



Kingdom of the Netherlands

Scoping and Ideation for Food and Nutrition Security (FNS) Programing in Kenya

Agri-food Scoping, Diagnostics and FNS Program Framework

2026-2029.

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This document presents the Kenya Agri-food Sector Scoping Findings and the Proposed Food and Nutrition Security Program Framework prepared by SPARD Africa Consulting Ltd for the Embassy of the Kingdom of the Netherlands. The analysis, findings, and recommendations expressed herein are those of the consultants and should not be interpreted as representing the official views or policy of the Embassy of the Kingdom of the Netherlands.

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Table of Content

Table of Content	3
List of Acronyms	4
Executive Summary	5
1. Agri-Food Sector Diagnostics and Programming Implications.....	8
1.1. Livestock Subsector Core System Diagnosis.....	8
1.2. Horticulture Subsector – Core System Diagnosis	9
1.3. Aquaculture & Fisheries System Diagnosis.....	12
1.4. Implications of Sector Diagnostics for Food and Nutrition Security.....	14
1.5. Cross-Cutting System Insights.....	14
1.6. Cross Cutting System Enablers	15
1.7. Policy Environment for Food Systems Transformation.....	16
1.8. Donor Landscape and Program Scoping Insights	16
2. From Diagnosis to Program Architecture	17
2.1. Overview	17
2.2. Program Framework: Structure and Strategic Rationale.....	18
2.3. Implementation and Partnership Principles.....	19
2.3.1 Program 1: Climate-Resilient, Market-Linked Production Systems.....	20
2.3.2 Program 2: First-Mile Value Protection and Market Systems Development.....	23
2.3.3 Program 3: Inclusive and Resilient Livelihood Systems in ASAL Regions	25
2.3.4 Final FNS Portfolio: Integrated System Transformation.....	28
2.3.5 Cross-Cutting System Enablers for FNS Transformation.....	30
2.4. Alignment with FNS, PSD and Transformation Framework.....	32
2.5. Dutch Comparative Advantage & Investment Pathways	32
2.6. Strategic Positioning of Key Counties.....	33
3. List of Annexes	Error! Bookmark not defined.

List of Acronyms

Acronym	Full Expression
ASAL	Arid and Semi-Arid Lands
BDS	Business Development Services
BMOs	Business Membership Organizations
BSF	Black Soldier Fly
EKN	Embassy of the Kingdom of the Netherlands
FIs	Financial Institutions
FNS	Food and Nutrition Security
GESI	Gender Equality and Social Inclusion
GMO	Genetically Modified Organism
MACS	Multi-Annual Country Strategy
MFIs	Microfinance Institutions
NGOs	Non-Governmental Organizations
PAYGO	Pay-As-You-Go
PPP	Public Private Partnership
PSD	Private Sector Development
RAS	Reticular Activating System
SMEs	Small and Medium-sized Enterprises
WEF	Water - Energy - Food
WRUAs	Water Resources Users Associations

Executive Summary

This report presents a system-level analysis for Food and Nutrition Security (FNS) in Kenya and program framework, developed to inform the Embassy of the Kingdom of the Netherlands (EKN) under the Multi-Annual Country Strategy (MACS) 2026–2029. The analysis covers livestock, horticulture, and fisheries subsectors, alongside the cross-cutting system enablers required to support market-led, climate-resilient, and inclusive transformation.

System Diagnosis and Opportunity Landscape

The analysis reveals that constraints within Kenya’s agri-food system are primarily structural rather than production-driven. While Kenya has strong production potential, system performance is undermined by fragmentation across production, aggregation, and market systems, as well as weak enabling conditions.

The most binding constraints are concentrated in the system’s “missing middle,” particularly aggregation, first-mile value protection, and input systems (feed, seed, genetics). Weak coordination between production and markets results in inconsistent supply, high post-harvest losses, and underutilization of infrastructure. Inefficient input systems drive high production costs and low productivity, while limited food and feed quality assurance and traceability systems expose consumers to food safety risks, including misuse of agrochemicals and feed contamination. Informality, while critical for livelihoods and market access, contributes to inefficiencies, weak standards enforcement, and constrained investment readiness.

Climate change further amplifies these structural weaknesses. Increasing variability in rainfall, rising temperatures, and recurrent droughts particularly in ASAL regions intensifies production risks, disrupting supply reliability, and exacerbating resource constraints such as water and feed availability. At the same time, climate pressures are exposing the limits of rain-fed and fragmented production systems, reinforcing the need for more resilient, resource-efficient, and market-linked production models.

Despite these constraints, the sector presents strong opportunities for transformation. Growing domestic, regional, and export market demand, increasing private sector interest, and the emergence of scalable models such as Water–Energy–Food (WEF) systems, structured aggregation, localized input systems, and quality assurance infrastructure which provide a foundation for system-level change. ASAL regions, in particular, represent a high-potential frontier for expansion, provided that constraints related to water access, infrastructure, governance, and market connectivity are addressed.

A key insight is that transformation does not require eliminating informality, but enabling “functional formalisation”, progressively integrating informal actors into structured, performance-driven systems through aggregation, quality assurance, digital tools, and inclusive business models. This creates hybrid systems that retain inclusivity while improving efficiency, quality, and scalability.

Implications for Food and Nutrition Security and Programming

The findings highlight that food and nutrition security challenges in Kenya are not primarily driven by insufficient production, but by systemic inefficiencies that constrain availability, affordability, safety, and utilisation of food. These inefficiencies reduce supply, increase costs, and limit access to safe and nutritious foods, particularly for low-income populations.

Addressing these challenges requires a shift from production-focused interventions to integrated, market-led food system transformation. The greatest impact can be achieved by targeting the

system's missing middle by strengthening aggregation systems, first-mile value protection, and input systems—while aligning production with market demand and improving quality assurance.

At the same time, climate resilience must be embedded as a core design principle by strengthening absorptive, adaptive, and transformative capacities across the system. This includes reducing exposure to shocks through improved infrastructure, diversified input systems, and loss reduction; enabling producers and market actors to adjust practices through climate-smart production systems, Water–Energy–Food (WEF) solutions, and access to reliable climate and market information; and supporting longer-term structural shifts toward more resilient production geographies, including ASALs, alongside circular resource use models and market-linked systems.

The study established that system transformation presents a pathway to improving farmer incomes, productivity, and resilience. However, achieving inclusive outcomes requires deliberate design to ensure that farmers access reliable markets, productivity gains translate into improved margins, and value is equitably distributed across the system.

Overall, the analysis underscores that achieving food and nutrition security in Kenya requires coordinated investments that simultaneously address productivity, market efficiency, quality assurance, and resilience. This forms the foundation of the proposed Program Framework, which positions EKN to support a transition toward climate-resilient, market-driven, and inclusive agri-food system capable of delivering safe, affordable, and diverse diets at scale.

Program Framework: In response to the challenges, the report proposes a three-program architecture, structured as distinct but complementary investment pathways that can be implemented independently or together depending on system maturity and geographic context, addressing interconnected system layers:

Program 1: Market-driven Production Systems: Strengthens productive capacity and supply reliability through climate-resilient production, improved input systems, and producer organization development.

Program 2: Integrated Market Systems and Value Protection: Addresses the core system bottleneck, focusing on aggregation, logistics, cold chain, quality assurance, and market access. This represents the highest-leverage investment area.

Program 3: Inclusive Market Development in ASAL and Frontier Systems: Focuses on market creation in emerging regions, combining resilience, governance, and WEF-integrated production systems. ASALs are positioned as future production and market frontiers, not only resilience zones.

System Enablers and Investment Approach: The framework includes cross-cutting investments in finance and blended finance, digital systems and data, policy and regulatory strengthening, WEF infrastructure, nutrition and inclusion, and capacity development. It adopts a market-led, private sector–anchored approach in which public funding is deployed strategically to de-risk investment, strengthen system coordination, and enable scalable, sustainable outcomes.

Implementation and Partnership Principles

Implementation of the framework will need to reflect the realities of system transformation by being coordinated, locally grounded, adaptive, and sustained over time. This implies stronger alignment and complementarity across FNS actors, deliberate co-creation with county governments, grassroots actors, and market participants, and embedded learning mechanisms

that allow approaches to be refined and scaled rather than repeatedly piloted. It also requires longer and more flexible programming horizons that can support behaviour change, institutional strengthening, and sustained private sector crowding-in.

Geographic Strategy: The framework adopts a county portfolio approach that anchors interventions in high-potential production and market hubs across key subsectors, including horticulture production zones, aquaculture and fisheries ecosystems, and livestock and ASAL market corridors. In addition, the program targets Water–Energy–Food (WEF)-integrated frontier systems in climate-vulnerable areas to unlock new production potential. These geographies serve as model development zones for testing, refining, and scaling integrated system approaches across counties and value chains.

Investment Outlook: The program is structured around a €45–60 million investment envelope over five years (working estimate €50 million), with priority allocation toward market systems and value protection as the largest share, followed by production systems, ASAL market development, and cross-cutting system enablers. The approach is designed to mobilise additional private capital by leveraging public funding as a catalytic instrument to crowd in investment and support scalable, market-driven solutions.

Conclusion: Kenya’s agri-food system holds significant potential, but transformation requires a shift from fragmented interventions to integrated, market-driven system approaches.

By focusing on market systems, WEF-enabled production, and inclusive market development, while strengthening key system enablers, the proposed framework provides a clear and scalable pathway to achieving improved productivity, enhanced food and nutrition security, and inclusive economic growth.

1. Agri-Food Sector Diagnostics and Programming Implications

1.1. Livestock Subsector Core System Diagnosis

Kenya's livestock sector presents significant economic, food and nutrition security potential, but is constrained by a set of interrelated system failures that limit productivity, market participation, and competitiveness. These constraints are not primarily driven by insufficient production, but by structural inefficiencies across feed systems (fodder, supplement, compounded feeds and feed inputs), market integration, productivity drivers, and first-mile value preservation.

At the core of the system is a high-cost and poorly coordinated feed system, which accounts for the majority of production costs across livestock value chains. Fragmentation across forage production, raw material supply, processing, and distribution results in volatile prices, inconsistent quality, and unreliable supply. A key distortion is that fodder surplus and deficit coexist across geographies, yet weak aggregation, storage, and logistics systems prevent efficient redistribution. As a result, value is disproportionately captured by traders, while farmers sell low during surplus periods and repurchase at higher prices during scarcity. This is compounded by a weak fodder seed and planting material system, limiting the availability and adoption of improved forage varieties and constraining productivity gains at the foundation of the feed system.

Domestic feed input supply systems remain underdeveloped despite strong demand from feed millers. At the same time, weak regulation of feed millers and ingredient imports contributes to inconsistent quality, adulteration, and food safety risks, including aflatoxin contamination. Emerging innovations such as Black Soldier Fly (BSF) offer potential for circular and alternative protein systems, but remain constrained by scale, cost, and standardisation, positioning them as medium-term complementary solutions. For BSF specifically, our analysis does not support it as the primary farm-level scaling model for small mixed farms. It is more viable as a hub-based circular infrastructure solution located at aggregation centres, wholesale markets, and processing clusters where organic waste is concentrated. Financially, it works best as a dual-output system producing both larvae and frass, but it is not yet ready to replace mainstream feed ingredients at industrial scale.

Regulatory uncertainty around GMO feed ingredients continues to limit competitiveness and access to lower-cost feed options. In the short term, yellow maize contract farming presents a clear and scalable opportunity to substitute imports and stabilise feed costs, but requires aggregation systems, quality standardisation, and targeted de-risking mechanisms to crowd in private sector investment.

Beyond production, livestock markets are constrained by the absence of a structured “missing middle” in secondary production, particularly in red meat systems. While Kenya has a large livestock base, animals are typically marketed before reaching optimal weight and quality, resulting in significant value loss. At the same time, strong domestic demand signals for red meat, rising prices, and underutilised processing capacity indicate a supply-quality gap rather than a demand constraint. Export opportunities further reinforce this potential. Commercial finishing systems demonstrate strong returns, yet remain underdeveloped due to constraints in finance, feed access, and technical capacity. In addition to cattle, small ruminants present a high-potential segment, offering faster turnover, lower input requirements, and strong domestic and regional demand.

Productivity across livestock systems is further constrained by weak genetic systems, which limit the returns to investments in feed, animal health, and market access. While demand for improved genetics is strong, delivery systems remain fragmented and unreliable, particularly in artificial insemination and breeding services. At the same time, land-use dynamics are reshaping supply pathways: some traditional ranch-based breeding systems are declining due to shifts toward conservation and tourism, while community conservancies and group ranches are emerging as viable platforms for coordinated breed improvement and dissemination, particularly in ASAL systems. This highlights a clear delivery gap, rather than a demand constraint.

In dairy and camel milk systems, the primary constraint lies at the first mile, where significant value is lost due to inadequate cooling, inefficient transport, and weak quality assurance systems. While demand is strong and market participation high, quality control is weakest at the point of aggregation. Limited use of milk testing equipment and quality-based pricing mechanisms results in undetected adulteration, microbial contamination, and product rejection further along the value chain. This indicates that the system is not supply-constrained, but infrastructure- and model-constrained, requiring distributed and commercially viable first-mile solutions.

Indigenous poultry systems reflect a similar pattern of strong demand constrained by systemic inefficiencies. Despite clear market pull, high mortality rates, feed challenges, and weak aggregation systems limit productivity and value capture. Significant price differentials between farmgate and end markets highlight the absence of coordinated systems capable of linking producers to demand.

Across all livestock systems, a consistent pattern emerges: strong and growing demand coexists with weak system coordination, resulting in high costs, lost value, and underperformance. Informality enables participation but also contributes to inefficiencies, weak quality control, and limited investment readiness.

Strategic Implication

The primary constraint in Kenya's livestock sector is not lack of production, but the absence of coordinated, market-driven systems that integrate feed, production, aggregation, quality assurance, and market access. This creates a clear strategic direction for intervention:

- *Feed systems* as the primary cost and competitiveness lever (including domestic sourcing and circular innovations)
- *Secondary production* (finishing) as the market-bridging layer for quality and value capture
- *Genetic delivery systems* as productivity enablers anchored in emerging institutional models
- *First-mile aggregation and quality systems* as critical value protection infrastructure
- *Inclusive livestock segments* (poultry, small ruminants) as scalable and high-impact entry points

Addressing these constraints through integrated, market-driven approaches provides a strong foundation for system transformation, private sector investment, and improved food and nutrition security outcomes.

1.2. Horticulture Subsector – Core System Diagnosis

Kenya's horticulture sector has strong growth potential driven by domestic and export demand, but is constrained by system-level inefficiencies that limit supply reliability, quality, and value capture. These constraints are not rooted in agronomic potential, but in the lack of coordinated, market-linked production and post-harvest systems.

At the production level, the system remains heavily dependent on rain-fed agriculture, resulting in significant seasonal variability and unreliable supply. Production volumes can fluctuate sharply between peak and off-season periods, leading to under-supply during high-demand windows and oversupply during peak harvests.

While irrigation infrastructure has expanded, utilisation remains inconsistent, with some systems operating below capacity during off-seasons or delivering unreliable water supply due to weak governance and management of shared infrastructure. This highlights that the constraint is not infrastructure alone, but the absence of coordinated production systems and effective governance models. Integrating irrigation, energy, and production within Water–Energy–Food (WEF) frameworks, anchored in market demand, presents a pathway to stabilising supply. However, high upfront costs and limited access to appropriate financing continue to constrain adoption, particularly where infrastructure is not linked to predictable revenue streams.

Beyond production, the most significant losses occur at the first mile, where value is lost between harvest and market entry due to weak aggregation, poor handling, inefficient logistics, and limited cooling. Existing infrastructure is often underutilised or financially unviable, particularly during low production periods, reinforcing that cold chain systems are throughput-dependent and require coordinated supply to function effectively. The constraint therefore lies in the absence of integrated first-mile systems that combine aggregation, quality assurance, logistics, and selective cooling within commercially viable service models.

The system is further characterised by recurring cycles of oversupply and price collapse, where large volumes of produce lose value during peak seasons, while markets face shortages during off-season periods. This reflects a structural gap in loss absorption mechanisms, as processing and drying capacity remains limited and weakly linked to supply systems. During periods of glut, farmers consistently prioritise reliable market access over price maximisation, indicating that reducing downside risk is more critical than capturing peak prices. Strengthening demand-led, aggregation-linked processing systems therefore represents a key opportunity for stabilising markets and reducing waste.

Food safety presents an additional and growing systemic risk. Weak enforcement of pesticide regulations, including the use of banned or unregulated agrochemicals sometimes entering through cross-border trade combined with limited adherence to post-harvest intervals and misuse of inputs, undermines product safety, market access, and consumer confidence. These risks are particularly significant for both domestic and export markets and point to the need for stronger quality assurance, traceability, and enforcement systems embedded within aggregation and market structures.

Upstream, horticulture performance is constrained by weak seed and seedling systems, which limit productivity, resilience, and alignment with market requirements. While export-oriented systems demonstrate strong performance, a large share of domestic production relies on informal and uncertified planting material, contributing to inconsistent quality and market rejection. The constraint lies not in demand for improved inputs, but in weak delivery systems and limited integration with market signals.

At the same time, input systems particularly fertilisers present both a cost and sustainability challenge. High dependence on inorganic fertilisers increases production costs and exposes farmers to price volatility, while access to viable organic alternatives remains constrained by limited availability, inconsistent quality, and weak market development. Circular solutions, including composting and organic fertiliser systems, present opportunities to improve soil health

and reduce input costs, but require stronger integration with aggregation, waste management, and advisory systems to scale effectively.

Circular bioeconomy pathways, particularly Black Soldier Fly (BSF), are relevant to Kenya's agri-food transition because they can link organic waste management, feed systems, and soil health outcomes. However, the diagnostic shows that BSF is not yet a scalable standalone solution. Its commercial viability is constrained by high production costs, limited operational scale, dependence on specific non-fibrous waste streams, and the high cost of waste collection beyond short transport radii. In addition, county-level differences in waste handling regulations, together with the cost of waste segregation, limit reliable access to feedstock and increase operational uncertainty. While BSF offers potential to produce both feed ingredients and organic fertilizer through frass, it is not yet cost-competitive with conventional protein sources at industrial scale. Its strongest relevance therefore lies in dense urban and peri-urban systems where suitable waste streams, aggregation infrastructure, and end-markets for both larvae and frass are concentrated. This also positions BSF within a broader soil health agenda, particularly in relation to reducing dependence on inorganic fertilizers through circular nutrient use.

BSF should be positioned as a medium-term, system-integrated opportunity within a broader circular bioeconomy strategy rather than as a primary standalone investment. Programming should prioritise hub-based pilots in urban and peri-urban counties with concentrated horticultural waste streams, strong market infrastructure, nearby livestock demand, and county governments supportive of waste segregation and reuse. A portfolio approach to circularity is likely to be more effective, combining BSF with composting, vermiculture, and other waste-to-value pathways that strengthen both feed and soil systems. Support should focus on improving feedstock access, clarifying regulatory pathways, strengthening standards, and building viable dual-market models for larvae and frass. This would allow circularity investments to contribute not only to feed diversification, but also to soil restoration, nutrient recycling, and more sustainable fertiliser systems.

Regional horticulture markets, particularly in the Horn of Africa corridor, represent a significant and underexploited opportunity for Kenya, with strong demand for bulk fresh produce in markets such as Somalia, Djibouti, Eritrea, and Ethiopia. Compared with EU export channels, these markets are geographically closer, less compliance-intensive, and better suited to high-volume commodities, making them both a diversification opportunity and a resilience pathway. However, unlocking this potential will require investment not only in production, but in the systems that support reliable regional trade, including irrigation-linked supply stability, aggregation, first-mile value protection, cooling, quality management, traceability, and cross-border trade facilitation.

Urban agriculture can play a complementary role in Kenya's food system, particularly in dense urban markets such as Nairobi, by supporting high-value, short-cycle, and controlled-environment production with advantages in proximity to consumers and reduced transport costs. However, it is unlikely to serve as a major bulk supply source due to constraints in space, water access and safety, technology, producer organisation, and formal market linkages. Its strongest strategic relevance lies in niche horticulture, nurseries, and integrated circular models that combine production with water efficiency, nutrient recycling, and organic waste utilisation.

Across the horticulture sector, a consistent pattern emerges: strong and growing demand coexists with weak system coordination, resulting in supply instability, high post-harvest losses, food safety risks, and limited value capture.

Strategic Implication

The primary constraint in Kenya's horticulture sector is not production potential, but the absence of coordinated, market-driven systems that integrate production, governance, value preservation, and market access.

This creates a clear strategic direction for intervention:

- WEF-linked, market-oriented production systems to stabilise supply across seasons
- First-mile aggregation, logistics, and quality systems as the primary value protection layer
- Loss absorption systems (processing and drying) to stabilise prices and reduce waste
- Seed, seedling, and input systems as the foundation of productivity and competitiveness
- Food safety and regulatory enforcement systems embedded within market structures
- Circular bioeconomy solutions as emerging pathways for efficiency and sustainability

Addressing these constraints through integrated, market-oriented approaches provides a strong foundation for enhancing competitiveness, improving food safety, reducing losses, and strengthening food and nutrition security outcomes.

1.3. Aquaculture & Fisheries System Diagnosis

Kenya's aquaculture and fisheries sector operates within a context of strong and growing domestic demand, yet remains constrained by system-level inefficiencies that limit production, coordination, and market integration. The sector's underperformance is not driven by resource constraints alone, but by the absence of coordinated, input-to-market systems that enable reliable and scalable supply.

At the core of the system is a high-cost and underdeveloped aquafeed system, which accounts for approximately 60–70% of production costs and serves as the primary determinant of productivity and profitability. Beyond cost, the system is constrained by structural gaps in last-mile distribution, driven by low stocking incentives for agrovets, limited technical understanding of aquafeed among distributors, and dispersed production geographies that increase delivery costs. As a relatively young subsector, the study established that feed millers are still developing technical capacity in aquafeed formulation and production, resulting in a limited number of specialised players in the market. In addition, gaps in processing technologies such as pelleting and production of specialised feed categories (e.g. starter feeds) necessitate continued reliance on imports, exposing producers to price volatility and supply risks.

While there is growing interest in alternative proteins such as Black Soldier Fly (BSF), these remain constrained by scale, cost, and standardisation, positioning them as medium-term complementary solutions. Strengthening integrated feed systems by combining local production, technology upgrading, distribution, and input financing present a critical entry point for sector transformation.

Alongside feed, fingerling and broodstock systems represent a foundational but underdeveloped constraint. Seed quality remains highly variable and difficult for farmers to verify, resulting in inconsistent survival rates, uneven growth, and suppressed productivity. Hatchery systems are fragmented and weakly regulated, while transport and handling challenges further degrade seed quality. At the same time, there are strong demand signals for high-quality, certified fingerlings, with farmers willing to pay premium prices where quality and performance are demonstrated. The constraint is therefore not demand, but the absence of coordinated, quality-assured seed systems and decentralised distribution networks capable of delivering reliable inputs at scale.

Despite strong market demand, the sector is constrained by weak aggregation and market coordination systems, limiting its ability to translate production into consistent supply. Producers remain highly fragmented, while marketing cooperatives and aggregation structures are weak or underdeveloped. This results in a disconnect where producers struggle to access reliable markets, while processors simultaneously face inadequate and inconsistent supply. The system is therefore coordination-constrained rather than demand-constrained.

Value losses are concentrated at the transport and handling stage, where inadequate icing, delays, and poor logistics reduce product quality and market value. While cold chain solutions can significantly extend shelf life and unlock access to higher-value markets, their viability depends on sufficient throughput, which is currently limited by weak aggregation systems. This confirms that aggregation—not infrastructure alone—is the central system anchor.

Production systems themselves remain weakly aligned with market demand, with farmers often producing based on familiarity rather than market specifications such as species, size, and consistency. This limits the sector's ability to respond to strong price signals and favourable policy conditions, including reduced feed costs and import restrictions, further reinforcing that the constraint lies in system organisation rather than demand.

At the same time, emerging WEF-integrated technologies, including Recirculating Aquaculture Systems (RAS), present opportunities to expand aquaculture into water-constrained ASAL regions by improving water efficiency and production control. However, adoption remains limited due to high upfront costs, technical complexity, and weak integration into market systems, highlighting the need for cluster-based, market-linked deployment models.

Governance remains a critical cross-cutting constraint. While regulatory frameworks and zoning tools exist, they are fragmented and inconsistently applied, creating uncertainty and increasing transaction costs. In particular, weak coordination in fish marketing systems, combined with fragmented producer structures, limits collective action and market efficiency. This results in a dual-speed system where larger actors can navigate regulatory complexity, while smaller producers remain excluded or operate informally. Strengthening governance particularly in aggregation, marketing systems, and enforcement will be critical to improving investment readiness and sector performance.

Across the aquaculture and fisheries sector, a clear pattern emerges: strong demand coexists with weak system coordination, resulting in underproduction, high costs, and limited ability to scale.

Strategic Implication

The primary constraint in Kenya's aquaculture and fisheries sector is not demand or resource availability, but the absence of coordinated, market-driven systems that integrate inputs, production, aggregation, value preservation, and governance. This creates a clear strategic direction for the following interventions:

- Integrated feed and seed systems, including technology upgrading and distribution
- Aggregation and market coordination systems to bridge producers and processors
- Value preservation and logistics systems to protect quality and extend market reach
- Market-aligned production systems to improve responsiveness to demand
- WEF-integrated aquaculture models to unlock new production geographies
- Strengthened governance and marketing structures to improve coordination and inclusivity
- Circular bioeconomy pathways as emerging efficiency and sustainability opportunities

Addressing these constraints through integrated, market-led approaches provide a strong foundation for increasing production, reducing import dependency, improving incomes,

strengthening food and nutrition security outcomes, while enhancing the development of a robust private-sector-led aquaculture industry

1.4. Implications of Sector Diagnostics for Food and Nutrition Security

The analysis demonstrates that in Kenya, key gaps in nutrition security emerge from systemic weaknesses across production, aggregation, and market systems, with significant implications for availability, affordability, safety, and dietary diversity.

Food availability is reduced by weak coordination across production, aggregation, and market systems. In livestock, feed constraints and the absence of structured finishing systems limit milk yields and meat supply. In horticulture and fisheries, weak aggregation, inadequate first-mile handling, and limited cold chain infrastructure result in significant post-harvest losses, reducing the volume and consistency of food reaching markets.

Affordability is shaped by inefficiencies in input and market systems, particularly in feed and fodder value chains, which drive up production costs. These costs are transmitted to consumers, making nutrient-dense foods such as milk, meat, fish, and eggs less accessible. At the same time, fragmented and informal market structures distort price formation, resulting in low producer returns and high consumer prices.

At the same time, low value capture by producers further constrains food and nutrition outcomes. Smallholder farmers often receive a limited share of final market value due to weak bargaining power, fragmented markets, and inefficient value chains. This suppresses farm-level incomes, reducing households' ability to invest in productivity, access diverse diets, and improve nutrition and wellbeing. Strengthening value distribution within the system is therefore central to achieving inclusive food and nutrition security outcomes.

Food safety and quality remain critical constraints, particularly at the first-mile level. Limited testing capacity, weak enforcement, and inadequate traceability systems allow quality risks—such as adulteration and aflatoxin contamination—to persist across value chains. These risks undermine consumer trust, increase losses, and constrain integration into formal and higher-value markets.

Dietary diversity is further constrained by limited access to affordable, safe, and diverse foods. Despite national production capacity, consumption of nutrient-rich foods remains low, reflecting weak alignment between production systems, market incentives, and nutrition outcomes.

These findings highlight that production-focused interventions alone are insufficient. Improving food and nutrition security requires a transition toward nutrition-sensitive, market-driven food systems, where investments simultaneously address productivity, market efficiency, quality assurance, and access to diverse foods.

Ultimately, achieving food and nutrition security in Kenya requires aligning agri-food system transformation with nutrition outcomes, ensuring that systems are not only productive and commercially viable, but also capable of delivering safe, affordable, and diverse diets at scale.

1.5. Cross-Cutting System Insights

The analysis shows that Kenya's agri-food constraints are fundamentally systemic, cutting across livestock, horticulture, and aquaculture rather than sitting within individual value chains. Across subsectors, performance is constrained by fragmented input systems, weak first-mile value protection, limited market coordination, underdeveloped quality assurance, and governance gaps. A defining cross-cutting feature is the central role of informality, which remains essential

for livelihoods and market access but is only weakly connected to systems for quality control, traceability, finance, and structured market participation.

The strategic implication is not to replace informality, but to pursue functional formalisation through aggregation, inclusive business models, appropriate quality assurance, and digital-enabled transparency that gradually integrate informal actors into more efficient and investment-ready systems. The analysis also highlights the importance of WEF-linked approaches, stronger climate resilience, and ecosystem protection, including water catchment management and broader natural resource stewardship, as core conditions for long-term system performance.

In ASAL and frontier areas, future growth potential is significant, but depends not only on infrastructure and market connectivity, but also on peace and stability, rangeland and ecosystem rehabilitation, and more effective governance of natural resources. Circularity is an additional emerging opportunity, particularly where waste streams can be linked to feed, soil health, and resource efficiency, though these systems remain at an early stage of commercial development.

1.6. Cross Cutting System Enablers

Beyond the structural constraints within the subsectors, a set of cross cutting system enablers critically determines whether transformation can occur at scale:

- **Finance systems** are not absent, but misaligned. Capital exists but does not flow effectively due to inappropriate ticket sizes which persistently excludes SMEs, limited understanding of agricultural risk by lenders, and poor alignment with production cycles. Finance becomes effective when embedded within structured systems particularly aggregation and offtake models.
- **Digital systems** have strong potential to improve coordination, traceability, and advisory delivery. However, many platforms are stand alone, lack sustainable business models, and there are gaps in verification of information and reliability of climate and market intelligence, limiting adoption and trust. Impact is strongest when digital solutions are embedded within market-linked systems.
- **Governance systems** both formal and informal are central to system performance. Weak institutional coordination, inconsistent enforcement, and limited accountability reduce predictability and increase transaction costs. Strengthening governance is critical for enabling market functionality, investment confidence, and effective public-private coordination, particularly in shared resource systems.
- **Capacity and skills** systems remain a foundational constraint. Gaps in technical, managerial, and system-level capabilities limit adoption, efficiency, and participation in structured markets. Effective capacity development requires embedded, market-linked advisory and institutional strengthening.
- **Behavioural, social, and inclusion dynamics** shape adoption, participation, and benefit distribution. Trust in markets, gender dynamics, and risk perceptions influence outcomes, while nutrition remains weakly integrated into system design.

Overall, the evidence points to a clear conclusion: Kenya's agri-food sector underperforms not due to lack of opportunity, but due to systemic coordination failures across core systems and enabling environments.

Strategic Implication

Transforming the sector requires a shift from fragmented value chain interventions toward integrated, market-driven food systems approaches, where:

- Production and input systems are strengthened
- Aggregation, value protection, and market coordination systems anchor efficiency
- Informal systems are progressively integrated into structured markets
- ASAL/frontier systems are unlocked through integrated WEF, governance, and market approaches
- Circular systems are developed to improve resource efficiency, reduce dependency on certain imported inputs and improve soil health.
- Finance, digital, governance, and capacity systems enable scale, inclusion, and sustainability

This integrated approach ensures that productivity gains translate into inclusive economic and nutrition outcomes, forming the foundation for the program framework:

- Program 1 → Market-led production systems
- Program 2 → Market systems, aggregation, and value protection
- Program 3 → ASAL resilience, frontier expansion, and livelihood systems
- System enablers → Cross-cutting drivers of scale and sustainability

1.7. Policy Environment for Food Systems Transformation

Kenya has a strong policy foundation for agri-food transformation, anchored in the ASTGS and supported by sector-specific frameworks across livestock, horticulture, and aquaculture. However, sector performance is constrained less by policy ambition than by gaps in coordination, enforcement, and implementation. Field validation findings point to a difficult private sector operating environment characterised by multiple licensing requirements, high taxation, and frequent policy changes, all of which increase transaction costs and weaken investment confidence. Additional constraints include fragmented mandates across sectors and levels of government, limited cascading of national policies into county implementation, low investment in extension and frontline service delivery, and weak enforcement of quality and standards.

Regulatory complexity and limited investment-enabling mechanisms further reduce private sector participation, particularly in coordination-intensive areas such as aggregation, first-mile systems, quality assurance, and climate-smart infrastructure.

The strategic implication is that policy should be treated as a system enabler within program design, with priority given to strengthening implementation, improving national–county coordination, streamlining the business environment, increasing extension capacity, supporting regulatory clarity, and aligning de-risking and blended finance instruments with sector realities. This creates an important role for development partners to help bridge the gap between policy intent and system delivery, enabling more coordinated, market-driven, and resilient food systems.

1.8. Donor Landscape and Program Scoping Insights

Kenya's agri-food sector benefits from a strong development partner presence, with substantial investments in food systems, climate resilience, and value chain development. These interventions have generated important localised gains, particularly in production, capacity building, and input access. However, their contribution to system transformation has often been limited by fragmentation, short implementation horizons, and weak alignment with market systems. Many interventions remain project-based, geographically dispersed, and heavily focused on production, with insufficient attention to aggregation, first-mile value protection, commercial

viability, and private sector incentives. As a result, productivity gains do not consistently translate into sustainable income growth or scalable business models.

Validation findings also pointed to weak co-creation with local actors in some programmes, with externally designed and often rigid interventions limiting local ownership, participation, and opportunities for co-investment. Across the landscape, short funding cycles have reinforced repeated piloting rather than scaling, while weak coordination has increased the risk of duplication and reduced sector-level learning. Although private sector engagement is increasingly recognised, it often remains transactional rather than anchored in risk-sharing and long-term system building.

At the same time, there is clear convergence across development partners around climate resilience, inclusive market development, private sector engagement, and food and nutrition security. This creates a strong basis for a more coordinated and programmatic approach. The proposed Program Framework is designed to respond to these gaps by shifting from fragmented projects to integrated system programmes, embedding market systems and private sector engagement at the core, and positioning EKN as a system convener that can support longer-term, flexible, and scalable investment platforms. In this way, the framework is intended to complement rather than duplicate existing efforts, while helping move the sector from isolated pilots toward coordinated, market-led transformation.

2. From Diagnosis to Program Architecture

2.1. Overview

The cross-sector analysis shows that constraints in Kenya's agri-food systems are not isolated, but systemic and interdependent, requiring a coordinated response that goes beyond standalone value chain interventions.

At the core, system performance is shaped by two interacting layers:

- Value chain functions, which drive productivity, efficiency, and market participation (inputs, production, aggregation, first-mile value protection, and market linkages)
- System enablers, which determine whether these functions operate effectively and can scale (governance, finance, policy, digital systems, capacity, and climate/WEF infrastructure)

While value chain interventions deliver immediate performance gains, system enablers determine sustainability, scalability, and investment viability. Across all subsectors, the primary constraint is not the absence of technical solutions, but the lack of alignment between these two layers. This misalignment explains why gains in production do not consistently translate into improved incomes, why infrastructure remains underutilised, and why private investment remains constrained despite strong market demand signals. The implication is clear: system transformation requires integrated intervention architecture, where production, market systems, and enablers are designed and implemented as a coherent whole.

Strategic Direction

The Program Framework is therefore structured to:

- Integrate production systems, market systems, and system enablers within a unified design
- Prioritise market-linked interventions that align supply with demand
- Embed enablers within delivery models, rather than treating them as standalone components
- Focus on scalability and private sector participation as core design principles

This approach shifts the response from fragmented interventions to coordinated system transformation, providing the foundation for the three-program architecture that follows.

2.2. Program Framework: Structure and Strategic Rationale

The proposed Program Framework translates the system-level diagnosis into a coherent set of market-led investment pathways designed to address Kenya’s most binding agri-food constraints while advancing Food and Nutrition Security (FNS) outcomes. It is structured around three distinct but complementary programs, each representing a different entry point for system transformation depending on context, system maturity, and the nature of the binding constraint. Program 1 focuses on strengthening climate-resilient, market-led production systems; Program 2 addresses the “missing middle” through aggregation, first-mile value protection, quality assurance, and market coordination; and Program 3 targets inclusive market development in ASAL and frontier areas where viable systems remain weak or underdeveloped.

The rationale for this structure is that Kenya’s agri-food constraints do not sit at one level of the system alone. In some contexts, the core challenge is unstable and poorly aligned production; in others, it is weak aggregation and value protection; while in ASALs and frontier areas the more fundamental constraint is the absence of viable market systems altogether. Organising the framework into three programs therefore allows EKN to respond to different system conditions through targeted but connected investment pathways, rather than through a single undifferentiated model.

While the programs are distinct, they are designed to work in a complementary manner within a common systems framework. Cross-cutting enablers including finance, governance and policy, digital systems, capacity development, WEF infrastructure, and inclusion are embedded across all three programs rather than treated as standalone components. This ensures that technical interventions are linked to the institutional, commercial, and coordination conditions required for scale, sustainability, and private sector participation. The framework also reflects a deliberate shift in programming approach: from fragmented projects to integrated program platforms; from production-led interventions to market-driven system transformation; and from short-term outputs to longer-term, investable outcomes. Within this architecture, EKN is positioned not only as a funder, but as a system convener and platform builder capable of aligning actors, crowding in investment, and supporting coordinated transformation. Figure xxx summarizes the relationship between the three programs and cross-cutting enablers within the FNS framework.

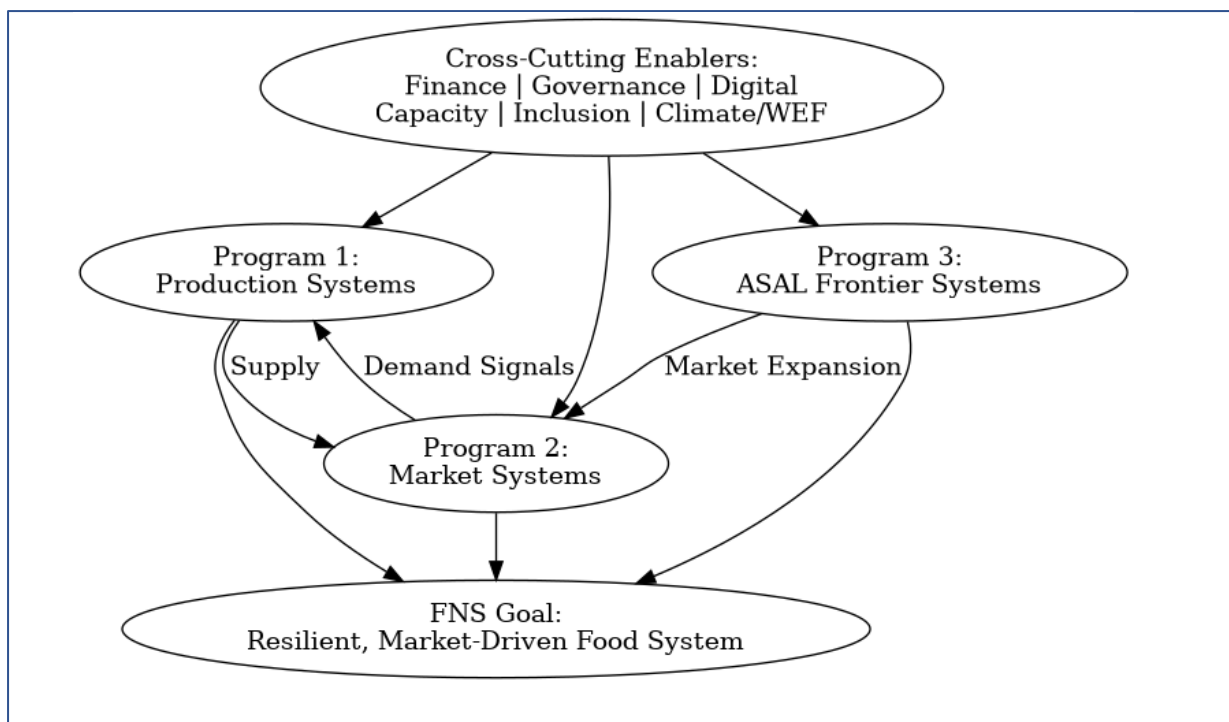


Figure 1: Relationship between the three programs and cross-cutting enablers within the FNS framework

2.3. Implementation and Partnership Principles

Effective delivery of the framework will depend not only on sound technical design, but also on an implementation approach that is coordinated, locally grounded, adaptive, and sustained over time. In response to lessons from the donor landscape, the framework should be implemented in ways that strengthen complementarity across FNS actors, reduce duplication, and support alignment around shared system priorities and geographic focus areas. This reinforces EKN’s role not only as a funder, but as a convener that can help connect public, private, and development actors around coherent market-led transformation pathways.

A second principle is co-creation with local actors, particularly county governments, grassroots organisations, producer structures, and private sector market actors. Implementation should be designed with these actors rather than for them, so that interventions are better aligned with local realities, institutional systems, and opportunities for ownership and co-investment. This is especially important in a devolved context such as Kenya, where counties play a central role in service delivery, coordination, and the operationalisation of national policy.

The framework should also embed deliberate knowledge sharing, learning, and adaptive management. Food system transformation is inherently complex and context-specific, requiring continuous learning across counties, value chains, and implementation partners. The program should therefore include mechanisms for capturing evidence, sharing lessons, and adapting delivery models over time, so that successful approaches can be refined, coordinated, and scaled rather than repeatedly piloted in isolation.

Finally, implementation should be anchored in longer and more flexible time horizons (at least 5 years) that match the realities of system transformation. Shifting from fragmented interventions to sustainable, market-driven systems requires time for behaviour change, institutional strengthening, private sector crowding-in, and the maturation of viable delivery models. A longer-term programming perspective is therefore essential if the framework is to move beyond pilot activity and contribute to durable, scalable change.

2.3.1 Program 1: Climate-Resilient, Market-Linked Production Systems

Program Goal: *To guide the development of climate-resilient, market-driven production systems that deliver reliable, year-round supply of nutritious food, improve productivity and incomes, and create conditions for sustained private sector investment across horticulture, livestock, and aquaculture systems.*

Program Logic and Change Pathways

Program 1 transforms production systems into stable, market-aligned, and investable systems through the interaction of three reinforcing domains: stabilization, market alignment, and system utilisation supported by cross-cutting enablers.

The transformation begins with Domain 1 (Stabilized Production Systems), where integrated Water–Energy–Food (WEF) systems convert water and energy into productive, shared infrastructure. This reduces climate dependency, improves resource efficiency, and enables coordinated, year-round production. Production shifts from fragmented and rainfall-driven to predictable and system-managed.

Building on this foundation, Domain 2 (Market-Aligned Production Systems) ensures that stable production is translated into economic value. Through aggregation platforms, structured market linkages, and strengthened input systems, production becomes demand-driven, with improved alignment on quality, volumes, and timing. This converts output into marketable, consistent, and higher-value supply. While it interfaces with aggregators and offtakers, its focus is on strengthening producer-side organisation and market readiness rather than on building aggregation businesses, which is the primary focus of Program 2.

Domain 3 (Adoption and System Utilisation) ensures that these systems function effectively and are sustained over time. By strengthening the capabilities of producers, service providers, and institutions, this domain enables consistent application of practices, adherence to standards, and effective participation in coordinated systems. It also supports the uptake of climate-smart production and resource management practices, helping ensure that increased productivity is sustained under growing climate variability. This closes the gap between system availability and system performance. The interaction of these domains creates a reinforcing pathway:

Stability → Market Alignment → Utilisation → Scale and Investment

In ASAL contexts, Program 1 focuses on strengthening production performance within existing or emerging systems, including livestock, irrigated horticulture, and aquaculture. Its role is to improve productivity, resilience, and resource efficiency through WEF systems, input access, advisory, and climate-smart practices. This differs from Program 3, which focuses on developing the market systems, infrastructure, and enabling conditions required to make frontier areas economically viable and investable.

As systems become more predictable and coordinated, risks decline, productivity improves, and income streams stabilize creating conditions that crowd in private sector participation and investment.

Domain 1.1: Stabilized and Climate-Resilient Production Systems (WEF)

Production systems across livestock, horticulture, and aquaculture remain constrained by unreliable, inefficient, and poorly coordinated use of water and energy, resulting in fragmented,

climate-dependent, and unpredictable outputs. Even where water exists, production is rarely managed in a structured way that enables consistency, efficiency, or alignment with market cycles.

This domain addresses these constraints through integrated Water–Energy–Food (WEF) systems, which transform water and energy from passive resources into shared, multi-use productive infrastructure. These systems are designed to serve multiple value chains—supporting irrigated crops, fodder production, aquaculture, and livestock—thereby improving utilization, reducing costs, and strengthening resilience.

The approach is context-specific. In ASAL areas, the focus is on enabling production through structured water access and service delivery systems. In high-potential zones, the emphasis shifts to efficiency, coordination, and production planning, ensuring that existing resources are used optimally and aligned with market cycles.

A defining feature of this domain is the transition from individual, reactive production to coordinated, planned production systems, enabled through production scheduling, shared infrastructure, and service-based delivery models (e.g. irrigation-as-a-service). Governance structures such as cooperatives, water user associations, and private operators ensure sustainability and equitable access.

A core design feature of this domain is the integration of infrastructure, governance, and service delivery models to ensure sustainability and utilization. Water and energy investments are not deployed as standalone assets, but are embedded within structured management systems—such as cooperatives, water user associations, and private operators—and supported by service-based models (e.g. irrigation-as-a-service).

In addition, infrastructure is deliberately designed for multi-use across value chains, improving utilization rates, strengthening economic viability, and creating clearer entry points for private sector participation. Climate-smart practices are integrated alongside infrastructure investments to ensure efficient resource use and long-term resilience. This integrated approach ensures that investments translate into functional, scalable production systems, rather than underutilized assets.

The outcome is a shift toward stable, predictable, and climate-resilient production systems, forming the foundation for market alignment and investment.

Domain 1.2: Market-Aligned and Performance-Driven Production Systems

This domain focuses on transforming production into a demand-driven, performance-oriented system, anchored in structured aggregation and market coordination. Producer organizations and SME platforms are strengthened to act as commercial intermediaries, aggregating supply, enforcing quality, and linking producers to structured markets.

Market alignment is achieved through formalized relationships with buyers (e.g. contract farming, outgrower models), which provide clear signals on specifications, volumes, and timing. In parallel, input systems are strengthened and embedded within delivery platforms, ensuring consistent access to quality inputs aligned with production systems and market needs.

Quality assurance and traceability are integrated into production and aggregation processes, supported by digital tools that enhance coordination, transparency, and performance monitoring. The outcome is a shift toward market-oriented, efficient, and performance-driven production systems, capable of delivering consistent quality and volumes required by formal and higher-value markets.

Domain 1.3: Adoption, Capacity, and System Utilisation

The effectiveness of investments in infrastructure, inputs, and market systems ultimately depends on how well they are adopted, utilised, and sustained. Across agri-food systems, a persistent constraint is not only access to technologies and services, but the capacity and incentives to apply them consistently and correctly. As a result, otherwise viable interventions often underperform due to partial adoption, weak utilisation, and limited behaviour change.

This domain focuses on strengthening the human, institutional, and service delivery capabilities required to translate system improvements into sustained performance. It ensures that producers, organizations, and service providers are able to operate within structured, market-linked systems and respond effectively to production and market requirements.

At the producer level, the emphasis is on practical, performance-oriented capacity, enabling farmers to manage production as a coordinated economic activity. This includes effective use of irrigation and water systems, application of improved practices, climate smart practices, appropriate use of inputs, and alignment of production with schedules and market demand. Capacity development is embedded within production cycles and linked to real-time decision-making, rather than delivered as one-off training.

Behaviour change is central to this domain. Transitioning from traditional, risk-averse practices to coordinated, market-oriented systems require shifts in decision-making, including adherence to quality standards, participation in aggregation systems, and responsiveness to market signals. These shifts are supported through incentive structures, embedded advisory, and continuous engagement. At the institutional level, producer organizations, cooperatives, and SMEs are strengthened to function as effective system anchors, with capabilities in governance, financial management, operations, and market coordination. In parallel, service providers such as extension agents, irrigation operators, and input distributors are supported to deliver reliable, commercially viable services at scale.

Digital systems play an enabling role by improving access to advisory, market information, and performance monitoring, while gender, youth, and nutrition considerations are integrated to ensure inclusive participation and equitable benefit distribution.

The outcome is a shift from fragmented and inconsistent adoption toward sustained utilisation of systems, ensuring that investments translate into lasting improvements in productivity, incomes, and resilience.

Program 1 – Expected Outcomes

Program 1 is expected to deliver more reliable, climate-resilient, and market-linked production systems across livestock, horticulture, and aquaculture. By combining WEF-enabled production stability, stronger producer-side market alignment, and improved system utilisation, the program will improve supply consistency, productivity, and cost efficiency, while strengthening the participation of producers and their organisations in structured markets. Over time, this is expected to contribute to more stable incomes and increased readiness of production systems for private sector investment and commercial scaling. See Annex 3 for the detailed Program 1 Results Framework.

2.3.2 Program 2: First-Mile Value Protection and Market Systems Development

Program Goal: *To develop coordinated first-mile aggregation and value protection systems that reduce losses, improve quality, and enable reliable market access across livestock, horticulture, and aquaculture value chains.*

Program Logic and Change Pathways

Program 2 addresses the critical transition from production to markets by ensuring that food is preserved, organized, and trusted as it moves through the first mile. Program 2 is distinct from Domain 2 under Program 1 (1.2) in that it focuses on strengthening the market system itself rather than producer-side market alignment. While Program 1 works with producers and their organisations to improve market readiness, Program 2 works through aggregation, first-mile value protection, quality assurance, logistics, and buyer coordination to build the commercial architecture needed for structured, reliable, and inclusive markets.

The transformation is driven through three interdependent domains. Domain 2.1 stabilizes the physical integrity of products through integrated first-mile value protection systems, reducing losses and preserving quality at the point where value is most vulnerable. Domain 2.2 builds on this foundation by organizing preserved production into coordinated, market-oriented supply systems, where aggregation platforms function as system anchors linking producers to demand. Domain 2.3 reinforces system credibility by embedding quality assurance and traceability mechanisms, ensuring that products meet standards and are trusted by markets.

Together, these domains create a reinforcing system dynamic: reduced losses increase the volume of marketable production; improved aggregation enables efficient market access; and strengthened quality systems enhance price realization and access to higher-value markets. This shifts agri-food systems from fragmented, loss-prone structures to efficient, value-driven, and market-oriented systems.

Domains of Change

Domain 2.1: First-Mile Value Protection Infrastructure and Systems

The first pathway focuses on protecting the physical integrity and value of products from the point of production through to aggregation. Across Kenya's agrifood systems, significant losses occur due to inadequate handling, lack of cooling, poor storage, and weak logistics particularly for perishable commodities such as milk, fish, meat, fruits, and vegetables. Domain 2.1 addresses these constraints through the development of functionally integrated first-mile infrastructure systems, including cooling, storage, packhouses, and appropriate transport solutions.

The emphasis is not only on infrastructure provision, but on ensuring that these systems are operationally embedded within value chains and utilized effectively by aggregation actors. This includes aligning infrastructure with production volumes, geographic realities, and market requirements, as well as ensuring that handling protocols are applied consistently. By stabilizing product quality at the point where deterioration typically begins, this domain reduces post-harvest losses, extends shelf life, and creates the necessary foundation for downstream aggregation and market participation.

At its core, Domain 2.1 answers the question of whether products can retain their value long enough to reach the market. Without this foundation, subsequent investments in aggregation and market systems are undermined by physical losses and declining quality.

Domain 2.2: Aggregation, Coordination, and Market Linkages

The second pathway focuses on organizing preserved production into structured, coordinated, and commercially viable supply systems. While Domain 1 ensures that products retain their value, Domain 2.2 ensures that this value is effectively mobilized, consolidated, and delivered to markets.

This domain works primarily with market actors such as cooperatives, SMEs, aggregators, processors, and buyers to strengthen their role as system coordinators rather than passive market participants. These actors organize supply, consolidate volumes, establish market linkages, and align production with demand through structured sourcing arrangements, including contracts, delivery schedules, and demand signalling mechanisms.

A central function of Domain 2.2 is to transform fragmented and opportunistic trading into predictable and coordinated supply systems, where producers are linked to markets through stable relationships and clear expectations on volumes, timing, and specifications. Trust-building mechanisms are critical in this process, particularly in contexts where side-selling and informal trade disrupt coordination.

Importantly, Domain 2.2 operates at the interface between production and markets. It does not focus on how products are produced (Program 1), but rather on how they are organized, aggregated, and delivered once produced. By strengthening aggregation systems as market anchors, this domain enables scale, reduces transaction costs, and improves price realization.

Domain 2.3: Quality Assurance, Traceability, and Market Confidence

The third pathway focuses on ensuring that aggregated products are consistently verifiable, compliant with standards, and trusted by markets. While Domain 2.2 organizes the flow of products, Domain 2.3 establishes the credibility of that flow, which is essential for participation in formal and higher-value markets.

This domain brings together producers, market actors, and regulators within a coordinated quality ecosystem, where each plays a distinct but complementary role. Producers are supported to adopt practices that generate quality at source, including proper handling, hygiene, and compliance with input and production standards. Market actors operationalize quality systems by testing, grading, and enforcing standards at aggregation points, while linking pricing and market access to quality performance. Regulators provide oversight by setting standards, certifying systems, and strengthening enforcement to ensure system-wide integrity.

A key shift introduced by this domain is the movement of quality assurance closer to the first mile, where quality outcomes are determined, rather than relying solely on downstream testing at processing or export stages. This includes the deployment of portable testing technologies, standardized grading systems, traceability mechanisms, and incentive structures that reward compliance.

By embedding quality assurance and traceability within aggregation systems, Domain 2.3 reduces rejection rates, mitigates food safety risks, and builds confidence among buyers, processors, and consumers. This enables a transition from informal and trust-deficit markets to transparent, standards-based systems capable of supporting premium pricing, export access, and sustained private sector investment.

Program 2 – Expected Outcomes

Program 2 is expected to reduce first-mile losses and strengthen the market systems that organise, protect, and commercialise agricultural production. By combining value protection

infrastructure, stronger aggregation and coordination, and improved quality assurance and traceability, the program will increase the volume and quality of marketable produce, improve price realisation, and expand access to formal and higher-value markets. The program is also expected to strengthen aggregation and buyer-facing systems as investable commercial platforms capable of supporting more efficient and reliable trade. See Annex 3 for the detailed Program 2 Results Framework.

2.3.3 Program 3: Inclusive and Resilient Livelihood Systems in ASAL Regions

Program Goal: *To transform ASAL livelihood systems into resilient, diversified, and market-integrated local economies that improve incomes, enhance food and nutrition security, and reduce vulnerability to climate and economic shocks.*

Program 3 is anchored in the recognition that ASAL regions represent high-potential but structurally underdeveloped economic frontiers, where market systems remain thin, fragmented, and weakly coordinated. In these contexts, transformation requires a market emergence approach, focused not on optimizing existing systems, but on building the foundational conditions through which viable, resilient, and inclusive local economies can take shape.

The program follows a sequenced pathway of system development, progressing from resource stabilization, to enterprise emergence, to market system formation and deepening.

The process begins with Domain 3.1, which establishes climate-resilient, governed, and productive resource systems through integrated Water–Energy–Food (WEF) investments, strengthened rangeland and water governance, and conflict-sensitive resource management. In ASAL contexts, where resource variability and competition constrain economic activity, these interventions convert natural resources particularly water, rangelands, and feed into stable, productive, and governable assets. This creates the minimum viable conditions for sustained production and reduces systemic risks that deter both producers and investors.

Building on this foundation, Domain 3.2 focuses on the emergence and strengthening of enterprises and service providers as the core economic actors within the system. This includes SMEs across livestock, horticulture, aquaculture, and a broader range of ASAL-relevant livelihood activities such as poultry, apiculture, gums and resins, camel milk, and other nature-based or niche products. These enterprises form the operational base of the economy, enabling production to be mobilized, services to be delivered, and value chains to begin taking shape. Particular emphasis is placed on inclusive participation, ensuring that women, youth, and marginalized groups are able to engage as entrepreneurs, service providers, and market actors. By strengthening enterprise capacity, improving access to inputs and services, and supporting commercially viable business models, this domain builds the supply-side readiness required for market systems to function.

Domain 3.3 then establishes structured and coordinated market systems that organize these enterprises into functioning economic networks. This includes the development of market anchor enterprises—such as feedlots, aggregation hubs, processors, and traders—that create demand pull, establish pricing and quality signals, and coordinate supply flows. Aggregation systems, logistics, and structured sourcing arrangements enable consistent volumes, predictable delivery, and alignment with market requirements. Importantly, this domain adopts a diversified market systems approach, supporting multiple value chains aligned with ASAL comparative advantages, rather than focusing on a limited set of commodities. This reflects the reality that resilience in

ASAL systems is driven by structured diversification, allowing households and enterprises to spread risk, capture multiple income streams, and respond to evolving market opportunities.

Together, these domains create a reinforcing system dynamic. Stabilized and governed resource systems enable reliable production; viable enterprises translate this production into economic activity; and structured market systems organize and scale these activities into functioning and investable local economies. As coordination improves and risk declines, these systems become increasingly attractive to private sector actors, enabling the gradual expansion of investment and market participation in frontier regions.

The program also deliberately reduces investment risk in a progressive and sequenced manner—from resource stabilization, to enterprise development, to market coordination—thereby creating conditions under which private sector actors can enter, operate, and scale in contexts traditionally perceived as high-risk.

Climate resilience is embedded throughout this pathway. Absorptive capacity is strengthened through improved resource management, loss reduction, and stabilization of production systems. Adaptive capacity is enhanced through diversified livelihood and enterprise systems, enabling actors to adjust to changing environmental and market conditions. Transformative capacity is achieved through the emergence of structured, market-linked local economies, including expansion into underutilized ASAL geographies and the development of circular and resource-efficient economic models.

Program 3 is therefore distinct from Programs 1 and 2. While those programs focus on optimizing production and market systems in more established contexts, Program 3 focuses on making market systems possible in frontier environments—building the foundational layers of production, enterprise, and coordination required for inclusive, resilient, and economically viable ASAL development

Domains of Change

Domain 3.1: Climate-Resilient and Productive Resource Systems as Foundations for Market Emergence

This domain focuses on transforming ASAL resource systems particularly water, rangelands, and feed into productive and governable assets that enable the emergence of viable market systems. In these contexts, the primary constraint is not only low productivity, but the absence of stable, coordinated, and conflict-resilient systems required for sustained economic activity.

The domain supports the development of integrated Water–Energy–Food (WEF) systems that enable reliable production across livestock, horticulture, and aquaculture. Water infrastructure, combined with appropriate energy solutions, is repositioned from a basic consumption resource to a driver of economic activity supporting irrigated horticulture, localized aquaculture, and fodder production systems that stabilize livestock productivity.

Central to this transformation is the strengthening of shared resource governance systems, including conservancies, group ranches, and water user associations, as institutional entry points for managing land, water, and grazing resources. These structures are critical for coordinating access, regulating use, and ensuring equitable benefit sharing across communities.

A conflict-sensitive approach is embedded throughout, recognizing that resource competition particularly over water and grazing can undermine both production and market development. Strengthening local governance systems, clarifying resource use arrangements, and supporting

negotiated access frameworks are therefore essential to creating stable conditions for investment and private sector engagement.

In parallel, the domain promotes the introduction and adoption of appropriate technologies, including water-efficient irrigation systems, pasture and fodder improvement technologies, feed conservation methods, and climate-smart production practices. These technologies are not deployed in isolation, but within organized and governed systems that enable sustained use and scale.

Unlike similar interventions in high-potential zones, where WEF systems optimize already commercial production, in ASAL regions these investments function as market-enabling infrastructure, creating the minimum conditions required for reliable production, aggregation, and economic coordination. By stabilizing resource access, strengthening governance, reducing conflict risks, and improving productivity, this domain lays the foundation for the emergence of structured and investable market systems.

Domain 3.2: Enterprise Development and Inclusive Economic Participation

This domain focuses on developing the base of economic actors required to participate in and drive emerging ASAL market systems. In frontier contexts, the absence of viable enterprises and service providers often constrains market formation, as there are limited actors capable of producing, aggregating, trading, or delivering services at a scale and level of organization required for structured economic activity.

The domain supports the emergence, strengthening, and formalization of small and medium enterprises (SMEs) across livestock, horticulture, aquaculture, and related service sectors, including input supply, aggregation, transport, processing, and local trading. These enterprises form the foundational layer of the market system, enabling production to be mobilized, services to be delivered, and economic linkages to take shape.

Beyond core value chains, the domain supports the development of diversified and context-specific market systems aligned with ASAL comparative advantages. These include livestock and livestock products (e.g., red meat, camel milk), as well as complementary livelihood activities such as poultry, beekeeping, gums and resins, and other nature-based and niche products. These systems are not treated as peripheral, but as integral components of resilient and diversified local economies, enabling households and enterprises to spread risk, capture multiple income streams, and respond to evolving market opportunities.

Particular emphasis is placed on enabling women, youth, and marginalized groups to participate as economic actors, not only as producers but as entrepreneurs, service providers, and value chain participants. This includes addressing barriers related to access to assets, skills, finance, and market entry opportunities, while supporting enterprise models that are viable within ASAL contexts.

The domain also strengthens the capacity of enterprises to operate commercially, including business management, financial planning, market engagement, and service delivery. This ensures that emerging enterprises are not only established but are able to grow, sustain operations, and respond to evolving market opportunities. In addition, the domain supports the development of localized service ecosystems that reduce transaction costs and improve access to critical inputs and services. These include extension services, veterinary services, input distribution, mechanization, and logistics, which are essential for enabling both production and enterprise growth.

By expanding the base of viable enterprises and strengthening participation across value chains, this domain lays the foundation for functional and inclusive market systems. It creates the supply-side readiness necessary for structured market coordination and private sector engagement to emerge and scale.

Domain 3.3: Market System Development and Demand Anchoring

This domain focuses on establishing structured, coordinated, and commercially viable market systems that organize production, create demand pull, and enable sustained economic exchange within ASAL regions. While Domain 3.2 builds the base of enterprises and actors, Domain 3.3 creates the system architecture through which these actors interact, transact, and scale.

In ASAL contexts, markets are often thin, fragmented, and characterized by opportunistic transactions, weak coordination, and limited price transparency. This domain addresses these constraints by catalysing market anchor enterprises and strengthening aggregation and value chain coordination systems that organize supply and connect producers and enterprises to reliable market outlets. Market anchor actors including feedlots, aggregation hubs, processors, and traders play a central role in this domain by creating demand pull, establishing pricing and quality signals, and structuring supply flows. These actors enable the transition from distress-driven and opportunistic sales to planned, coordinated, and market-oriented production systems.

Market system development in ASALs is approached as a layered system, combining anchor value chains (e.g., livestock) with complementary and emerging value chains (e.g., apiculture, poultry, gums and resins), which together enhance system resilience, economic diversity, and income stability

The domain also supports the development of aggregation infrastructure, logistics systems, and coordination mechanisms that enable consistent volumes, predictable delivery, and alignment with market requirements. Structured sourcing arrangements, including contracts and delivery schedules, strengthen relationships between producers, enterprises, and buyers, reducing uncertainty and improving system efficiency.

Beyond livestock, the domain enables the integration of emerging production systems such as irrigated horticulture and aquaculture into structured markets, expanding the economic base and increasing system depth. By organizing supply, anchoring demand, and strengthening coordination, this domain transforms fragmented economic activity into functioning market systems. It creates the conditions necessary for price discovery, quality differentiation, and sustained private sector investment.

Program 3 – Expected Outcomes

Program 3 is expected to create the conditions for viable, resilient, and inclusive market development in ASAL and frontier areas. By combining resource stabilisation, enterprise development, and market system formation, the program will strengthen local economic participation, diversify livelihoods, and reduce the systemic risks that currently constrain investment in frontier contexts. Over time, this is expected to support the emergence of more stable resource systems, stronger enterprise ecosystems, and coordinated market pathways that connect ASAL and frontier economies to structured demand. See Annex 3 for the detailed Program 3 Results Framework.

2.3.4 Final FNS Portfolio: Integrated System Transformation

Taken together, the three programs form an integrated FNS portfolio that addresses the core dimensions of food system transformation in a reinforcing way. Program 1 strengthens the

capacity of production systems to deliver stable, climate-resilient, and market-aligned supply. Program 2 ensures that this supply is preserved, aggregated, quality-assured, and efficiently connected to markets. Program 3 expands the reach of the system by creating the conditions for inclusive market development in ASAL and frontier areas, bringing new geographies, enterprises, and livelihood systems into structured economic participation. The result is not a set of parallel interventions, but an integrated portfolio in which gains in one part of the system strengthen performance in others.

At portfolio level, this integration is what allows the framework to contribute meaningfully to food and nutrition security. Improved and more reliable production increases food availability; stronger market systems reduce losses, improve value capture, and enhance access; better quality assurance strengthens food safety and utilisation; and ASAL/frontier system development improves resilience and stability in the face of climate and economic shocks. In this way, the portfolio links system transformation directly to FNS outcomes, ensuring that productivity gains are translated into safer, more affordable, and more diverse food systems.

The portfolio also provides EKN with a balanced and flexible investment structure. It allows resources to be deployed where constraints are most binding, while maintaining the ability to layer programs for deeper and more accelerated transformation. This creates a pathway for combining productivity, market efficiency, resilience, inclusion, and private sector development within one coherent strategic framework. As such, the portfolio should be understood as an integrated transformation model through which coordinated investments in production systems, market systems, and frontier market development together drive more resilient, inclusive, and nutrition-sensitive agri-food systems in Kenya. At system level, this integrated approach delivers across the core dimensions of food and nutrition security:

- Availability: Increased and stabilized supply of diverse foods
- Access: Improved incomes and reduced inefficiencies in food markets
- Utilisation: Enhanced food safety and quality systems
- Stability: Greater resilience to climate and economic shocks

Integrated Portfolio – Expected Outcomes

Taken together, the three programs are expected to deliver a more market-driven, climate-resilient, and inclusive agri-food system that contributes to improved food and nutrition security in Kenya. The integrated portfolio will strengthen the availability and reliability of safe and nutritious food, improve access through stronger incomes and more efficient markets, enhance utilisation through better quality assurance and food safety systems, and increase stability through greater climate resilience, diversified livelihoods, and expansion into new production geographies. It is also expected to create stronger conditions for private sector participation, investment, and inclusive economic growth across value chains and regions. See Annex 3 for the detailed Results Framework while figure 2 summarizes the program's Theory of Change.

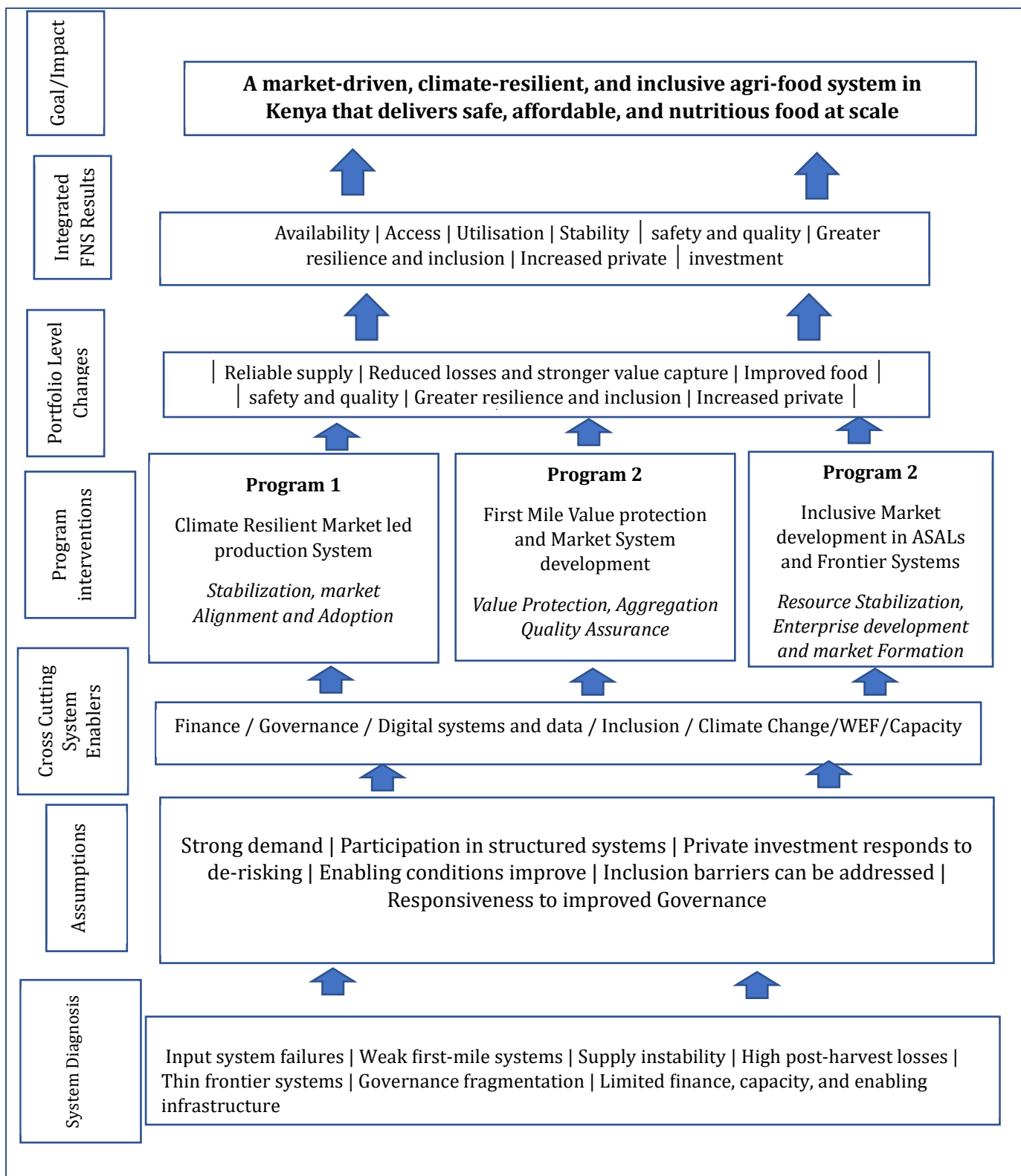


Figure 2: Full Theory of Change for the FNS program.

2.3.5 Cross-Cutting System Enablers for FNS Transformation

System enablers function as the underlying architecture that enables Programs 1, 2, and 3 to operate effectively and scale. They reduce risk, improve coordination, and create the conditions for sustained system performance and private sector participation. Rather than operating as standalone components, these enablers are embedded across all domains and programs, ensuring

that gains in production, markets, and frontier systems are sustained and scaled. Below is a brief description of these enablers while Annex 3 presents a detailed Cross-Cutting System Enablers' Results Framework.

- 1) **Finance Systems:** Finance is treated as a system enabler rather than a standalone input. The framework will support financing approaches that are better aligned to agri-food business cycles and structured market systems, including blended finance and de-risking mechanisms that can crowd in private investment across production, aggregation, and frontier market development.
- 2) **Governance and Policy Systems:** Governance and policy are critical to system performance, particularly in areas such as coordination, quality assurance, enforcement, and management of shared resources. The framework will therefore support stronger national–county coordination, improved regulatory implementation, and more effective governance arrangements that enable market functionality, investment confidence, and sustainable resource use.
- 3) **Digital and Data Systems:** Digital and data systems will be used to strengthen coordination, traceability, advisory delivery, and access to climate and market information. The framework will prioritise embedded digital solutions that are linked to real system functions and delivery models, rather than standalone platforms, so that they improve transparency, responsiveness, and decision-making across value chains.
- 4) **Capacity and Skills Systems:** Capacity development is essential to ensure that investments in production, markets, and frontier systems are effectively utilised and sustained. The framework will support practical, market-linked strengthening of producers, enterprises, service providers, and institutions so that they can operate more effectively within structured, performance-driven systems.
- 5) **Behaviour, Inclusion, and Nutrition Systems:** Social and behavioural factors shape participation, adoption, and the distribution of benefits across agri-food systems. The framework will therefore integrate gender, youth, inclusion, and nutrition considerations across programs, with the aim of expanding equitable participation, improving incentives for behaviour change, and strengthening the contribution of system transformation to food and nutrition outcomes.
- 6) **Climate and WEF Systems:** Climate resilience and Water–Energy–Food (WEF) systems are foundational to the framework's transformation logic. The framework will promote climate-smart, resource-efficient, and market-linked approaches that reduce vulnerability to shocks, improve water and energy productivity, and support more resilient production and livelihood systems across both high-potential and frontier geographies.

Climate Resilience Capacity strengthening Strategy

The program adopts a systems-based approach to strengthening climate resilience by building absorptive, adaptive, and transformative capacities across agri-food systems. At the absorptive level, the program reduces exposure to climate shocks through improved first-mile infrastructure, diversified feed and input systems, and strengthened risk management practices that stabilize production and minimize losses.

Adaptive capacity is enhanced by enabling producers and market actors to adjust practices and respond to climate variability through climate-smart production systems, Water–Energy–Food (WEF) solutions, access to reliable climate and market information, and strengthened technical and managerial capabilities.

At the transformative level, the program supports structural shifts toward more resilient and market-linked systems, including expansion into climate-resilient geographies such as ASALs, development of circular resource use models, and strengthening of aggregation and market systems that enable long-term system reconfiguration.

These capacities are reinforced through cross-cutting enablers—finance, digital systems, governance, and inclusive institutions—ensuring that resilience is not only built at the farm level, but embedded across the entire food system to support sustained performance under increasing climate stress.

2.4. Alignment with FNS, PSD and Transformation Framework

The proposed program framework is strongly aligned with the Embassy of the Kingdom of the Netherlands' Food and Nutrition Security (FNS) and Private Sector Development (PSD) priorities, reflecting a deliberate design that links system transformation to measurable outcomes in productivity, income, nutrition, sustainability, and market development.

Across the three programs, interventions collectively contribute to improved dietary diversity, increased productivity and incomes, sustainable land and water use, strengthened knowledge systems, and enhanced policy and governance environments. At the same time, the framework advances PSD objectives by improving the business climate, strengthening market systems, and enabling MSME growth, job creation, and investment mobilisation.

Each program plays a distinct but complementary role:

- Program 1 drives productivity, enterprise growth, and market-linked production
- Program 2 strengthens value preservation, trade systems, and food quality
- Program 3 anchors resilience, inclusion, and sustainable resource management, particularly in ASAL regions.

Cross-cutting system enablers—including finance, digital systems, policy and governance, WEF systems, and nutrition—ensure that structural constraints are addressed and that outcomes are scalable and sustainable across the system. Together, the programs contribute to FNS strategic results by promoting market-led food systems, climate resilience, improved nutrition outcomes, and environmental sustainability, while also creating conditions for increased private sector participation and investment.

The framework is therefore not a set of standalone interventions, but an integrated transformation model, where production systems, market systems, and frontier system development interact to drive inclusive, resilient, and market-oriented agrifood system change in Kenya.

The framework aligns strongly with EKN's FNS and PSD priorities by linking production, markets, and frontier systems into an integrated approach that drives productivity, resilience, nutrition, and private sector development. Each program contributes distinct but complementary outcomes, while cross-cutting enablers ensure scalability and sustainability, positioning the framework as a coherent pathway for market-led agrifood system transformation. Annex 1 presents a detailed framework of alignment with EKN's FNS and FSD priorities.

2.5. Dutch Comparative Advantage & Investment Pathways

The Netherlands' comparative advantage lies in its ability to integrate technology, knowledge, private sector engagement, and system design into scalable food system solutions. Across the three programs, it plays a distinct but complementary role as a technology provider, knowledge

partner, private sector mobiliser, and system integrator, aligning with the Embassy's focus on market-led and climate-resilient transformation.

In production systems (Program 1), Dutch strengths in water management, WEF systems, seed and genetics, and precision agriculture support the development of efficient, climate-resilient, and market-aligned production systems. In market systems (Program 2), its expertise in logistics, cold chains, food safety, traceability, and cooperative models strengthens value chain coordination, competitiveness, and access to high-value domestic and export markets. In ASAL and frontier systems (Program 3), Dutch experience in climate-resilient production, livestock and feed systems, and inclusive value chain development supports the emergence of diversified and market-oriented local economies, while its experience in cooperative and institutional strengthening enhances governance and coordination.

Overall, the Netherlands is uniquely positioned to connect infrastructure, inputs, markets, and institutions into coherent and investable systems, enabling large-scale transformation of Kenya's agrifood sector.

Investment pathways translate this system-level vision into practical, fundable entry points. Rather than prescribing rigid projects, they identify priority areas where investments can catalyse systemic change, unlock market opportunities, and attract a wide range of actors, including private sector, SMEs, and development partners.

Prioritisation is guided by principles that emphasise system-level impact, private sector crowding-in, market integration, climate resilience, scalability, and inclusion. Interventions that are fragmented, subsidy-dependent, or disconnected from market systems are deprioritised. In this way, investment pathways serve as a bridge between strategy and implementation, ensuring that program frameworks translate into targeted, scalable, and market-driven interventions aligned with Food and Nutrition Security outcomes. Annex 2 presents the investment Pathways.

2.6. Strategic Positioning of Key Counties

The county selection follows a portfolio approach in which each geography is positioned according to its role within production systems, market systems, and ASAL/frontier system development. Rather than serving as isolated intervention sites, the counties function as interconnected system nodes through which scalable models can be developed, adapted, and expanded. This approach recognises that food systems transformation requires both geographic diversity and system connectivity, linking high-potential production zones, market hubs, and frontier regions.

Within this portfolio, aquaculture is anchored in counties such as Kakamega and Bungoma, where ecosystem density supports viable feed, hatchery, extension, and market systems, with opportunities to adapt models in counties such as Machakos and Murang'a. Capture fisheries are represented in Siaya, Homa Bay, Marsabit and Turkana, where the focus is on value preservation, cold chain systems, market linkages, and fisheries governance. These counties are important for strengthening nutrition-sensitive food systems and improving efficiency in wild fisheries.

Horticulture is anchored in commercially oriented counties including Murang'a, Meru, Makueni, Machakos, Nakuru, Taita Taveta, Uasin Gishu, Kiambu, and Kajiado, which provide diverse platforms for market-linked production, aggregation, and integration into domestic, regional, and export markets. Uasin Gishu is also emerging as an important hub for both horticulture and dairy.

Livestock systems span both commercial and frontier contexts. Counties such as Laikipia, Kajiado, Narok, Nakuru, Kiambu, Uasin Gishu, Murang'a, and Tharaka Nithi provide important entry points for dairy, beef, pig, and poultry systems, while Isiolo, Samburu, Marsabit, Turkana, Tana River,

West Pokot, and parts of Makueni and Machakos are critical for building resilient and inclusive frontier systems. Kiambu has particular strategic relevance as an intensive agriculture node, given its concentration of dairy, horticulture, pigs, poultry, and emerging circular bioeconomy opportunities. Tharaka Nithi represents an important transitional frontier for horticulture, livestock, and dairy.

Taken together, these counties form a strategic portfolio of anchor, scale-out, and interface geographies that enables the operationalisation of the three-program framework. This allows investment to be concentrated in high-impact locations while supporting scale, strengthening production–market linkages, and connecting more established systems with emerging frontier economies.

