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Women's Adaptation Plans for Climate-Resilient Livelihoods in the Sundarbans

Adaptation Plan

Empowering Women for Sustainable Lvelihoods

Locally Led Adaptation Plan

ASSESSMENT LENSE

CLIMATE IMPACT

FIVE CAPITAL FRAMEWORK

POLICY & SOCIAL

AUTHORS & ACKNOWLEDGEMENTS

This publication has been developed by Uttaran under the project "Women's Adaptation Plans for Climate Resilient Livelihoods in the Sundarbans," implemented in collaboration with the Global Center on Adaptation (GCA) and with support from Global Affairs Canada.

GCA provided both financial assistance and strategic guidance, playing a critical role in advancing a locally led, women-centered approach to climate adaptation in the coastal regions of Bangladesh. Their support enabled the integration of global adaptation priorities with locally grounded practices, strengthening the relevance and scalability of the initiative.

Uttaran led the overall implementation of the project, including community mobilization, participatory research, facilitation of Women's Adaptation Labs (WALs), and documentation of evidence and learning. Through these efforts, Uttaran worked closely with communities, local institutions, and stakeholders to promote inclusive, responsive, and climate-resilient local governance systems.

This publication is the result of the collective efforts and contributions of women participants, community leaders, local government representatives, technical experts, and partner organizations, whose knowledge, experiences, and insights have shaped the development of this adaptation model. Their active engagement and leadership remain at the heart of this work.

EXECUTIVE SUMMARY

Climate change in the Sundarbans is not a distant threatit is an ongoing crisis that is reshaping livelihoods, deepening poverty, and intensifying existing inequalities, particularly for women. Frequent cyclones, salinity intrusion, and environmental degradation are continuously eroding traditional livelihood systems. Yet, despite significant investments in climate adaptation, most interventions remain fragmented, short-term, and disconnected from the lived realities of coastal communities. Critically, they fail to address the structural barriers that limit women's agency, mobility, and decision-making power. By confining women to predefined roles and excluding them from systems of planning and resource allocation, traditional approaches undermine the very foundation of sustainable adaptation.

This Adaptation Plan challenges that status quo.
It presents a women-led, system-based model for climate-resilient livelihood development, grounded in the knowledge, priorities, and leadership of women in the Sundarbans. The approach moves beyond viewing women as passive beneficiaries and instead positions them as decision-makers, innovators, and agents of change. Through Women's Adaptation Labs (WALs), participatory risk assessments, and multi-stakeholder engagement platforms, over 925 women across three highly climate-vulnerable villages actively analysed climate risks, identified viable livelihood options, and developed structured business and adaptation plans.

The process integrates scientific climate risk analysis, the Five Capitals framework, and market system assessments, ensuring that livelihood decisions are informed by both environmental realities and economic feasibility. Fourteen pilot initiatives were implemented and tested, demonstrating that climate-resilient livelihoods are not defined by production alone, but by their ability to function within interconnected systems of ecology, markets, finance, and governance.

The evidence is clear: adaptation fails when systems fail. Livelihood interventions that are not aligned with market access, financial services, and institutional support cannot deliver sustained resilience. This highlights a fundamental limitation of conventional project-based approaches, which often prioritize short-term outputs over long-term system transformation.

To address this, the plan calls for a shift towards adaptive, phased, and flexible financing models, coupled with stronger institutional integration. Scaling adaptation is not about replicating activities, it is about replicating processes that enable continuous learning, negotiation, and system alignment. This requires investments not only in livelihoods, but also in capacity building, market linkage, governance engagement, and enabling environments that support women's leadership.

This document is not a conventional project report, it is a blueprint for transformation and an advocacy tool for systemic change. It offers a replicable model for embedding locally led, women-centered adaptation into policy and practice, while providing evidence-based insights to inform future investments.

The message is unequivocal: sustainable climate adaptation in the Sundarbansand beyondwill not be achieved through isolated interventions. It requires a fundamental redesign of systems that places women at the center, enabling them not only to adapt, but to lead resilient and transformative change.

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The coastal regions of southwest Bangladesh are undergoing a profound transformation driven by climate change. What were once manageable environmental stresses have evolved into complex and persistent risks that are reshaping the foundations of local livelihoods and community resilience. The Sundarbans-adjacent areas, in particular, are increasingly exposed to a combination of rapid-onset and slow-onset climate hazards that interact in ways that amplify their overall impact.

This changing risk landscape is not only affecting the natural environment but also disrupting the socio-economic systems that sustain vulnerable populations. Livelihoods are becoming less predictable, recovery from shocks is increasingly difficult, and existing coping mechanisms are proving insufficient in the face of continuous stress. As these challenges intensify, it is becoming clear that incremental adjustments are no longer adequate.

This section presents the case for a fundamental shift in how adaptation is understood and operationalized in coastal Bangladesh. By examining the evolving climate realities, the pressures on livelihood systems, and the structural constraints that limit effective response, it highlights the need for a more integrated, system-based approach to building resilience.

2.1 Climate Reality in the Coastal Belt

The southwest coastal belt of Bangladesh, particularly the regions adjacent to the Sundarbans, is increasingly characterized by a complex and intensifying climate risk profile. This area experiences a convergence of multiple hazards, including cyclones, tidal surges, salinity intrusion, erratic rainfall, and prolonged waterlogging. These hazards are not isolated events; rather, they interact with each other, creating compounded and cascading impacts on both the natural environment and human systems.

Cyclones remain one of the most visible and destructive threats, frequently damaging homes, infrastructure, and productive assets. However, equally significant are the slow-onset changes that gradually erode the ecological foundation of livelihoods. Salinity intrusion, driven by sea-level rise and reduced freshwater flow, is altering soil composition and water quality, limiting agricultural productivity and affecting freshwater availability. In parallel, erratic rainfall patterns are disrupting traditional seasonal cycles, making it increasingly difficult for communities to plan and manage agricultural activities effectively.

Waterlogging has emerged as a persistent and disruptive challenge in many areas, often caused by a combination of heavy rainfall, poor drainage systems, and embankment failures. In some locations, land remains inundated for extended periods, rendering it unsuitable for cultivation and restricting mobility within communities. This not only affects production systems but also limits access to markets, services, and social infrastructure.

A critical shift in recent years is the transition from episodic climate shocks to continuous climate stress. Previously, communities experienced disasters as distinct events, followed by periods of recovery. Today, however, the frequency and overlap of climate hazards have reduced recovery time, creating a near-constant state of exposure. This continuous pressure weakens household resilience, depletes assets, and undermines long-term planning.

Importantly, the impacts of these climate risks are not uniform. Variations in geography, infrastructure, and access to resources create differentiated exposure and vulnerability across communities. Areas with weak embankments, poor connectivity, and limited access to services face disproportionately higher risks. As a result, climate change is not only intensifying environmental hazards but also amplifying existing inequalities within and between communities.

This evolving climate reality fundamentally challenges traditional approaches to risk management and livelihood support. It underscores the need to move beyond reactive, event-based responses toward a more comprehensive understanding of riskone that accounts for the cumulative, interconnected, and persistent nature of climate impacts in coastal Bangladesh.

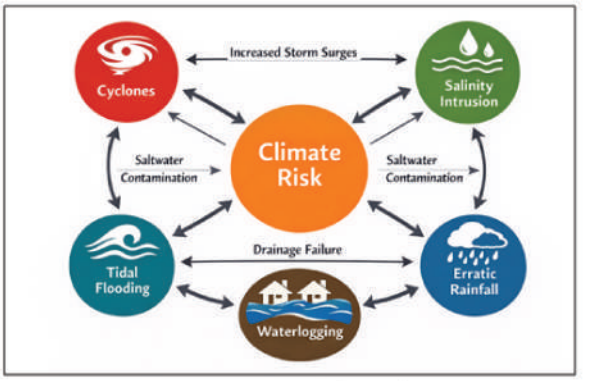

Figure 1: Compounding Climate Risks in Coastal Bangladesh

2.2 Livelihood Systems Under Stress

Livelihood systems in the southwest coastal region of Bangladesh are closely linked to the natural resource base and seasonal environmental conditions. Agriculture, aquaculture, capture fisheries, forest-dependent activities, and small-scale enterprises together form a diversified but fragile economic system. These livelihoods have historically evolved in response to local ecological dynamics, enabling communities to manage risk through seasonal variation and activity diversification.

However, the increasing intensity and unpredictability of climate risks are placing these systems under growing pressure. Salinity intrusion is significantly reducing soil fertility and constraining crop choices, leading to declining agricultural productivity. In many areas, traditional rice varieties can no longer be cultivated without significant adaptation, and alternative crops often require inputs or conditions that are not readily accessible to smallholder farmers. Similarly, freshwater scarcity is affecting both agriculture and aquaculture, limiting the viability of fish cultivation and other water-dependent activities.

Cyclones and tidal surges continue to cause repeated damage to productive assets, including cropland, fishponds, livestock shelters, and storage facilities. These shocks not only result in immediate losses but also disrupt future production cycles, making it difficult for households to recover fully before the next event occurs. Over time, this repeated asset erosion reduces the capacity of households to reinvest in their livelihoods.

Waterlogging further intensifies these challenges by rendering land unusable for extended periods. In some locations, prolonged inundation delays planting seasons or prevents cultivation altogether, forcing households to leave land fallow or seek alternative income sources. At the same time, waterlogged conditions often restrict mobility, limiting access to markets, inputs, and services. This creates a direct link between environmental stress and economic isolation.

As traditional livelihood systems become less reliable, households are increasingly shifting toward coping strategies that offer limited returns and higher levels of risk. These include casual wage labor, seasonal migration, overexploitation of natural resources, and engagement in informal economic activities with low entry barriers but limited growth potential. While such strategies may provide short-term income, they do not contribute to building long-term resilience and often lead to further depletion of household assets.

The transition toward these fragile coping mechanisms reflects a deeper structural issue. Even where alternative livelihood opportunities exist, households face significant barriers in accessing them. Limited access to finance, lack of technical knowledge, inadequate infrastructure, and weak market linkages prevent communities from transitioning to more sustainable and climate-resilient livelihood options. As a result, there is a growing gap between potential opportunities and actual livelihood outcomes.

This cumulative pressure is gradually transforming livelihood systems from adaptive and diversified to constrained and vulnerable. Without interventions that address both environmental risks and systemic barriers, these livelihoods are likely to become increasingly unsustainable, reinforcing cycles of poverty and dependence in coastal communities.

2.3 Women at the Center of Vulnerability

In the coastal regions of southwest Bangladesh, women play a central yet often under-recognized role in sustaining household livelihoods. They are actively engaged in a range of activities, including homestead agriculture, livestock rearing, small-scale aquaculture, processing of agricultural products, and informal income-generating work. In many cases, women's contributions are essential to maintaining household food security and economic stability, particularly in times of crisis.

However, despite their significant involvement, women face structural constraints that limit their access to resources, opportunities, and decision-making processes. Access to land, financial services, productive assets, and market systems is often mediated by social norms and institutional barriers. As a result, women's capacity to influence

Figure 2: Women at the frontline of climate-affected livelihoods

livelihood decisions or invest in adaptation options remains constrained, even when they are directly responsible for managing livelihood activities.

Climate change intensifies these existing inequalities. As environmental stresses increase, women are required to take on additional responsibilities, including managing scarce water resources, securing alternative food sources, and supporting recovery efforts following climate shocks. These added burdens are often accompanied by reduced income opportunities, as climate impacts disrupt the very activities in which women are engaged. For example, salinity intrusion and waterlogging can limit homestead gardening, while damage to livestock or poultry assets directly affects women-managed income streams.

At the same time, women's mobility and access to external support systems remain limited in many contexts. Constraints related to transportation, safety, social norms, and time availability reduce their ability to engage with markets, training programs, or institutional services. This creates a disconnect between available support mechanisms and women's actual ability to benefit from them. Even when programs are designed to support livelihoods, they often fail to account for these access barriers, resulting in uneven or limited impact.

Importantly, women are not only vulnerable but also key agents of adaptation. Their knowledge of local resources, household management strategies, and risk coping mechanisms positions them as critical actors in designing and implementing effective adaptation solutions. However, this potential remains underutilized when planning processes do not actively include women's perspectives or when interventions are not tailored to their specific needs and constraints.

The intersection of climate risk and gender inequality creates a compounded form of vulnerability that cannot be addressed through generic livelihood interventions. Without intentional efforts to ensure women's inclusion, access, and leadership, adaptation strategies risk reinforcing existing disparities rather than reducing them. Recognizing women as central to both the problem and the solution is therefore essential for building effective and equitable climate-resilient livelihood systems.

2.4 System Constraints and Structural Gaps

While climate risks and livelihood pressures are critical drivers of vulnerability in coastal Bangladesh, their impacts are significantly shaped and often intensified by underlying system constraints. These constraints are embedded within infrastructure, market systems, service delivery mechanisms, and institutional arrangements. Without addressing these

structural factors, efforts to support livelihoods remain fragmented and limited in their effectiveness.

Figure 3: Livelihood success depends on system alignment, not single inputs

One of the most visible constraints is the condition and functionality of physical infrastructure. Embankments, roads, drainage systems, and irrigation structures play a crucial role in enabling or restricting livelihood opportunities. In areas where embankments are damaged or poorly maintained, agricultural land is regularly exposed to saline water intrusion, making crop cultivation difficult or impossible. Conversely, where embankments are functional and water management systems are in place, agricultural activities are more stable and productive. Similarly, the presence or absence of canal excavation and drainage directly influences water availability and land usability. These examples highlight that livelihood viability is closely tied to the performance of local infrastructure systems.

Market access represents another critical bottleneck. Many communities in the coastal belt face significant challenges in accessing markets due to poor road connectivity, limited transportation options, and high transaction costs. Even when households engage in productive activities such as poultry rearing, small businesses, or aquaculture, their ability to generate income is constrained by difficulties in reaching buyers, securing fair prices, or maintaining consistent supply chains. This disconnects between production and market access reduces the economic viability of otherwise promising livelihood options.

Institutional coordination and service delivery gaps further compound these challenges. Although multiple actors, including government agencies, local authorities, and development organizations are involved in supporting livelihoods, their efforts are often not well aligned. Programs may focus on input distribution or short-term training without adequately considering whether the enabling environments such as infrastructure, market systems, or access to finance is in place to support sustained outcomes. As a result, interventions may generate initial results but fail to create lasting impact.

Access to finance and technical services also remains uneven and limited, particularly for marginalized groups. Many households lack the financial capacity to invest in adaptation measures, while existing financial products are not always tailored to the realities of climate-exposed livelihoods. Similarly, extension services and technical support often do not reach the most vulnerable populations or are not designed to address the specific challenges posed by changing climate conditions.

These structural constraints reveal a critical insight: livelihood outcomes are not determined solely by individual effort or resource availability, but by the broader system within which households operate. Even when communities have the willingness and basic capacity to adapt, the absence of supportive infrastructure, functional markets, and coordinated institutional engagement can significantly limit their options.

This underscores the need to move beyond isolated interventions toward a more integrated approach that recognizes and addresses these systemic barriers. Without such a shift, efforts to strengthen livelihoods will continue to face limitations, regardless of the level of investment or support provided.

2.5 The Urgency for Systemic Change

The evidence from coastal communities clearly indicates that climate vulnerability is not driven by a single factor, nor can it be addressed through isolated interventions. Instead, it emerges from the interaction of multiple, interconnected dimensions, climate exposure, livelihood systems, access to assets, infrastructure conditions, market dynamics, and institutional support. When these elements are misaligned, even well-intentioned interventions struggle to deliver sustainable outcomes.

Current approaches to livelihood support have largely focused on addressing individual constraints, often through the provision of input, training, or financial assistance. While these efforts have generated short-term benefits, they have not consistently translated into long-term resilience. In many cases, households are able to initiate livelihood activities but are unable to sustain or scale them due to underlying system limitations. As a result, gains remain fragile and vulnerable to disruption.

This highlights a critical gap between intervention design and the realities on the ground. Supporting livelihoods in climate-exposed regions requires more than enabling production, it requires ensuring that the broader system within which livelihoods operate is functional, connected, and responsive. Without access to reliable infrastructure, functioning markets, financial services, and coordinated institutional support, livelihood opportunities remain constrained regardless of individual capacity or effort.

At the same time, the exclusion of local perspectives, particularly those of women, from planning and decision-making processes further limits the effectiveness of adaptation strategies. Without locally grounded understanding and ownership, interventions risk overlooking context-specific challenges and opportunities, leading to solutions that are misaligned with community needs.

The growing complexity and persistence of climate risks demand a shift in how adaptation is conceptualized and implemented. Rather than treating adaptation as a series of discrete activities, there is a need to adopt a system-based approach that integrates climate risk analysis, livelihood feasibility, resource availability, and institutional alignment. Such an approach must be locally led, inclusive, and grounded in the realities of the communities it aims to support.

This shift is not optional, but it is essential. Without a more integrated and systemic approach, efforts to support climate-resilient livelihoods will continue to face limitations, and the gap between vulnerability and resilience will persist. The challenge, therefore, is not only to expand support but to fundamentally rethink how that support is designed and delivered.

3 WHY CURRENT APPROACHES FAIL

The growing complexity of climate risks and livelihood challenges in coastal Bangladesh underscores a critical reality: existing approaches to livelihood support are not keeping pace with the evolving nature of vulnerability. While a range of interventions have been implemented to improve income opportunities and reduce poverty, their effectiveness in building long-term, climate-resilient livelihoods remains limited.

Over the years, livelihood support initiatives have largely focused on providing inputs, assets, training, or financial assistance to vulnerable households. These efforts have often generated immediate and visible outputs, enabling households to initiate or expand livelihood activities. However, in many cases, these gains are not sustained over time. Livelihoods established through such interventions frequently struggle to withstand environmental shocks, market fluctuations, and structural constraints, resulting in cycles of progress followed by setbacks.

A key limitation of these approaches lies in their fragmented nature. Interventions are often designed to address specific constraints in isolation, such as lack of capital, skills, or input without fully considering the broader system within which livelihoods operate. As a result, critical factors such as climate risk exposure, infrastructure conditions, market access, and institutional support are either under-addressed or overlooked entirely. This disconnects between intervention design and system realities significantly undermines the effectiveness of livelihood support efforts.

Moreover, many existing approaches are not sufficiently grounded in local context. Standardized livelihood packages or predefined activity models are often applied across different locations without adequate adaptation to local environmental conditions, risk profiles, or socio-economic dynamics. This one-size-fits-all approach limits the relevance and viability of supported livelihoods, particularly in climate-exposed regions where conditions vary significantly across communities.

These limitations are not a reflection of insufficient effort or investment, but rather of a structural gap in how livelihood adaptation is conceptualized. As climate risks become more complex and persistent, the need to move beyond isolated, short-term interventions toward more integrated and context-responsive approaches becomes increasingly evident.

This section examines the key limitations of current livelihood support approaches, highlighting the gaps that prevent them from delivering sustainable and climate-resilient outcomes. In doing so, it sets the foundation for rethinking how adaptation strategies can be designed to better align with the realities of coastal communities.

3.1 Focus on Inputs, Not Systems

A defining characteristic of many livelihood support interventions in coastal Bangladesh is their strong focus on the provision of inputs, such as cash transfers, productive assets, seeds, livestock, or short-term training. These interventions are often designed to address immediate resource gaps faced by vulnerable households and can generate quick, visible outcomes. In the short term, they enable households to initiate livelihood activities, increase production, or diversify income sources.

However, this input-driven approach often assumes that once resources are provided, households will be able to sustain and grow these activities independently. In practice, this assumption rarely holds true in climate-exposed and system-constrained environments. Livelihoods do not operate in isolation; they depend on a wider ecosystem of factors that determine whether an activity can be sustained over time.

For example, providing support for poultry rearing or small-scale business development may help households begin an income-generating activity. Yet, without access to reliable markets, transportation, veterinary services, or supply chains, these activities remain limited in scale and vulnerable to disruption. Similarly, agricultural inputs may improve production in the short term, but without proper water management, soil conditions, and infrastructure, productivity gains are often inconsistent and unsustainable.
Another limitation of input-focused approaches is that

they tend to prioritize outputs over outcomes. Success is frequently measured by the number of assets distributed, trainings conducted, or beneficiaries reached, rather than by the long-term viability and resilience of supported livelihoods. This creates a disconnect between project achievements and actual impact on household resilience.

Moreover, input-based interventions often fail to account for the dynamic and evolving nature of climate risks. A livelihood option that appears viable at the time of intervention may become unfeasible due to changing environmental conditions, such as increased salinity or prolonged waterlogging. Without mechanisms to continuously assess and adapt to these changes, initial investments can quickly lose their effectiveness.

This narrow focus on inputs, without sufficient attention to the broader system, results in interventions that are inherently fragile. While they may provide temporary relief or short-term improvement, they do not address the underlying factors that determine whether livelihoods can be sustained, scaled, or adapted over time.

The limitation, therefore, is not in the provision of inputs itself, but in the absence of a system-oriented approach that connects inputs with enabling conditions. Without this alignment, livelihood support remains partial, and its contribution to long-term resilience remains constrained.

3.2 Lack of Climate-Informed Planning

A critical limitation of existing livelihood support approaches for Sundarbans-dependent communities is the insufficient integration of climate risk into planning and decision-making. While climate change is widely acknowledged as a key challenge in the region, its specific implications for livelihood viability are not consistently reflected in the selection and design of interventions. As a result, many livelihood options are promoted without adequately considering the unique and evolving risk profile of the Sundarbans landscape.

The Sundarbans-dependent areas are characterized by a highly dynamic and fragile ecological system, where salinity intrusion, tidal flooding, cyclones, and waterlogging interact in complex ways. These risks vary significantly across locations, even within short distances, depending on factors such as proximity to rivers, condition of embankments, and access to freshwater sources. However, in practice, livelihood interventions are often designed using generalized assumptions, with limited differentiation based on these localized risk conditions.

This leads to a fundamental mismatch between livelihood support and environmental reality. For example, agricultural activities may be promoted in areas where salinity levels are too high to sustain consistent crop production. Similarly, aquaculture or livestock-based interventions may be introduced without adequate consideration of water quality, disease risks, or exposure to flooding. In such cases, households invest their time and limited resources into activities that are inherently vulnerable to the surrounding climate conditions.

Table 1: Mismatch Between Livelihood Support and Sundarbans Climate Reality

Planning Assumption	Actual Sundarbans Context	Implication for Livelihoods
Livelihood options are broadly applicable across locations	Climate risks vary significantly by location (salinity, flooding, waterlogging)	Selected livelihoods may not be viable in specific contexts
Environmental conditions remain stable or manageable	Increasing salinity intrusion and unpredictable weather patterns	Declining productivity and increased uncertainty
Access to water is sufficient for agriculture and aquaculture	Freshwater scarcity is common in many Sundarbans-dependent areas	Water-dependent livelihoods become unsustainable
Physical environment supports regular production cycles	Frequent cyclones and tidal surges damage land, ponds, and assets	Repeated losses disrupt livelihood continuity
Infrastructure conditions are adequate or secondary	Weak embankments, poor drainage, and limited water control systems	High exposure to climate risks and reduced land usability
Livelihood activities are equally accessible for all	Women are primarily engaged in homestead-based activities affected by salinity and water stress	Reduced effectiveness and sustainability of women-led livelihoods

The lack of systematic climate risk screening further reinforces this mismatch. In many instances, livelihood options are selected based on prior project experience or perceived feasibility, rather than on detailed analysis of current and projected climate risks. This results in a reactive approach, where interventions respond to immediate needs but fail to anticipate future environmental changes. For Sundarbans-dependent communities, where climate risks are both persistent and intensifying, this gap significantly undermines the sustainability of livelihood investments.

Moreover, existing approaches often overlook the differentiated vulnerabilities of specific groups, particularly women. Women's livelihood activities are frequently concentrated in homestead-based or near-household environments, which are directly affected by salinity, waterlogging, and limited access to freshwater. Without climate-informed planning that considers these realities, supported activities may not align with women's actual conditions and capacities, reducing their effectiveness and sustainability.

The consequence of this gap is a pattern of repeated trial and failure, where livelihood options are introduced but do not endure under climate stress. This not only affects income stability but also reduces confidence in adaptation efforts among communities.

Addressing this challenge requires a shift toward climate-informed livelihood planning that is grounded in the specific ecological and risk context of the Sundarbans. This includes integrating scientific risk assessments, differentiating interventions based on local conditions, and ensuring that livelihood options are selected with a clear understanding of both current and future climate realities. Without this alignment, livelihood support will continue to face limitations in delivering sustainable and resilient outcomes.

3.3 Disconnection from Market and Infrastructure

A critical limitation of existing livelihood support approaches in Sundarbans-dependent communities is the weak integration of market systems and infrastructure considerations into intervention design. While many programs successfully support households to initiate livelihood activities, far less attention is given to whether these activities can be sustained and scaled within the broader economic and physical environment.

In practice, livelihood support often prioritizes productions such as promoting poultry rearing, small businesses, aquaculture, or crop cultivation, without adequately addressing how products will reach markets, how inputs will be accessed, or how value chains will function. This creates a situation where households can produce, but struggle to convert that production into stable and sufficient income.

Market access remains a significant barrier in many areas. Poor road connectivity, limited transportation options, and high travel costs restrict the ability of households to reach local or regional markets. In some locations (such as kalabogi), even when production is successful, the absence of reliable transport systems forces households to sell products at lower prices within the local area or depend on intermediaries who capture a significant share of the value. This reduces profitability and discourages further investment in livelihood activities.

Infrastructure constrains further compound these challenges. The condition of embankments, roads, canals, and drainage systems directly influences both production and market access. For example, areas with functional embankments and effective water management systems are better able to sustain agricultural activities, while areas without such infrastructure face frequent crop loss due to saline water intrusion or flooding. Similarly, the absence of accessible roads or transport routes limits the movement of goods, inputs, and services, constraining both production and trade.

These realities highlight a fundamental disconnect between livelihood promotion and the enabling environment required for success. A livelihood option may be technically feasible and even initially productive, but without the necessary infrastructure and market linkages, it cannot develop into a reliable or scalable source of income.

This disconnect is particularly evident in the case of women-led livelihood activities. While many interventions support women in engaging in poultry rearing, small enterprises, or home-based production, their ability to access markets is often constrained by mobility limitations, safety concerns, and lack of transport options. As a result, women's economic activities remain small in scale and confined to local markets, limiting their income potential and growth opportunities.

The implication is clear: livelihood development cannot be achieved through production-focused support alone. It requires a deliberate integration of market systems and infrastructure considerations into planning and implementation. Without this

alignment, livelihood interventions remain incomplete, and their potential to generate sustainable income and resilience remains unrealized.

3.4 Limited Inclusion of Women and Local Context

A significant limitation of current livelihood support approaches is the insufficient inclusion of women and local context in planning and decision-making processes. While many interventions are designed with the intention of supporting vulnerable populations, they are often developed through top-down approaches that do not fully reflect the lived realities, constraints, and priorities of the communities they aim to serve.

In practice, livelihood planning is frequently guided by predefined models or external assumptions about what activities are viable, rather than by a grounded understanding of local conditions. This limits the relevance of interventions, particularly in the Sundarbans context, where environmental, social, and economic conditions vary significantly across locations. Without incorporating local knowledge and context-specific insights, livelihood options may not align with the actual opportunities and constraints faced by communities.

The limited inclusion of women in these processes further reinforces this gap. Although women are central to household livelihoods and are often the primary managers of homestead-based economic activities, their voices are not always adequately represented in planning discussions. Decisions regarding livelihood support are frequently made without fully understanding women's roles, capacities, time constraints, mobility limitations, and access to resources.

This disconnect has practical implications. Livelihood options that appear viable in theory may not be feasible for women in practice due to constraints such as limited access to markets, lack of control over assets, or restrictions on movement. For example, supporting small enterprise or production activities without addressing how women will access markets or manage logistics can limit the effectiveness of such interventions. As a result, women's economic participation remains confined to low-scale, low-return activities.

Furthermore, the absence of local participation in planning reduces ownership and sustainability. When communities are not actively involved in identifying and prioritizing livelihood options, interventions are less likely to be adapted, maintained, or scaled over time. This is particularly important in climate-exposed environments like the Sundarbans, where local knowledge of risks, resources, and coping strategies is essential for designing effective adaptation responses.

The lack of inclusive and locally grounded planning therefore represents a critical gap in current approaches. Without meaningful engagement of women and communities, livelihood interventions risk being misaligned with real needs and constraints, limiting their impact and sustainability.

Addressing this challenge requires a shift toward more participatory and locally led planning processes that recognize women not only as beneficiaries, but as key decision-makers and agents of change. Integrating local knowledge and ensuring women's active involvement can significantly enhance the relevance, effectiveness, and sustainability of adaptation efforts in Sundarbans-dependent communities.

3.5 The Result: Fragile and Unsustainable Outcomes

The combined effect of input-focused interventions, limited climate integration, weak market and infrastructure linkages, and insufficient inclusion of women and local context leads to a consistent outcome: livelihood gains that are fragile, short-lived, and difficult to sustain.

In many Sundarbans-dependent communities, livelihood support initiatives succeed in generating initial progress. Households can start new activities, diversify income sources, or temporarily improve their economic conditions. However, these gains often do

Figure 4: Without market and infrastructure linkage, production does not translate into income

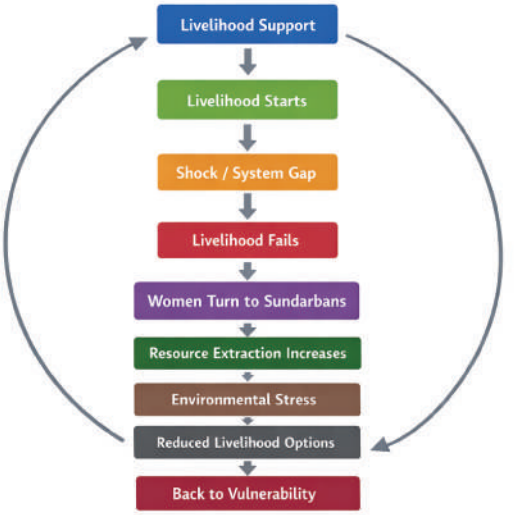

Figure 5: Cycle of Fragile Livelihoods and Ecosystem Pressure

not persist over time. Environmental shocks, market barriers, and system constraints quickly erode progress, returning households to conditions of vulnerability.

This pattern reflects a fundamental disconnect between short-term outputs and long-term outcomes. While interventions may achieve immediate targets, such as asset distribution, training completion, or income generation over a limited period, they often fall short in building the resilience required to withstand ongoing climate stress. As a result, households remain exposed to repeated cycles of loss and recovery.

For women, these outcomes are particularly pronounced. Despite active engagement in livelihood activities, the combination of limited access to resources, restricted mobility, and inadequate market linkages constrains their ability to sustain or scale economic gains. When supported livelihood options fail or become unviable, women are often left with limited alternatives.

In such situations, many women turn toward the Sundarbans, engaging in activities such as fishing, crab collection, or resource extraction from mangrove areas, as a coping mechanism. While these activities provide immediate income opportunities, they are inherently risky, low-return, and environmentally fragile. Women often face physical danger, health risks, and insecurity while engaging in these activities, reflecting the absence of safer and more sustainable livelihood options.

At the same time, this increasing dependence on the Sundarbans places additional pressure on already stressed ecosystems. As more households rely on natural resource extraction for survival, the intensity of use increases, contributing to the degradation of mangrove resources. This creates a reinforcing cycle, where fragile livelihoods drive environmental stress, and environmental degradation further reduces livelihood opportunities.

The implications extend beyond individual households. When livelihood interventions fail to deliver sustained impact, they also limit opportunities for broader economic development and reduce the effectiveness of public and donor investments. Efforts remain localized, fragmented, and difficult to

4 RETHINKING ADAPTATION

The limitations outlined in the previous section highlight a critical reality: improving livelihoods in Sundarbans-dependent communities cannot be achieved through incremental adjustments to existing approaches. The challenges faced by these communities are not isolated or temporary; they are deeply interconnected and shaped by a combination of climate risks, environmental conditions, infrastructure gaps, market barriers, and social dynamics. Addressing such complexity requires a fundamental shift in how livelihood adaptation is understood and implemented.

In the Sundarbans context, livelihoods are not simply economic activities, they are part of a broader system that is continuously influenced by changing environmental conditions and structural constraints. Climate risks such as salinity intrusion, flooding, and cyclones do not act independently; they interact with limitations in infrastructure, access to resources, and market systems, shaping what is possible and what is not. As a result, livelihood outcomes are determined not only by the type of activity promoted, but by the wider conditions that support or constrain it.

This calls for a transition from a narrow focus on individual livelihood options toward a more comprehensive understanding of livelihood systems. Such an approach recognizes that sustainable livelihood development depends on the alignment of multiple factors, including environmental suitability, access to infrastructure and services, market connectivity, and social inclusion. Without this alignment, even well-designed interventions are unlikely to produce lasting results.

At the same time, there is a need to reconsider who drives adaptation planning. Women in Sundarbans-dependent communities play a central role in managing household livelihoods and responding to climate-related challenges, yet their knowledge and priorities are often underrepresented in decision-making processes. Placing women at the center of adaptation planning is therefore not only a matter of inclusion, but a practical necessity for ensuring that interventions are grounded in local realities and capable of delivering sustainable outcomes.

Rethinking adaptation also requires moving beyond short-term responses toward approaches that are informed by climate risk and oriented toward long-term resilience. This includes integrating scientific analysis into decision-making, differentiating interventions based on local conditions, and ensuring that livelihood options remain viable under both current and future climate scenarios.

In response to these needs, this section presents a framework for livelihood adaptation that is system-based, climate-informed, and locally led. It brings together key elements, such as the integration of climate risk, the application of a five-capital approach, the strengthening of market and infrastructure linkages, and the central role of women and communities, to outline a more effective pathway for supporting sustainable livelihoods in Sundarbans-dependent areas.

This is not a departure from existing efforts, but a progression toward a more coherent and context-responsive approach, one that aligns livelihood development with the realities of the Sundarbans and provides a stronger foundation for scaling adaptation through institutional support and investment.

4.1 From Livelihood Support to Livelihood Systems

Livelihood support in many development interventions has traditionally been approached as the promotion of individual income-generating activities. These may include agriculture, livestock rearing, aquaculture, or small-scale enterprises, often supported through inputs, training, or financial assistance. While such approaches can enable households to initiate economic activities, they do not fully capture the complexity of how livelihoods function in climate-exposed environments such as the Sundarbans.

In reality, livelihoods in Sundarbans-dependent communities operate within a broader system shaped by multiple interconnected factors. The viability of any livelihood activity is influenced not only by the effort and capacity of households, but also by environmental conditions, infrastructure, access to services, market dynamics, and institutional support. When these elements are aligned, livelihood activities can grow

and sustain over time. When they are not, even well-supported activities can fail.

For example, supporting poultry rearing or crop production may appear viable from a technical perspective. However, if road connectivity is poor, access to markets is limited, or water conditions are unsuitable, these activities struggle to generate stable income. Similarly, without access to veterinary services, extension support, or reliable inputs, productivity remains low and risks remain high. These examples illustrate that the success of a livelihood is determined by the system in which it operates, not by the activity alone.

This understanding calls for a shift from a narrow focus on "livelihood support" toward a more comprehensive approach that considers "livelihood systems." A livelihood system includes the full set of conditions that enable or constrain economic activities. This includes:

- Natural conditions, such as soil quality, salinity levels, and water availability
- Physical infrastructure, including embankments, roads, and water management systems
- Market systems, such as access to buyers, pricing structures, and value chains
- Financial services, including access to credit and investment opportunities
- Institutional support, such as extension services, local governance, and program coordination
- Social dynamics, including gender roles, mobility, and access to resources

In the Sundarbans context, where climate risks interact with these system components, a fragmented approach to livelihood support is particularly ineffective. Supporting one element in isolation, such as providing inputs or training without strengthening the surrounding system limits the potential for sustainability and growth.

Adopting a livelihood systems perspective allows for a more integrated and realistic approach to adaptation. It enables planners and practitioners to identify not only which livelihood options are feasible, but also what conditions are required to make them viable over time. This approach shifts the focus from short-term outputs to long-term outcomes, ensuring that livelihood interventions are supported by the necessary enabling environment.

Ultimately, moving toward a livelihood systems approach is essential for designing adaptation

Figure 6: Livelihood outcomes depend on system alignment

strategies that are both context-specific and resilient. It provides a foundation for aligning climate realities, economic opportunities, and institutional support, thereby increasing the likelihood that livelihood improvements can be sustained and scaled in Sundarbans-dependent communities.

4.2 Integrating Climate Risk into Decision-Making

A fundamental requirement for effective livelihood adaptation is the integration of climate risk into planning and decision-making. As demonstrated in earlier sections, one of the key limitations of existing approaches is the mismatch between promoted livelihood options and the environmental conditions in which they are implemented. Addressing this gap requires a shift toward climate-informed planning, where livelihood decisions are guided by a clear understanding of both current and future risks.

The Sundarbans region presents a highly variable and dynamic risk landscape. Salinity levels differ across locations, water availability fluctuates seasonally, and exposure to flooding and cyclones varies depending on geographic and infrastructural conditions. These variations directly influence the suitability and sustainability of different livelihood options. As such, a livelihood that is viable in one location may not be appropriate in another, even within the same administrative boundary.

Integrating climate risk into decision-making involves systematically assessing these local conditions and aligning livelihood options accordingly. This includes analyzing key factors such as salinity intrusion, water availability, flood exposure, soil conditions, and long-term climate trends. By doing so, it becomes possible to identify which livelihood options are not only feasible in the present context, but also resilient under changing environmental conditions.

A critical element of this approach is the use of

climate risk screening to guide livelihood selection. Rather than relying on generalized assumptions or predefined livelihood packages, risk-informed planning allows for the differentiation of interventions based on location-specific realities. This ensures that livelihood options are matched with the environmental context, reducing the likelihood of failure and increasing the potential for sustainability.

This approach also enables forward-looking decision-making. Climate risks in the Sundarbans are not static; they are evolving in response to broader climatic changes. Planning must therefore consider not only current conditions, but also how risks may intensify or shift over time. Livelihood options that are viable today may become increasingly vulnerable in the future if these trends are not taken into account.

Importantly, integrating climate risk into decision-making must be combined with local knowledge and community participation. Scientific analysis provides critical insights into environmental conditions, but it is most effective when complemented by the lived experiences and observations of local communities, particularly women who manage day-to-day livelihood activities. This combination of scientific and local knowledge ensures that planning is both technically sound and contextually grounded.

By embedding climate risk into livelihood planning, adaptation efforts can move from reactive responses toward proactive and strategic decision-making. This strengthens the ability of households to invest in livelihood options that are not only productive, but also resilient to the uncertainties of the Sundarbans environment.

4.3 Centering Women in Adaptation Planning

In Sundarbans-dependent communities, women are at the center of household livelihood systems. They play a critical role in managing homestead-based production, small livestock, poultry aquaculture activities, pickles processing, and other income-generating practices that contribute directly to household resilience. Their day-to-day engagement with natural resources and household economies provides them with practical knowledge of environmental changes, risks, and coping strategies.
However, despite their central role, women are often positioned as beneficiaries rather than active participants in the design and planning of livelihood interventions. Decision-making processes related to livelihood support are frequently dominated by external actors or community-level structures where women's voices are underrepresented. As a result, interventions may not fully reflect the realities of women's roles, constraints, and priorities.

In the context of the Sundarbans, this gap has significant implications. Women's livelihood activities are typically concentrated within or near the household, making them highly sensitive to changes in water availability, salinity, and environmental conditions. At the same time, women face structural barriers that limit their access to resources, markets, and services. These include restricted mobility, limited control over assets, and reduced access to information and institutional support. Without explicitly addressing these factors, livelihood interventions risk overlooking key constraints that directly affect their success.

Centering women in adaptation planning requires a shift in both approach and mindset. It involves recognizing women as key knowledge holders and decision-makers, and ensuring their meaningful participation in identifying livelihood options, assessing risks, and designing solutions. This goes beyond consultation; it requires creating spaces and processes where women can actively influence outcomes and shape interventions according to their needs and capacities.

Such an approach enhances both the relevance and sustainability of adaptation efforts. When women are involved in planning, livelihood options are more likely to align with local realities, resource availability, and household dynamics. This increases the likelihood that interventions will be adopted, maintained, and adapted over time.

Moreover, empowering women in adaptation planning has broader implications for resilience. Women's economic participation contributes not only to household income, but also to improved food security, resource management, and community stability. In the Sundarbans context, where livelihoods are closely linked to fragile ecosystems, women's knowledge and practices can also play a role in promoting more sustainable use of natural resources.

Moving toward women-centered adaptation planning is therefore not only a matter of inclusion, but a strategic requirement for effective and sustainable livelihood development. It ensures that adaptation is grounded in local realities, responsive to gender-specific challenges, and capable of delivering long-term resilience in Sundarbans-dependent communities.

4.4 Applying the Five Capitals Approach to Livelihood Adaptation

Sustainable livelihood development in the Sundarbans cannot be achieved through isolated interventions that focus on a single dimension of support. As demonstrated in earlier sections, livelihood outcomes

Figure 7:A systems approach to livelihoods integrates five capitals

are shaped by a range of interconnected factors. Addressing these complexities requires a structured approach that captures the multiple dimensions influencing livelihoods. The Five Capitals Framework provides such an approach, offering a practical way to understand and strengthen the systems that underpin livelihood resilience.

The Five Capitals Framework recognizes that livelihoods are built upon five key forms of capital: natural, physical, financial, human, and social. Each of these capitals plays a distinct role in enabling households to pursue and sustain livelihood activities. In the Sundarbans context, where environmental risks and structural constraints are highly pronounced, the balance and interaction between these capitals are particularly critical.

- Natural capital refers to the environmental resources that support livelihoods, including land, water, soil quality, and ecosystem services. In the Sundarbans, this is heavily influenced by salinity, water availability, and exposure to climate hazards.

- Physical capital includes infrastructure and assets such as embankments, roads, water management systems, and production equipment. These determine the extent to which households can access resources, protect assets, and connect to markets.
- Financial capital relates to access to income, savings, credit, and investment opportunities. It enables households to initiate, sustain, and expand livelihood activities, as well as to absorb shocks.

- Human capital encompasses skills, knowledge, health, and labor capacity. This includes both technical skills for livelihood activities and the ability to adapt to changing conditions.

- Social capital refers to networks, relationships, and institutional linkages that provide support, information, and access to opportunities. This includes community groups, local governance structures, and connections to service providers.

In many existing livelihood interventions, support tends to focus primarily on financial capital, through cash transfers, grants, or inputs, while other capitals remain underdeveloped. This imbalance limits the effectiveness of interventions, as improvements in one area are constrained by gaps in others. For example, providing financial support for aquaculture may not lead to sustainable outcomes if water conditions are unsuitable (natural capital), access to inputs is limited (physical capital), or technical knowledge is insufficient (human capital).

Applying a five capitals approach allows for a more comprehensive assessment of livelihood systems. It enables planners to identify not only which livelihood options are feasible, but also what specific investments are required across different capitals to make those options viable. This ensures that interventions are designed in a way that addresses the full set of enabling conditions, rather than focusing on a single input.

Importantly, the five capitals are interconnected. Strengthening one capital can enhance others, while gaps in one can undermine the overall system. For instance, improved infrastructure (physical capital) can enhance market access (financial capital), while strengthened social networks (social capital) can improve access to information and services (human capital). Recognizing these interlinkages is essential for designing integrated and effective adaptation strategies.

In the Sundarbans context, applying the five capitals framework provides a structured way to align livelihood interventions with local realities. It ensures that adaptation planning considers environmental constraints, infrastructure needs, economic opportunities, and social dynamics in a coordinated manner. This not only improves the sustainability of individual livelihood activities, but also strengthens the overall resilience of households and communities.

By embedding the five capitals approach into livelihood adaptation planning, interventions can move beyond fragmented support toward a more balanced and system-oriented model. This creates a stronger

4.5 Linking Livelihoods to Markets and Infrastructure

The sustainability of livelihood activities in Sundarbans-dependent communities is not determined solely by their technical feasibility or environmental suitability. Even when livelihood options are well-aligned with local conditions and supported through multiple forms of capital, their long-term viability depends significantly on access to markets and enabling infrastructure. Without these linkages, livelihood activities remain limited in scale, profitability, and resilience.

In many parts of the Sundarbans, physical isolation remains a major constraint. Poor road connectivity, limited transport options, and fragmented market access create significant barriers for households attempting to sell their products or access necessary inputs. For women, these challenges are often more pronounced due to mobility constraints and limited access to transportation. As a result, even viable livelihood activities such as poultry rearing, small-scale aquaculture, or home-based enterprises struggle to generate consistent and meaningful income.

Market access is not only about physical connectivity, but also about integration into value chains. This includes access to buyers, fair pricing mechanisms, reliable demand, and opportunities for value addition. In the absence of these elements, producers are often forced to sell at lower prices within local markets, limiting income potential and reducing incentives for scaling up production.

Infrastructure plays a foundational role in enabling these market linkages. Embankments, for example, not only protect land from saline intrusion and flooding, but also create the conditions necessary for agricultural production. Similarly, water management systems influence the viability of aquaculture and crop cultivation. Road networks and transport systems determine whether products can reach markets in a timely and cost-effective manner. These infrastructural elements are therefore not separate from livelihoods they are integral to their success.

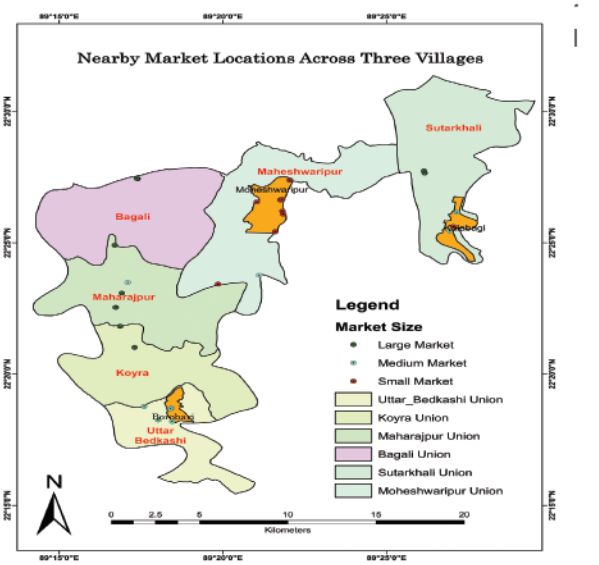

Figure 8: Market Locations

The experiences from the Sundarbans clearly demonstrate that livelihood interventions which do not consider these factors are unlikely to achieve sustainable outcomes. Promoting an income-generating activity without ensuring access to markets and supporting infrastructure often results in limited returns and eventual decline. This reinforces the cycle of fragile livelihoods and constrains long-term development.

Table 2: From Isolated Livelihoods to Market-Integrated Systems

System Constraint	Underlying System Gap	Required Intervention	Resulting Outcome
Poor road connectivity and physical isolation	Weak physical infrastructure limits mobility and access	Investment in roads, transport networks, and rural connectivity	Improved access to markets and services
Limited transport and logistics options	Lack of last-mile connectivity for goods movement	Development of local transport and logistics solutions	Timely market access, especially for perishable products
Dependence on local markets	Weak integration into broader value chains	Establish producer–buyer linkages and market networks	Better pricing and stable demand
Absence of aggregation and processing systems	No value addition or scale efficiency	Support for aggregation, storage, and processing facilities	Increased income and business expansion

Inadequate water and embankment systems	Unstable production environment due to climate exposure	Strengthening water management and embankment infrastructure	Reduced risk and improved productivity
Fragmented institutional support	Lack of coordination across actors and services	Alignment between government, NGOs, and market actors	Integrated and sustained livelihood support

Linking livelihoods to markets and infrastructure requires a more coordinated and system-oriented approach. This includes identifying potential value chains, strengthening connections between producers and buyers, improving access to transport and logistics, and aligning infrastructure investments with livelihood priorities. It also requires collaboration between multiple stakeholders, including government agencies, development partners, and local institutions.

Importantly, this approach shifts the focus from subsistence-level support toward livelihood development as an economic pathway. It recognizes that for livelihoods to contribute meaningfully to resilience, they must be capable of generating stable and sufficient income over time.

4.6 Toward a Locally Led and Institutionally Aligned Adaptation Model

The shift toward a system-based, climate-informed, and inclusive approach to livelihood adaptation requires more than changes in design, it requires alignment between community-level processes and institutional systems. Without this alignment, even well-conceived adaptation strategies will face challenges in implementation, scaling, and sustainability. Bridging this gap is therefore essential for translating adaptation concepts into actionable and scalable solutions in Sundarbans-dependent communities.

At the community level, locally led adaptation plays a central role in ensuring that livelihood planning is grounded in real needs and conditions. Communities, particularly women, possess valuable knowledge of environmental changes, resource availability, and practical coping strategies. Engaging them in identifying risks, prioritizing livelihood options, and shaping interventions ensures that adaptation measures are context-specific and relevant. This approach strengthens ownership and increases the likelihood that livelihood activities will be sustained over time.

However, community-led processes alone are not sufficient. For adaptation to be effective and scalable, they must be supported by enabling institutional systems. This includes government agencies, local authorities, development partners, and financial institutions working in a coordinated manner to provide infrastructure, services, technical support, and investment. In many cases, these actors operate in parallel rather than in alignment, leading to fragmented support and missed opportunities for impact.

Institutional alignment requires a shift toward integrated planning and coordinated action. This involves linking community-level adaptation plans with local and national development priorities, ensuring that investments in infrastructure, services, and livelihood support are mutually reinforcing. For example, livelihood plans developed at the community level should inform decisions related to infrastructure development, water management, and market systems. Similarly, institutional programs should be designed in a way that responds to locally identified needs and priorities.

An important aspect of this alignment is the creation of feedback loops between communities and institutions. Continuous engagement allows for the adaptation of interventions based on emerging challenges, changing climate conditions, and lessons learned from implementation. This dynamic process ensures that adaptation strategies remain relevant and effective over time.

For Sundarbans-dependent communities, where climate risks are persistent and structural constraints are significant, such alignment is critical. It enables the integration of local knowledge with technical expertise, and community priorities with institutional capacity. This creates a pathway for moving from isolated interventions to a coordinated and scalable adaptation model.

Ultimately, a locally led and institutionally aligned approach provides the foundation for sustainable livelihood development. It ensures that adaptation is not only responsive to immediate needs, but also embedded within broader systems of planning, investment, and governance. This alignment is essential for unlocking the full potential of adaptation efforts and for enabling long-term resilience in the Sundarbans.

5 THE ADAPTATION MODEL

Building on the principles outlined in the previous sections, this chapter presents a structured adaptation model designed to guide climate-resilient livelihood development in Sundarbans-dependent communities.

The model translates a system-based, climate-informed, and women-centered approach into a practical framework that can support planning, investment, and implementation. It brings together key dimensions of livelihood systems, including climate risk, local resource conditions, market dynamics, and institutional supportinto a coherent structure for decision-making.

At its core, the model is designed to ensure that livelihood options are not selected in isolation, but are assessed in relation to their feasibility, sustainability, and long-term resilience. It provides a step-by-step logic for identifying viable livelihood pathways, aligning them with local capacities and constraints, and connecting them to the systems required for their success.

A defining feature of the model is its emphasis on locally led planning, with women playing a central role in identifying priorities and shaping adaptation pathways. This ensures that the resulting strategies are grounded in lived realities and responsive to context-specific challenges.

Importantly, the model is intended to function beyond a project setting. It offers a structured approach that can be applied across different contexts, enabling government and development partners to design interventions that are both locally relevant and scalable. In doing so, it provides a practical basis for aligning community-level adaptation planning with broader systems of investment and institutional support.

5.1 The Adaptation Model: Overview

The Women's Adaptation Model is a locally led and evidence-based approach designed to strengthen climate-resilient livelihoods among Sundarbans-dependent communities. The model is built on the principle that sustainable adaptation cannot be externally designed; it must emerge from the knowledge, priorities, and decisions of the communities themselves particularly women, who are central to livelihood systems.

At the core of the model is a structured process of inquiry driven by women. Through facilitated engagement, women collectively examine their livelihood realities by asking and answering a set of critical questions. These questions guide the identification of risks, constraints, and opportunities, ensuring that adaptation planning is grounded in lived experience rather than external assumptions.

The process begins with women reflecting on the performance of their existing livelihoods. It recognizes that current practices, such as agriculture, livestock rearing, small businesses, and natural resource-based activities are not inherently ineffective. However, women identify how these livelihoods are increasingly affected by climate risks, limited market access, and infrastructural constraints, which reduce their stability and long-term sustainability.

Building on this, women analyze where maladaptation is occurring. They identify how climate change, combined with certain development practices, can unintentionally increase risk or deepen vulnerability. This includes situations where limited livelihood options push women toward high-risk dependence on rivers and mangroves, increasing both livelihood insecurity and environmental pressure.

The model then supports women in exploring how livelihood systems can be strengthened. Using the Five Capitals Framework, they assess gaps across human, natural, financial, social, and physical dimensions. This enables them to move beyond income-focused thinking and consider the broader system required to sustain livelihoods over time.

A key dimension of the model is the identification of institutional and social barriers that limit women's participation and access. Women examine how formal and informal structures restrict their access to resources, markets, and decision-making spaces. Through the Women's Adaptation Lab process, they actively participate in shaping solutions, strengthening their role as decision-makers within their communities.

The model, therefore, is not a predefined set of interventions, but a locally driven decision-making pathway. It enables women to move from questioning

Figure 9: Women-Led Adaptation Model

to analysis, and from analysis to planning resulting in adaptation strategies that are context-specific, system-oriented, and grounded in local ownership.

By placing women at the center of both inquiry and decision-making, the model ensures that adaptation is not only technically sound but also socially embedded and sustainable. At the same time, it creates a structured foundation through which these locally developed plans can be aligned with broader systems of infrastructure, market access, and institutional support.

5.2 Core Components of the Adaptation Model

The Women's Adaptation Model is operationalized through a set of interlinked components that combine locally led analysis with structured technical support. The model ensures that women's knowledge and priorities remain central, while also integrating scientific evidence and systematic assessments to strengthen decision-making.

These components together create a pathway through which women move from understanding livelihood challenges to developing context-specific and climate-resilient adaptation plans.

5.2.1 Climate Risk and Local Context Analysis

The model begins with a grounded understanding of local conditions and climate risks. Women lead the analysis of how environmental changes, such as salinity intrusion, waterlogging, cyclones, and seasonal variability affect their livelihoods.

This process is strengthened through scientific support. Climate risk assessments conducted with technical partners provide insights into present, near future, and long-term climate scenarios. In addition, identified livelihood options are screened against climate risks to assess their suitability and sustainability over time.

This combination of local knowledge and scientific evidence ensures that livelihood planning is both context-specific and forward-looking.

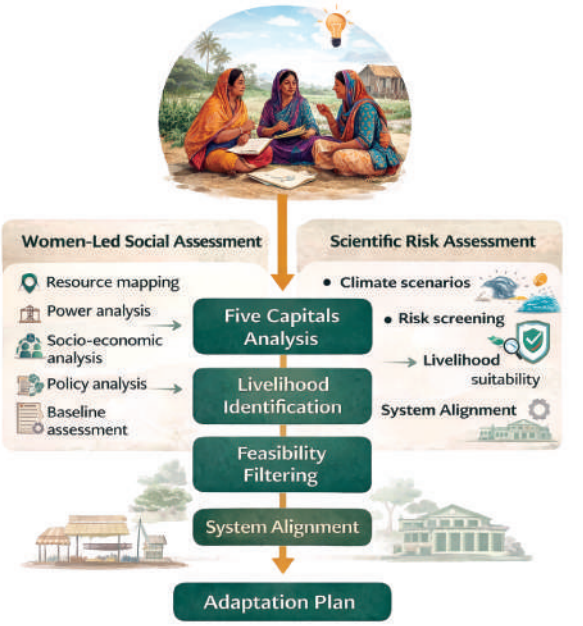

Figure 10: Core Components of the Women-Led Adaptation Model

5.2.2 Social and System Assessment

To understand the broader livelihood context, women conduct a comprehensive social assessment supported by academic and technical institutions. This includes:

- Socio-economic analysis
- Community resource mapping
- Stakeholder and power analysis
- Policy analysis
- Baseline assessment

Through these processes, women identify existing resources, institutional dynamics, power structures, and socio-economic constraints that shape their livelihood opportunities.

This component ensures that adaptation planning is not limited to environmental risks, but also considers the social, economic, and institutional realities that influence livelihood outcomes.

5.2.3 Livelihood System Assessment through Five Capitals

Building on climate and social analysis, the model applies the Five Capitals Framework to assess livelihood systems in an integrated manner. Women evaluate their livelihoods across:

- Human capital (skills and knowledge)
- Natural capital (land and natural resources)
- Financial capital (income and access to finance)
- Social capital (networks and cooperation)
- Physical capital (infrastructure and connectivity)

This assessment helps identify systemic gaps and constraints, shifting the focus from individual activities to the broader system required to sustain livelihoods.

5.2.4 Identification of Livelihood Pathways

Based on the combined analysis, women identify livelihood pathways that are feasible within their context. This includes strengthening existing livelihoods as well as exploring complementary options.

The process ensures that livelihood choices are grounded in:

- Climate suitability
- Resource availability
- Local capacity
- System conditions

This step reflects a shift from externally proposed solutions to locally identified pathways.

5.2.5 Feasibility and Risk Filtering

Identified livelihood options are further assessed through a structured filtering process. Women evaluate each option based on:

- Climate risk exposure
- Resource requirements
- Market potential
- System readiness

This step helps identify which options are viable and which may lead to maladaptation if pursued without adequate support.By integrating both local judgment and scientific screening, the model ensures that selected pathways are resilient and sustainable.

5.2.6 System Alignment and Enabling Conditions

Recognizing that livelihood success depends on enabling systems, women identify the support required to sustain selected livelihood pathways. This includes:

- Market access and value chains
- Infrastructure (roads, water systems, storage)
- Technical services
- Financial access

This component ensures that adaptation planning moves beyond livelihood selection to system strengthening.

5.2.7 Women's Leadership and Institutional Engagement

Women remain central throughout the process, leading analysis, decision-making, and planning. Through structured engagement platforms such as the Women's Adaptation Lab, women actively shape adaptation pathways based on their priorities and experiences.

At the same time, the model connects these locally developed plans with institutional systems. Engagement with local government, service providers, and development actors ensures that community priorities are linked to resources, programs, and investment opportunities.This creates a bridge between locally led planning and broader systems of implementation and scaling.

5.3 Building the Livelihood System

The Women's Adaptation Model moves beyond viewing livelihoods as isolated activities and instead frames them as part of an interconnected system. In the context of Sundarbans-dependent communities, livelihoods are shaped by a combination of environmental conditions, resource availability, social dynamics, and institutional support. As such, strengthening livelihoods requires not only improving individual activities, but also addressing the system within which these activities operate.

Building the livelihood system involves bringing together the different dimensions identified through earlier stagesclimate risks, local context, and capital assetsinto a coherent structure. This process enables women to understand how various elements interact, where constraints exist, and how these constraints can be addressed in an integrated manner.

At the core of this approach is the recognition that no single intervention can ensure livelihood resilience. For example, improving agricultural productivity may depend not only on inputs or techniques, but also on access to water, protection from salinity, market connectivity, and institutional support. Similarly, alternative livelihood options such as small businesses or livestock rearing require a combination of skills, finance, infrastructure, and access to services. Without these interconnected elements, livelihood activities remain fragile and unsustainable. The model therefore emphasizes the alignment of five key capitalshuman, natural, financial, social, and physical, as the foundation of a functioning livelihood system. Each capital plays a distinct role, but their effectiveness depends on how they interact. A lack of infrastructure can limit market access even when production is successful; insufficient financial capital can prevent investment in otherwise viable options; weak social networks can reduce access to information and collective support. By examining these interdependencies, women can identify not only what is missing, but how different constraints reinforce one another.

Climate risk acts as a cross-cutting factor that influences all elements of the livelihood system. Salinity intrusion, waterlogging, cyclones, and seasonal variability affect natural resources, damage

infrastructure, disrupt markets, and increase financial uncertainty. Integrating climate considerations into the system ensures that livelihood strategies are not only viable under current conditions but also resilient to future changes.

Another critical dimension of the livelihood system is its connection to broader enabling environments. Livelihoods do not operate in isolation from markets, institutions, and governance structures. Access to markets determines whether products can be sold at fair value; infrastructure such as roads and water systems influences production and mobility; institutional support provides access to services, information, and financial resources. Recognizing these linkages allows women to understand that livelihood success depends not only on household-level decisions, but also on the systems that support them.

Through this process, women develop a system-level perspective on their livelihoods. Instead of focusing solely on increasing income through individual activities, they begin to consider how different elements must come together to create stability, sustainability, and resilience. This shift from activity-based thinking to system-based thinking is a defining feature of the model.

Importantly, the livelihood system is not static. It evolves in response to changing environmental conditions, market dynamics, and social factors. The model therefore encourages continuous reflection and adaptation, enabling women to adjust their strategies as conditions change. This dynamic approach ensures that the livelihood system remains responsive and relevant over time.

By building livelihoods as a systemrather than as a collection of disconnected activitiesthe model creates a stronger foundation for identifying viable pathways, planning interventions, and engaging with institutional support. It establishes the structural logic upon which subsequent steps, including livelihood identification, feasibility assessment, and implementation, are based.

5.4 Livelihood Identification and Feasibility

Building on the understanding of livelihoods as an interconnected system, the Women's Adaptation Model moves to the identification of viable livelihood options and the assessment of their feasibility within the local context. This stage translates system-level insights into practical choices, ensuring that selected livelihood pathways are not only desirable but also sustainable under real-world conditions.

Rather than introducing externally defined solutions, the model enables women to identify livelihood options grounded in their own experiences, existing practices, and contextual realities. This process draws on the combined insights generated through social assessment, climate risk analysis, and system-level understanding, ensuring that livelihood identification is both locally relevant and evidence-based.

Women begin by mapping a range of potential livelihood options. These may include strengthening existing activities such as agriculture, livestock rearing, fisheries, or small businesses as well as exploring complementary or alternative options that can diversify income sources. The focus is not on replacing current livelihoods, but on identifying pathways that can enhance stability, reduce risk, and improve overall resilience.

Once a broad set of options is identified, the model introduces a structured process to assess their feasibility. This is a critical step, as not all livelihood options are suitable within the Sundarbans context, where environmental risks, resource constraints, and market limitations significantly influence outcomes. Women therefore evaluate each option against a set of interrelated considerations.

Climate suitability is a primary factor in this assessment. Livelihood options are examined in relation to current and projected climate conditions, including salinity levels, flooding patterns, and exposure to extreme events. Scientific risk assessments provide forward-looking insights, while women's local knowledge helps interpret how these risks manifest in practice. This ensures that selected options are resilient not only today, but also under future climate scenarios.

Resource availability is another key consideration. Women assess whether the necessary inputs such as land, water, capital, and labor are accessible within their context. This includes evaluating whether existing resources can support the activity or whether additional investments are required. Options that depend on scarce or inaccessible resources are carefully reconsidered to avoid future constraints.

Economic viability is also central to the feasibility assessment. Women examine whether an option can generate stable and sufficient returns, considering market demand, price fluctuations, and costs of production. This helps ensure that selected livelihoods contribute meaningfully to household income rather than creating additional financial risk.

Social and institutional factors further shape feasibility. Women consider whether an activity is socially acceptable, whether it aligns with their roles and responsibilities, and whether there are barriers related to mobility, access, or decision-making. They also assess the availability of institutional support, such as extension services, training, or financial assistance, which may be necessary to sustain the activity.

Through this multidimensional assessment, women collectively filter and refine the list of livelihood options. The process is not about identifying a single "best" option, but about selecting a combination of activities that together form a diversified and resilient livelihood strategy. This reflects an understanding that resilience is strengthened through diversity, flexibility, and risk distribution.

Importantly, this stage reinforces women's role as decision-makers. By engaging directly with both local knowledge and scientific evidence, women can make informed choices that reflect their priorities and capacities. The resulting set of livelihood pathways is therefore not only technically sound but also socially grounded and contextually appropriate.

By the end of this stage, a set of feasible and prioritized livelihood options is established. These options form the foundation for subsequent steps, where attention shifts toward enabling conditions, system support, and pathways for implementation and scaling.

5.5 Enabling Systems for Sustainability

The identification of feasible livelihood options represents a critical step in the adaptation process. However, the success of these options depends not only on their inherent viability, but on the systems that enable them to function effectively over time. In the context of Sundarbans-dependent communities, livelihoods are deeply influenced by access to markets, infrastructure, services, and institutional support. Without these enabling systems, even well-selected livelihood pathways remain fragile and difficult to sustain.

The Women's Adaptation Model therefore places strong emphasis on identifying and strengthening the systems required to support livelihood sustainability. This stage moves beyond the selection of livelihood options to examine the broader environment within which these options must operate. It ensures that adaptation planning is not limited to activities at the household level but is connected to the systems that determine long-term success.

A central element of this process is understanding how market systems influence livelihood outcomes. For many women in Sundarbans-dependent communities, limited access to markets remains a significant barrier. Poor transportation, lack of storage facilities, and weak value chain linkages often reduce profitability and discourage investment in livelihood activities. The model highlights the need to strengthen market access, improve connectivity, and establish linkages with buyers and intermediaries,

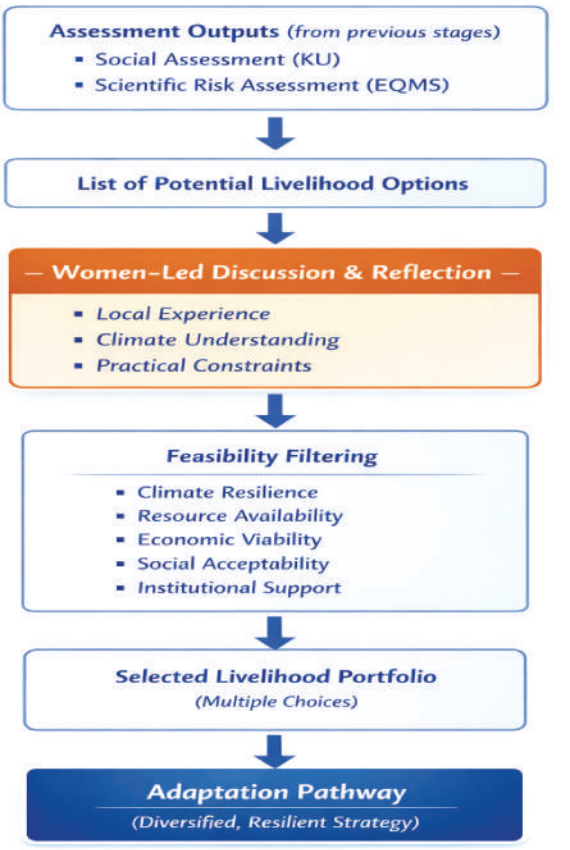

Figure 11: Women-Led Livelihood Decision-Making Process

ensuring that livelihood options can generate stable and meaningful returns.

Infrastructure plays an equally critical role. Physical systems such as roads, embankments, irrigation structures, and water management systems directly affect the feasibility of livelihood activities. For example, agricultural production depends on protection from salinity and flooding, while small businesses require reliable transport and communication networks to access markets. By identifying infrastructure gaps, women can articulate what physical investments are necessary to support their livelihood strategies.

Access to financial services is another key enabling factor. Many livelihood options require upfront investment, whether for inputs, equipment, or business development. However, women often face constraints in accessing credit, savings mechanisms, or financial support. The model emphasizes the importance of linking livelihood plans with financial systems, including microfinance, community savings groups, and formal banking services, to enable sustained investment and growth.
Technical knowledge and service support further

influence the success of livelihood pathways. Access to extension services, training programs, and technical guidance is essential for improving productivity, adopting new practices, and responding to changing conditions. By establishing connections with relevant service providers, such as agricultural extension agencies, livestock services, and research institutions the model ensures that women are supported with the knowledge and skills required to sustain their activities.

Institutional alignment is a defining feature of this stage. Livelihood sustainability depends on how well community-level priorities are connected to formal governance and development systems. The model therefore facilitates engagement with local government institutions, ensuring that women's adaptation priorities are reflected in local planning processes and development programs. This alignment creates opportunities for accessing public resources, infrastructure investments, and policy support.

Importantly, these enabling systems are not treated as external additions to the adaptation process. Instead, they are integrated into the overall logic of the model, forming a bridge between locally identified livelihood pathways and the broader systems required to sustain them. This approach ensures that adaptation is not limited to short-term interventions but is embedded within a supportive and functioning system.

By identifying and addressing these enabling conditions, the Women's Adaptation Model strengthens the foundation upon which livelihood strategies are built. It ensures that selected options are not only feasible in theory but are supported by the systems necessary for long-term sustainability.

5.6 Why This Model Works and Scales

The Women's Adaptation Model offers a structured yet flexible approach to strengthening climate-resilient livelihoods in Sundarbans-dependent communities. Its effectiveness lies not in any single component, but in the way it brings together local knowledge, scientific evidence, and system-level thinking into a coherent and actionable framework. This integrated approach enables the model to respond to complex livelihood challenges while remaining grounded in local realities.

A defining strength of the model is its emphasis on locally led decision-making. By placing women at the center of the adaptation process, the model ensures that livelihood strategies are rooted in lived experience and aligned with community priorities. Women are not treated as beneficiaries, but as decision-makers who analyze risks, identify opportunities, and shape adaptation pathways. This creates a strong sense of ownership, which is critical for sustained implementation and long-term impact.

At the same time, the model is reinforced by robust evidence. The integration of social assessment and scientific risk analysis ensures that decisions are informed by both local realities and future climate scenarios. This combination reduces the risk of maladaptation and strengthens the credibility of the model for policy and investment. It demonstrates that locally led approaches can be both participatory and technically sound.

Another key factor that contributes to the model's effectiveness is its system-based perspective. Rather than focusing on isolated livelihood activities, the model addresses the broader set of conditions that influence livelihood outcomes. By incorporating the Five Capitals Framework and identifying enabling systems such as markets, infrastructure, finance, and institutional support, the model ensures that livelihood strategies are sustainable and resilient over time. This shifts the focus from short-term support to long-term system strengthening.

The model also supports diversification and flexibility, which are essential in climate-vulnerable contexts. By encouraging a combination of livelihood pathways rather than reliance on a single activity, it reduces risk and enhances the ability of households to adapt to changing conditions. This approach reflects a practical understanding of resilience, where stability is achieved through diversity and adaptability.

Importantly, the model is designed to align with existing institutional frameworks. By linking community-level adaptation plans with local government systems, development programs, and service providers, it creates pathways for resource mobilization and policy integration. This alignment increases the likelihood that locally developed plans will be supported, funded, and sustained beyond project cycles.

The scalability of the model lies in its structured yet adaptable design. The process comprising context analysis, system assessment, livelihood identification, and system alignment can be applied across different geographical and socio-economic contexts, while allowing flexibility to reflect local conditions. This makes the model suitable for replication in other climate-vulnerable regions, particularly those with similar ecological characteristics and livelihood dependencies.

Furthermore, the model contributes to broader development and climate goals. By strengthening livelihood resilience, reducing vulnerability, and decreasing pressure on natural resources such as the Sundarbans, it supports both socio-economic development and environmental sustainability. This dual contribution enhances its relevance for national planning and international climate adaptation agendas.

6 FROM MODEL TO PRACTICE

While the preceding sections have articulated the need for a shift in adaptation thinking and introduced a women-led, locally grounded model for climate-resilient livelihoods, the central question remains: how can this model be translated into practice within complex, climate-vulnerable contexts such as the Sundarbans? Moving from conceptual framing to implementation is neither linear nor automatic. It requires a structured yet flexible process that can respond to dynamic environmental conditions, diverse livelihood systems, and deeply rooted social norms that shape women's roles and agency.

In coastal regions like the Sundarbans, livelihoods are not only exposed to recurrent climatic shockssuch as cyclones, salinity intrusion, and floodingbut are also embedded within fragile market systems and institutional limitations. At the same time, women's participation in livelihood decision-making is often constrained by socio-cultural expectations, limited mobility, and restricted access to resources and services. Therefore, operationalizing a women-led adaptation model demands more than technical solutions; it requires deliberate processes that enable women to engage, negotiate, and lead within both community and institutional systems.

This section outlines a phased implementation pathway that translates the adaptation model into actionable steps. It demonstrates how climate risk analysis, community engagement, livelihood identification, planning, and system linkage are sequenced and integrated to support women in developing and sustaining climate-resilient livelihood strategies. Rather than presenting a fixed set of activities, the approach emphasizes an adaptive and iterative process, one that is rooted in local realities, informed by evidence, and responsive to feedback and learning. It highlights not only what needs to be done, but also how and through whom, ensuring that adaptation is both locally owned and systemically supported.

6.1 Translating the Model into Action: Implementation Pathway

Transforming a women-led adaptation model into practice requires more than the application of predefined activities; it demands a structured pathway that can guide implementation while remaining responsive to local realities. In the context of the Sundarbans, where climatic uncertainty intersects with socio-economic vulnerability, adaptation cannot be delivered through isolated interventions. Instead, it must unfold through a sequence of interconnected processes that gradually build understanding, agency, and system linkages.

The implementation pathway developed under this approach is designed as a phased and iterative process, where each stage builds upon the outcomes of the previous one. Rather than imposing solutions, the process begins with grounding adaptation efforts in climate risk analysis and local context, ensuring that all subsequent decisions are rooted in evidence. This is followed by the deliberate organization of women into collective platforms, such as Women's Adaptation Labs (WAL) where they can engage in dialogue, reflect on risks, and begin to reposition themselves as active decision-makers.

From this foundation, the pathway progresses toward livelihood identification and feasibility assessment, where women evaluate potential options through multiple lenses, including climate suitability, resource availability, and market demand. This step ensures that livelihood choices are not only context-specific but also viable under changing environmental conditions. The selected options are then translated into structured plans, incorporating elements of cost, risk, and adaptive measures, enabling women to move from ideas to actionable strategies.

However, the pathway does not end at planning. Recognizing that adaptation is inherently a learning process, the model integrates piloting and iterative learning, allowing women to test livelihood options, reflect on outcomes, and refine their approaches. This experiential phase is critical in strengthening both technical capacity and confidence, particularly in contexts where women have had limited exposure to market-oriented or climate-adaptive livelihood practices.

Figure 12: A horizontal phased flow diagram for women adaptation plan

Equally important is the establishment of enabling systems and institutional linkages, which connect women's initiatives to markets, service providers, financial mechanisms, and local governance structures. Through platforms such as Local Project Advisory Committees (LPAC) and multi-stakeholder engagement, the pathway ensures that women's adaptation efforts are not isolated at the household level but are embedded within broader systems that can sustain and scale them.

Importantly, this implementation pathway is not rigid. It is designed to be adaptive and recursive, allowing movement back and forth between stages as new information emerges or conditions change. In doing so, it reflects the realities of climate-affected environments, where uncertainty is constant and flexibility is essential.

6.2 Grounding in Climate Risk and Local Systems

Effective adaptation begins with a clear understanding of the environment in which it is situated. In the climate-vulnerable landscapes of the Sundarbans, livelihoods are shaped by a complex interplay of environmental stressors, socio-economic conditions, and institutional dynamics. Therefore, the first phase of implementation focuses on grounding the adaptation process in robust climate risk analysis and a deep understanding of local systems, ensuring that all subsequent actions are context-specific and evidence-driven.

This phase integrates scientific climate assessments with community-level insights. Technical analyses, such as salinity intrusion patterns, flood depth probabilities, and cyclone exposure, provide a forward-looking understanding of risk. However, these findings are not treated as standalone data. Instead, they are translated into locally understandable formats and validated through community engagement processes, allowing women and other stakeholders to contextualize risks based on their lived experiences. This dual approach ensures that adaptation planning is both scientifically informed and socially grounded.

At the same time, the process involves mapping the local socio-economic and institutional landscape. Livelihood patterns, resource dependencies, seasonal variations, and market access are analyzed to understand how households currently sustain themselves and where vulnerabilities lie. Particular attention is given to identifying the constraints faced by women, including limited mobility, restricted access to productive assets, and exclusion from decision-making spaces. This helps to reveal not only what risks exist, but also who is most affected and why.

Equally critical is the identification of existing systems and actors that influence livelihood outcomes. This includes local government institutions such as Union Parishads, line departments (agriculture, livestock, fisheries), market actors, service providers, and informal community networks. Mapping these actors allows the project to understand where support already exists, where gaps remain, and how women's adaptation efforts can be linked to broader systems from the outset.

By combining climate science, community knowledge, and institutional mapping, this phase establishes a strong analytical foundation for the entire adaptation pathway. It ensures that livelihood decisions are not based on assumptions or generic solutions, but are rooted in the specific risks, capacities, and

Figure 13: From understanding risks to making decisions, transform women into active agents of livelihood adaptation."

6.3 Organizing Women as Decision-Makers

Building on the analytical foundation established in the previous phase, the adaptation process moves toward its most critical transformation: positioning women as active decision-makers within the livelihood system. In the context of the Sundarbans, women play a central role in sustaining household livelihoods, yet their participation in decision-making processes remains limited due to socio-cultural norms, restricted mobility, and unequal access to resources and information. Addressing these structural barriers requires more than inclusion, it requires intentional organization, collective engagement, and confidence building.

To facilitate this shift, the approach establishes structured platforms where women can come together, reflect, and act collectively. Central to this process is the formation of Women's Groups and Women's Adaptation Labs (WALs) safe, inclusive spaces that enable women to discuss climate risks, share experiences, and explore livelihood options without external pressure or dominance. These platforms are not designed as passive discussion forums; rather, they function as decision-making environments, where women gradually build the capacity to analyze, question, and influence livelihood choices.

Within these spaces, women engage in facilitated discussions that connect climate risks to their daily realities, how salinity affects crop production, how cyclones disrupt income sources, or how seasonal changes influence labor opportunities. Through this process, abstract risks are translated into practical concerns and opportunities, allowing women to better understand the implications of climate variability on their livelihoods. This shared understanding becomes the basis for collective thinking and informed decision-making.

A key strength of this phase lies in its emphasis on peer learning and collective reflection. Women learn not only from facilitators but also from each other sharing local knowledge, discussing coping strategies, and identifying emerging opportunities. Over time, this process contributes to increased confidence, stronger voice, and greater willingness to participate in decisions that were previously dominated by male household members or external actors.

Importantly, this phase also begins to reshape women's relationships with the broader system. As women organize and articulate their perspectives collectively, they become more visible to local institutions, service providers, and market actors. This visibility is critical in enabling future engagement and negotiation, particularly when accessing resources, services, or market opportunities.

Rather than treating women as beneficiaries of adaptation interventions, this phase redefines them as planners, negotiators, and agents of change. It lays the social and institutional foundation upon which all subsequent phases livelihood identification, planning, and implementation are built. Without this transformation, adaptation efforts risk reinforcing existing inequalities rather than addressing them.

6.4 Livelihood Identification and Feasibility

With women organized as active decision-makers and a shared understanding of climate risks established, the adaptation process progresses toward identifying livelihood options that are both contextually relevant and future-resilient. This phase serves as a critical bridge between analysis and action, ensuring that livelihood choices are not based on assumptions, trends, or external prescriptions, but are grounded in a systematic assessment of viability within the local context.

Figure 14: From inputs to returns: a structured approach to building climate-resilient livelihood plans

In the Sundarbans, where environmental uncertainty and resource constraints shape everyday life, not all livelihood options are equally suitable. Therefore, this phase adopts a multi-dimensional screening approach, through which potential livelihood options are evaluated using three interconnected lenses: climate suitability, resource feasibility, and market viability.

The first lens, climate suitability examines how different livelihood options perform under current and projected climate conditions. This includes assessing exposure to salinity, flooding, and cyclone risks, as well as the capacity of specific livelihood activities to withstand or adapt to these stressors. For example, certain agricultural practices may be highly vulnerable to salinity intrusion, while small livestock or non-farm enterprises may offer more resilient alternatives. By aligning livelihood choices with climate realities, the process reduces the risk of future loss and enhances long-term sustainability.

The second lens, resource feasibility draws on the Five Capitals framework to assess whether households, particularly women, have the necessary assets to initiate and sustain a given livelihood. This includes evaluating access to natural resources, financial capacity, skills and knowledge, physical infrastructure, and social networks. Importantly, this analysis also highlights existing gaps and constraints, helping to identify where additional support or capacity building may be required.

The third lens, market viability, focuses on the demand, accessibility, and profitability of potential livelihood options. Even climate-resilient activities may fail if they are not supported by stable market demand or accessible value chains. Therefore, women assess factors such as local demand patterns, price fluctuations, input availability, and competition. This ensures that selected livelihood options are not only technically feasible but also economically viable.

Through facilitated discussions within Women's Adaptation Labs (WAL), these lenses are applied collectively, enabling women to compare, debate, and prioritize livelihood options. This participatory process results in the shortlisting of viable livelihood opportunities, tailored to the specific context of each community and the capacities of participating women.

Rather than producing a fixed list of "recommended" livelihoods, this phase generates a context-sensitive portfolio of options, recognizing that different households may pursue different strategies based on their resources, risk tolerance, and aspirations. This flexibility is essential in diverse and dynamic environments such as the Sundarbans. It transforms livelihood identification from a trial-and-error process into a deliberate and evidence-based step, laying a strong foundation for planning and implementation in the subsequent phases.

6.6 Piloting, Learning, and Adaptive Refinement

With structured livelihood and adaptation plans in place, the process advances to implementation through small-scale piloting, enabling women to test, refine, and validate their plans in real-world conditions. This phase is critical in translating planning into practice while generating practical insights that strengthen both individual livelihoods and the overall adaptation model.

Rather than immediately scaling up, the approach intentionally adopts a pilot-first strategy, allowing selected livelihood options to be implemented on a limited scale across the target communities. This ensures that risks are minimized, learning is maximized, and necessary adjustments can be made before wider replication. In the context of the Sundarbans, where environmental uncertainty and market variability are highthis cautious and iterative approach is essential.

A diverse range of livelihood pilots were initiated, reflecting the context-specific portfolio developed in earlier phases. These included activities such as duck and native chicken rearing, vermicomposting,

candle production, small retail businesses, food stalls, and agriculture-based enterprises. The selection of these pilots was guided by their relatively low investment requirements, adaptability to local environmental conditions, and alignment with market demand.

The piloting phase generated tangible economic outcomes, demonstrating the viability of the approach. For instance, poultry-based initiatives in Uttar Bedkashi reported average profits of approximately BDT 8,000, while candle production activities in Moheshwaripur achieved average profits of around BDT 12,000 within initial cycles. These results not only provided immediate financial benefits but also built confidence among participating women and their communities.

Beyond economic gains, this phase emphasized continuous learning and adaptive refinement. Women engaged in regular reflection sessions within Women's Adaptation Labs (WAL), where they discussed challenges, shared experiences, and identified solutions. Common challenges included limited prior experience in business management, difficulties in maintaining livestock health (e.g., vaccination schedules), and gaps in financial literacy such as cost tracking and profit calculation.

To address these challenges, the process incorporated targeted support mechanisms, including hands-on training, mentoring, and peer learning. Exposure visits played a particularly important role, allowing small groups of women to observe successful livelihood practices in similar contexts. These visits facilitated experiential learning, encouraged innovation, and helped participants adapt proven techniques to their own settings.

A key outcome of this phase is the development of a learning-driven implementation model, where feedback from pilots directly informs improvements in planning, training, and support systems. This iterative process ensures that the model remains flexible, context-responsive, and grounded in real-world experience.

Importantly, the piloting phase also strengthens women's roles as active economic agents and innovators. By managing their own livelihood activities, making decisions, and navigating challenges, women move beyond planning into leadership and ownership. This transformation is central to the long-term sustainability of the approach.

6.7 Institutional Linkages and Scaling Pathways

While the earlier phases focus on building women's capacity, identifying viable livelihoods, and validating them through piloting, the long-term success of the model depends on its ability to connect with and influence existing institutional systems. Without such linkages, even successful pilot initiatives risk remaining isolated and un-sustained beyond the project lifecycle. This phase therefore focuses on embedding the approach within local governance, service delivery mechanisms, and market systems to enable scaling, replication, and sustainability.

In the context of the Sundarbans, multiple public institutions, including the Departments of Agriculture, Fisheries, Livestock, Youth Development, Women & Children Affairs, and Social Services play critical roles in supporting livelihoods, providing training, and facilitating access to resources. However, these services often remain fragmented, supply-driven, and not fully accessible to women, particularly those from vulnerable households. This phase addresses that gap by creating structured pathways for engagement between women's groups and these institutions.

A key mechanism for this engagement is the formation and activation of Multi-Stakeholder Platforms (MSPs) and Local Project Advisory Committees (LPACs) at village and union levels. These platforms bring together representatives from government departments, local government institutions (Union Parishads), market actors, civil society, and women's groups. By facilitating regular dialogue, these platforms create opportunities for women to present their needs, share their adaptation plans, and engage directly with decision-makers and service providers.

Through these interactions, women transition from being passive recipients of services to active participants in local development processes. They gain visibility, build relationships with institutional actors, and develop the confidence to negotiate for resources, training, and market access. At the same time, institutions gain a clearer understanding of community needs and context-specific adaptation priorities, enabling them to align their services more effectively.

This phase also promotes the integration of locally developed adaptation plans into formal planning and budgeting processes. By linking women's livelihood plans with Union Parishad development plans and relevant departmental programs, the approach ensures that adaptation priorities are recognized and supported within existing systems. This alignment is essential for mobilizing resources and sustaining interventions beyond project funding.

Market linkages are another critical component of this phase. Women are supported in connecting with local traders, input suppliers, and value chain actors, enabling them to access markets, secure fair prices, and expand their economic activities. These linkages strengthen the economic viability of livelihood options and open pathways for growth.

Importantly, this phase positions the model as a scalable framework for locally led adaptation (LLA). By demonstrating how community-driven planning can be systematically linked with institutional structures, the approach provides a replicable pathway for other climate-vulnerable regions. It shifts adaptation from isolated project interventions to a coordinated, system-integrated process.

Ultimately, this phase ensures that the transformation initiated at the community level, particularly women's increased agency, voice, and economic participation is reinforced and sustained through in stitutional support. It creates the enabling environment necessary for long-term resilience, where local knowledge, community priorities, and formal systems work together to

7 VILLAGE ADAPTATION PLANS

The preceding section outlined a structured, participatory model for locally led adaptation, demonstrating how women-centered processes can move from analysis to action. Building on that foundation, this section translates the model into practice through the development of Village Adaptation Plans across three climate-vulnerable communities in the Sundarbans region. These plans represent the operationalization of the approach at the local level, where climate risks, livelihood systems, and social dynamics intersect most directly.

Village-level planning is central to ensuring that adaptation strategies are context-specific, inclusive, and actionable. While broader frameworks provide guidance, it is at the village scale that climate impacts are experienced, livelihood decisions are made, and adaptation measures are implemented. Recognizing this, the project adopted a deeply participatory approach, engaging women and community stakeholders in generating evidence, analyzing risks, and co-creating solutions tailored to their realities.

The development of these plans was guided by the phased approach described in Section 6, combining scientific climate risk assessment, socio-economic analysis, and participatory planning through Women's Adaptation Labs (WAL). Across the three villagesMoheshwaripur, Kalabogi, and Uttar Bedkashiwomen played a central role in identifying livelihood challenges, assessing feasible options, and developing structured adaptation and business plans. This process ensured that the resulting plans are not externally imposed, but rather locally grounded and collectively owned.

Each village plan captures a comprehensive understanding of local conditions, including climate hazards such as salinity intrusion, cyclones, and flooding; existing livelihood systems; gender dynamics; and access to resources and markets. These insights are then linked to the identification and prioritization of climate-resilient livelihood options, followed by the development of practical adaptation plans and their validation through piloting.

Importantly, the Village Adaptation Plans are not static documents. They are designed as dynamic tools for decision-making and action, capable of evolving based on new information, changing conditions, and ongoing learning. They also serve as a bridge between community priorities and institutional systems, creating opportunities for alignment with local government planning, service delivery, and resource allocation processes.

7.1Village Context and Socio-Economic Profile 7.1.1: Profile of Moheshwaripur

Moheshwaripur village, located in Moheshwaripur Union under Koyra Upazila of Khulna district, represents a typical climate-vulnerable coastal settlement within the Sundarbans ecosystem. The village is characterized by its proximity to tidal rivers, low-lying topography, and frequent exposure to climatic shocks, making it highly susceptible to environmental stressors such as salinity intrusion, waterlogging, and cyclonic events.

The socio-economic structure of the village is largely shaped by its dependence on climate-sensitive livelihood systems. The majority of households rely on a combination of agriculture, aquaculture, small-scale trading, and wage labor. However, these livelihood activities are increasingly under pressure due to changing climatic conditions. Salinity intrusion has reduced agricultural productivity, while erratic weather patterns and extreme events have disrupted traditional income sources, leading to growing livelihood uncertainty.

Women in Moheshwaripur play a significant yet often under-recognized role in sustaining household livelihoods. They are actively involved in

Figure 15: Village boundary of Moheshwaripur

activities such as homestead gardening, livestock and poultry rearing, post-harvest processing, and small informal businesses. Despite their contributions, women's participation in decision-making remains limited due to socio-cultural norms, restricted mobility, and limited access to productive resources and market systems. Their economic activities are often confined to the household level, with minimal opportunities for expansion or formal engagement in markets.

The village also faces structural challenges related to access to services, infrastructure, and institutional support. Limited access to freshwater, inadequate market connectivity, and insufficient extension services from relevant government departments further constrain livelihood opportunities. In addition, access to financial resources remains limited, particularly for women, restricting their ability to invest in or diversify livelihood activities.

At the same time, Moheshwaripur demonstrates strong elements of community resilience and social cohesion. Informal support systems, shared coping strategies, and collective responses to climatic shocks play an important role in managing risks. These social dynamics provide a critical foundation for participatory processes such as the Women's Adaptation Labs (WAL), where women can organize, share experiences, and engage in collective decision-making.

Within this context, the development of the Village Adaptation Plan for Moheshwaripur aims to address both environmental vulnerabilities and socio-economic constraints, with a particular focus on strengthening women's agency in livelihood decision-making. By grounding the adaptation process in the lived realities of the community, the plan seeks to identify pathways that are not only technically feasible but also socially inclusive and locally owned.

7.1.2: Profile of Boro-Bari

Boro Bari village, located in Uttar Bedkashi Union under Koyra Upazila of Khulna district, represents a highly climate-vulnerable coastal settlement within the Sundarbans-adjacent zone. The village is characterized by its exposure to recurring cyclones, tidal flooding, waterlogging, and increasing salinity intrusion, all of which significantly shape local livelihoods and socio-economic conditions.

The majority of households in Boro Bari are dependent on natural resource-based livelihoods, particularly small-scale agriculture, aquaculture, day labor, and forest-related activities. However, agricultural productivity has been severely affected by soil and water salinity, limiting crop diversification and reducing yield reliability. As a result, many households have shifted toward aquaculture practices such as shrimp and crab cultivation, although these are also subject to environmental uncertainties and market fluctuations.

Socio-economically, the community is composed largely of low- to middle-income households, with a significant proportion of vulnerable groups who experience seasonal income instability. Livelihoods are often irregular and highly dependent on climatic conditions, leading to periods of underemployment and financial stress, particularly following extreme weather events. Access to formal financial services remains limited, and many households rely on informal borrowing or local networks to manage economic shocks.

Gender dynamics in Boro Bari reflect broader coastal norms, where women play a crucial but often undervalued role in household and livelihood activities. While women are actively engaged in homestead-based production, livestock rearing, small trading, and post-harvest processing, their participation in formal markets and decision-making spaces is constrained by socio-cultural norms, mobility limitations, and restricted access to

Table 3: Village Snapshot for Moheshwaripur

Dimension	Key Insights
Location & Landscape	Moheshwaripur, Koyra Upazila, Khulna; located along the Koyra River and adjacent to the Sundarbans; low-lying, embanked (polder) settlement
Climate Risks	High exposure to cyclones and tidal surges; salinity intrusion affecting land and water; riverbank erosion; seasonal waterlogging and drainage congestion
Natural & Physical System	Agricultural land within embankments; shrimp ghers and aquaculture areas; proximity to mangrove forest; infrastructure concentrated along embankments (roads, markets, water points)
Dominant Livelihoods	Agriculture (declining due to salinity); aquaculture (shrimp/fish); wage labor; small rural enterprises; forest-dependent activities
Women's Livelihood Roles	Homestead gardening, poultry and livestock rearing; post-harvest processing; informal small businesses; increasing engagement in natural resource-based livelihoods
Key Constraints	High climate exposure; limited freshwater access; weak market and service connectivity; restricted access to finance; socio-cultural barriers limiting women's mobility and decision-making
Local Strengths & Opportunities	Strong community cohesion; local knowledge of coping strategies; existing women's groups and collective action platforms; potential for participatory adaptation planning

resources. Despite these barriers, women demonstrate strong interest in income-generating activities, particularly those that can be managed within or near the household.

Infrastructure and service access in the village remain limited. Market access is moderate, with local bazaars serving as primary points for buying and selling goods, although connectivity can be disrupted during adverse weather conditions. Access to extension services from government departments such as agriculture, fisheries, and livestock exists but is not consistently utilized, particularly by women, due to awareness gaps and social barriers.

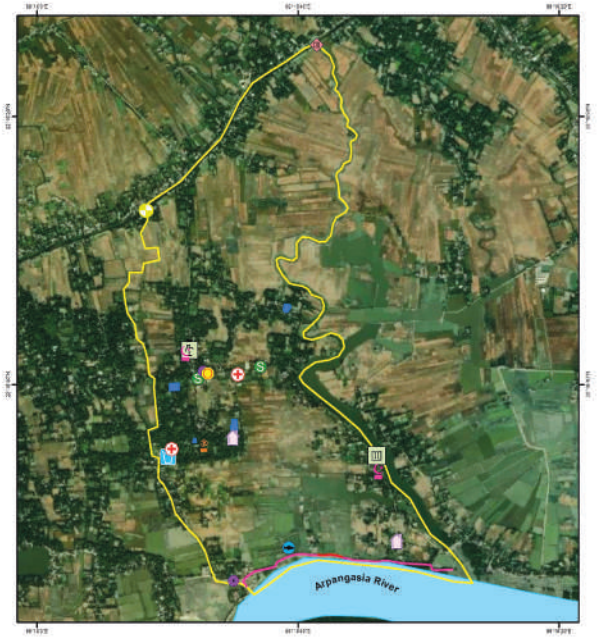

Figure 16: Village boundary of Boro-Bari

Overall, Boro Bari presents a context where livelihoods are highly climate-sensitive, resource-constrained, and gender-unequal, yet there is strong potential for adaptation through diversified, small-scale, and climate-resilient livelihood options. The presence of active community groups and women's engagement platforms provides an important foundation for introducing locally led adaptation strategies that enhance resilience, strengthen income stability, and promote women's economic participation.

7.1.2: Profile of Kalabogi

Kalabogi village, located in Sutarkhali Union under Dacope Upazila of Khulna district, is a remote and climate-exposed coastal settlement situated in close proximity to the Sundarbans. The village is highly vulnerable to recurrent cyclones, tidal surges,

Table 4: Village Snapshot for Boro-Bari

Dimension	Key Insights
Location & Landscape	Boro Bari village, located within the Sundarbans-dependent coastal belt; characterized by low-lying terrain, tidal influence, and proximity to forest and river systems
Climate Risks	High exposure to cyclones and storm surges; salinity intrusion affecting soil and drinking water; tidal flooding; increasing climate variability impacting seasonal livelihoods
Natural & Physical System	Mixed landscape of agricultural land, water bodies, and forest-adjacent zones; dependence on common natural resources; limited protective infrastructure and drainage systems
Dominant Livelihoods	Agriculture (increasingly constrained); aquaculture and fishing; forest resource collection (fuelwood, crab, honey); wage labor and small informal businesses
Women's Livelihood Roles	Active in homestead-based production (vegetables, poultry, livestock); involved in processing and small trade; participation in forest-dependent activities due to livelihood stress; growing but constrained role in income generation
Key Constraints	High dependency on fragile natural resources; limited access to alternative livelihoods; poor market linkage and service access; lack of climate-resilient infrastructure; strong gender barriers restricting access to assets and decision-making
Local Strengths & Opportunities	Strong reliance on collective coping practices; indigenous knowledge of forest and water systems; emerging women's groups; potential to diversify livelihoods through climate-resilient options

prolonged waterlogging, and increasing salinity intrusion, which collectively shape the socio-economic conditions and livelihood systems of the community.

The local economy in Kalabogi is predominantly dependent on natural resource-based livelihoods, including small-scale agriculture, aquaculture, fishing, and forest-dependent activities. However, agricultural production has become increasingly unreliable due to high salinity levels in soil and water, limiting crop diversity and reducing productivity. As a result, many households have transitioned toward aquaculture practices such as shrimp, fish, and crab cultivation, as well as seasonal fishing, although these activities remain highly sensitive to environmental changes and market dynamics.

Households in Kalabogi are largely characterized by low and irregular income levels, with a significant portion of the population engaged in day labor and informal economic activities. Seasonal unemployment and income fluctuations are common, particularly following extreme climatic events that disrupt livelihood activities and damage productive assets. Limited access to formal credit and financial services further constrains households' ability to invest in resilient livelihood options, often forcing them to depend on informal lending mechanisms.

Gender dynamics in Kalabogi reflect deeply rooted socio-cultural norms that restrict women's mobility, decision-making power, and access to resources. Despite these constraints, women actively contribute to household livelihoods through homestead-based activities such as poultry and livestock rearing, small-scale processing, and petty trading. However, their participation in market-oriented and higher-income activities remains limited. At the same time, there is a growing interest among women to engage in income-generating activities, particularly those that can be managed within safe and accessible environments.

Infrastructure and service access in Kalabogi are relatively constrained due to its geographic isolation. Market access is limited and often disrupted during adverse weather conditions, affecting both input

Table 5: Village Snapshot for Kalabogi

Dimension	Key Insights
Location & Landscape	Boro Bari village, located within the Sundarbans-dependent coastal belt; characterized by low-lying terrain, tidal influence, and proximity to forest and river systems
Climate Risks	High exposure to cyclones and storm surges; salinity intrusion affecting soil and drinking water; tidal flooding; increasing climate variability impacting seasonal livelihoods
Natural & Physical System	Mixed landscape of agricultural land, water bodies, and forest-adjacent zones; dependence on common natural resources; limited protective infrastructure and drainage systems
Dominant Livelihoods	Agriculture (increasingly constrained); aquaculture and fishing; forest resource collection (fuelwood, crab, honey); wage labor and small informal businesses
Women's Livelihood Roles	Active in homestead-based production (vegetables, poultry, livestock); involved in processing and small trade; participation in forest-dependent activities due to livelihood stress; growing but constrained role in income generation
Key Constraints	High dependency on fragile natural resources; limited access to alternative livelihoods; poor market linkage and service access; lack of climate-resilient infrastructure; strong gender barriers restricting access to assets and decision-making
Local Strengths & Opportunities	Strong reliance on collective coping practices; indigenous knowledge of forest and water systems; emerging women's groups; potential to diversify livelihoods through climate-resilient options

supply and product sales. Access to government extension services, including agriculture, fisheries, and livestock support, exists but remains underutilized, particularly by women, due to limited awareness, accessibility challenges, and social barriers.

Overall, Kalabogi presents a highly climate-stressed and resource-constrained environment where livelihoods are fragile and heavily dependent on natural systems. However, the community demonstrates adaptive potential through its gradual shift toward diversified livelihood strategies and the active participation of women in local development platforms. This creates an enabling environment for promoting locally led adaptation approaches that focus on climate-resilient, low-investment, and women-friendly livelihood options to enhance

7.2 Climate Risk and Environmental Analysis

The project villagesMoheshwaripur (Moheshwaripur Union, Koyra), Boro Bari (Uttar Bedkashi Union, Koyra), and Kalabogi (Sutarkhali Union, Dacope)are located within the Sundarbans-adjacent coastal belt of southwest Bangladesh, one of the most climate-exposed ecological zones in the country. The environmental conditions across these villages are shaped by the dynamic interaction of tidal systems, upstream hydrological changes, and coastal climatic hazards, resulting in a highly complex and evolving risk landscape. Climate risk analysis, supported by scientific assessment (EQMS) and validated through community insights, indicates that all three villages are subject to both current and projected climate risks that are already significantly affecting local ecosystems and livelihood systems.

From an exposure perspective, the villages are uniformly subjected to multiple, interrelated climate hazards due to their geographic location within a low-lying tidal floodplain and proximity to the Bay of Bengal. The key hazards include:

- Salinity intrusion, driven by reduced upstream

freshwater flow, tidal ingress, and storm surges, affecting both soil and water systems

- Cyclones and storm surges, causing periodic shocks to infrastructure, settlements, and productive assets

- Waterlogging and drainage congestion, resulting from inadequate drainage combined with tidal flooding

- Riverbank erosion, particularly in river-adjacent areas, contributing to land loss and displacement

While these hazards are common across all villages, their intensity and manifestation vary slightly. Moheshwaripur experiences higher exposure to riverbank erosion due to its proximity to the Koyra River, Boro Bari faces prolonged waterlogging and aquaculture-related environmental stress, and Kalabogi's relative remoteness and closer dependence on Sundarbans resources increases its ecological vulnerability.

In terms of sensitivity, the livelihood systems and environmental conditions in these villages are highly susceptible to climate stress. Agriculture, which traditionally formed the backbone of rural livelihoods, is increasingly affected by soil salinity, irregular rainfall, and prolonged inundation, resulting in declining productivity and reduced crop diversity. Freshwater scarcity further exacerbates this sensitivity, limiting livestock rearing, homestead gardening, and domestic water use. Aquaculture-based livelihoods, while expanding, remain sensitive to water quality changes and disease outbreaks. Additionally, the degradation of soil fertility and ecosystem healthparticularly due to repeated saline inundation, has reduced the long-term viability of conventional production systems.

Social and gender dimensions further heighten sensitivity. Women, who are actively engaged in homestead production, livestock care, and small-scale income activities, face disproportionate impacts due to increased workload, limited mobility, and restricted access to resources and services. Climate-induced stresses such as water scarcity and food insecurity directly translate into additional burdens for women, reinforcing existing inequalities.

From an adaptive capacity perspective, the communities demonstrate both constraints and emerging strengths. On one hand, adaptive capacity is limited by factors such as low and irregular household incomes, limited access to formal financial services, inadequate infrastructure, and underutilization of government extension services. Market access remains inconsistent, particularly in more remote areas like Kalabogi, and technical knowledge on climate-resilient practices is still evolving. On the other hand, there are important enabling factors, including strong community networks, the presence of women's groups through the Women's Adaptation Lab (WAL), and growing awareness of the need for livelihood diversification. Households are already experimenting with alternative livelihood strategies, such as crab farming, small livestock rearing, and micro-enterprises, indicating an inherent willingness to adapt.

Scientific projections, combined with local observations, indicate several reinforcing environmental trends across the project areas:

- Gradual increase in salinity levels in both surface and groundwater

- Increased frequency and intensity of cyclonic events

- Greater variability in rainfall patterns, disrupting seasonal cycles

- Declining soil fertility and agricultural productivity

- Increasing pressure on Sundarbans ecosystems due to livelihood dependence

These trends interact and compound, creating a cycle of environmental degradation and livelihood vulnerability that is likely to intensify over time.

The implications of these climate risks are profound and multi-dimensional. Livelihood systems are becoming increasingly uncertain, with agriculture transitioning from a primary to a secondary or supplementary income source. Dependence on natural resources, including fisheries and forest products, is increasing, often under conditions of heightened ecological stress. Households are increasingly adopting short-term coping strategies

that offer limited returns and higher risks, reflecting a gradual erosion of resilience. Women, in particular, face increased exposure to climate risks while having limited control over adaptation resources and decision-making processes.

The overall risk outlook suggests a worsening trajectory if adaptive interventions are not implemented. Current risks, especially salinity intrusion and waterloggingare already at critical levels. In the near future (5–10 years), further decline in agricultural viability and increased stress on freshwater resources are expected. Over the longer term (15–30 years), significant transformation of livelihood systems is likely, with traditional practices becoming increasingly unsustainable.

This analysis underscores the urgent need for forward-looking, climate-informed, and locally led adaptation strategies that address not only environmental risks but also livelihood and social vulnerabilities. Strengthening adaptive capacity through diversified, climate-resilient, and women-inclusive livelihood options is essential to enhance long-term resilience across the project villages.

7.3 Livelihood Systems and Gender Roles

Livelihood systems across the project villagesMoheshwaripur, Boro Bari, and Kalabogiare shaped by a dynamic interaction between natural resources, seasonal variability, and socio-economic conditions. Households do not rely on a single source of income; rather, they depend on a diversified portfolio of activities, shifting between agriculture, aquaculture, wage labor, small businesses, and natural resource collection throughout the year to manage uncertainty and sustain their livelihoods.

However, this diversification is increasingly driven by necessity rather than opportunity. Climate-induced stressesparticularly salinity intrusion, waterlogging, cyclone impacts, and erratic rainfall patternsare reducing the reliability of traditional livelihood systems. Agriculture, once the backbone of the rural economy, is steadily losing its viability due to declining soil fertility, freshwater scarcity, and irregular production cycles. As a result, households are transitioning toward alternative livelihood options such as aquaculture, small businesses, and wage labor. While these options provide opportunities for income generation, they are often more labor-intensive, require higher investment, and remain exposed to environmental and market risks.

Across all three villages, the structure of livelihood systems shows both common patterns and slight variations. Moheshwaripur demonstrates a transition toward mixed aquaculture and small business activities, Boro Bari shows a stronger dependence on aquaculture and Sundarbans-based resource extraction, while Kalabogi reflects a more transitional system where agriculture still exists but is gradually declining in importance. Despite these differences, all villages exhibit increasing livelihood fragility and growing dependence on climate-sensitive and risk-prone income sources.

Within this system, women play a central and indispensable role. Their contributions span across homestead-based production, livestock and poultry rearing, aquaculture support activities, post-harvest processing, and small-scale informal businesses. In addition, women carry primary responsibility for household management, including water collection, food preparation, and ensuring household food security—tasks that are becoming increasingly difficult under changing environmental conditions. Despite this extensive involvement, women's economic contributions remain largely unrecognized and undervalued, and their participation in decision-making processes continues to be limited due to socio-cultural norms, mobility constraints, and restricted access to resources and services.

The table below provides an integrated overview of major livelihood activities across the project villages, highlighting household engagement, women's roles, climate sensitivities, and key structural constraints.

Table 6: Livelihood Systems and Gender Roles Overview (Across Project Villages)

Livelihood Activity	Household Involvement	Women's Role	Key Climate Sensitivity	Key Constraints
Agriculture (Rice, crops, vegetables)	Traditionally primary, now declining	Homestead gardening, post-harvest processing	Highly sensitive to salinity, waterlogging, irregular rainfall	Reduced productivity, freshwater scarcity, soil degradation
Aquaculture (Shrimp, Fish, Crab)	Increasingly important income source	Feeding, maintenance, sorting, processing	Sensitive to salinity balance, water quality, disease, extreme weather	High investment, disease risk, market dependency
Livestock & Poultry	Supplementary livelihood	Primarily managed by women	Affected by water scarcity, disease, heat stress	Limited veterinary services, feed cost, input availability
Wage Labor	Common coping strategy	Limited participation due to mobility constraints	Seasonal and climate-dependent	Low wages, irregular work, gender barriers
Small Businesses (shops, tailoring, food, services)	Growing income source	Small-scale informal trade, home-based enterprises	Moderately affected by climate disruptions	Limited capital, restricted mobility, weak market linkages
Natural Resource Collection (River & Sundarbans)	Increasing fallback livelihood (especially in Boro Bari)	Active participation in crab/fish collection and processing	Highly exposed to cyclones, tides, ecological changes	Physical risk, income uncertainty, ecosystem degradation

The analysis indicates that while households are actively attempting to adapt through diversification, the overall livelihood system is becoming more fragile and risk prone. The shift away from agriculture has not necessarily resulted in stable alternatives; instead, households are increasingly engaging in livelihoods that are either environmentally sensitive, economically uncertain, or socially constrained.

A particularly concerning trend is the growing dependence on river and Sundarbans-based livelihoods. This is most pronounced in Boro Bari but is also emerging in Moheshwaripur and Kalabogi.

Activities such as crab collection, fishing, and resource extraction provide immediate income opportunities but expose individuals to significant physical risks, including extreme weather events and unsafe working conditions. At the same time, increased extraction is placing additional pressure on already fragile ecosystems, raising concerns about long-term sustainability.

Women are at the center of this transition. Their participation in livelihood activities is expanding, particularly in areas such as aquaculture support, small businesses, and resource collection. However,

this increased involvement is not accompanied by improved access to resources, markets, finance, or decision-making power. As a result, women are experiencing a disproportionate increase in workload and exposure to risk, without corresponding gains in economic empowerment or control over income.

These dynamics highlight that the challenges within the livelihood system are not solely driven by environmental change but are also shaped by structural constraints and gender inequalities. Limited access to enabling systems—such as financial services, market linkages, technical support, and institutional engagementrestricts the ability of households, particularly women, to transition toward more resilient and sustainable livelihood options.

Taken together, the evidence suggests that the livelihood system is not failing due to a lack of effort or initiative from communities. Rather, it is constrained by a combination of climate stress, ecosystem dependency, weak enabling environments, and unequal access to opportunities. This reinforces the need for a system-based, locally led adaptation approach that goes beyond promoting individual livelihood activities and instead focuses on strengthening the overall livelihood systemplacing women at the center of planning, decision-making, and implementation.

7.1.4 Identification and Screening of Livelihood Options

The identification and screening of livelihood options across the project villagesMoheshwaripur, Kalabogi, and Borobarifollowed a structured, participatory, and evidence-based approach that integrates community knowledge with scientific analysis. This process was designed to ensure that the selected livelihood options are not only locally relevant but also climate-resilient, feasible, and aligned with women's priorities and capacities.

The process was initiated through the Women's Adaptation Labs (WALs), where women actively engaged in identifying a broad range of existing, potential, and alternative livelihood options based on their lived experiences. These discussions enabled women to reflect on their daily practices, resource access, and socio-economic constraints, ensuring that they played a central role in shaping livelihood pathways. The identification process considered key factors such as existing livelihood practices, locally available natural resources, skills and knowledge within the community, market demand and accessibility, and women's preferences, mobility, and decision-making constraints. As a result, a diverse and context-specific set of livelihood options was generated across the three villages, covering agriculture, aquaculture, livestock, and small and micro-enterprises.

Following the identification phase, each livelihood option was systematically assessed against prevailing and projected climate risks using insights from the EQMS-supported climate analysis. Given the coastal setting of the study areas, particular emphasis was placed on understanding the impacts of salinity intrusion, flooding and waterlogging, cyclone exposure, and seasonal variability. Livelihood options were evaluated to determine their sensitivity and vulnerability to these climate stressors and were broadly categorized into climate-resilient, conditionally viable, and high-risk groups. Climate-resilient options demonstrated strong adaptability under both current and projected climate scenarios, while conditionally viable options required specific adaptation measures such as climate-smart practices, improved inputs, or technical support. High-risk options were identified as those highly sensitive to climate variability and less suitable for scaling in the long term. This step ensured that the selection process was forward-looking and aligned with evolving climate realities rather than relying solely on present-day feasibility.

The shortlisted livelihood options were further analyzed using the Five Capitals Framework to assess their feasibility across multiple dimensions. This included evaluating human capital in terms of skills and knowledge, natural capital such as access to land and water resources, financial capital related to investment capacity, social capital including networks and collective support systems, and physical capital such as infrastructure, tools, and market access. This multi-dimensional assessment helped identify which livelihood options are realistically adoptable within each village context, what types of support would be required to enable their success, and where key gaps exist. In general, small businesses and livestock-based options showed strong alignment with existing capacities and required relatively lower investment, while aquaculture and certain production-based activities required moderate technical inputs and environmental considerations.

Finally, a feasibility filtering process was conducted to

refine the list of livelihood options into a prioritized and actionable set suitable for implementation. This stage considered practical criteria such as initial investment requirements, market linkage and profitability, accessibility and control for women, risk levels, and scalability potential. Based on this filtering, livelihood options were categorized into priority, moderate, and low-feasibility groups for each village. High-priority options typically combined strong climate resilience, market demand, and accessibility for women, while moderate options required targeted support to become viable. Low-priority options were those constrained by high investment requirements, regulatory barriers, or climate-related risks.

While the overall methodology remained consistent across all locations, the final selection of livelihood options varied by village, reflecting differences in environmental conditions, resource availability, market access, and community preferences. The following sections present the village-specific screening and selection outcomes.

Table 7:Screening & Selection of Livelihood Options – Moheshwaripur

Livelihood	Climate Suitability	Market Demand	Capital Need	Skill Need	Risk Level	Decision	Remarks
Clothing & Tailoring	High	High	Medium	Medium	Low	Selected (Priority)	Strong for women, scalable
Multipurpose Shop	High	High	Medium	Low	Low	Selected	Diversified income
Grocery Store	High	High	Medium	Low	Low	Selected (Priority)	Stable daily income
Chicken Rearing	Medium	High	Medium	Medium	Medium	Selected (Pilot)	Disease management needed
Tea Stall	High	High	Low	Low	Low	Selected	Quick income generation
Fish Cultivation	Medium	High	Medium	Medium	Medium	Selected (Conditional)	Salinity adaptation required
Shoe Business	**High**	**Medium**	**Medium**	**Low**	Low	Not Priority	Market-dependent
Sheep Rearing	Medium	Low	Medium	Low	Medium	Not Priority	Low demand locally
Freshwater Shrimp Farming	Low–Medium	High	High	High	High	Limited Selection	Salinity-sensitive
Cattle Rearing	Medium	High	High	Medium	Medium	Limited	High investment
Pharmacy	High	High	High	High	High	Not Selected	Regulatory barrier
Crab Cultivation	High	High	Medium	Medium	Medium	Selected (Priority)	Strong coastal value chain
Honey Business	High	High	Medium	Medium	Medium	Selected	Sundarbans linkage
Organic Fertilizer Business	High	Medium	Medium	Low	Low	Selected	Seasonal demand
Duck Rearing	High	Medium	Low	Low	Low	Selected	Climate-resilient
Potato Business	Medium	Medium	Medium	Low	Medium	Selected	Storage dependency
Vegetable Cultivation	Medium	High	Low	Low	Medium	Selected (Improved)	Needs climate-smart methods
Auto-mill	High	High	High	Medium	Medium	Limited	High capital
Goat Rearing	High	High	Low	Low	Low	Selected (Top Priority)	Highly suitable

Table 8: Screening & Selection of Livelihood Options – Borobari

For Barobari, livelihood selection emphasizes resilience to environmental stressors alongside diversification into small enterprises and locally viable economic activities, ensuring both sustainability and income stability.

Livelihood	Climate Suitability	Market Demand	Capital Need	Skill Need	Risk Level	Decision	Remarks
Clothing & Tailoring	High	High	Medium	Medium	Low	Selected (Priority)	Strong for women
Multipurpose Shop	High	High	Medium	Low	Low	Selected	Diversified income
Grocery Store	High	High	Medium	Low	Low	Selected (Priority)	Daily income
Chicken & Duck Rearing	High	Medium	Low	Low	Low	Selected	Climate adaptive
Fish & Crab Cultivation	High	High	Medium	Medium	Medium	Selected (Priority)	Diversified
Goat Rearing	High	High	Low	Low	Low	Selected (Top Priority)	Very suitable
Cattle Rearing	Medium	High	High	Medium	Medium	Limited	High cost
Honey Business	High	High	Medium	Medium	Medium	Selected	Sundarbans linkage
Fishing Net Production	High	High	Low	Medium	Low	Selected	Value chain
Vegetable Cultivation	Medium	High	Low	Low	Medium	Selected (Improved)	Needs climate-smart methods
Homestead Gardening	High	Medium	Low	Low	Low	Selected	Nutrition + resilience
Handicraft	High	Medium	Low	Medium	Low	Selected	Needs market linkage
Variety Store	High	High	Medium	Low	Low	Selected	Good demand
Threshing Machine	High	Medium	High	Medium	Medium	Limited	Capital heavy
Auto-mill	High	High	High	Medium	Medium	Limited	High investment
Hotel Business	High	High	Medium	Low	Medium	Selected	Location dependent
Achar (Pickle)	High	Medium	Low	Low	Low	Selected	Needs market linkage
Bakery Factory (Bekari)	High	Medium	Medium	Medium	Medium	Selected	Skill required

Table 9: Screening & Selection of Livelihood Options – Kalabogi

Livelihood	Climate Suitability	Market Demand	Capital Need	Skill Need	Risk Level	Decision	Remarks
Clothing & Tailoring	High	High	Medium	Medium	Low	Selected (Priority)	Strong women engagement
Multipurpose Shop	High	High	Medium	Low	Low	Selected	Diversified income
Grocery Store	High	High	Medium	Low	Low	Selected (Priority)	Stable demand
Duck Rearing	High	Medium	Low	Low	Low	Selected	Climate-resilient
Native Chicken Rearing	High	High	Low	Low	Low	Selected	Low-cost option
Goat Rearing	High	High	Low	Low	Low	Selected (Top Priority)	Highly resilient
Cow/Cattle Rearing	Medium	High	High	Medium	Medium	Limited	High investment
Sheep Rearing	Medium	Low	Medium	Low	Medium	Not Priority	Low local demand
Fish Cultivation	Medium	High	Medium	Medium	Medium	Selected	Salinity issue
Freshwater Shrimp Farming	Low–Medium	High	High	High	High	Limited	Salinity-sensitive
Fishing Net Production	High	High	Low	Medium	Low	Selected	Strong value chain
Honey Business	High	High	Medium	Medium	Medium	Selected	Sundarbans linkage
Vegetable Cultivation	Medium	High	Low	Low	Medium	Selected (Improved)	Needs climate-smart methods
Mixed Cultivation	Low	High	Medium	Medium	High	Not Selected	High climate risk
Homestead Gardening	High	Medium	Low	Low	Low	Selected	Nutrition + resilience
Potato Business	Medium	Medium	Medium	Low	Medium	Selected	Storage dependent
Fertilizer Business	High	Medium	Medium	Low	Low	Selected	Seasonal demand
Hotel Business	High	High	Medium	Medium	Medium	Selected	Needs location advantage
Cosmetics Business	High	High	Medium	Low	Low	Selected	Women-friendly
Furniture Business	Medium	Medium	High	High	Medium	Not Selected	Not women friendly
Betel Nut Business	High	Medium	Medium	Low	Medium	Selected	Market fluctuation
Handicraft Business	High	Medium	Low	Medium	Low	Selected	Needs market linkage
Achar (Pickle Production)	High	Medium	Low	Low	Low	Selected	Women-friendly
Bakery	High	High	Medium	Medium	Medium	Selected	Requires

7.1.5 Pilot Implementation and Key Results

Building on the adaptation model described in the previous section, the pilot phase marked the transition from design to real-world application. While earlier sections outlined how women identify, assess, and select climate-resilient livelihoods through a structured and locally led process, this phase tested whether those decisions could translate into viable, sustainable, and scalable livelihood systems in practice .

Following the identification and screening process, a total of 45 livelihood options were shortlisted across the three villages, reflecting the diversity of local resources, skills, and market opportunities. However, recognizing that not all options could be implemented simultaneously, a smaller set of 14 livelihood options was strategically selected for piloting. This selection was guided by climate suitability, feasibility, resource requirements, and potential for replication.

Table 10: Piloted Livelihood Options Across Project Villages

Sl. No.	Livelihood Option	Category	Key Features / Rationale
1	Duck Rearing	Livestock	Climate-resilient, suitable for waterlogged areas, low input cost
2	Native Chicken Rearing	Livestock	Quick return, adaptable to homestead systems, strong local demand
3	Vermicompost Production	Agriculture / NbS	Enhances soil fertility, low-cost input, supports climate-resilient agriculture
4	Home Gardening	Agriculture	Improves nutrition and income, adaptable to small spaces, supports food security
5	Candle Production	Small Enterprise	High local demand (especially during power outages), low investment
6	Incubator-Based Poultry Business	Livestock Enterprise	Improved productivity, controlled breeding, higher income potential
7	Cosmetics Shop	Small Business / Retail	Women-friendly enterprise, steady market demand
8	Varieties (General) Store	Small Business / Retail	Diversified products, stable income source
9	Hotel / Food Stall	Service-Based Business	Daily cash flow, high demand in local markets
10	Clothing Business	Small Business / Retail	Seasonal and continuous demand, scalable
11	Fishing Net & Equipment Business	Fisheries-linked Enterprise	Supports local fishing economy, strong backward-forward linkage
12	Agro Product Processing & Sales	Agro-Processing	Value addition to local products, market linkage potential
13	Bag Production (Recycled Sacks)	Eco-friendly Enterprise	Reuses cement/rice sacks, low-cost, environmentally sustainable, strong local market demand
14	Online-Based Small Business	Digital Enterprise	Emerging opportunity, expands market reach beyond locality

The pilot phase therefore functioned as a proof of concept, demonstrating how the adaptation model performs under real conditions. It marked the transition from identified opportunities to tested livelihood systems, generating the evidence required for scaling and institutional adoption.

Across Moheshwaripur, Kalabogi, and Uttar Bedkashi, these selected livelihood options were implemented by women who had actively participated in the planning process. This ensured that implementation remained locally owned and decision-driven, rather than externally imposed.

A key distinguishing feature of this phase was the integrated nature of support provided. Unlike conventional livelihood programs that focus primarily on input distribution, the pilot approach combined training, technical guidance, business planning, and continuous mentoring with initial resource support. As a result, each livelihood activity was treated not as a standalone intervention, but as a developing enterprise within a broader system.

Table 11: This shift from conventional practice to a system-based approach

Conventional Livelihood Practice	Pilot-Based Adaptation Approach
Selection based on familiarity or tradition	Selection based on climate risk, local context, and feasibility
Focus on input distribution	Focus on system development (skills, planning, support)
Limited attention to markets	Market analysis and linkage integrated
No structured financial planning	Business planning and financial management included
Standalone activities	Integrated livelihood systems with continuous support

Table 12: The transition from identification to implementation

Stage	What Happened
Identification	45 livelihood options identified through women-led processes
Screening	Options filtered through climate risk and feasibility analysis
Selection for Piloting	14 options selected based on viability and scalability potential
Pilot Implementation	Integrated support provided (training, inputs, mentoring, market linkage)
Learning & Evidence	Performance assessed to inform scaling and institutionalization

The pilot results demonstrate that when livelihoods are selected through a climate-informed and locally grounded process, and supported through a system-based approach, they can generate meaningful outcomes even in highly vulnerable contexts such as the Sundarbans.

Several livelihood options showed encouraging economic performance, particularly those with low investment requirements and strong local market demand. Activities aligned with local ecological conditions, such as livestock rearing, aquaculture, and small-scale tradingproved more stable under salinity, waterlogging, and seasonal variability. These outcomes reinforce the importance of aligning livelihood choices with environmental realities.

Beyond economic returns, the pilot phase contributed to significant improvements in capacity and agency among women participants. Through hands-on engagement, women developed practical skills in managing production, tracking costs, and engaging with markets. This process gradually strengthened their confidence and participation in economic decision-making.

At the same time, the pilots revealed important operational challenges, particularly related to limited technical knowledge, weak financial management skills, and initial hesitation in taking business risks. However, these challenges were largely addressed through continuous mentoring and support, highlighting that such constraints are capacity gaps rather than structural barriers.

A key learning emerging from this phase is that livelihood success is not determined solely by the choice of activity, but by the presence of an enabling system. When training, market linkage, and advisory support are integrated with initial inputs, the likelihood of sustainability increases significantly.

Taken together, the pilot phase provides a clear and evidence-based conclusion:

“A selected set of well-performing, climate-suitable, and system-supported livelihoods can serve as effective entry points for scaling adaptation”.

In this sense, thepiloted livelihood options represent more than individual interventions. They form a validated foundation for scaling, demonstrating how the adaptation model can move from localized success to broader application. This evidence is critical for informing us how such approaches can be adopted, adapted, and institutionalized within government systems and supported by development partners.

8 CROSS-CUTTING INSIGHTS

he preceding sections of this document have outlined the journey from understanding climate risks and livelihood vulnerabilities to designing and implementing a locally led adaptation model. Through women-led social assessments, scientific risk analysis, institutional engagement, and pilot implementation across three villages, a substantial body of practical experience has been generated.This section brings together the key insights emerging from that experience.

These insights are not isolated observations. They reflect system-level learnings on how livelihood adaptation functions in the Sundarbans context, where climate exposure, ecological fragility, and socio-economic constraints are deeply interconnected. More importantly, they highlight what enables adaptation efforts to move beyond short-term support and towards sustained, climate-resilient livelihood systems.

A central message emerging from this work is that effective adaptation cannot be achieved through fragmented interventions. Livelihood resilience depends on the alignment of multiple factors, including local knowledge, climate-informed decision-making, access to resources, market integration, and institutional support. When these elements operate in isolation, livelihood gains remain limited. When they are brought together through a structured and locally driven process, they create pathways for sustainable change.

The experiences from Moheshwaripur, Kalabogi, and Uttar Bedkashi demonstrate that women, when supported with the right tools, knowledge, and platforms, can play a central role in navigating these complex systems. Their participation in planning, decision-making, and implementation has not only improved livelihood outcomes but has also reshaped how adaptation processes are understood and practiced at the community level.

The insights presented in this section therefore serve a dual purpose. First, they distill the key lessons emerging from field implementation. Second, they provide strategic directions for scaling this approachinforming how locally led, women-centered adaptation can be integrated into broader development planning and investment frameworks.

8.1 Women's Agency and Leadership as the Entry Point

One of the most significant insights emerging from this initiative is that women's agency is not an outcome of adaptation, it is the starting point of it. Across the three villages, the shift from externally guided planning to women-led decision-making fundamentally changed how livelihood adaptation was understood and practiced.

In conventional approaches, women are often positioned as recipients of support, with limited influence over what livelihoods are selected or how resources are used. In contrast, this process placed women at the center, from identifying risks and resources to selecting livelihood options and participating in implementation. Through platforms such as the Women's Adaptation Labs (WAL), women were able to collectively analyze their context, articulate priorities, and make informed decisions based on both lived experience and structured assessment.

This shift in role had important implications. As women engaged more actively in planning and implementation, they began to move beyond household-level participation into broader engagement with markets, service providers, and local institutions. In doing so, they started to navigate systems that were previously less accessible to them, whether in negotiating prices, accessing inputs, or seeking technical support.

Over time, this process contributed to a gradual strengthening of confidence, skills, and collective voice. Women demonstrated increasing ability to manage livelihood activities, make financial decisions, and participate in discussions that influence local development processes. This was not only a change in economic activity, but also a change in who participates in decision-making and how those decisions are shaped.
Equally important was the role of collective platforms in enabling this transformation. The WALs functioned not only as planning spaces, but also as environments for peer learning, problem-solving, and mutual support. Through these interactions, women were able to share

experiences, address challenges collectively, and build a sense of ownership over the adaptation process.This experience highlights a critical lesson for adaptation planning in the Sundarbans context:livelihood resilience cannot be achieved without strengthening the agency of those who are directly managing these livelihoods.

When women are equipped with knowledge, supported through structured processes, and connected to systems beyond the household, they become active agents of change, capable of shaping not only their own livelihoods but also the broader adaptation pathways of their communities.

8.2 Climate-Informed and Knowledge-Based Livelihood Decision-Making

A second critical insight emerging from this work is the importance of shifting livelihood decision-making from experience-based choices to climate-informed and knowledge-driven processes. In the Sundarbans context, where environmental conditions are rapidly changing, traditional livelihood practices, while valuableare no longer sufficient on their own to ensure sustainability.

Prior to this intervention, livelihood decisions were largely influenced by familiarity, immediate necessity, and limited local experience. While these factors remain important, they often do not account for evolving climate risks such as increasing salinity, erratic rainfall, flooding, and extreme weather events. As a result, many livelihood activities, particularly those dependent on natural resources, have become increasingly fragile and uncertain.

The approach introduced through this adaptation plan addressed this gap by integrating scientific climate risk analysis with local knowledge and lived experience. Women engaged in a structured process where they were able to assess not only what is currently feasible, but also what is likely to remain viable under future climate conditions. This marked a significant shiftfrom selecting livelihoods based on immediate opportunity to selecting them based on long-term resilience.

Central to this process was the application of multiple analytical lenses. Climate risk screening helped identify which livelihood options are sensitive to salinity, flooding, and seasonal variability. The Five Capitals Framework provided a structured way to assess the availability and limitations of resourcessuch as skills, land, finance, and infrastructure. At the same time, local knowledge ensured that these assessments remained grounded, reflecting practical constraints and opportunities within each village.

This combination of scientific and community-based knowledge created a more robust decision-making framework, enabling women to make informed choices that balance risk, feasibility, and potential return. It also helped to avoid investments in livelihood options that may appear profitable in the short term but are vulnerable under changing environmental conditions.
The pilot phase further reinforced the value of this approach. Livelihoods that were selected through this combined assessment process,particularly those aligned with local ecological conditions, demonstrated greater stability and performance. This confirms that climate-informed selection is not an abstract concept, but a practical requirement for sustainable livelihoods in climate-exposed regions.

Another important outcome of this process was the strengthening of technical capacity. Through training and continuous engagement, women developed a better understanding of production methods, risk management, and adaptation practices. This enabled them not only to adopt new livelihood options but also to improve the performance of existing ones."This experience highlights a broader lesson for adaptation planning:effective livelihood strategies must be informed by both science and local knowledge and supported by continuous learning."

8.3 From Isolated Activities to Systemic Linkages

A central insight emerging from this work is that livelihoods cannot be sustained as isolated activities, they function within, and depend on, broader systems. In the Sundarbans context, where environmental conditions, infrastructure, markets, and institutions are tightly interconnected, the success or failure of a livelihood is rarely determined by the activity alone.

Traditional livelihood support approaches often treat activities such as agriculture, livestock rearing, or small businesses as standalone interventions. Inputs are provided, training may be delivered, and outcomes are expected at the individual level. However, the experiences from this initiative demonstrate that such approaches overlook the critical role of enabling systems, including water management, infrastructure, market access, and institutional services.

For example, in areas where embankments are functioning effectively, agricultural production becomes possible by protecting land from saline intrusion. Similarly, the excavation and maintenance of canals enable water availability, which directly influences cropping patterns and productivity. Without these systems in place, even well-supported agricultural activities remain vulnerable or entirely unviable.

A similar pattern is observed in non-farm livelihoods.

While women are capable of managing small businesses such as tailoring, poultry rearing, or retail shops, their ability to sustain and grow these activities depends heavily on connectivity and market access. In villages where communication systems are weak and transport is limited, accessing markets becomes difficult, restricting both input supply and product sales. As a result, otherwise viable livelihood options struggle to generate consistent income.

These realities highlight that livelihood outcomes are shaped by a combination of interconnected factors, including:

- Physical infrastructure (roads, embankments, water systems)
- Natural resource management (land, water, ecosystems)
- Market systems (access, demand, price dynamics)
- Institutional support (services, training, coordination)

When these elements are weak or disconnected, livelihood interventions tend to produce limited or short-lived results. When they are aligned and functioning together, they create an enabling environment where livelihoods can stabilize, grow, and adapt.

The adaptation model applied in this initiative recognizes this interdependence and moves beyond activity-based planning towards a system-oriented approach. Rather than asking only,"what livelihood can be introduced," the process also considers what conditions are required for that livelihood to succeed. This includes identifying gaps in infrastructure, services, and market linkages, and understanding how these gaps can be addressed through coordination and investment.

The pilot further reinforced this insight. Livelihood options that were supported within a broader system, where training, inputs, market access, and advisory support were aligneddemonstrated stronger performance compared to those operating in isolation. This confirms that the sustainability of livelihoods depends as much on the surrounding system as on the activity itself.

This has important implications for policy and investment. Supporting livelihoods in the Sundarbans cannot be limited to providing financial assistance or input at the household level. It requires simultaneous attention to system-level factors, including infrastructure development, market strengthening, and institutional coordination.

8.4 Barriers and Adaptive Learning

One of the most prominent challenges observed was related to technical and business capacity. Many participants, particularly women, had limited prior exposure to improved production techniques, livestock management practices, or structured business planning. This was evident in areas such as vaccination scheduling, input management, pricing decisions, and basic record-keeping. While initial training provided a foundation, it became clear that one-time capacity building is insufficient. Livelihoods require continuous learning, mentoring, and practical guidance to stabilize and grow.

Social and cultural norms also shaped the extent to which women could engage with livelihood activities beyond the household. Although participation increased significantly through the project, constraints related to mobility, market access, and interaction with external actors persisted in some cases. These factors influenced not only the type of livelihoods women selected but also their ability to expand or diversify their activities over time.

Institutional and service-related barriers were another important consideration. Access to government services, such as agricultural extension, livestock support, and training programswas often limited by procedural delays, resource constraints, or lack of coordination. For example, while relevant departments expressed willingness to support, the timelines for training, registration, or service delivery did not always align with the immediate needs of participants. This highlights the gap between availability of services and accessibility in practice.

Market-related challenges also emerged, particularly for livelihood options that require reliable input supply or access to broader markets. Fluctuations in prices, limited transport connectivity, and dependence on local demand affected income stability for some participants. Without strong and consistent market linkages, even technically viable livelihood options faced difficulties in achieving sustained profitability.

In addition to these structural constraints, the uncertainty of the climate itself remains an overarching challenge. Sudden weather changes, salinity fluctuations, and seasonal variability continue to affect production systems, particularly in agriculture and livestock. This reinforces the need for livelihood strategies that are not only profitable but also flexible and adaptive.

However, a defining strength of this initiative was its ability to respond to these challenges through an adaptive learning approach. Rather than treating barriers as fixed limitations, the process allowed for continuous adjustment based on real-time experience. Several adaptive measures were introduced throughout the implementation:

- Iterative training and follow-up support, enabling participants to gradually improve their practices
- Exposure visits and peer learning, allowing women to learn from successful examples within similar contexts
- Regular engagement and troubleshooting, helping to address emerging challenges in production and business management
- Flexible livelihood selection, ensuring that participants could shift or refine their activities based on performance and context

This adaptive approach helped to mitigate risks, improve outcomes, and build resilience within the livelihood systems themselves. It also contributed to a more realistic understanding of what it takes to sustain livelihood interventions in complex and dynamic environments.

"A key lesson emerging from this experience is that: barriers are not exceptions, they are inherent to the system, and effective adaptation depends on the ability to respond to them continuously."

8.5 Scaling Pathways and Institutionalization Potential

The experiences generated through this initiative point clearly towards the possibility of moving from localized pilots to scalable and institutionalized adaptation models. However, scaling in this context does not simply mean expanding the number of beneficiaries or replicating activities across locations. Rather, it requires embedding the approach, processes, and enabling systems within existing institutional and development frameworks.

A key insight is that the strength of this model lies not in a predefined set of livelihood options, but in the structured process through which those options are identified, tested, and refined. The progression from 45 identified livelihoods to 14 piloted options demonstrates a practical pathway for narrowing down choices based on climate suitability, resource availability, and market feasibility. This process can be replicated in other locations, allowing communities to identify context-specific solutions rather than adopting externally prescribed models.

For scaling to be effective, however, this process must be supported by institutional alignment and coordination. The engagement with local government departmentssuch as agriculture, livestock, fisheries, and youth developmenthas shown that technical services and training support are available but often operate in fragmented ways. Strengthening coordination among these actors is essential to ensure that communities can access services in a timely and integrated manner.

Platforms such as the Local Project Advisory Committee (LPAC) and Multi-Stakeholder Platforms provide an important foundation for this coordination. By bringing together government representatives, market actors, and community stakeholders, these platforms create opportunities to align priorities, share responsibilities, and support collective problem-solving. For scaling purposes, such platforms can serve as institutional anchors, linking community-level planning with formal development systems.

Another critical requirement for scaling is the integration of this approach into local planning and budgeting processes. Adaptation plans developed through this model can inform Union and Upazila-level development plans, ensuring that identified priorities—such as infrastructure improvements, training needs, and livelihood supportare reflected in public investment decisions. Without this integration, scaling efforts risk remaining project-bound and limited in duration.

Financial mechanisms also play a central role. While small-scale pilots can be initiated with limited investment, scaling requires access to sustainable financing, including public funding, microfinance, and private sector engagement. Ensuring that women and vulnerable households can access these financial resources is essential for expanding livelihood activities and maintaining momentum beyond the project period.

Importantly, the pilot phase has shown that not all livelihood options need to be scaled uniformly. Some options demonstrate strong potential for replication due to their adaptability, low cost, and market demand, while others may require further development or enabling conditions before they can be expanded. This highlights the need for a selective and evidence-based scaling strategy, rather than a one-size-fits-all approach.

At a broader level, this initiative illustrates how locally led adaptation can be operationalized in practice. By combining community-driven planning, scientific analysis, and institutional engagement, it creates a model that is both grounded and scalable. The role of women's leadership within this process further strengthens its potential for sustainability, as it builds capacity and ownership at the community level.
"A key message emerging from this experience is that: scaling adaptation is not about replicating activities, it is about institutionalizing a process that enables continuous identification, testing, and support of climate-resilient livelihoods."

9 INVESTMENT & POLICY IMPLICATION

The insights generated through this initiative demonstrate that climate adaptation in the Sundarbans cannot be addressed through isolated or short-term interventions. As outlined in the preceding sections, livelihood resilience emerges from the interaction of multiple factors, including women's agency, climate-informed decision-making, enabling infrastructure, market access, and institutional coordination. These interconnected dimensions point to the need for a fundamental shift in how adaptation is financed and governed.

This section translates those learnings into investment and policy implications. It highlights the types of investments required to move from pilot-based interventions to scalable and sustainable adaptation systems and identifies the policy directions needed to support this transition.

A key message emerging from this work is that effective adaptation requires integrated and system-oriented investment approaches. Supporting livelihoods at the household levelthrough cash, input, or trainingcan generate short-term benefits but is insufficient to ensure long-term resilience. Instead, investments must simultaneously address the broader systems that shape livelihood outcomes, including natural resource management, infrastructure, market systems, and service delivery mechanisms.

Equally important is the need to recognize and support the role of women as central actors within these systems. The experience from this initiative shows that when women are enabled to participate in planning, decision-making, and implementation, adaptation efforts become more responsive, inclusive, and sustainable. This has direct implications for how programs are designed, financed, and integrated into local governance structures.

Finally, the transition from localized success to broader impact depends on the ability to institutionalize processes rather than replicate activities. The model developed through this initiative provides a structured approach for identifying, testing, and scaling climate-resilient livelihoods in a way that is adaptable to different contexts. For this model to be sustained and expanded, it must be embedded within policy frameworks, supported by coordinated institutional action, and backed by flexible and long-term financing.

The following sections outline the key areas where targeted investments and policy adjustments can enable this transition, ensuring that locally led adaptation is not only demonstrated, but effectively scaled and sustained.

9.1 Investing in Women-Centered Adaptation Systems

A key implication from this initiative is that women's agency is a core investment priority for effective climate adaptation. When women are positioned as planners and decision-makersrather than beneficiarieslivelihood strategies become more context-responsive, inclusive, and sustainable.

The Women's Adaptation Labs (WAL) demonstrated how structured platforms can enable this shift. Through these spaces, women collectively assessed risks, selected livelihoods, and engaged in continuous learning and problem-solving. This not only improved livelihood outcomes but also strengthened their ability to interact with markets, services, and local institutions.

To sustain and scale such outcomes, investments should focus on:

- Establishing and maintaining women-led planning platforms
- Providing continuous capacity development (technical, financial, negotiation)
- Improving access to markets, services, and institutions
- Addressing mobility and socio-cultural barriers

At the policy level, women-centered adaptation approaches need to be integrated into local planning and budgeting systems, ensuring formal recognition and resource allocation.

"The central lesson is clear: investing in women's agency is not optional it is foundational to building resilient and sustainable livelihood systems."

9.2 Financing Climate-Resilient Livelihood Portfolios

The findings from this initiative highlight the need to move beyond financing individual livelihood activities towards supporting climate-resilient livelihood portfolios. In climate-exposed contexts like the Sundarbans, reliance on a single livelihood increases vulnerability, while diversified and well-selected options provide greater stability and risk reduction.

The process applied in this initiativecombining climate risk analysis, the Five Capitals framework, and local knowledgedemonstrates how livelihood options can be selected based on long-term viability rather than short-term opportunity. The transition from 45 identified options to 14 tested pilots illustrates the importance of structured filtering and evidence-based decision-making.

From an investment perspective, this implies that financing should not be limited to inputs or start-up support for a single activity. Instead, it should support integrated livelihood packages, including:

- Climate-informed livelihood selection processes
- Skills development and technical training
- Input support and risk mitigation measures
- Ongoing advisory and mentoring support

Such an approach enables households to diversify income sources while reducing exposure to climate and market shocks.At the policy level, livelihood and development programs should incorporate climate screening and portfolio-based planning as standard practice. This ensures that investments are directed towards livelihood systems that are both economically viable and environmentally resilient.

9.3 Investing in Enabling Systems: Infrastructure and Natural Resource Management

A critical implication from this initiative is that livelihood investments alone are insufficient without parallel investment in enabling systems. The performance of many livelihood options was directly influenced by the condition of local infrastructure and natural resource systems.

In the Sundarbans context, elements such as embankments, canal networks, water management systems, and rural connectivity play a decisive role in determining whether livelihoods can function and sustain. For example, agricultural activities depend on protection from salinity intrusion and access to water, while small businesses rely on transport and market connectivity. When these systems are weak or disrupted, livelihood gains remain limited regardless of household-level support.

This highlights the need for investments that go beyond direct livelihood support and address the underlying systems that enable productivity and resilience. Priority areas include:

- Strengthening and maintaining embankments and water management systems
- Improving rural infrastructure and market connectivity
- Promoting nature-based solutions to restore and manage ecosystems

At the policy level, there is a need to better align livelihood programs with infrastructure and environmental planning processes, ensuring that investments are coordinated rather than fragmented across sectors.

9.4 Strengthening Market Systems and Financial Inclusion

The experience from this initiative highlights that market access and financial inclusion are critical determinants of livelihood sustainability. While many livelihood options demonstrated technical feasibility, their long-term success depended on the ability to access markets, secure fair prices, and obtain working capital.

In several cases, limitations in transport, local market size, and weak value chain linkages constrained income potential. At the same time, access to financeparticularly for womenremained limited, affecting the ability to start, expand, or stabilize livelihood activities. Without adequate financial support, even promising livelihood options struggled to scale beyond small, subsistence-level operations.
This underscores the need for targeted investments in:

- Strengthening local market systems and value chains
- Improving market connectivity and access to buyers
- Expanding financial services, including microcredit and working capital
- Promoting women-friendly financial products and access mechanisms

At the policy level, stronger collaboration is needed between development programs, financial institutions, and market actors to create an enabling environment where livelihood activities can grow and sustain.

"The key message is livelihood resilience depends not only on production, but on the ability to connect to markets and access finance without these, sustainability remains limited."

9.5 Institutional Coordination and Governance Integration

The findings from this initiative highlight that institutional coordination is essential for sustaining and scaling adaptation efforts. While multiple government departments provide relevant servicessuch as agriculture, livestock, fisheries, and youth development, these services often operate in parallel, limiting their collective impact at the community level.

The engagement process demonstrated that when coordination mechanisms are in place, communities can better access training, technical support, and advisory services. Platforms such as the Local Project Advisory Committee (LPAC) and multi-stakeholder forums played a key role in bridging gaps between communities, government actors, and market stakeholders.

From an investment perspective, there is a need to strengthen and institutionalize such coordination platforms to ensure aligned planning, timely service delivery, and shared accountability. This includes supporting regular engagement, clarifying roles across departments, and linking community-level priorities with institutional mandates.

At the policy level, adaptation approaches should be integrated into local governance and development planning systems, ensuring that climate-resilient livelihoods are reflected in Union and Upazila plans and budgets. Without this integration, adaptation efforts risk remaining project-driven and limited in scale.trt

10 CALL TO ACTION

As climate risks intensify across vulnerable geographies, there is an urgent need to rethink how adaptation is designed, implemented, and scaled. Locally Led Adaptation (LLA) has emerged as a promising pathway, yet in practice, many interventions still fall short of shifting power, resources, and decision-making to those most affected. To unlock the full potential of LLA, a more deliberate and systemic commitment is requiredone that moves beyond participation toward genuine transformation.

First, governments, donors, and development actors must recognize that effective adaptation is not only about technical solutions, but about who defines priorities and makes decisions. Women and marginalized groups, despite being at the frontline of climate impacts, are often constrained by social norms, limited access to resources, and exclusion from formal systems. Investing in approaches that strengthen their agency, through collective platforms, access to information, and leadership opportunitiesis essential. When women are enabled to assess risks, negotiate options, and influence decisions, adaptation pathways become more grounded, inclusive, and sustainable.

Second, there is a critical need to invest in evidence-driven adaptation. While many LLA initiatives demonstrate promising practices, there remains a gap in systematically understanding what works, for whom, and under what conditions. Donors and research institutions should prioritize funding for approaches that integrate implementation with learningcombining local knowledge with scientific analysis, and generating actionable insights on livelihood resilience, equity, and long-term outcomes. This includes identifying and addressing risks of maladaptation, particularly in fragile ecosystems where short-term coping strategies may undermine future resilience.

Third, financing mechanisms must evolve to support locally driven processes. Rigid, short-term funding cycles often limit the ability of communities to test, adapt, and refine their solutions. Flexible, multi-year funding is needed to enable iterative learning, strengthen local institutions, and support the scaling of successful models. At the same time, improved access to finance at the community level, especially for womencan unlock opportunities for climate-resilient livelihoods and reduce dependency on climate-sensitive and exploitative practices.

Fourth, strengthening linkages between community-level initiatives and formal systems is essential for sustainability and scale. Policymakers should prioritize integrating locally generated adaptation plans into national and sub-national frameworks, including social protection, livelihood development, and climate strategies. This requires building functional bridges between communities and institutions, ensuring that local voices inform policy decisions, and that government systems are responsive to context-specific needs. Such alignment can enhance targeting, reduce inefficiencies, and create pathways for scaling without duplicating structures.

Fifth, monitoring and evaluation frameworks must be reoriented to capture transformative outcomes. Current systems often focus on outputs and short-term results, overlooking critical dimensions such as changes in agency, shifts in social norms, and improvements in decision-making power. To fully understand the impact of LLA, there is a need for indicators that reflect these deeper changes, alongside traditional measures of resilience and livelihood improvement. Embedding learning within implementation processes will enable continuous adaptation and more effective scaling.

Finally, scaling Locally Led Adaptation requires building enabling ecosystems where communities are not only implementers, but co-creators of knowledge and solutions. This includes fostering partnerships across community groups, government institutions, research organizations, and the private sector. Investing in women's leadership within these systems is particularly critical, as it not only advances equity but also enhances the effectiveness and sustainability of adaptation outcomes.

In conclusion, advancing Locally Led Adaptation is not simply about expanding programs, it is about transforming systems. By prioritizing agency, evidence, flexible financing, institutional alignment, and inclusive governance, stakeholders can move toward adaptation approaches that are not only locally grounded, but also scalable, equitable, and resilient in the face of increasing climate uncertainty.

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