programme has attracted private investment from firms like Dangote Group and Olam Nigeria, which have established rice and cassava processing plants. These partnerships have improved value-chain integration, increased local processing capacity, and stimulated rural employment and incomes. (Agribusiness Space, 2025)

6. Ethiopia – Agricultural Transformation Agency Partnerships

In Ethiopia, the Agricultural Transformation Agency (ATA) has engaged with multinational agribusiness firms, such as Syngenta, to increase wheat yields by providing access to high-yield seed varieties and modern agronomic techniques. These collaborative efforts have reduced import dependency and strengthened domestic production, illustrating how PPPs can mobilise private expertise for public agricultural goals (Laja, 2025).

Broader Lessons from Agribusiness PPPs

FAO and World Bank analyses of PPPs across Asia, Africa, and Latin America show that such partnerships can span multiple objectives, including value-chain development, technology transfer, market infrastructure upgrades, and business development services for small and medium agribusinesses. In a survey of more than 70 cases from 15 countries, PPPs were found to improve investment, risk sharing, and smallholder access to services when well-structured and supported by enabling institutions.

These global examples highlight that PPPs are not limited to finance alone but often combine technology, research, market access, and risk management to create comprehensive agricultural support systems. For Pakistan, adapting successful elements of these models such as digital finance integration, value-chain infrastructure development, and blended risk-sharing mechanisms can provide a practical pathway for scaling Shariah-compliant agricultural finance, especially when combined with supportive policy frameworks and institutional capacity development.

CHAPTER 5: CONCLUSION

Agriculture remains the backbone of Pakistan's economy, supporting livelihoods, food security and rural development. Yet, despite its critical importance, the sector continues to experience persistent underinvestment, volatile productivity, climate vulnerability and uneven financial inclusion. Only a fraction of farmers currently interacts with formal financial institutions, and even fewer access Islamic finance despite strong societal demand for Shariah-aligned financial products. This reality exposes a dual gap: the missed potential of agriculture as a driver for national economic transformation, and the underutilisation of Islamic finance as a tool for ethical, asset-backed, productivity-enhancing capital deployment.

This report has attempted to bridge this gap by developing a structured research framework, rigorously diagnosing present constraints, and proposing implementable solutions grounded in evidence and international experience. Through Phase 1 desktop research, Phase 2 stakeholder engagements, and Phase 3 benchmarking analysis, the study has journeyed from understanding *what is missing* to framing *how Pakistan can move forward systematically*. The process revealed not only challenges, but a pathway to unlock Islamic agricultural financing as a scalable engine for prosperity and inclusion.

Reflecting on the Core Findings

At the foundation of this research sit twelve systemic pain points grouped across six pillars; regulation and policy, institutional actors, people and farmers, products and services, Shariah governance, and technology and infrastructure. These are not isolated problems, but interlinked constraints that reinforce one another. Regulatory fragmentation slows product innovation; limited Shariah governance reduces investor confidence; weak documentation and literacy inhibit farmer onboarding; low digitisation increases cost-to-serve; and the absence of risk-sharing instruments discourages lenders. The ecosystem operates in silos, when agriculture itself functions as an interconnected value chain.

The study's benchmarking work demonstrates that other Muslim-majority economies have successfully navigated similar challenges. Malaysia's institutionally embedded Islamic banking, Indonesia's fintech-enabled rural models, Turkey and Saudi Arabia's state-backed agriculture finance, Kenya and Nigeria's digital inclusion mechanisms, Ethiopia's roadmap-driven agriculture finance vision, and the Netherlands' cooperative-led financing culture collectively illustrate that strong agricultural finance systems are built not inherited. They

emerge from alignment between policy direction, market incentives, product design, risk infrastructure, and human capital development.

Pakistan, therefore, is not starting from zero. It is standing at a point where lessons are abundant, demand is strong, technology is emerging, and Islamic finance expertise is present but disconnected. The opportunity lies in converting these capabilities into a coordinated ecosystem with clear rules, standardisation, interoperability, and trust.

From Diagnosis to Prescription: What This Report Contributes

This paper does more than highlight gaps; it provides a roadmap for transformation. The recommendations presented are categorised into three mutually reinforcing clusters:

1. Policy & Institutional Reform
   Establishing regulatory coordination, creating a national Islamic Agriculture Finance Roadmap, standardising Shariah oversight, and providing legal recognition for agriculture-focused Islamic NBFCs.
2. Product & Operational Innovation
   Developing *Salam, Wakalah, Musharakah* and warehouse-receipt-backed structures; enabling digital contracting and takedown financing; incentivising value-chain anchored financing; and mainstreaming climate-linked *Takaful*.
3. Ecosystem Enablement & Capacity Development
   Enhancing farmer literacy, building institutional talent, designing multilingual onboarding processes, integrating cooperatives, increasing digital agent networks, and fostering fintech partnerships.

These are not incremental tweaks; they are structural reforms that can shift agricultural finance from risk-averse lending to participatory capital deployment, from asset-based collateral dependence to cashflow/value-chain based underwriting, and from fragmented pilots to national-scale implementation.

A Vision Beyond Implementation: What Success Looks Like

If the roadmap outlined in this report is adopted and executed, Pakistan can evolve into a regional reference point for Islamic agriculture finance within the next decade. The future state

we aspire to is one where:

- Small farmers can access financing without land collateral, using warehouse receipts, produce contracts or cooperative guarantees.
- *Salam and Musharakah* arrangements finance seeds, inputs and mechanisation in ethical, asset-backed forms.
- Digital onboarding reduces paperwork from weeks to minutes through NADRA-based eKYC and USSD channels.
- Climate-index *Takaful* protects farmers from weather shocks, ensuring loan sustainability instead of default.
- Islamic NBFCs operate alongside banks and fintechs as competitive, Shariah-compliant intermediaries.
- Provincial extension officers double as finance educators, building trust and financial literacy in villages.
- Women farmers, youth, and tenant farmers are fully integrated into the financing ecosystem.
- Value-chain platforms connect financiers, buyers, storage operators, insurers and logistics actors seamlessly.
- Rural prosperity rises not through subsidies, but through access to fair, productive, and Shariah-aligned capital.

The transformation is not merely financial; it is socio-economic, ethical, and generational.The journey toward a functional Shariah-compliant agricultural finance system requires political will, institutional partnership, and continuity of implementation. This report emphasises that no single institution can achieve the reform alone not the regulator, not the banks, not the fintechs, not the cooperatives, and not the farmers. The ecosystem must move like a chain: if even one link is weak, progress slows.

Policymakers have a unique window to anchor agriculture finance priorities into national strategy. Regulators have authority to standardise frameworks and unlock innovation. NBFCs and banks have capital and distribution networks. Fintechs bring agility, data, and digital access. Cooperatives and farmer groups hold community trust and last-mile reach. Takaful providers can underwrite climate uncertainty. Academia and development partners can strengthen capacity and generate evidence.

But above all, farmers remain the centre of this system. Their needs, culture, literacy levels, and cashflow cycles must shape product design and delivery not the other way around. A system that works on paper but fails in the field is only a theoretical success. The true test is affordability, accessibility, usability, and impact.

Conclusion: A Call to Action

In closing, this report is both a reflection of Pakistan's current landscape and a blueprint for its future. Implementing the recommendations herein will not be simple, nor immediate, but progress is entirely achievable through phased roll-out and coordinated leadership. Pakistan possesses the human capital, Islamic finance talent, farmer networks and digital rails needed to build a globally recognised agricultural finance model one grounded in Shariah, powered by technology, strengthened by institutions, and inclusive of even the smallest farmer.

The work ahead demands commitment to policy coherence, product innovation, capacity development, and patience for systemic reform. Yet, the reward is immense: food security, rural prosperity, climate resilience, economic growth, and dignity for the millions who feed the nation.

This report is therefore not an ending, but a beginning. It marks the foundation upon which Pakistan can grow one of the world's most comprehensive Islamic agriculture financing ecosystems robust in design, global in alignment, digitally enabled, and rooted in justice and sustainability. Let this serve as a guide and a call to collective action, so that the vision articulated here moves beyond paper and into the hands of farmers across Pakistan.

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