GMS 2030

Kunming Strategic Framework for Transformation of Agrifood Systems

Greater Mekong Subregion Sustainable Agriculture & Food Security Program

Title

GMS 2030 Kunming Strategic Framework for Transformation of Agrifood Systems

Note

This document has been prepared in consultation with the Greater Mekong Subregion (GMS) Working Group on Agriculture (WGA), development partners, private sector representatives, academia and other stakeholders at national and regional levels.

The views expressed herein do not necessarily represent those of ADB's Board of Directors, Management, or staff, and may be preliminary in nature. In preparing any country program or strategy, financing any project, or by making any designation of or reference to a particular territory or geographic area in this document, the Asian Development Bank does not intend to make any judgments as to the legal or other status of any territory or area.

In this document, the symbol "$" refers to US dollars.

Photo Credits

This is a draft for consideration by the GMS Agricultural Ministers for endorsement.

Contents

Figures

Tables

Abbreviations

ADB	Asian Development Bank
ASEAN	Association of Southeast Asian Nations
CASP	Core Agriculture Support Program
CSA	Climate-smart Agriculture
COVID-19	Coronavirus Disease-19
FAO	Food and Agriculture Organization of the United Nations
GDP	gross domestic product
GHG	greenhouse gas
GI	geographical indication
GMS	Greater Mekong Subregion
GMS KN	Greater Mekong Subregion knowledge network
GMS-2030	The Greater Mekong Subregion economic cooperation program strategic framework 2030
GMS-2030 KSFTAS	The Greater Mekong Subregion 2030 Kunming Strategic Framework for Transformation of Agrifood Systems
ICT	information and communications technology
ISDGMS	Innovation Strategy for Development 2030
Lao PDR	Lao People's Democratic Republic
MSME	micro, small, and medium-sized enterprise
NGO	non-governmental organization
PPP	public-private partnership
PRC	People's Republic of China
R&D	research and development
RCI	regional cooperation and integration
RIF	Regional Investment Framework
SAFSP	Sustainable Agriculture and Food Security Program
SASRAP	Strategy for Promoting Safe and Environment-friendly Agro-based Value Chains In the GMS and Siem Reap Action Plan, 2018–2022
SDG	Sustainable Development Goal
SEAP	safe and environment-friendly agriculture products
SMEs	small and medium-sized enterprises
SPS	sanitary and phytosanitary
TA	technical assistance
UN	United Nations
WGA	Working Group on Agriculture
WHO	World Health Organization

Executive Summary

The Greater Mekong Subregion (GMS) is characterized by rapid economic growth, rich biodiversity, and a strong reliance on agriculture for livelihoods. Agriculture remains the backbone of the GMS economies, employing a large portion of the population and contributing substantially to the national Gross Domestic Product especially in less industrialized countries. The subregion's ecosystems, ranging from highland forests to vast river basins, support diverse crops, livestock, and fisheries, making the GMS a key player in both regional and global food markets exporting rice, fruits, vegetables, and seafood.

However, the GMS faces considerable challenges that threaten the sustainability and resilience of its agrifood systems. Climate change, deforestation, and environmental degradation are adversely affecting agricultural productivity. Additionally, rapid urbanization and population growth are driving higher demand for safe, high-quality, and sustainable food products. Traditional farming practices, limited access to modern technologies and financial constraints complicate efforts to achieve food security and enhance global competitiveness.

DRIVERS OF TRANSFORMATION

Regional cooperation and cross-border initiatives are vital to address transboundary challenges that impact the GMS agrifood systems. The following key drivers influence the future trajectory of transformation of agrifood systems in the GMS.

1. **Demographic Shifts and Food Diversification.** Rapid urbanization in the GMS is shifting dietary preferences toward higher-value foods and alternative protein sources as consumers seek healthier, sustainable options requiring farmers to diversify production. However, challenges around food safety standards and sustainable practices persist.

2. **Economic and Market Dynamics.** The GMS agrifood sector is integrated into global markets, but market volatility, global competition, and disparities in logistics and supply chain infrastructure pose challenges. Smallholder farmers in the GMS struggle to compete with larger agribusinesses due to limited access to technology, finance, and markets.

3. **Investment in Agrifood Systems.** The GMS Economic Strategic Framework 2030 for the agriculture sector emphasizes expanding agrifood production and trade by adopting climate-smart, value chain approaches that enhance food safety, lower transaction costs, and harmonize standards. Investment priorities include agro-industrial zones, agribusiness incubators, livestock and aquaculture value chains, and education and logistics improvements. While recognizing women farmer's roles. This multifaceted strategy, linking agriculture with water, energy and infrastructure, aims to boost resilience, reduce food insecurity, and cut food loss and waste. Additionally, a 'One Health' approach will ensure interconnected health benefits across human, animal and environmental systems, creating a robust and adaptable food system to withstand future challenges.

4. **Country Interdependencies.** The GMS adopts a programmatic approach centered on regional economic cooperation, knowledge sharing, and transboundary initiatives. Emphasizing community, connectivity and competitiveness, the GMS framework integrates environmental sustainability, resilience,and inclusivity while recognizing the region's interdependencies in areas such as energy sharing, cross-border trade, and agrifood systems. With increased globalization, transboundary issues like diseases, resource challenges and climate change require GMS countries to tailor their programs with a sub-regional approach that respects country-specific needs within a cohesive framework.

5. **Technological Advancements and Digitalization.** Digital traceability, precision agriculture, and e-commerce platforms offer transformative opportunities in the GMS for enhancing market access, traceability, and resource management by improving productivity and reducing transaction costs. However, poor infrastructure in rural areas and limited digital literacy in the GMS restrict the adoption of digital tools.

6. **Environmental and Natural Resource Pressures.** Agriculture in the GMS is a major consumer of natural resources and a contributor to environmental degradation, with water scarcity and land degradation being the major concerns. Solutions such as climate-smart agriculture and agroforestry offer hope, while better management of the water-food-energy-climate nexus presents opportunities to address resource trade-offs.

7. **Poverty, Inequality, and Food Insecurity.** Disparities in access to land, credit, and technology remain significant. Empowering smallholder farmers, particularly women, youth, and marginalized groups, is critical to reducing poverty and enhancing food security.

8. **Inflation and Food Prices.** Inflation and rising food prices, exacerbated by global tensions and climate impacts, are straining GMS agrifood systems. Higher input costs and supply chain disruptions reduce farmers' profitability and heighten food insecurity. Increasing agricultural productivity, strengthening supply chain resilience, and providing targeted support to farmers must be pursued as key priorities.

9. **Transition in Workforce, Gender, and Inclusivity.** An aging farmer population and urban migration has led to labor shortages in several GMS countries. Empowering youth and ensuring gender inclusivity through access to finance, technology, and leadership opportunities will foster a more equitable and sustainable agrifood system.

10. **Financial Access.** Limited access to affordable financing, high interest rates and complex lending requirements, pose challenges for smallholders and micro, small, and medium enterprises in the GMS to invest in sustainable agricultural practices and productivity-enhancing technologies. Innovative financing instruments and microfinance are necessary to support the transition to more resilient agrifood systems.

STRATEGIC PATHWAYS

The GMS-2030 Kunming Strategic Framework for Transformation of Agrifood Systems (GMS 2030 KSFTAS) addresses the evolving needs of the subregion's agricultural sector, while aligning with broader GMS cooperation initiatives. It outlines a strategy for transforming the agrifood trade as a crucial economic driver through sustainable farming systems, low-carbon and climate resilient value chains, digital technologies, and financing mechanisms to enhance livelihoods, reduce food loss, and meet the rising demand for safe, high-quality, and green products. The strategic framework prioritizes inclusive growth by empowering smallholders, women, youth, and disadvantaged groups to access resources and opportunities through three strategic focus areas:

A. **Green and Climate-Resilient Agriculture.** Promoting climate smart agriculture and strengthening resilience throughout the value chain. The goal is to enhance holistic resilience to climate shocks, reduce greenhouse gas emissions across the agrifood sector, and improve economic stability for farming communities and agribusinesses.

B. **Safe and Quality Agrifood Systems.** Harmonizing food safety standards across GMS countries and the development of digital traceability systems to ensure product safety throughout the value chain. Modernizing food processing and storage facilities to ensure compliance with regional and international standards by creating cross-border regulatory frameworks and adopting standards.

C. **Food Diversification and Value Chain Optimization.** Supporting agrifood product diversification and value chain efficiency by introducing high-value crops, livestock, and aquaculture and promoting non-traditional products like plant-based and insect proteins. Infrastructure investment in storage, transportation, and digital platform systems will optimize value chains, reduce food loss and improve market access.

The **Strategic pillars** guiding the framework's implementation include:

Policy and governance: creating an enabling environment to support climate resilient, low-carbon, sustainable practices, and resource efficient value chains.

Knowledge-based solutions: promoting research, capacity building, and innovation in sustainable practices, food safety, and value chain optimization.

Market and behavior transformation: aligning market systems with sustainable production and consumer behavior and promoting regional trade integration.

Infrastructure and investments focusing on public-private partnerships, infrastructure development, and financing mechanisms to improve efficiency and competitiveness of agrifood systems.

INSTITUTIONAL ARRANGEMENTS

The GMS 2030 KSFTAS aligns with the GMS Regional Investment Framework and potential initiatives such as the Innovative Natural Capital Financing Facility. ADB will support project development through a technical assistance program, ensuring alignment with SDGs. The GMS Working Group on Agriculture will lead the implementation of the strategic framework in close collaboration with GMS national teams. Private sector engagement, particularly with agribusinesses and cooperatives, is crucial. Small enterprises will be linked with larger, more established businesses for mentorship and resource support. Public-private partnerships will be actively promoted to drive infrastructure development, innovation, and market access. Cross-sector partnerships and collaborations will mobilize resources and expertise effectively, and a comprehensive results framework will guide monitoring and evaluation efforts.

I. INTRODUCTION

I. INTRODUCTION

The Greater Mekong Subregion (GMS) faces both significant challenges and tremendous opportunities in transforming its agrifood systems. As a subregion that relies heavily on agriculture for economic growth, food security, and livelihoods, the need for sustainable, inclusive, and competitive agrifood systems has never been more critical. Rapid population growth, shifting consumer preferences, climate change impacts, and global market demands are placing unprecedented pressure on GMS agriculture. In response, the GMS-2030 Kunming Strategic Framework for Transformation of Agrifood Systems (GMS-2030 KSFTAS) provides an overarching comprehensive framework designed to drive the subregion's transition toward sustainable, low carbon, and resilient agriculture while enhancing its global competitiveness.

The GMS-2030 KSFTAS outlines a vision to transform the agrifood system into an integrated, inclusive, and globally competitive sector that produces safe, clean, and green agrifood products. This transformation is essential for addressing the growing demand for high-quality, safe, and traceable food products in both domestic and international markets. Furthermore, the framework recognizes the significance of providing support to smallholders, women, youth, and disadvantaged groups, often marginalized in traditional agricultural systems, to ensure equitable access to resources, opportunities, and market benefits for all stakeholders.

The strategic framework aligns with initiatives such as the GMS Economic Cooperation Program Strategic Framework 2030 and the GMS Innovation Strategy for Development 2030, as well as ADB Strategy 2030 and its Operational Plan for Rural Development and Food Security. It is also consistent with international commitments, including the Sustainable Development Goals (SDGs), particularly those focused on zero hunger, gender equality, climate action, and sustainable production and consumption.

II. BACKGROUND

II. BACKGROUND

The Greater Mekong Subregion (GMS) is one of the most dynamic and diverse areas in Southeast Asia, characterized by rapid economic growth, rich biodiversity and a significant reliance on agriculture as a primary source of livelihoods.

Agriculture remains the backbone of the economies of GMS countries, employing a large share of the population and contributing substantially to the national Gross Domestic Product (GDP), especially in the less industrialized countries. The subregion's diverse ecosystems, ranging from highland forests to expansive river basins, support a wide variety of crops, livestock and fisheries. These natural resources have enabled the GMS to become a key player in regional and global food markets, supplying a range of agricultural products from staples like rice to high-value exports such as fruits, vegetables and seafood. However, the GMS is also facing significant challenges that threaten the sustainability and resilience of its agrifood systems. Climate change, deforestation and environmental degradation are adversely affecting agricultural productivity. Simultaneously, rapid urbanization and population growth are increasing the demand for safe, high-quality and sustainable food products. Moreover, the subregion's dependence on traditional farming practices and limited access to modern technologies and financial resources present significant barriers to achieving long-term food security and competitiveness.

The GMS Program,[1] established in 1992 and facilitated by the Asian Development Bank (ADB), aims to enhance economic relations among Cambodia, People's Republic of China (Yunnan Province and Guangxi Zhuang Autonomous Region), Lao PDR, Myanmar, Thailand and Viet Nam. The program covers key sectors such as transport, trade facilitation, energy, agriculture, environment and human resource development. Notable achievements include the development of economic corridors, cross-border power trade and initiatives addressing climate change and food security. The GMS Strategic Framework 2030 emphasizes strengthening connectivity, promoting competitiveness, ensuring sustainability and building resilience across the subregion.[2]

Agricultural cooperation has been a central focus of the GMS Program, aimed at enhancing agricultural productivity, food security and environmental sustainability through regional trade and collaboration. This effort has been guided by successive GMS agriculture programs administered by the GMS Working Group on Agriculture (WGA), established in 2005. Notable initiatives include the Core Agriculture Support Programs (CASP Phases I and II) and the Strategy for Promoting Safe and Environment-Friendly Agro-based Value Chains in the GMS (SASRAP). These programs have been instrumental in expanding agricultural trade, promoting inclusive value chains, and tackling critical issues related to climate change and food safety.

Building on the success of past programs, the GMS Sustainable Agriculture and Food Security Program (SAFSP) for 2020-2025 aims to create an enabling environment to improve agricultural productivity and sustainability through investments in low-carbon and climate-adaptive agriculture and harmonized safety and quality systems for crops and livestock and through a better understanding of water-food-energy-climate nexus issues. The SAFSP is aligned with the GMS vision to become a leading supplier of safe, quality and climate-friendly agrifood products. The objective is to enhance economic, social and environmental benefits to GMS stakeholders by accessing markets and advancing safer food products. The focus is on enhancing opportunities for closer collaboration among GMS countries and with other sub-regional entities through policy coherence, extensive dialogue and market integration to enhance food security. This stimulates discussions on transboundary issues and eventually promotes greater regional integration.

[1] ADB. 2015. Overview of GMS Economic Cooperation Program.
[2] GMS. 2024. GMS Economic Cooperation Program Strategic Framework 2030.

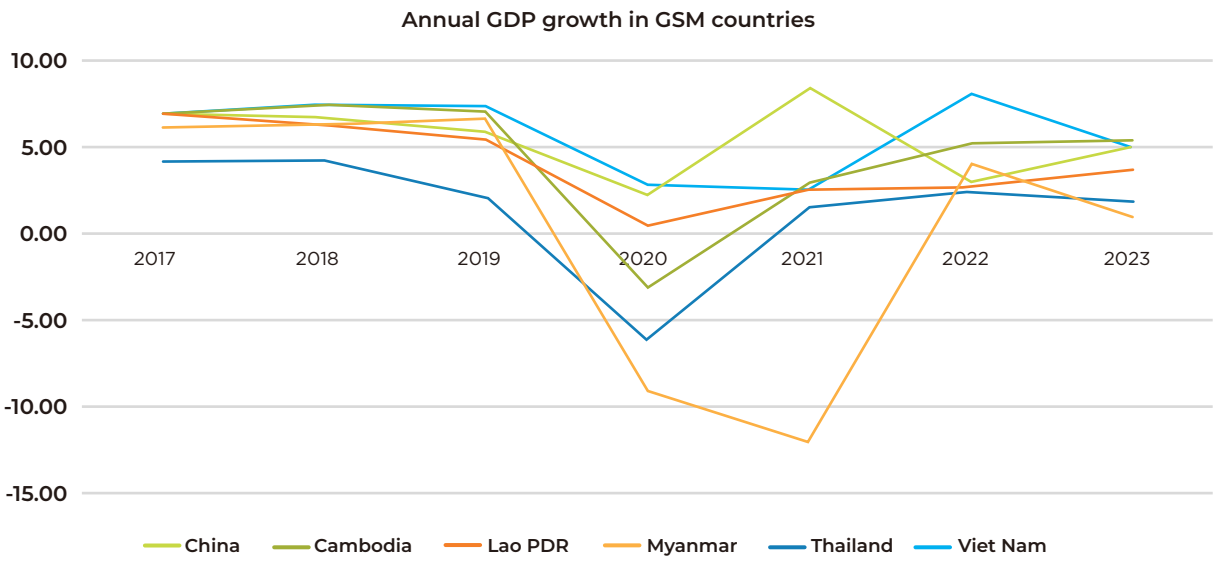
Looking forward, the GMS-2030 Kunming Strategic Framework for Transformation of Agrifood Systems (GMS 2030 KSFTAS) reflects the evolving priorities for the subregion's agricultural sector. The transformation of agrifood systems is the cornerstone of this strategic framework, which prioritizes expanding agrifood trade, including within the GMS, as a crucial driver of economic growth. Digital technologies and emerging innovations will play a significant role in this transformation. The framework prioritizes enhancing livelihoods for smallholder farmers through increased productivity and reduced wastage and food loss all of which have an impact on food security. Meeting market and customer demands for safe and green products will be central to the vision, together with the continuous promotion of sustainable farming systems for rural communities and low-carbon value chains for agribusinesses as integral components of the strategic direction.

A. Economic Growth

Over the past decade, the GMS has witnessed economic expansion, with an estimated average annual growth rate exceeding 6%[3]. This growth trajectory can be attributed to several factors. Increased foreign direct investment (FDI) fueled infrastructure development, industrialization, and job creation. Trade liberalization initiatives and active participation in global markets facilitated exports of agricultural products, manufactured goods, and tourism services.

The COVID-19 pandemic in 2020 marked a turning point for the GMS economies. The decline in the annual growth rate reflects the global economic slowdown caused by disruptions to value chains, travel restrictions, and a decrease in business activity. However, a recovery in Gross Domestic Product (GDP) growth for most GMS countries has been noticeable since 2021.

Figure 1: Annual GDP growth in GMS countries from 2017-2023

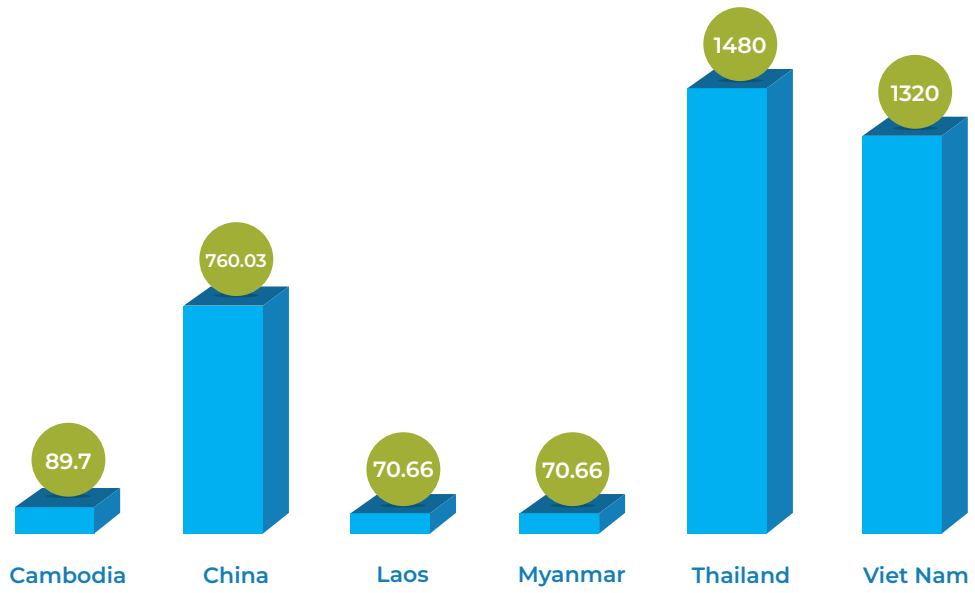


Source: World Development Indicators (Retrieved on July 20, 2024)

The economic performance of the GMS countries in 2022 has been significant in terms of contributions to GDP at purchasing power parity (PPP) from various sectors (Figure 2). Cambodia's ongoing modernization of its agrifood sector and improvements in infrastructure have positively impacted its economy, as reflected in its strong GDP growth. Similarly, Lao PDR's investments in renewable energy and infrastructure, including the Laos-China railway, underscore its economic momentum. China has made substantial contributions to the regional economy, driven by cross-border trade and agricultural development. In contrast, Myanmar's economic growth has been sluggish due to political and economic challenges, though efforts to stabilize the agrifood sector continue. Meanwhile, Thailand and Viet Nam show robust economic resilience, with Thailand's dynamic agrifood sector, tourism and strong export markets, and Viet Nam's thriving manufacturing and agrifood exports playing key roles in their GDP growth.

[3] The World Bank. 2024. Retrieved from World Development Indicators | DataBank (worldbank.org)

Figure 2: GMS Countries Annual GDP at PPP in 2022



Source: GDP Growth in Asia and the Pacific, Asian Development Outlook (ADO) | ADB Data Library | Asian Development Bank (Retrieved on July 20, 2024)

B. GMS Socio-economic Profile

The GMS presents a complex tapestry of economic development, with member countries at various stages of progress. This diversity presents both challenges and opportunities for transforming agrifood systems in the region. On one hand, countries like PRC, with its massive economy and robust infrastructure, have the potential to invest heavily in modernizing agricultural practices and food production technologies. Additionally, middle-income nations like Thailand and Viet Nam boast growing consumer demand for diverse and high-quality food products, driving market-oriented reforms within their agrifood systems. However, significant hurdles remain, particularly in less developed countries within the GMS. Persistent poverty, as seen in some countries, limits access to essential resources like improved seeds, fertilizers, and irrigation technologies. This, coupled with high inflation rates, can hinder investments in sustainable agricultural practices and food security initiatives. Moreover, the prevalence of childhood stunting and moderate to severe hunger levels in these countries highlights the need for targeted interventions to improve dietary diversity and nutritional outcomes. As highlighted in the Food and Agriculture Organization's (FAO) State of Food Security and Nutrition in the World 2024 report, these countries face challenges such as limited access to essential services, inadequate infrastructure, and climate vulnerability.[4] These factors hinder investments in sustainable agricultural practices and perpetuate cycles of food insecurity. Table 1 below provides a snapshot of the socio-economic profile of the GMS countries illustrating the wide divergence between the countries on several indicators.

[4] https://www.fao.org/publications/home/fao-flagship-publications/the-state-of-food-security-and-nutrition-in-the-world/en

Table 1: Socio-Economic Profile of GMS countries

Indicator	Cambodia	PRC	Lao PDR	Myanmar	Thailand	Viet Nam
Population (million) - 2023	17.09	1409.6	7.55	54.58	70.06	100.31
Population below National Poverty Line (%) 2022[1]	17.8	n/a	18.3	24.8	6.8	6.7
GDP Growth (%) (2023)	5	5.2	3.7	0.8	2.6	5
Inflation (%) 2023	2.1	0.2	31.2	22	1.2	3.3
Undernourishment (% of population) - 2020	4.8	<2.5	4.7	3.8	5.2	5
Prevalence of Stunting (% below 5 years old) 2022	21,9	4.6	27.7	24.1	11.8	19.3
Prevalence of Wasting (% below 5 years old) 2022[2]	9.6	1.9	9	7.4	7.7	4.7
Global Hunger Index 2023 (rank out of 125 countries)[3]	67	4	74	72	51	54
Prevalence of Severe food security 2020-22 (% of population)	14.8	n/a	7.2	5.0	5.2	1.2
World Risk Index 2023 (rank out of 193 countries)[4]	65	10	127	6	23	15
Human Development Index 2023 -24 (rank out of 193 countries)[5]	148	75	139	144	66	107

[1] https://hdr.undp.org/system/files/documents/global-report-document/hdr2023-24reporten.pdf
[2] State of Food Security and Nutrition in the World 2024. https://openknowledge.fao.org/handle/20.500.14283/cd1254en and https://data.adb.org/dataset/basic-statistics-asia-and-pacific
[3] Higher number rank indicates increased hunger levels. https://www.globalhungerindex.org/ranking.html
[4] Based on exposure, vulnerability, susceptibility, lack of coping capacities and lack of adaptive capacities. Lower number rank indicates high risk. https://weltrisikobericht.de/en/#iLightbox[46dc504658f1cec6166]/0
[5] https://hdr.undp.org/system/files/documents/global-report-document/hdr2023-24reporten.pdf

The FAO's report Future of Food and Agriculture – Drivers and triggers for transformation identifies several factors influencing the transformation of agrifood systems. The report underscores the importance of inclusive and equitable growth for successful agrifood system transformation. In the context of the GMS, bridging the socio-economic gap between member countries is crucial. This could involve knowledge sharing and technology transfer from more developed nations to support sustainable intensification and improved resource management practices in less developed countries.[5] Additionally, fostering regional cooperation on climate change, soil and water resources management, agrifood quality and safety standards and trade facilitation can create a more integrated and competitive market for GMS agricultural products. By addressing these disparities and fostering collaboration, the GMS can leverage its diverse strengths to build a more sustainable agrifood system for the future.

[5] https://openknowledge.fao.org/server/api/core/bitstreams/002ef5c5-3501-413f-b226-c87da30a7a29/content

In the GMS context, transformation translates to a need for targeted interventions that address the specific challenges faced by each member country. For instance, Cambodia and Lao PDR may require strategies that promote access to credit and financial services for smallholder farmers, while simultaneously improving rural infrastructure and extension services. This can empower them to adopt climate-smart practices and diversify production, ultimately enhancing food security and contributing to a more sustainable agrifood system. Conversely, countries like Thailand and Viet Nam, with their lower poverty rates and more improved infrastructure, can leverage their strengths to become regional leaders in innovation and technology adoption. Investments in research and development coupled with knowledge sharing mechanisms across the GMS can foster the region's collective transformation towards a more resilient, inclusive, and sustainable agrifood future.

Beyond the contrasts in economic development and food security, several other socioeconomic factors significantly influence agrifood systems within the GMS. Rapid urbanization, coupled with changing dietary preferences, is driving shifts in agricultural production towards higher-value crops, livestock and aquaculture. While this can offer new economic opportunities, it may also lead to land-use changes, environmental degradation, and increased reliance on external inputs.

Additionally, the region's vulnerability to natural disasters, such as floods, droughts, and typhoons, exacerbates food insecurity and hampers agricultural development. More recently heatwaves have led to record temperatures across the GMS affecting the production of various agricultural commodities and threatening farmers' livelihoods. Understanding these interconnected socio-economic factors is essential for designing effective interventions to transform the GMS agrifood systems. By addressing these challenges, policymakers and development practitioners can create an enabling environment for sustainable agriculture, improved livelihoods, and enhanced food security for all.

C. Changing Landscape of the Agrifood Sector

Balancing Food Security and Export Competitiveness

The GMS faces the dual challenge of ensuring food security for its population while capitalizing on its agricultural export potential. As urbanization and population growth accelerate, the demand for food security has become increasingly critical across the subregion. According to the 2022 Food Security Index, the GMS countries show varying levels of food security, with challenges in availability, affordability and quality affecting different parts of the subregion. While agriculture plays a central role in both livelihoods and national economies, the subregion's food security landscape is highly diverse, with significant disparities in food access and availability.

Table 2: GMS Country Food Security Index 2022

Rank	Country	Overall	Affordability	Availability	Quality and Safety	Sustainability and Adaptation
78	Cambodia	55.7	74.3	54.5	54.0	33.9
25	People's Republic of China	74.2	86.4	79.2	72.0	54.5
81	Lao PDR	53.1	59.7	51.8	51.7	47.0
72	Myanmar	57.6	62.1	53.5	64.4	49.0
64	Thailand	60.1	83.7	52.9	45.3	51.6
46	Viet Nam	67.9	84.0	60.7	70.2	52.2

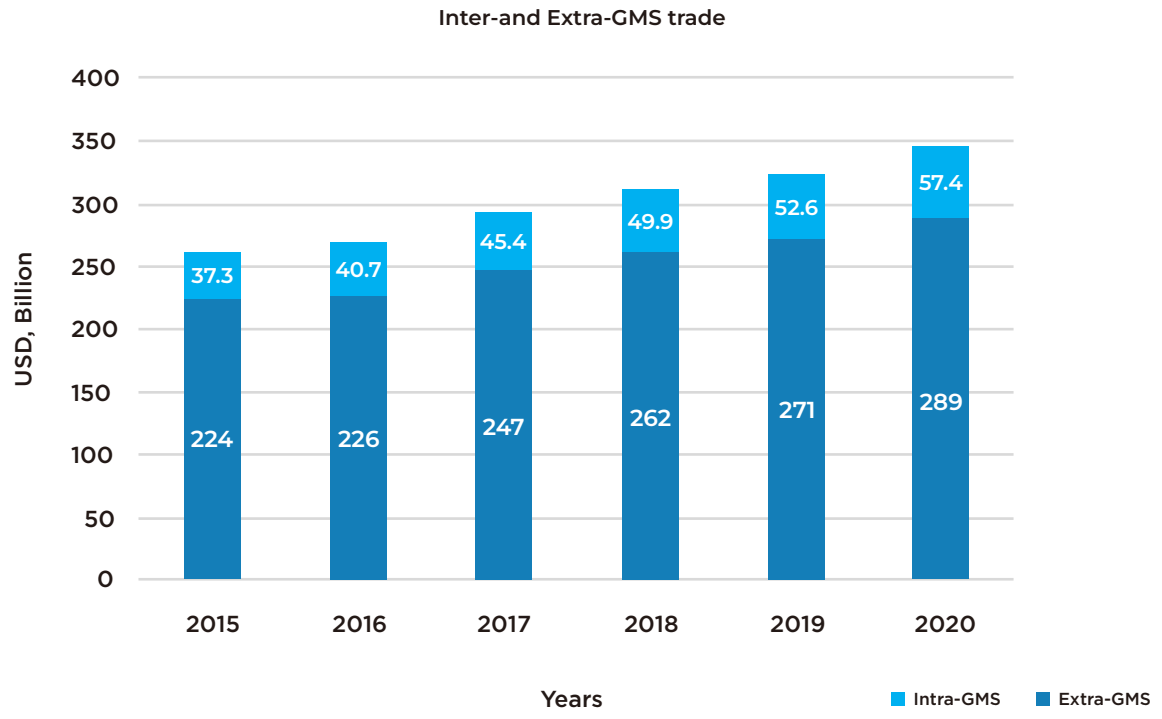
Source: Economist Impact. 2024. Global Food Security Index 2022.

Economic access to food is still an issue, particularly for low-income households, which spend a significant portion of their income on food. Household income levels in the GMS directly influence food affordability, making poorer communities more susceptible to price fluctuations. A mix of policies, including targeted cash transfers, food subsidies, and enhanced market access, is essential to ensure that all segments of society have sufficient access to nutritious food.

The urbanization rate in the GMS is accelerating, with projections showing a rapid rise from 42% in 2010 to over 50% by 2050.[6] The region is witnessing major shifts driven by economic growth, industrialization and migration from rural to urban areas. The number of urban centers is increasing, especially small and medium-sized towns that are emerging as hubs of economic activities. It presents both opportunities and challenges for the agrifood system. On one hand, urban centers drive demand for premium, safe and diverse food products, opening up new markets for high-value products. On the other hand, the rapid expansion of cities puts pressure on rural agricultural systems to produce more while facing limited land resources, environmental degradation and shifting labor dynamics. The growing urban populations are increasingly reliant on a stable and resilient supply of food from rural areas, underscoring the need for efficient and sustainable food systems capable of reconciling domestic requirements with export goals.

[6] https://www.adb.org/sites/default/files/publication/185008/urban-development-gms.pdf

Figure 3: 2015-2020 Intra- and Extra-GMS Trade Value



Source: GDP Growth in Asia and the Pacific, Asian Development Outlook (ADO) | ADB Data Library | Asian Development Bank (Retrieved on July 20, 2024)

Export competitiveness remains a core objective for many GMS countries, which are key suppliers to global markets of rice, seafood, fruits and other agricultural products. The GMS countries are key players in both intra- and extra-regional agricultural trade. Intra-GMS trade in agricultural products recorded robust growth of 10.3% annually before the COVID-19 pandemic and continued growing at 9.2% during the pandemic. In 2020, the value of intra-GMS agricultural trade reached $57.4 billion, accounting for 16.6% of the subregion's total agricultural trade.

PRC, Thailand, and Viet Nam remain the dominant players in intra-GMS agricultural trade as of 2021, serving as key hubs for agricultural products within the region. These three countries benefit not only from diverse agricultural capabilities, but also from advanced logistical and infrastructure networks that include major ports and sophisticated transportation systems. This infrastructure, combined with active participation in regional and bilateral trade agreements and economic communities promotes efficient trade flows and lowers tariff barriers throughout the region. For Cambodia, Lao PDR, and Myanmar (CLM countries), deeper integration into these established trade networks presents significant opportunities. These include access to larger and more diverse markets, as well as the potential to attract investments in infrastructure development, which could boost their own agricultural exports. Furthermore, by participating in capacity-building and trade facilitation programs supported by PRC, Thailand, and Viet Nam, CLM countries can boost their competitiveness and status in the regional agricultural market. This dynamic highlight the interconnected nature of GMS countries in fostering a cooperative trade environment, as PRC, Thailand, and Viet Nam's leading roles in agricultural exports can have a significant impact on economic opportunities for their neighboring countries within the GMS framework.

Table 3: Intra-GMS Agricultural Trade in 2021

Exporter	Partner						
	Cambodia	PRC	Lao PDR	Myanmar	Thailand	Viet Nam	World
Cambodia	-	433,416	692	97	268,399	1,533,132	922,465
PRC	170,537	-	52,540	496,008	4,052,590	5,101,269	73,287,109
Lao PDR	9,600	346,483	0	2,322	331,238	775,536	1,520,164
Myanmar	11,188	1.689.830	0	-	673,716	187,531	4,190,738
Thailand	1,395,166	9,686,624	784,808	1,248,604	-	1,425,490	37,555,238
Viet Nam	566,166	5,384,514	102,417	39,813	557,497	-	335,792,598

Unit: $'000
Source: International Trade Center. 2024. Trade Map - Trade statistics for international business development

The focus on agrifood exports must be balanced, however, with ensuring stable domestic food supplies. Export-oriented agriculture, if not managed carefully, can exacerbate food insecurity by prioritizing high-value crops for global markets over staple foods needed locally. In addition, barriers such as non-tariff measures (NTMs) add complexity to the trade landscape, with regulatory discrepancies between GMS countries limiting the potential for deeper integration[7]. Harmonizing these regulations could boost both the volume and variety of traded agrifood products across the subregion, thereby enhancing both food security and export competitiveness.

Regional cooperation initiatives should also focus on market-driven and industry-led setting of agrifood standards and developing joint strategies for better intra-GMS trade facilitation. Case in point is that the strong growth of supermarkets (especially in PRC and Thailand) throughout the GMS signifies a major shift in consumer behavior and retail dynamics, moving from traditional wet markets to modern retail formats. This change is driven by rapid urbanization, increasing income levels, substantial foreign direct investment from multinational retail chains, and shifting consumer preferences towards convenience, variety, and safety. Although, this also impacts local markets and producers, often challenging smallholder farmers to meet higher standards for volume, consistency, and quality, this also offers a good opportunity for farmers to scale operations and access larger markets through partnerships and cooperative groups.

Furthermore, the integration of e-commerce, especially post-COVID-19, allows for broader market reach and catering to the increasing consumer preference for online grocery shopping. Along with this is an increasing focus on sustainability, with more organic and locally sourced products being offered to meet consumer demands – a positive transformation that is reshaping the GMS agrifood landscape, presenting both new opportunities and challenges. This supply chain modernization should be supported along with enhancing logistics, reducing post-harvest losses, and improving the overall quality of produce. It also enforces stricter food safety and traceability standards, which benefits the entire food sector by raising consumer trust and compliance with safety regulations. Under the GMS agriculture program, digital traceability systems have been instrumental in enhancing agricultural exports, particularly for high-value products like durians. For example, under the ADB's TA-9916 – GMS Sustainable Agriculture and Food Security Program, digital traceability was used to support the export of durians to PRC. This involved partnerships with the Thailand National Science and Technology Development Agency (NSTDA) and GS1, which helped in implementing standards and technologies that ensured the fruits met the stringent safety and quality requirements of international markets.

[7] https://www.iseas.edu.sg/wp-content/uploads/2022/04/ISEAS_Perspective_2022_48.pdf

III. DRIVERS OF TRANSFORMATION: BARRIERS TO PROGRESS AND OPPORTUNITIES FOR GROWTH

III. DRIVERS OF TRANSFORMATION: BARRIERS TO PROGRESS AND OPPORTUNITIES FOR GROWTH

The FAO's report on The Future of food and agriculture – Drivers and triggers for transformation identifies 18 key interconnected socio-economic and environmental drivers that impact and shape the future of agrifood systems. The drivers have been organized into four broad groups:

(a) Systemic (overarching) drivers

(b) Drivers directly affecting food access and livelihoods

(c) Drivers directly affecting food and agricultural production and distribution systems

(d) Drivers regarding environmental systems

This section highlights the key drivers in the context of the GMS, the challenges faced and the opportunities for growth.

1. Demographic Shifts and Food Diversification

Rapid urbanization is a defining feature of the GMS, with cities attracting a growing number of the population. The World Bank projects that by 2050, over 60% of the GMS population will reside in urban areas, up from around 40% in 2015. This urban influx is driving a significant shift in dietary preferences. Urban dwellers are increasingly consuming more processed foods, meat, dairy, and fresh produce, reflecting a move towards higher value agrifood products. Rising incomes and urbanization are causing dietary shifts towards higher value meat and dairy products. The Food and Agriculture Organization (FAO) projected that meat consumption in Southeast Asia to increase by 24% between 2016 and 2026. This is supported by the growing livestock industry and the expansion of corn production in Thailand, Lao PDR, and Myanmar.

Recently, the market for plant-based proteins and meat alternatives is expanding rapidly in the GMS. A report by Euromonitor International (2023) indicates a significant increase in the consumption of plant-based proteins across the region.[8] For instance, Thailand has seen a rise in the sales of plant-based meat products over the past two years, reflecting a growing consumer preference for healthier and more sustainable food options.

While meat consumption continues to grow with the higher income of the urbanized population, the demand for alternative protein sources is gaining momentum. Innovative protein sources, such as insect-based proteins and lab-grown meat, are also making inroads in the GMS. Cambodia and Viet Nam are investing in the development of insect farms, which provide high-protein feed for both human consumption and livestock, offering a sustainable and efficient protein source. Cricket farming, for instance, is well-established as a sustainable protein source in the GMS.[9] A study by Yhoung-Aree and Viwatpanich (2005) identified 164 species of edible insects reared in Lao PDR, Myanmar, Thailand and Viet Nam.[10] As the global market for these products expands, GMS countries are making substantial investments in insect farming. These developments offer new opportunities for diversification within the GMS agrifood sector, promoting the exploration of alternative protein sources that address both health and environmental concerns.

At the same time, economic growth in the GMS is leading to a rise in purchasing power. The ADB forecasted that the middle-income group in the GMS will expand significantly in the coming decades, further boosting demand for higher-quality food. This increased purchasing power is enabling consumers to access a wider variety of food options, including imported goods and specialty products. Furthermore, there is a growing awareness among consumers about the importance of safe and nutritious food. This is driving demand for sustainably produced, organic, and locally sourced food. Concerns about food safety and contamination are also on the rise, prompting consumers to seek products with clear labeling and traceability.

Recent market dynamics in the GMS underscores the region's growing penetration into premium international markets. The growing demand for higher value agrifood products presents prospects for farmers to diversify production and increase incomes. Farmers are increasingly cultivating higher value products that can be efficiently transported over longer distances. This trend is already established in a variety of specialty crops, including aromatic rice, tropical fruits, coffee, and herbal tea across GMS. However, meeting the growing demand for safe and nutritious food will require investments in sustainable agricultural practices, improved infrastructure, and strengthened food safety systems. A key driver of this shift is the increasing demand for safe, traceable, and high-quality food products. However, despite these opportunities, challenges remain in aligning food safety standards and ensuring equitable access to certification processes.

[8] Fazira, E. 2023. Plant-based in Asia Pacific: What's next? Euromonitor.
[9] van Huis, A., Van Itterbeeck, J., Klunder, H., Mertens, E., Halloran, A., Muir, G., and Vantomme, P. 2013. Edible insects: future prospects for food and feed security. FAO forestry paper No. 171. FAO.
[10] Yhoung-Aree, J. and Viwatpanich, K. 2005. Edible insects in the Lao PDR, Myanmar, Thailand, and Viet Nam. In M.G. Paoletti, ed. Ecological implications of mini livestock, pp. 415–440. New Hampshire, Science Publishers.

To meet the demands of the expanding higher value and quality markets, farmers often resort to unsustainable practices to increase productivity. Although such methods can temporarily increase income, they may also entail higher production costs, import dependence, and excessive agrochemical use, which degrade soil quality, undermine biological diversity. These problems can be compounded by monocropping that creates income volatility and undermines local food security. Farmers need a deeper understanding of consumer preferences, production technology, cost, and market dynamics to sustainably align themselves with external markets and local needs. Additionally, global market integration poses further challenges as competition from imported agrifood products makes it difficult for smallholder farmers to compete and sustain their income.

Many smallholders and micro, small and medium enterprises (MSMEs) in the GMS struggle to meet the food safety requirements that are often mandatory for accessing premium markets due to the costs associated with certification, such as obtaining Good Agricultural Practices (GAP) or organic certification.[11] Further, the complexity of complying with varying national and international standards creates bottlenecks, particularly in cross-border trade. While food safety systems and traceability frameworks are being established at the national level in a few GMS countries, the frameworks primarily benefit larger agribusinesses with the resources to navigate complex regulatory environments. Meanwhile, smallholders often remain excluded from high-value markets due to their inability to bear the financial and logistical burdens associated with certification and compliance.

To address these gaps, innovative models such as Participatory Guarantee Systems (PGS) are being explored in the GMS. PGS facilitates localized verification and peer-based assurance, enabling small-scale farmers to access local and regional markets that require certified products. This approach effectively bridges the gap between grassroots producers and premium market opportunities. There is also a growing interest in utilizing geographical indications (GIs) and region-specific certifications which provide added value and market recognition for local products.

GIs protect the reputation of local foods by associating their identity with a specific geographic origin,[12] such as Kampot pepper in Cambodia or Thai jasmine rice. The GIs not only promote regional specialties but also function as a branding tool that can enhance the marketability of products in premium markets, often with simplified certification processes. Moreover, ongoing advancements in digital traceability systems are improving transparency and safety throughout the value chain.

Another key challenge in addressing food safety is harmonizing policies and practices across the subregion. A framework that aligns national standards with international best practices, such as those established by Codex Alimentarius, will be critical to ensure compliance and enhance market access for GMS products.[13] Furthermore, modernizing trading systems and integrating regional markets can assist GMS suppliers in adapting to evolving consumption patterns and offer opportunities for expansion into higher-value markets beyond the subregion.

As GMS countries undergo structural transformation, the proportion of their labor force dedicated to the agriculture sector has declined. While some of this reduction in agricultural labor can be attributed to new income generating opportunities from downstream value chain opportunities or the lure of the cities while others can be due to economic and environmental factors. High rural indebtedness, loss of traditional intermediaries, deprivation of resources or limited access to adequate water, agricultural extension services and low agricultural prices push farmers into poverty and necessitate an urban migration. Environmental factors such as drought, floods, and low productivity due to degraded land also drive migration to urban areas. For instance, in Lao PDR, environmental challenges such as deforestation and soil erosion have contributed to rural-to-urban migration. Vientiane, the capital, has experienced an influx of migrants seeking refuge from environmental stressors that affect their agricultural livelihoods.[14]

[11] ADB. 2020. Policies for high quality, safe, and sustainable food supply in the Greater Mekong subregion.
[12] FAO. 2020. Geographical Indications for sustainable food systems. Preserving and promoting agricultural and food heritage; Policy Support and Governance.
[13] Agriculture Information Network Service v2.0. 2019. Harmonizing food safety systems and increasing market access in the Greater Mekong subregion
[14] USAID. 2023. Climate Related Migration: Challenges and Opportunities in Urban Areas.

Establishing the GMS as the leading supplier for safe and environment-friendly agricultural products is the vision of the Strategy for Promoting Safe and Environment-Friendly Agro-Based Value Chains in the Greater Mekong Subregion and Siem Reap Action Plan, 2018–2022 (SASRAP). Building upon the achievements of the previous strategy, there is a need to leverage existing innovation and digitalization initiatives to transform the GMS agrifood system into a sustainable, inclusive, and competitive global trade hub for safe and green agricultural products.

It is, therefore, important that the strategic framework addresses these challenges by reducing rural indebtedness through financial mechanisms and agriculture extension services to assist small farm holders increase productivity and connect with provincial urban markets in the first instance prior to accessing larger regional markets.

2. Economic and Market Dynamics

Globalization and market integration have transformed food supply chains, creating opportunities for trade and investment in the GMS. However, they also expose GMS agrifood systems to market volatility and economic shocks. Policies that promote fair trade, market access and economic diversification are crucial for stability and growth. Harmonization and standardization of policies within GMS countries is critical to be able to access markets within the GMS as well as outside the region. This is essential for the GMS to attract foreign direct investment in the agriculture sector both in primary as well as downstream value chain activities.

The lack of a streamlined and integrated supply chain and logistics network has impeded the ability of some of the developing GMS countries to access national, regional and global markets. Investment in transportation systems, storage facilities, and refrigeration are necessary to ensure that agricultural produce reaches the end consumer within a short time span to ensure its freshness and longer shelf life. Some critical parts of the GMS agrifood systems are becoming more capital intensive and vertically integrated, and consequently they become the preserve of large farm holders and food industry corporates. This alters the existing dynamics as smallholder farmers are unable to compete in terms of yield volume, processing, market access and economies of scale. The COVID-19 pandemic and geopolitical tensions have accelerated the growth of the digital market place that enables corporations to cut across interlinked markets leading to the exclusion of smallholder farmers. As smallholder farmers constitute a majority of the agrarian sector, the strategic framework will seek to enhance competitiveness of selected agrifood value chains using digital technologies and improve livelihood strategies so that farmers are discouraged to move to urban areas. In addition, a greater focus will be on the reduction of food losses and wastage, that claim a significant proportion of agricultural output in the GMS. Reduction of food losses and waste can lessen the need for production increases and reduce GHG emissions.

3. Investment in Agrifood Systems

The Greater Mekong Subregion Economic Cooperation Program Strategic Framework 2030 for the agriculture sector seeks to expand production and regional trade of agrifood products through the adoption of a climate smart value chain approach, promoting food safety and by leveraging economies of scale to low transaction costs and harmonizing standards.[15] Investment projects will focus on supporting agro-industrial zones and parks, agribusiness incubators, livestock health and value chains, fisheries and aquaculture value chains, education and training, improved logistics, and incentives for innovation. The initiatives will also acknowledge the often overlooked and undervalued contributions of women farmers in family-run farms and value chain activities.

As investment in agriculture involves several sectors including water, energy and infrastructure, a multifaceted strategy is required to bolster the resilience and sustainability of the GMS agrifood systems. By investing in infrastructure and technology, the framework aims to strengthen supply chains, reduce food insecurity, and minimize food loss and waste. In addition to enhancing supply chain resilience, it will prioritize a One Health approach, recognizing the interconnectedness of human, animal, and environmental health. This will ensure a more reliable and efficient food system that can better withstand shocks and disruptions.

[15] https://www.adb.org/sites/default/files/institutional-document/678631/gms-economic-cooperation-strategic-framework-2030.pdf.

4. GMS Country Interdependencies

The GMS adopts a programmatic approach that is centred on sub-regional economic cooperation, knowledge sharing and transboundary initiatives. The program is focused on its fundamental strengths of community, connectivity, and competitiveness, while embracing the core principles of environmental sustainability and resilience, internal and external integration, and inclusivity. Given their geographical proximity and linkages, the GMS countries have developed several interdependencies ranging from energy sharing to cross border trade and tourism activities. Interdependencies among agrifood systems have become increasingly prominent in recent decades, driven by factors such as transboundary diseases, natural resource management challenges, and climate change. While these relationships have always existed, their impact has intensified due to globalization and the interconnectedness of modern societies.

Programs and initiatives for the GMS need to be curated with a sub-regional approach while ensuring that country variations and requirements are accounted and integrated into a holistic framework.

5. Technological Advancements and Digitalization

Given its late entry into digitalization, most GMS nations have leapfrogged into the big data era without going through the evolutionary stages. Hence, to their advantage, they are not burdened by issues relating to the upgrading or abandoning of legacy systems. Digitalization and the process of data analysis has been applied to agrifood systems only relatively recently. Digital platforms provide the potential to alter agricultural practices by making markets more accessible and equitable for smallholder farmers. These tools not only increase profitability, but also ensure that the advantages of technology reach some of the world's most marginalized communities, encouraging a more inclusive economic model.

Digital transformation is increasingly recognized as a key enabler for enhancing the competitiveness and resilience of the GMS agrifood sector. As the market landscape evolves and the demand for safer and high-quality food products grows, digital solutions offer scalable pathways to address persistent challenges in fragmented supply chains, inefficient resource management and limited market access for smallholders and MSMEs.

One of the core drivers of digitalization in the GMS is the need for enhanced traceability and transparency within value chains. Digital platforms, such as blockchain technology, are being adopted to ensure that product origin, handling processes and safety standards are verified and accessible throughout the supply chain.[16] This is particularly vital in markets where consumer trust and compliance with international standards are essential for accessing premium segments.

From precision farming techniques that utilize sensors and data analytics to optimize resource use, to e-commerce platforms that connect farmers directly to consumers, digital solutions hold potential to address agricultural challenges in the GMS. Increased productivity and efficiency are at the forefront of these advancements. Using sensor data and analytics, farmers can make informed decisions on fertilizer and water application.[17] Studies in GMS countries found that precision agriculture techniques can increase crop yields while reducing water usage.

Beyond traceability, e-commerce platforms and digital marketplaces are transforming how farmers and agribusinesses connect with markets. By reducing dependency on intermediaries, these digital platforms enable producers to access consumers directly, improving profitability and reducing transaction costs. Digital platforms are indeed transforming the agricultural landscape by enabling farmers to bypass intermediaries and secure better prices for their produce. This advancement not only enhances their livelihoods but also promotes a more equitable agricultural system. Digital marketplaces have increased smallholder farmers' incomes. In Cambodia, farmers using digital platforms saw an increase in profits compared to those relying on traditional markets.

Furthermore, digital tools play a crucial role in enhancing climate resilience. Real-time weather forecasts, early warning systems for pests and diseases, and information on drought tolerant crops help farmers adapt to changing climatic conditions and maintain crop productivity. Pilot projects in Viet Nam have demonstrated that the adoption of digital weather forecasts has led to improved crop yields, while early warning systems have been effective in reducing crop losses.

[16] Osakwe, S., Shahid, N., Ayala, D. L., Limpamont , A. K., & Kittipanya-ngam, P. (2022). Digitalizing rural MSMEs: Thailand's agriculture and tourism sectors.
[17] Ngo, D. M., Doan, H. S., & Mai, V. T. 2019. A Review of Precision Agriculture in Rice Production in Viet Nam. Food and Fertilizer Technology Center Agricultural Policy Platform (FFTC-AP).

Despite these advances, significant barriers to digital adoption persist. Rural areas, which are home to the majority of smallholder farmers in the GMS, often face poor connectivity and limited access to digital infrastructure. The GMS Digital Economy Cooperation report highlights that access to digital infrastructure and services is uneven across the subregion, with rural areas often lacking the connectivity and resources needed to fully benefit from these innovations. While more than 70% of rural households in advanced countries have internet access, digital penetration rates remain below 30% in most developing countries. Furthermore, digital literacy remains a critical challenge. Addressing these barriers requires concerted efforts from both governments and the private sector to invest in rural connectivity, provide training programs and develop user-friendly digital solutions tailored to the needs of small-scale farmers.

Moreover, financial access for adopting digital technologies remains limited. A study from the Mekong Institute highlighted that few farmers in the GMS were aware of designated credit lines for smart technologies.[18] This suggests the need for innovative financial instruments such as equipment rental services, credit guarantees and contract farming arrangements to help smallholders and MSMEs overcome financial barriers. Encouraging the development of incubators and accelerators for agri-tech startups could also foster more inclusive digital transformation by enabling the scaling of solutions that address the specific needs of smallholders.

Opportunities to overcome these barriers include targeted training programs to improve digital literacy, investment in rural broadband infrastructure, and the development of affordable and user-friendly digital tools. GMS governments and the private sector can collaborate to create supportive policies and frameworks that encourage the integration of digital technologies in agriculture.

6. Poverty, Inequality and Food Insecurity

The GMS is characterized by significant disparities in poverty, inequality, and food security. Countries like Cambodia and Lao PDR continue to make progress in dwindling rural poverty rate and in strengthening essential infrastructure and services, while others like Thailand and Viet Nam have made notable progress in poverty reduction. However, even in these countries, pockets of vulnerability and food insecurity persist. Inequality is also pronounced, with disparities in income, education, and healthcare access between urban and rural populations.

Several aspects of agrifood systems perpetuate poverty and inequality, including unequal land distribution, low incomes driven by suppressed food prices, and the exclusion of small producers from value chains. Smallholder farmers face significant challenges due to limited resources to combat natural resource degradation and climate change.

For many rural communities in the GMS agriculture is the primary source of income and livelihood. However, limited access to land, credit, modern agricultural technologies, and markets can constrain the ability of smallholder farmers to improve their incomes and food security. Additionally, climate change natural disasters, and trade policies can further exacerbate these challenges.

Food security is a critical concern in the GMS. Many households, especially in rural areas, struggle with undernourishment and malnutrition. In Cambodia, Lao PDR and Myanmar, for example, the prevalence of stunting among children under five is alarmingly high (between 22% – 27%). The agrifood systems in the region, while vital for livelihoods, are often inefficient and unable to meet the nutritional needs of the population.

[18] Smart Technologies for Agricultural Supply Chain in the CLMTV. Mekong Institute. 2023.

Agrifood systems in the GMS are crucial for economic development and food security but are also a source of vulnerability. The reliance on traditional farming practices and the lack of diversification in crops make the region susceptible to climate change and market fluctuations. To tackle poverty, inequality, and food insecurity in the GMS, a multifaceted approach is necessary. One effective strategy is to enhance agricultural productivity through the adoption of modern farming techniques and technologies. For example, Viet Nam has seen success with the introduction of high-yield rice varieties and improved irrigation systems, which have significantly boosted production and farmer incomes. Another approach is to strengthen rural infrastructure, including roads, storage facilities, and market access. Improved infrastructure can reduce post-harvest losses and enable farmers to sell their produce at better prices. In Thailand, investments in infrastructure facilitated better market integration and increased income for rural households.

Sustainable agrifood systems are key to long-term food security and poverty reduction. Practices such as agroforestry, conservation agriculture, and integrated pest management can enhance productivity while preserving the environment. In Laos, agroforestry projects have shown promise in improving soil health, increasing biodiversity, and providing additional income sources for farmers. Moreover, regional cooperation and policy harmonization can play a significant role in addressing these challenges. Collaborative efforts among GMS countries to share knowledge, resources, and best practices can lead to more resilient and sustainable agrifood systems.

7. Inflation and Food Prices

Since 2021, GMS countries have witnessed high inflation and elevated food prices, first due to the COVID-19 pandemic and the disruption of supply chains, and later by increased geopolitical tensions and lately due to increased heat stress, floods and related climate change impacts. The continued degradation of natural resources, the effects of climate change on crop yields, pests, and diseases, along with the impact of pollutants on pollinators and uncoordinated policies, all contribute to growing uncertainty and tensions that could drive food prices even higher.

Agrifood systems in the GMS are significantly impacted by inflation and rising food prices. Higher input costs, such as seeds, fertilizers, and fuel, reduce the profitability of farming, making it challenging for smallholder farmers to sustain their livelihoods. Additionally, increased food prices can lead to reduced consumption of nutritious foods, exacerbating malnutrition and food insecurity in the region.

Inflation also affects the entire agrifood value chain, from production to distribution and retail. For instance, transportation costs rise with fuel prices, making it more expensive to move goods from farms to markets. This can lead to higher retail prices and reduced access to affordable food for consumers. The agrifood systems' vulnerability to inflation highlights the need for resilient and sustainable practices to mitigate these impacts. Both Lao PDR and Myanmar are currently experiencing very high inflation, 31% and 22%, respectively and this is disproportionately adversely affecting the most vulnerable sections of the population who spend a larger share of their income on food.

Opportunities to overcome these inflationary challenges are to enhance agricultural productivity through the adoption of modern technologies and practices, strengthening food supply chains by improving infrastructure and logistics and providing fiscal or in-kind incentives to farmers for agricultural extension services.

8. Transition in Workforce, Gender and Inclusivity

The agrifood sector remains the backbone of the GMS economies. This sector contribution to economic growth is vital for the livelihoods of millions. Over 60% of the GMS' 340 million inhabitants are engaged in agriculture, either directly or indirectly, which supports nearly 200 million people. Despite significant economic diversification, agriculture remains a primary source of income and employment, particularly in rural areas.

In 2022, it was estimated that about 23-70% of the employed population in GMS countries was engaged in agricultural activities.[19] This reflects a slight decline from previous years, indicative of ongoing urbanization and shifts towards other economic sectors. The sector is now facing a labor shortage, and temporary solutions include hiring migrant workers to address the manpower deficit.

Small-scale farming is the predominant mode of production, with average farm sizes being less than two hectares. This small-scale nature of farming presents challenges with access to mechanization, resources, financial services, and markets. Land tenure insecurity and limited access to land ownership or secure land use rights can constrain agricultural investment and productivity. As one of the consequences, many farming households fall below the national poverty line.

Inclusivity and gender empowerment are essential for achieving equitable and sustainable growth in the GMS agrifood sector. However, significant barriers remain regarding access to resources, market opportunities, and leadership roles for women, youth, and disadvantaged groups.

In many GMS countries, traditional gender roles continue to restrict women's participation in decision-making processes and economic activities.[20] Despite their crucial contributions to agriculture, women are frequently relegated to low-paying or unpaid roles with limited access to training, financial services, and land ownership.

[19] The World Bank. 2024. Retrieved from World Development Indicators | DataBank (worldbank.org)
[20] USAID. (2023). GENDER ANALYSIS REPORT Climate Resilient Agriculture in the Mekong Delta. https://pdf.usaid.gov/pdf_docs/PA00ZTR9.pdf

Initiatives for land registration and titling are often hindered by customary tenure practices and legal ambiguities.[21] In rural areas, women are primarily responsible for food production and household nutrition, yet they face significant barriers to accessing resources such as seeds, technology, and training needed to enhance productivity.[22] These activities often occur within small-scale agricultural businesses, underscoring the need for inclusive policies that support both female farmers and agri-entrepreneurs and the associated value chains. Although, efforts have been made to improve women's access to agricultural training and education, these programs are often underfunded or limited in scope. Empowering women through targeted financial inclusion initiatives, such as microfinance programs and women-focused agricultural extension services, can foster more equitable economic growth. Additionally, programs designed to enhance women's leadership skills and support female entrepreneurship in agribusinesses are crucial for ensuring that women play a central role in the sector's transformation.

Many young people in the GMS are migrating to urban areas in pursuit of better employment opportunities, resulting in an aging farmer population and reduced innovation in rural areas. Encouraging youth engagement in agriculture through modern digital and mechanical technologies and innovative farming practices that reduce labor demand and shifting to higher-value products and higher-income markets can attract a new generation of farmers. Policies that encourage and support youth to become agri-entrepreneurs and provide processing, marketing, and other professional services to farmers are also needed to provide opportunities for rural youth. Initiatives such as agricultural education programs, entrepreneurship training, and access to digital tools are crucial for empowering young people to see farming, agribusinesses and agricultural services as viable and profitable careers.

9. Financial Access

Despite their significant role in the subregion's agricultural value chains, smallholders, MSMEs, women, and youth frequently face challenges in securing the capital necessary for investing in productivity-enhancing technologies, expanding operations, or transitioning to more sustainable practices. High interest rates, stringent collateral requirements, and a lack of tailored financial products present substantial obstacles. Financial institutions in rural areas often perceive small-scale agricultural enterprises as high-risk, further restricting access to affordable credit.

Many traditional financing mechanisms do not adequately address the unique challenges faced by agribusinesses in the GMS, including income seasonality, fluctuating market conditions, and the long-term nature of returns on agricultural investments. These constraints discourage smallholders and MSMEs from pursuing innovation and scaling up their operations, resulting in underinvestment in sustainable agricultural practices and technologies.

However, increasing opportunities exist to overcome these financial barriers through innovative financing mechanisms. Blended finance models, which combine public and private sector funds, are being explored to mitigate investment risks in sustainable agriculture. For instance, green bonds and impact investment funds are emerging as viable sources of financing for CSA, value chain optimization, and agroecological initiatives. Microfinance institutions and digital financial platforms are enhancing access to small-scale loans and credit in rural communities, facilitating farmers' investment in essential inputs and technologies.

[21] Daley, E., Campbell, N. Y., Lowry, J. (2024). Outlook on Gender and Land in the Mekong Region. Brief. Vientiane: Mekong Region Land Governance.
[22] Hett, C., Aye, Z. C., Gironde, C., Beban, A., Castella, J., Bernhard, R., & Ehrensperger, A. (2023). Agroecological initiatives in the Mekong Region: a systematic literature review and mapping reveals their implications for transitioning to sustainable food systems. Journal of Land Use Science, 18(1), 334–355. https://doi.org/10.1080/1747423x.2023.2248980

10. Environmental and Natural Resource Pressures

Agrifood systems depend upon natural resources and are also a major cause for the depletion of natural resources. As agrifood activities intensify, they drive significant changes in land use, agricultural practices, resource exploitation, climate change, pollution, and the spread of invasive species. It also exerts considerable pressure on natural resources, particularly land and water. The GMS is experiencing significant land degradation and water scarcity, with agriculture being the largest consumer of water, accounting for nearly 70% of overall consumption despite growing urbanization and industrialization. By 2030, ADB projected that the demand for water and energy is projected to increase by 40%, as the sector is expected to produce 30%–50% more food. The interdependence of water, energy, and food security means that interventions in one area impact the others. Unsustainable farming practices exacerbate water scarcity and limit productivity, making agriculture highly vulnerable to extreme weather events. This has potentially dramatic implications for food security and requires substantial improvements in managing the WFE Nexus in the transboundary context of the GMS.

Linked closely to these climate challenges is the issue of deforestation, which not only accelerates biodiversity loss but also destabilizes essential ecosystem services such as water regulation, carbon sequestration and soil fertility. The degradation of natural forests heightens the subregion's vulnerability to climate change, as forests play a critical role in mitigating its effects through carbon dioxide absorption and buffering against extreme weather events. Unfortunately, if current trends persist, the GMS is projected to lose another third of its forest cover by 2030.[23] While some countries have made progress in reforestation efforts, much of this has been through monoculture plantations, which lack the ecological diversity needed to sustain long-term environmental health.

The interaction between food systems and climate is a key driver of transformation, with food systems both contributing to and being affected by climate change. Food systems account for about one-third of all human-caused greenhouse gas (GHG) emissions, with agriculture, livestock, and land-use changes being major sources. Agricultural activities in the GMS, which include rice cultivation, livestock rearing, and the extensive use of synthetic fertilizers, are essential to livelihoods but also

[23] WWF Greater Mekong Programme. The Greater Mekong and Climate Change: Biodiversity, Ecosystem Services and Development at Risk, text, October 2009; Chulawich 1 Building, 5th Floor Chulalongkorn University Henri Dunant Road Bangkok, 10330, Thailand. (https://digital.library.unt.edu/ark:/67531/metadc226573/: accessed August 22, 2024), University of North Texas Libraries, UNT Digital Library, https://digital.library.unt.edu

contribute significantly to GHG emissions. In 2020, on-farm emissions in the GMS accounted for approximately 1.1 gigatons of CO2-equivalent, representing a substantial portion of global agricultural emissions. The primary sources of these emissions are rice cultivation (25%), animal husbandry (23%), and synthetic fertilizer application (15%).[24] As the agricultural sector continues to expand, the subregion faces the dual challenge of supporting economic growth while addressing its environmental footprint. To limit global warming to below 2°C above pre-industrial levels, annual greenhouse gas emissions from agriculture must be reduced by as much as 75%.

While some emissions reductions have been achieved through land-use changes, growing emissions from agriculture and post-harvest activities continue to rise. Climate change, in turn, is increasingly impacting food systems, leading to lower crop yields, reduced food quality, and altered ecosystems. Extreme weather and higher temperatures are disrupting food production and accessibility, threatening to reverse progress in the fight against hunger and malnutrition.

Altered rainfall patterns, temperature extremes, and increased frequency of droughts and floods pose serious threats to agricultural production. Projections indicate that without concerted action, climate change could reduce rice yields by 50% and GDP by 7% in Thailand and Viet Nam by 2050. Concurrently, agriculture significantly contributes to climate change, accounting for about 14% of global GHG emissions. To limit global warming to below 2°C above pre-industrial levels, annual GHG emissions from agriculture must be reduced by as much as 75%. Over the past decades, temperatures in the GMS have increased by 0.5 to 1.5 degrees Celsius, with projections indicating a further rise of 2 to 4 degrees Celsius by the end of the century.[25] These changes are already contributing to reduced crop yields, prolonged droughts, and devastating floods. For instance, the Mekong Delta, a key agricultural area, is increasingly affected by salinization and sea-level rise, threatening rice production and the livelihoods of millions. These climate-related challenges disproportionately impact smallholder farmers, who often lack the resources and knowledge needed to adapt effectively.

Many investments in the agricultural sectors of GMS countries that have been made in response to market dynamics (or climate change) have not considered cross-sector trade-offs, so-called Nexus trade-offs. Nexus trade-offs create economic and societal losses as benefits in one sector cause costs in other sectors, typically between water, food, energy, and the environment. While other parts of the world have moved towards integrating this Water-Food-Energy (WFE) Nexus risk perspective into the planning stage of agricultural investments, it remains largely absent in GMS countries. The ADB strongly promotes the integration of the WFE Nexus in the GMS as it is clear that solutions must be found to assure water security, thereby eliminating the immediate - and increasing - risk to food security, energy security, and economic growth and stability.[26]

Addressing these interconnected challenges presents both barriers and opportunities. Resource depletion, driven by the intense demand for water and land from agriculture, leads to long-term sustainability concerns. The sector's high vulnerability to climate change impacts further threatens agricultural productivity, food security and economic stability.

These intertwined challenges require a shift toward sustainable land-use practices that balance agricultural productivity with environmental stewardship. Climate-smart agriculture (CSA), agroforestry, and regenerative farming practices offer practical solutions to enhance both sustainability and resilience. For example, CSA techniques like alternate wetting and drying in rice cultivation can reduce methane emissions by up to 50%, while agroforestry integrates tree planting into agricultural landscapes, improving soil health water retention and biodiversity.[27] These approaches not only mitigate environmental impacts but also enhance the resilience of farming systems to climate shocks and offer pathways to increase efficiency and reduce environmental impact. Strategic policy support and investment in sustainable agriculture can drive the adoption of practices that mitigate climate change impacts and promote resource conservation.

[24] Bößner, S., & Mal, M. (2024). Tackling emissions from agriculture: A perspective from the Mekong countries. SEI brief. Stockholm Environment Institute. https://doi.org/10.51414/sei2024.002
[25] WWF Greater Mekong Programme. The Greater Mekong and Climate Change: Biodiversity, Ecosystem Services and Development at Risk, text, October 2009; Chulawich 1 Building, 5th Floor Chulalongkorn University Henri Dunant Road Bangkok, 10330, Thailand. (https://digital.library.unt.edu/ark:/67531/metadc226573/: accessed August 22, 2024), University of North Texas Libraries, UNT Digital Library, https://digital.library.unt.edu
[26] ADB. Thinking about Water Differently: Managing the Water-Food-Energy Nexus. 2023. https://www.adb.org/publications/thinking-about-water-differently-managing-water-food-energy-nexus
[27] Bößner, S., & Mal, M. (2024). Tackling emissions from agriculture: A perspective from the Mekong countries. SEI brief. Stockholm Environment Institute. https://doi.org/10.51414/sei2024.002

However, weak governance and inconsistent law enforcement continue to undermine conservation and sustainable land management efforts. Strengthening regional cooperation through existing mechanisms, such as the GMS Program, is essential for harmonizing policies, building political consensus and promoting knowledge-sharing to address transboundary environmental challenges. Fostering public-private partnerships and incentivizing sustainable practices can also drive positive change and support both forest conservation and agricultural sustainability within the subregion.

Further opportunities emerge from the improved management of the WFE Nexus as the GMS is increasingly experiencing significant sector trade-offs. Each GMS country faces at least some of these challenges. To improve the management of these Nexus trade-offs requires careful planning and, in some cases, even new policies. Strategically, this is where some of the highest risks for sustainable development in the GMS countries lie. It is critical to stress that introducing the Nexus concept as a strategic focus will not just reduce the risk of unintended side-effects for other sectors (e.g. water, environment, energy) but it will also help safeguarding food security from investments made in other sectors. Strengthening the cross-sector risk management will also contribute to the achievement of a broader set of SDGs as promoting one SDG in isolation can come at the cost of multiple other SDGs. Strategically, high priority Nexus trade-off risks are listed in Box 1 below.

Box 1: High Priority Trade-off Risks

- Agricultural modernization, water resource management, and energy efficiency
- Hydropower development, fish stock decline, and water management
- Water scarcity, agricultural irrigation efficiency, and energy for water pumping
- Water pollution, food safety, and energy-intensive waste treatment
- Overfishing, aquaculture sustainability, and energy for fish farming
- Soil degradation, crop yields, and energy for soil conservation practices
- Climate change impacts on water availability, crop productivity, and energy demand
- Deforestation, watershed health, and renewable energy potential
- Energy access, rural electrification, and agricultural mechanization
- Dependence on hydropower, ecosystem disruption, and agricultural water use
- Renewable energy adoption, water use for energy production, and food processing
- Food security, water use efficiency, and energy for cold storage and transportation
- Land use conflicts, water allocation, and energy distribution
- Infrastructure development, water resource impacts, and food supply chains

IV. GMS 2030 STRATEGIC PATHWAYS TOWARDS AGRIFOOD SYSTEM TRANSFORMATION

IV. GMS 2030 STRATEGIC PATHWAYS TOWARDS AGRIFOOD SYSTEM TRANSFORMATION

The GMS 2030 Kunming Strategic Framework for Transformation of Agrifood Systems (GMS 2030 KSFTAS) will support the implementation of targeted, GMS-wide interventions that align with national agriculture development plans and strategies related to food security, sustainable food systems, green agricultural value chains and climate-smart agriculture (CSA). This will accelerate the actions of each GMS country in achieving its agriculture and food system objectives while addressing shared challenges like climate change, food safety and market integration.

At the same time, this Framework is designed in alignment with several key regional strategies, including:

- **GMS Economic Cooperation Program Strategic Framework 2030 (GMS-2030)** – The GMS 2030 KSFTAS will support the GMS-2030 by promoting food safety, sustainable production, and inclusive value chains. Both frameworks prioritize resilience, sustainability, and digital innovation to position the GMS as a leading global supplier of safe, high-quality agricultural products while addressing food security and post-COVID-19 recovery.
- **GMS Innovation Strategy for Development 2030 (GMS ISD)** – Both strategies emphasize regional collaboration on CSA practices, digital literacy for farmers, and the development of digital infrastructure to optimize resource use, improve food safety, and support small-scale farmers. The GMS 2030 KSFTAS also supports GMS ISD initiatives to strengthen agricultural extension services, facilitate knowledge-sharing and introduce advanced technologies, while addressing agricultural risks through collaborative digital solutions and innovation.
- **The GMS 2030 KSFTAS** complements the GMS Gender Strategy by addressing gender disparities in agriculture, promoting women's access to resources and decision-making, and empowering them to lead and benefit from the transformation of agrifood systems in the GMS. Recognizing that women are predominantly clustered in smallholding agriculture and often limited by literacy, access to finance, and entrenched gender norms, one of the cross-cutting themes promotes gender-responsive approaches to overcome these barriers to ensure that women are not only participants but also key decision-makers in shaping the future of the agrifood sector.

A. Goal and Desired Impact

The goal of this Framework is

By 2030, the GMS agrifood system has transformed into a resilient, sustainable, inclusive, and integrated sector that advances increased productivity, improved food security and nutrition, enhanced market access, and reduced environmental impact through innovation, digitalization, and sustainable practices.

The transformation of the GMS agrifood system will be achieved through interconnected pathways centered on sustainability, inclusivity, resilience and competitiveness. By promoting low-carbon, climate-resilient practices, the Strategic Framework aims to safeguard natural resources and mitigate climate change impacts. Inclusive growth is prioritized by empowering smallholders, women, youth and disadvantaged groups for equitable access to resources and opportunities.

Enhancing food security and resilience through CSA and efficient value chains will augment the region's capacity to withstand shocks. Furthermore, the Framework prioritizes economic competitiveness by positioning the GMS as a leading producer of safe, high-quality and environmentally friendly products, which will be achieved through regional cooperation, policy alignment and market integration.

B. Strategic Focus Areas

Green and Climate-Resilient Agriculture

Emissions from the food system life cycle comprising pre and post production, farmgate and land use change contribute as much as 31% to global GHG emissions.[28] The GMS agriculture sector is a significant contributor to GHG emissions, primarily due to rice cultivation, livestock production and heavy reliance on synthetic fertilizers. Traditional, high-emission agricultural practices in the subregion not only exacerbate environmental impacts but also heighten the sector's vulnerability to climate change. This leads to increased exposure to extreme weather events, declining productivity, and instability within agricultural communities.

In response, the GMS 2030 KSFTAS prioritizes "Green and Climate-Resilient Agriculture" as a key strategic focus. This approach seeks to address the interconnected environmental and socioeconomic challenges within the agrifood system by promoting CSA and enhancing resilience across the value chain. The objective is to reduce emissions throughout the agrifood sector, improve resilience to climate shocks, and enhance economic stability for both farming communities and agribusinesses.

[28] FAO. 2021. The share of agrifood systems in total greenhouse gas emissions Global, regional and country trends, 1990–2019. https://openknowledge.fao.org/server/api/core/bitstreams/ffb21ed0-05dd-46b1-b16c-50c9d47a6676/content#:~:text=between%201990%20and%202019%2C%20but,2.1%20tonnes%20CO2eq%20per%20capita

The GMS 2030 KSFTAS will foster the adoption and scaling of existing CSA practices that integrate efficient land and water management, agroecological approaches and ecosystem-based techniques, complementing the GMS 2030 Strategic Framework for Accelerating Climate Action and Environmental Sustainability. It will support initiatives to build the adaptive capacities of smallholder farmers and agribusinesses by providing them access to climate-resilient technologies, reliable climate risk information, innovative financial tools and tailored capacity-building programs.

Practices such as zero-tillage and carbon sequestration will be promoted alongside renewable energy solutions, including solar power, biogas, and waste-to-energy systems. Integrating these low-emission options into agricultural production, processing, and distribution will accelerate the transition to a low-carbon agrifood system.

The GMS will achieve substantial food security improvements while adapting to accelerating climate change and global market disruptions without risking cross-sector trade-offs and the achievement of a broader set of SDGs. This will entail: conducting Nexus assessments for food sector investments to reveal potential cross-sector trade-offs and synergies; monitoring Nexus trade-offs for recent agricultural investments to collate data for effects between water, food, energy and the environment sectors; and a GMS-wide exchange of Nexus assessment and monitoring results to improve the awareness of cross-sector trade-offs and their quantitative dimension. This will be shared with the energy and water sectors to further safeguard food security from investments made in other sectors.

Technological innovation will be a cornerstone of the strategic focus. This involves investments in energy-efficient storage and processing equipment and sustainable infrastructure on-farm and for all postharvest stages. There is an emphasis on low-cost green technologies and digital innovations that are suitable for micro, small and medium enterprises (MSMEs). Access to green agri finance sources, especially for the micro and small enterprises, and for women and young agri-entrepreneurs will be a priority. Capacity development will support implementation of the low carbon value chain development.

Safe and Quality Agrifood Systems

Food safety, quality and traceability are major concerns in the agrifood value chains within the GMS. As demand for safe, high-quality and traceable agricultural products grows in domestic and international markets, the ability of GMS countries to meet these requirements becomes increasingly critical. However, inconsistent safety standards, inadequate regulatory frameworks and limited capacity in quality control continue to pose significant challenges.

The GMS 2030 KSFTAS places "Safe and Quality Agrifood Systems" as one of the key areas of focus. This strategic focus aims to improve the food safety and quality of GMS agricultural products in order to increase compliance with international standards and premium market opportunities. It aligns with ongoing national policies for a more integrated and coordinated approach to food safety.

In this focus area, strengthening food safety and quality standards and regulations is a foundational step. The Strategic Framework supports the harmonization of safety protocols within the GMS, ensuring alignment with regional benchmarks like the ASEAN Good Agricultural Practices (ASEAN GAP). By establishing minimum standards and regulatory frameworks, GMS countries can improve compliance, reduce trade barriers, and ensure that products meet the safety requirements of both regional and international markets.

In addition to regulatory improvements, this Strategic Framework focuses on building capacity and sharing best practices in traceability and quality control systems, drawing on the achievements of the SASRAP. The promotion of sustainable production practices and certification schemes will be continued to further enhance market access for high-quality GMS products.

Instead of pursuing one-size-fits-all minimum standards, there will be stronger emphasis on subregional cross-border coordination mechanisms/platforms linking respective national standards to align with broader ASEAN guidelines and global standards such as those set by the Codex Alimentarius. Working towards a more unified global framework of food safety standards to ensure consistency and quality across borders involve closer cooperation between international food safety agencies, governments, and industry leaders to synchronize regulations and practices, reducing confusion and barriers to trade.

Integration of interoperable digital traceability systems and standards across the GMS will facilitate seamless verification and traceability of agricultural products across borders, ensuring adherence to international safety and quality benchmarks and leveraging digital technologies such as blockchain and IoT (Internet of Things), and RFID to create fully transparent and traceable food supply chains.

Engaging with industry stakeholders to define practical and beneficial standards is key (e.g. Lao's coffee cooperatives have aligned their production processes with both ASEAN standards and external markets like the EU and the US).

Modernizing food processing facilities, enhancing storage infrastructure, and improving transportation and logistics systems and hardware infrastructure to support these standards is crucial (i.e. upgrading food processing units and storage systems to comply with ASEAN GAP). Additionally, modernization efforts will include a focus on energy efficiency to ensure that new and upgraded facilities minimize environmental impact (i.e. support for transport of agrifood products via railway) and reduce energy consumption, further supporting the GMS's commitment to sustainable and green agricultural practices. Supporting development and protection of product certification schemes like Geographical Indicators (e.g., for Cambodian Kampot pepper), not only ensures adherence to stringent growing conditions but also enhances market value and consumer trust on a global scale and can help differentiate GMS products in the global market, highlighting their unique qualities and origins, thereby adding value to the region's agricultural exports.

The adoption of electronic Sanitary and Phytosanitary (e-SPS) measures facilitates adherence to ASEAN and global food safety standards by providing a digital framework that supports the seamless verification and traceability of agricultural products across borders (e.g. Thailand e-phyto system to PRC and other major markets for the rapid and accurate sharing of phytosanitary information) ensuring that the exported agriculture products comply with the stringent safety and quality requirements of destination markets in other countries.

Food Diversification and Value Chain Optimization

The GMS agrifood sector's overreliance on a limited range of staple crops renders it vulnerable to market volatility and evolving consumer preferences. This narrow production base stifles innovation, limits economic opportunities and compromises overall sector resilience. Concurrently, inefficiencies throughout the value chain, from production to distribution, exacerbate food loss, reduce competitiveness and hinder market access, particularly for smallholders and MSMEs.

The strategic focus on "Food Diversification and Value Chain Optimization" aims to expand the agricultural product range and streamline value chains to enhance product diversity and value chain efficiency for greater market resilience and improved market access for all stakeholders.

The GMS 2030 KSFTAS supports the introduction of high-value crops, livestock, and aquaculture to align production with evolving consumer demands. It will support and promote non-traditional agrifood products, including plant-based and innovative protein products. To complement diversification, it will optimize the value chain through investments in key infrastructure, such as transportation and cold storage, as well as the adoption of digital platforms and innovative business models like contract farming and cooperatives.

Farmers, food producers, including women, and youth will be empowered with innovative tools and digital solutions. The adoption of advanced agriculture technologies and digital innovation to enhance sustainable farming practices and provide real-time data on soil moisture, nutrient levels, soil physical properties and weather patterns. These technologies enable the optimization of the timing of farming operations, irrigation water usage, fertilizer application, and contribute to increased crop yields. Improved food security and nutrition ensures that agrifood production labor, marginalized communities, and households living below the poverty line are food secure and are not malnourished.

C. Cross-cutting Themes

The transformation of the agrifood system requires integrating cross-cutting themes that address broader socio-economic, technological, and financial dynamics. These themes ensure that the interventions under the strategic framework are inclusive, forward-looking and responsive to the needs of diverse stakeholders. This Strategic Framework will work on the following cross-cutting themes:

- Youth, gender and social inclusion
- Digital and innovative technologies
- Innovative and inclusive financing mechanisms

The integration of cross-cutting themes will strengthen the actions towards the achievement of the framework's goal. Prioritizing youth, gender, and social inclusion ensures marginalized groups are actively engaged in decision-making and value chain activities, fostering innovation and community-driven solutions crucial for sustaining livelihoods and building resilience.

Digital and innovative technologies accelerate the adoption of climate-smart practices, improve transparency, and enhance traceability. Precision farming, blockchain and digital traceability systems are existing technologies that can be adopted for meeting international standards and accessing premium markets, while also driving efficiency and reducing waste.

Inclusive financing mechanisms empower smallholders, cooperatives and agribusinesses to invest in sustainable practices. By providing accessible financial instruments, the Strategic Framework supports the adoption of low-carbon technologies, quality improvement and market expansion.

Youth, Gender and Social Inclusion

In a region where agriculture remains a primary source of livelihood, addressing gender inequality and social exclusion is crucial for achieving both socio-economic and environmental outcomes. Women constitute a large portion of the agricultural workforce in the GMS, yet they consistently encounter barriers such as limited access to resources, financial services and decision-making roles. These disparities, highlighted in the GMS-2030, are deeply embedded in socio-cultural norms and economic systems, and restrict women's participation and capacity to scale up economic activities.

However, the challenges extend beyond gender. Rural youth, who represent the future of agriculture in the GMS, face significant obstacles in accessing training, resources, and employment opportunities. With limited prospects in agriculture, many young people migrate to urban areas in search of better opportunities, leading to a decline in agricultural productivity and innovation in rural communities. Without targeted interventions to engage youth in agriculture, the sector risks losing a generation of potential leaders and innovators who could drive the adoption of sustainable and climate-smart practices.

Moreover, disadvantaged groups, including those with limited mobility or disabilities, are often excluded from participating fully in agrifood systems. These groups face physical, social and economic barriers that prevent them from accessing training, markets and financial services. Inclusive strategies that account for these challenges are essential for ensuring that all community members can contribute to and benefit from agrifood value chains.

This Strategic Framework underscores the importance of inclusive growth and equitable access to opportunities for all segments of society. Gender-sensitive approaches are ethical imperatives and critical for achieving sustainability and resilience. To this end, the framework advocates for initiatives that enhance women's economic empowerment, promote female entrepreneurship and ensure equitable access to land, finance, and technology. Targeted interventions, such as female-centered agricultural extension programs, capacity-building, and improved access to finance, will be prioritized.

For youth, the GMS 2030 KSFTAS promotes agricultural education, skills development, and entrepreneurship programs that make farming more attractive and viable as a career choice by providing access to modern technology, mentorship, and financial support.

To ensure that disadvantaged groups, including individuals with limited mobility, are not excluded, the Strategic Framework advocates for the development of accessible infrastructure and adaptive technologies. These measures will facilitate the participation of individuals with disabilities or other mobility challenges in agricultural activities, enhance their market access, and improve their livelihoods.

There is also a focus on building capacity in business planning, financial management, and marketing to ensure that agribusinesses are well-prepared to compete and thrive in the evolving dynamic market landscape. Emerging digital innovation will be featured in all capacity development. To support youth with their agribusiness ventures, incubator programs and dedicated extension services that provide mentorship, resources, and networking opportunities will help new businesses overcome initial challenges and translate innovative ideas into successful enterprises. Specific programs for young women agri-entrepreneurs will be included.

Digital and Innovative Technologies

To effectively transform the agrifood sector in the GMS, the integration of digital and innovative technologies is imperative for boosting efficiency, competitiveness, and sustainability. However, the subregion faces substantial barriers to achieving comprehensive digital transformation, particularly in rural areas where access to advanced technology, digital literacy, and essential infrastructure is limited. These challenges are particularly pronounced for smallholder farmers and rural communities who often lack the digital skills and resources needed to adopt advanced technologies. The absence of adequate digital infrastructure, fragmented data ecosystems and regulatory barriers further hinder the widespread adoption of digital solutions.

To bridge this digital divide, the Strategic Framework prioritizes digital transformation while recognizing the need for a balanced approach. It emphasizes the importance of equipping farmers and agribusinesses with the tools and knowledge to adopt precision agriculture, optimize supply chains, and improve resource management. Simultaneously, the framework promotes practical and cost-effective innovations that are readily accessible to smallholders. Simple technologies like improved seed varieties, low-cost drip irrigation systems and mobile-based advisory services can significantly enhance productivity and resilience without requiring extensive infrastructure. The GMS ISD supports this balanced approach, recognizing the value of both cutting-edge and easily adaptable technologies to accelerate sustainable development.

Capacity-building initiatives will enhance both digital literacy and practical skills, enabling rural communities to adopt and benefit from a range of technological options. Establishing digital forums and demonstration sites will facilitate knowledge sharing and best practice dissemination. Public-private partnerships will be instrumental in investing in basic infrastructure and promoting affordable, scalable innovations.

Leveraging digitalization can create a seamless and connected agrifood system.[29] To address fragmentation and inadequate information sharing among stakeholders in the GMS, a bespoke digital approach that considers each country's unique capacities and development levels is needed. As a result, while the aim is aspirational, progress will most likely be modest and must be based in the subregion's unique environment and constraints. Based on insights and lessons learned from previous pilot demonstration initiatives under the previous phases, SAFS 2030 will promote the adoption of digital tools, including farm management software, e-commerce platforms, and digital traceability systems, and market information systems. These tools will streamline operations, improve efficiency, and enhance market access for farmers and MSMEs. Establishing mechanisms for secure and standardized data exchange between farmers, agribusinesses, and government agencies will improve transparency and facilitate better decision-making across the agrifood sector. Bridging the digital divide in rural areas, especially for rural women, is essential for equitable access to technology, market information and financial services. The SAFS 2030 will contribute to more inclusive digital cooperation frameworks by improving with infrastructure and literacy programs that will include women, ethnic minority groups and disadvantaged people.

[29] While digitalization offers the potential to create a more seamless and interconnected system, it is important to acknowledge that even many OECD countries have not yet fully achieved this standard.

Innovative and Inclusive Financing Mechanisms

In the GMS, many agricultural stakeholders face barriers to obtaining the financial resources they need, especially smallholders, women, youth and marginalized groups. The lack of inclusive financing limits their ability to adopt new technologies, scale up operations and transition to more sustainable practices.

The GMS 2030 KSFTAS will support the development and promotion of inclusive financing mechanisms to address these gaps, aligning with the GMS-2030's objective on financial inclusion. By expanding access to innovative financial instruments—such as blended finance models, green bonds and impact investments—the framework aims to unlock the potential for broader participation in sustainable agriculture. These mechanisms will provide the necessary capital for smallholders and agribusinesses to implement climate-smart practices, improve food safety standards and upgrade their operations to meet market demands.

Promoting microfinance, digital financial platforms and low-interest credit options that can be easily accessed even in remote areas will be prioritized. This Strategic Framework also supports capacity-building initiatives that help stakeholders improve their financial literacy and management skills, making them better equipped to navigate financial markets and make informed investment decisions. The 2030 KSFTAS will bridge the financing gap by facilitating improved access to green finance (equity, credit, insurance and other instruments), and other financial services, for MSMEs, including women and young agri-entrepreneurs. The improved access to green credit will facilitate unlocking growth opportunities and enable value chain actors to invest in sustainable innovative and green processing technologies essential for the agribusinesses to be competitive and profitable.

The private sector plays a pivotal role in the transformation of the agrifood system in the GMS. By leveraging their resources, expertise, and market-driven approaches, private enterprises can significantly contribute to increasing productivity, enhancing the resilience of farming communities, and ensuring sustainable agricultural practices. Private sector investment is critical as it brings in much-needed capital, innovation, and technology that can drive the adoption of climate-smart practices and improve food safety standards. Moreover, private companies can introduce efficient practices throughout the entire agrifood value chain, fostering the creation of value-added products and services.

To catalyze private sector investment, it is essential to provide opportunities that align with their business interests while also promoting sustainability. This includes offering incentives such as tax breaks, subsidies, and access to green finance options. Regular engagement with the private sector is crucial to understand their needs and challenges, ensuring that policies and strategies are aligned with market realities. Creating a conducive policy environment that reduces investment risks and enhances returns will attract more private sector participation. Additionally, fostering public-private partnerships can mobilize capital for sustainable and inclusive growth projects, further accelerating the transformation of the agrifood system in the GMS.

Private sector should be encouraged to invest in advanced technologies such as precision agriculture, IoT and blockchain all of which can enhance productivity, reduce waste and improve traceability. Investing in rural infrastructure such as cold chain facilities, and processing plants can improve market access and reduce post-harvest losses. The Strategic Framework supports the development of sustainable and inclusive value chains that will create new market opportunities and enhance the livelihoods of smallholder farmers.

The Strategic Framework will also provide capacity building to assist GMS countries to develop projects that are financially viable and attractive to private sector investors both within the country as well as in other GMS countries. The intention is to crowd-in private sector investment in key agribusinesses through risk mitigation tools and instruments, such as insurance, credit guarantees and bridge financing, to catalyze the modernization of the agrifood system.

Creating an inclusive financial ecosystem requires collaboration between public institutions and private investors. Partnerships with development banks, impact investors, and financial institutions will mobilize capital for sustainable and inclusive growth projects within the GMS agrifood value chain.

Figure 4: Strategic Focus and Cross-cutting Themes

Strategic Focus Areas	Green and climate-resilient agriculture	Safe and quality agrifood systems	Food diversification and value chain optimization
Cross-cutting themes	Youth, gender and social inclusion		
	Digital and innovative technologies		
	Public and Private Sector inclusive financing mechanisms		

D. Impact, Outcome and Outputs

The GMS 2030 Strategic Framework for Transformation of Agrifood systems is aligned with the following impact: climate resilience, productivity, market access and agrifood investment in the GMS enhanced. It will have the following outcome: safe and quality agrifood systems, climate resilience, environmental sustainability, and food and nutritional security improved.

The Strategic Framework proposes three key outputs to achieve the outcome and impact. These are:

1. Resilient and sustainable agri-food systems practices enhanced and agricultural livelihoods improved.
2. Food safety, product quality and access to markets improved.
3. Product diversity, food security and value chain efficiency improved.

The outputs have the following sub-outputs. For Output 1 the focus is on CSA practices and related policies:

1.1 Harmonized policies supporting low-carbon, climate resilient agriculture formulated.

1.2 Incentives for farmers and agribusinesses to adopt sustainable practices and technologies developed and implemented.

1.3 Public private partnerships to fund and scale up CSA and infrastructure mobilized.

1.4 Farmers and agribusinesses equipped with knowledge and skills to scale up CSA technologies and innovations.

For Output 2 the focus is on improving food safety and quality while enhancing traceability and market access through digital technologies and financial inclusion. The proposed sub-outputs are:

2.1 Food safety standards and inspection protocols developed and adopted.

2.2 Public private partnerships to develop infrastructure for food safety testing, certification and market access established.

2.3 Certification schemes and digital traceability systems to enhance food safety and quality control across value chains deployed.

For Output 3 the aim is to enhance resilience, competitiveness, and responsiveness of the GMS agrifood system to evolving market demands and ensure food security. The sub-outputs are:

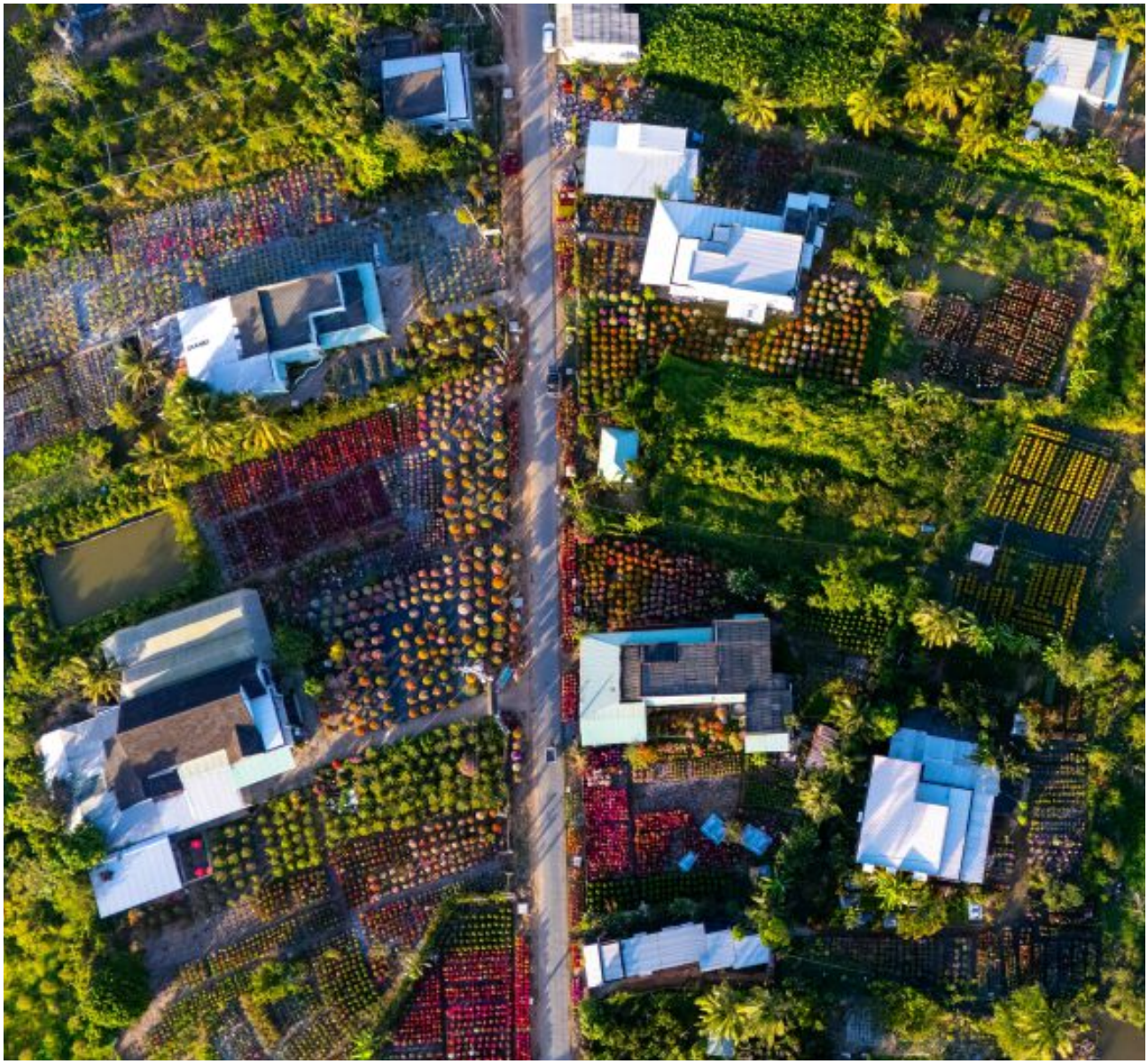
3.1 Product diversity and food security enhanced.

3.2 Key value chain infrastructure increased.

3.3 Digital platforms and innovative business models to streamline value chains adopted.

These outcomes are underpinned by three cross-cutting themes that ensure inclusivity, innovation, and financial accessibility:

- Participation and leadership of women, youth, and disadvantaged groups in all value chain activities prioritized
- Productivity, efficiency and transparency in agrifood systems through technology adoption improved
- Access to finance through inclusive financial mechanisms for public and private sector investment enhanced.



Five types of activities have been identified to achieve the objectives of the strategic framework.

These include (i) Policy dialogue and support; (ii) Knowledge sharing and capacity building; (iii) Pilot and demonstration projects; (iv) Investment preparation and financing support; (v) Monitoring, evaluation and learning. To link these activities with the impact, outcome and outputs, specific tangible activities, measurable sub-outputs, key performance indicators and means of verification must be established. Examples of key indicators for each theme and cross cutting issue and potential data sources are in the Design and Monitoring Framework (Appendix 3).

Clear performance indicators at each level in the Theory of Change are needed to monitor and evaluate the progress of transformation in agrifood systems. Each indicator should be SMART, i.e. specific, measurable, attainable, realistic and timebound. The framework includes systems for regular reporting and transparency to keep stakeholders informed about progress and challenges on a regular basis. The framework will follow an adaptive management approach to continuously improve strategic and actions on an ongoing basis.

E. Pillars for Agrifood System Transformation

The transformation of the GMS agrifood system requires a holistic approach that addresses the challenges and opportunities across the region. The approach centers on five key elements: (i) agrifood value chain development; (ii) climate change and environment; (iii) infrastructure for food systems; (iv) social protection, including emergency food assistance; and (v) nutrition and health. These components contribute to access, availability, utilization and stability of the food system. The strategic framework envisions several nutrition interventions, including nutrition fortification, food diversification to lower the cost of a healthy and nutritious diet, integrating nutrition in school meals, nutrition sensitive social protection and policy reform to enable the provision of a nutritious and healthy diet.

The strategic pillars of this framework provide the foundational structure necessary to achieve the strategic focus area goals and outcomes. These pillars represent the core areas of intervention that will enable the GMS to transition towards a sustainable, inclusive, and resilient agrifood system by 2030. Each pillar guides actions that will drive systemic change, supporting the framework's key strategic focus areas.

The pillars are interconnected, ensuring that progress in one area reinforces advancements in others, leading to a comprehensive and coordinated transformation of the agrifood sector.

The four strategic pillars are:

- Policy and Governance, which will focus on creating an enabling environment through policy harmonization, regulatory support, and developing effective policy and governance frameworks that will provide the foundation for implementing strategic reforms.
- Knowledge-based Solutions, which will prioritize building capacity, driving innovation, and supporting the adoption of best practices and sustainable technologies.
- Market and Behavior Transformations, which will work on aligning market systems and consumer behavior with sustainable production and consumption practices while promoting regional trade integration.
- Infrastructure and Investments, which will focus on investing in key infrastructure and attracting sustainable financing to enhance the agrifood systems' efficiency, sustainability, and competitiveness.

Policy and Governance

This pillar will create an enabling environment by focusing on policy harmonization, regulatory support and strengthening governance frameworks. Key actions include:

- Harmonizing regional policies and setting minimum standards to support low-carbon, sustainable and inclusive agricultural practices.
- Strengthening institutional frameworks for better coordination between governments, the private sector and local communities to drive climate-smart initiatives, food safety protocols and efficient value chains.

Knowledge-based Solutions

This pillar is dedicated to fostering knowledge, capacity and innovation to promote the adoption of practices that enhance climate resilience, food safety and product diversification. It directly supports the strategic focus areas by providing stakeholders with the essential tools and insights required to drive transformative change. Key actions include:

- Supporting research and innovation in CSA, sustainable production methods, food safety systems and value chain optimization.
- Implementing capacity-building programs for farmers, agribusinesses and policymakers that enable the effective adoption of sustainable practices, traceability systems and high-value crop production.
- Utilizing digital platforms and innovations for research, best practices, knowledge-sharing, and capacity-building programs, interactive applications and social media campaigns that educate, focused on sustainable agriculture and food safety, foster innovation and encourage collaboration.

Market and Behavior Transformations

Market and behavioral transformations encompass the reorganization of agricultural value chains to improve efficiency, transparency, and fairness, and engage consumers in making informed choices that promote sustainable food systems. This pillar aims to align market systems with sustainable production and consumption practices while facilitating regional trade and value chain integration. It addresses the need for market-driven incentives that support green agriculture, food safety, and product diversification. Key actions include:

- Enhancing regional market integration by streamlining value chains, improving market linkages and facilitating trade agreements that benefit smallholders and agribusinesses.
- Promoting certification schemes, digital platforms and traceability systems that reinforce food safety and quality standards and facilitate compliance with premium market requirements.
- Driving behavior change through initiatives that encourage all stakeholders to opt for safety and sustainability.

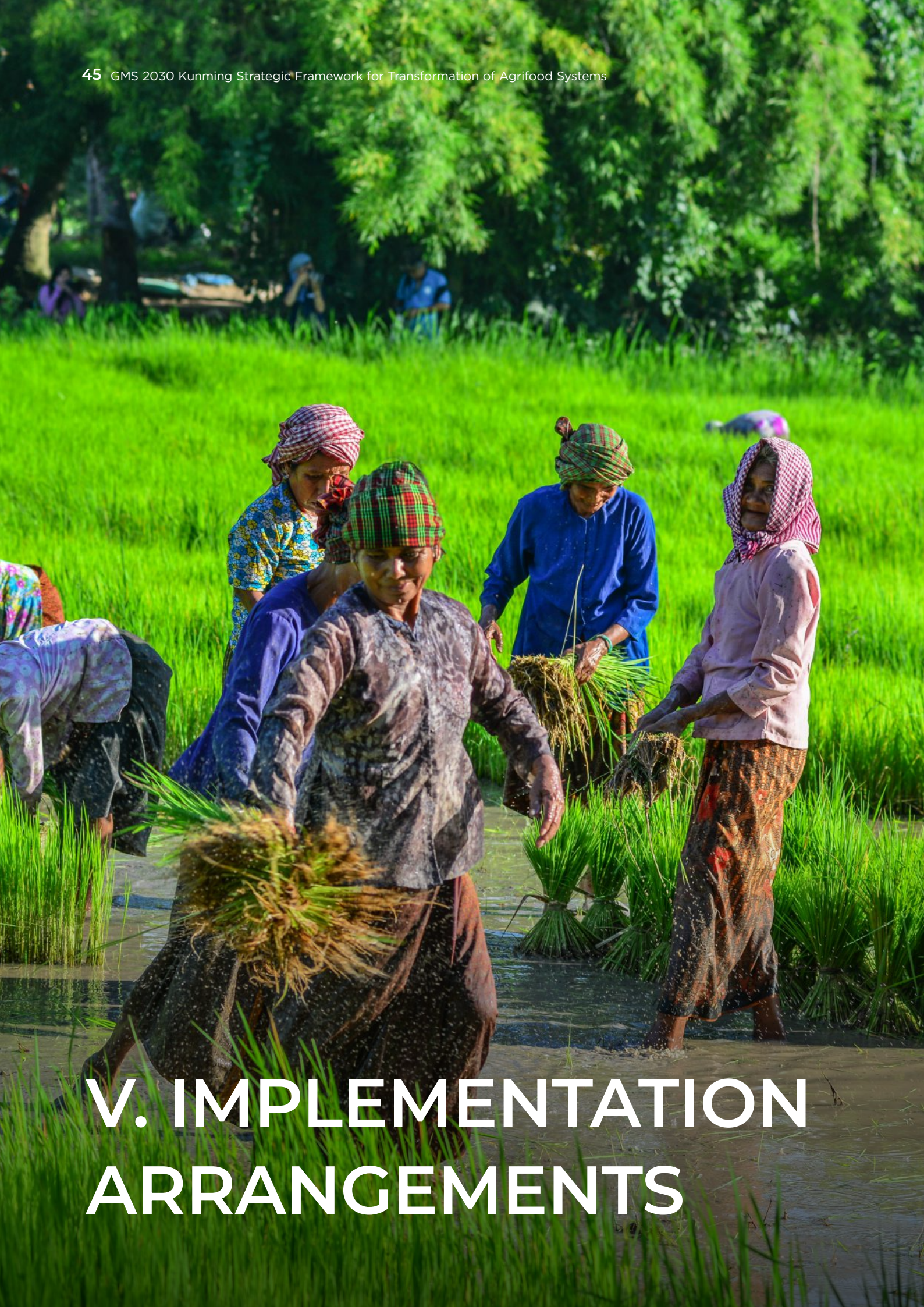
Infrastructure and Investments

This pillar recognizes that infrastructure and investments are essential for enhancing efficiency, sustainability and competitiveness. It supports all three strategic focus areas by fostering public-private partnerships (PPPs) and addressing gaps in logistics, processing and access to finance. Key actions include:

- Investing in key infrastructure such as cold storage facilities, transportation networks and processing units that reduce post-harvest losses and enhance product quality.
- Promoting the adoption of digital platforms and simple, scalable technologies that improve supply chain efficiency and connect producers to markets.
- Attracting investments through innovative financing models and Public Private Partnerships to support sustainable agrifood initiatives, infrastructure development and value chain optimization.

F. Theory of Change

IMPACT	Climate resilience, productivity, market access and agrifood investment in the GMS enhanced		
OUTCOME	Safe and quality agrifood systems, climate resilience, environmental sustainability, and food and nutritional security improved		
OUTPUTS	Outcome 1: **Green and Climate-Resilient Agriculture enhanced** Emissions from agriculture reduced, climate resilience improved and agricultural livelihoods enhanced	Outcome 2: **Safe and Quality Agrifood Systems improved** Food safety, product quality and access to markets improved	Outcome 3: **Product Diversification and Value Chain Optimized** Product diversity, food security and value chain efficiency enhanced
CROSS-CUTTING THEMES	**Youth, gender and social inclusion prioritized** Participation and leadership of women, youth, and disadvantaged groups are prioritized in all value chain activities.		
	Digital and innovative technologies improved Productivity, efficiency and transparency in agrifood systems improved through digitalization, innovation and technology adoption.		
	Public and Private Inclusive financing mechanisms enhanced Access to finance is improved through inclusive financial mechanisms.		
SUB-OUTPUTS	1.1 Harmonized regional policies supporting low-carbon, climate-resilient agriculture adopted 1.2 Financial incentives for farmers and agribusinesses adopting sustainable practices and technologies developed and implemented 1.3 Partnerships that fund and scale up CSA initiatives and infrastructure established 1.4 Farmers and agribusinesses equipped with knowledge and skills to implement and scale up climate-smart and low-emission technologies and innovations	2.1 Minimum food safety standards and inspection protocols developed and implemented 2.2 Partnerships established to develop infrastructure for food safety testing, certification and market access 2.3 Certification schemes and digital traceability systems deployed to enhance food safety and quality control across value chains	3.1 Product diversity enhanced 3.2 Key value chain infrastructure increased 3.3. Digital platforms and innovative business models to streamline value chains adopted
PILLARS	Policy and governance		
	Knowledge-based solutions		
	Market and behavior transformations		
	Infrastructure and investments		



V. IMPLEMENTATION ARRANGEMENTS

V. IMPLEMENTATION ARRANGEMENTS

A. Institutional Mechanisms

GMS Working Group on Agriculture will serve as the lead coordinating body, overseeing the implementation of the strategic plan and facilitating collaboration among stakeholders. Each member country of the GMS is suggested to establish a national-level team to coordinate actions in alignment with the strategic plan. This team will consist of representatives from relevant government ministries, farmer organizations, agribusinesses, academia, and local communities.

Private sector engagement, which includes agribusinesses, farmer organizations, and cooperatives, is crucial for successful implementation. The small ones will be linked to more advanced enterprises for mentoring, cooperation, and resource support. Public-private partnerships will be encouraged for resources and expertise support on infrastructure development, innovation initiatives, and market access activities.

B. Alignment with existing and potential projects and financing

A pipeline of projects are included in the GMS Regional Investment Framework. These projects will be developed in consultation with relevant GMS countries and with development partners and potential private sector stakeholders to seek their collaboration. ADB is considering the establishing an Innovative Natural Capital Financing Facility (INCFF) that will contribute to multiple SDGs by focusing on sustainable food value chains, climate resilient agriculture and natural resource management. The INCFF will be supported by a Nature Capital Lab, Natural Capital Fund and an Agribusiness Services Platform.

On endorsement of the KSFTAS, ADB will also develop a technical assistance program to ensure project development and management.

C. Partnership and Collaboration

Given the complexity and challenges of agrifood systems in the GMS, partnerships and collaborations are crucial for mobilizing knowledge, expertise, and resources, and ensuring coordinated actions.

D. Monitoring and Evaluation

Accompanying the Strategic Framework will be a results framework that will allow for its monitoring and evaluation. The detailed results framework includes a mid-term review and a final evaluation. This will be determined and adopted by the GMS WGA.

VI. REFERENCES

Asian Development Bank (ADB). (2007). The Core Agriculture Support Program Phase I: 2006-2010.

ADB. (2011). Core Agriculture Support Program Phase II: 2011–2015.

ADB. (2015). Overview of GMS Economic Cooperation Program. Retrieved from https://www.adb.org/sites/default/files/publication/29387/gms-ecp-overview-2015.pdf

ADB. (2016). Urban Development in the Greater Mekong Subregion.

ADB. (2018). Strategy for Promoting Safe and Environment-Friendly Agro-Based Value Chains in the Greater Mekong Subregion and Siem Reap Action Plan, 2018–2022.

ADB. (2019). Policies for High Quality, Safe, and Sustainable Food Supply in the Greater Mekong Subregion. https://www.adb.org/publications/food-supply-policies-gms

ADB. (2019). TA 9916-REG: Greater Mekong Subregion Sustainable Agriculture and Food Security Program (2020-2025).

ADB. (2021). GMS Economic Cooperation Program Strategic Framework 2030. http://dx.doi.org/10.22617/TCS210042.

ADB. (2022). Greater Mekong Subregion Gender Strategy. http://dx.doi.org/10.22617/TCS220441-2.

ADB and GMS Secretariat. (2024). Greater Mekong Subregion Innovation Strategy for Development 2030. Unpublished.

Asian Development Outlook (ADO). (2024). GDP Growth in Asia and the Pacific. ADB Data Library (Retrieved on July 20, 2024).

Bößner, S., & Mal, M. (2024). Tackling emissions from agriculture: A perspective from the Mekong countries. SEI brief. Stockholm Environment Institute. https://doi.org/10.51414/sei2024.002

PRC Government. (2021). 14th Five-Year National Agricultural Green Development Plan 2021-2025.

Daley, E., Campbell, N. Y., Lowry, J. (2024). Outlook on Gender and Land in the Mekong Region. Brief. Vientiane: Mekong Region Land Governance.

Economist Impacts. (2024). Global Food Security Index 2022. https://impact.economist.com/sustainability/project/food-security-index/

FAO. (2019). Geographical Indications for Sustainable Food Systems. Preserving and promoting agricultural and food heritage |Policy Support and Governance. http://www.fao.org/3/ca5693en/ca5693en.pdf

Fazira, E. (2023, November 30). Plant-based in Asia Pacific: What's next? Euromonitor. https://www.euromonitor.com/article/plant-based-in-asia-pacific-whats-next

GMS. (2024). GMS Economic Cooperation Program Strategic Framework 2030. Retrieved from https://www.greatermekong.org/strategy

GMS Secretariat. (2022). Greater Mekong Subregion Digital Economy Cooperation Initiative.

GMS Technical Meeting. (2023). Enhancing the Role of Private Sector in the GMS Program.

GMS Technical Meeting. (2023). Strengthening GMS Program's Engagement with Local Governments.

Hett, C., Aye, Z. C., Gironde, C., Beban, A., Castella, J., Bernhard, R., & Ehrensperger, A. (2023). Agroecological initiatives in the Mekong Region: A systematic literature review and mapping reveals their implications for transitioning to sustainable food systems. Journal of Land Use Science, 18(1), 334–355. https://doi.org/10.1080/1747423x.2023.2248980

International Trade Center. (2024). Trade Map - Trade Statistics for International Business Development.

Mekong Institute. 2023. Smart Technologies for Agricultural Supply Chain in the CLMTV.
Ministry of Agriculture and Cooperatives of Thailand. (2017). The Twenty-year Agriculture and Cooperative Strategy (2017-2036) and The Five-year Agriculture Development Plan under the Twelfth National Economic and Social Development Plan (2017-2021).

Ministry of Agriculture and Forestry of Lao PDR. (2015). Lao PDR's Agriculture Development Strategy to 2025 and Vision to the year 2030.

Ministry of Agriculture and Forestry of Lao PDR. (2021). Green and Sustainable Agriculture Framework for Lao PDR to 2030.

Ministry of Agriculture, Livestock and Irrigation of Myanmar. (2018). Myanmar Agriculture Development Strategy and Investment Plan (2018-19/2022-23).

Ngo, D. M., Doan, H. S., & Mai, V. T. (2019, August 14). A Review of Precision Agriculture in Rice Production in Viet Nam. FFTC Agricultural Policy Platform (FFTC-AP). https://ap.fftc.org.tw/article/1418

Osakwe, S., Shahid, N., Ayala, D. L., Limpamont , A. K., & Kittipanya-ngam, P. (2022). Digitalising rural MSMEs: Thailand's agriculture and tourism sectors.
Our World in Data. (2023, December 18). Meat Production. https://ourworldindata.org/grapher/meat-production-tonnes?tab=chart&time=2012.latest&country=THA~KHM~LAO~CHN~VNM~MMR

Ramachandran, P., Weaver, T., Medialdia, M.T., Adriano, L. (2017). Harmonizing Food Safety Systems and Increasing Market Access in the Greater Mekong Subregion.

Royal Government of Cambodia. (2022). National Agricultural Development Policy 2022-2030.
Suvannaphakdy, S. (2022). Enhancing Regulatory Cooperation for Agricultural Trade in the Greater Mekong Subregion.

USAID. (2023). Gender Analysis Report: Climate Resilient Agriculture in the Mekong Delta. https://pdf.usaid.gov/pdf_docs/PA00ZTR9.pdf

Van Huis, A., Van Itterbeeck, J., Klunder, H., Mertens, E., Halloran, A., Muir, G., & Vantomme, P. (2013). Edible insects: Future prospects for food and feed security. (FAO forestry paper; No. 171). FAO. https://edepot.wur.nl/258042

Viet Nam Government. (2022). Agriculture and Rural Development Strategy for 2021-2030.

WWF Greater Mekong Programme. (2009). The Greater Mekong and Climate Change: Biodiversity, Ecosystem Services and Development at Risk, text, October 2009; Chulawich 1 Building, 5th Floor Chulalongkorn University Henri Dunant Road Bangkok, 10330, Thailand. (https://digital.library.unt.edu/ark:/67531/metadc226573/: accessed August 23, 2024), University of North Texas Libraries, UNT Digital Library, https://digital.library.unt.edu.

Yhoung-Aree, J. & Viwatpanich, K. (2005). Edible insects in the Laos PDR, Myanmar, Thailand, and Viet Nam. In M.G. Paoletti, ed. Ecological implications of mini livestock, pp. 415–440. New Hampshire, Science Publishers.

VII. ANNEX

Annex 1. Proposed Regional Investments

Output 1	Resilient and sustainable agrifood systems practices enhanced and agricultural livelihoods improved
Countries	Cambodia, Lao PDR and Thailand
Project name	GMS Resilient Agriculture Infrastructure for a Greener Future
Rationale	Building climate resilience in agriculture requires substantial investment in infrastructure that supports sustainable farming practices and reduces the sector's carbon footprint. This project focuses on the development of key infrastructure components, including efficient irrigation systems, renewable energy solutions for farming, and facilities that support agroforestry and other sustainable land management practices. By improving these critical infrastructures, the project aims to enhance water-use efficiency, reduce reliance on fossil fuels, and promote land management practices that sequester carbon, thereby contributing to the overall reduction of agricultural emissions. Moreover, the project will help secure the livelihoods of farmers by making agricultural practices more resilient to climate change, thereby fostering long-term sustainability in the GMS region.
Outputs and Activities	**Output 1.2:** Financial incentives for farmers and agribusinesses adopting sustainable practices and technologies developed and implemented. **Activity:** Provide financial support for the development of irrigation systems, renewable energy installations, and infrastructure to support climate-smart agriculture. **Output 1.3:** Partnerships that fund and scale up CSA initiatives and infrastructure established. **Activity:** Establish public-private partnerships (PPPs) to support infrastructure investments in climate-smart agriculture. **Output 1.4:** Farmers and agribusinesses equipped with knowledge and skills to implement and scale up climate-smart and low-emission technologies and innovations. **Activity:** Develop infrastructure that supports the implementation of climate-smart practices, including agroforestry and sustainable land management.
Crosscutting themes	Green technologies; Climate resilience; Private sector engagement; Community participation
Links to new RIF proposals	• Lower Eastern Chao Phraya Irrigation Scheme Improvement Project (Thailand) • Sustainable Natural Resources Development Project (Thailand) • Supporting GMS countries' Economics through Development of Agricultural Land Use Zoning (Cambodia) • Strengthening farmer livelihood in GMS countries by improving cashew value chain (Cambodia and Lao PDR).
Funding needed	US$ 400 million
Potential stakeholders	ADB, National Ministries of Agriculture, Local Governments, Private Sector, Research Institutions

Output 2	Food safety, product quality, and access to markets improved
Countries	Cambodia, Lao PDR, PRC, and Thailand
Project name	Building GMS Food Safety and Quality Excellence
Rationale	To enhance food safety and access to premium markets, the GMS region requires modern infrastructure for food safety testing, certification, and traceability. This project will develop and upgrade laboratories and certification centers, ensuring that agricultural products meet international standards. By doing so, the project will reduce food safety risks, improve product quality, and increase the export of premium agrifood products.
Outputs and Activities	**Output 2.2:** Partnerships established to develop infrastructure for food safety testing, certification, and market access. **Activities:** • Establish and strengthen partnerships to develop and upgrade food safety testing laboratories and certification centers. • Facilitate regional food safety networks for collaborative monitoring and compliance. **Output 2.3:** Certification schemes and digital traceability systems deployed to enhance food safety and quality control across value chains. **Activities:** • Develop and implement digital traceability systems for food products across the GMS. • Promote regional collaboration in the development and deployment of food safety infrastructure.
Crosscutting themes	Digital innovations; Green technologies; Private sector engagement; Policy harmonization
Links to new RIF proposals	• Establishment of GMS Regional Food Safety Training Center (Thailand) • Construction of Digital Inspection Technology Platform for Animal Feed Quality & Safety (Lao PDR and PRC) • GMS Cross-border Livestock Health and Value Chains Improvement Project (Cambodia)
Funding needed	US$ 400 million
Potential stakeholders	ADB, National Ministries of Agriculture, Private Sector, Research Institutions, Local Governments

Output 3	Product diversity, food security and value chain efficiency enhanced
Countries	Cambodia and Lao PDR
Project name	Enhancing Value Chain Infrastructure for Sustainable Product Diversification
Rationale	To support the diversification of agricultural products and improve value chain efficiency, the GMS region needs to invest in critical infrastructure such as cold chain storage, processing facilities, and logistics hubs. This project will develop these key infrastructures, helping to reduce post-harvest losses and improve market access. By fostering private sector engagement and regional cooperation, the project aims to enhance the sustainability and competitiveness of GMS agrifood products in both domestic and international markets.
Outputs and Activities	**Output 3.2:** Key value chain infrastructure increased. **Activities:** • Develop and upgrade cold chain storage, processing facilities, and logistics hubs to support diverse and high-value products. • Implement infrastructure solutions that reduce post-harvest losses and enhance product quality. **Output 3.3:** Digital platforms and innovative business models to streamline value chains adopted. **Activities:** • Integrate innovative technologies into value chain infrastructure to improve efficiency and connectivity.
Crosscutting themes	Green technologies; Climate resilience; Private sector engagement; Community participation.
Links to new RIF proposals	• Enhancing GMS's Sustainable Cold Chain Development: Integrating Solar-Powered Cold Rooms Equipped with CoolBot for Fruit and Vegetable Collection Centers (Cambodia) • Fostering Inclusive Inland Fisheries Value Chain Development in Cambodia for Economic Growth and Market Integration in GMS Region (Cambodia) • Promoting Sustainable Cattle Farming in Laos through Crossbreeding and Artificial Insemination (Lao PDR)
Funding needed	US$ 300 million
Potential stakeholders	ADB, National Ministries of Agriculture, Private Sector, Local Governments, Research Institutions

Annex 2. Proposed Technical Assistance Projects

Output 1	Resilient and sustainable agrifood systems practices enhanced and agricultural livelihoods improved
Countries	All GMS countries
Project name	Empowering Climate-Smart Agriculture (CSA) through Capacity Building and Policy Synergy
Rationale	The agricultural sector in the GMS region is increasingly vulnerable to climate change, which leads to reduced productivity and higher greenhouse gas (GHG) emissions. This project aims to build the capacity of farmers, extension officers, and policymakers to adopt CSA practices that mitigate these impacts. By harmonizing regional policies and creating financial incentives, the project will support the widespread adoption of CSA practices, leading to improved resilience, reduced emissions, and enhanced agricultural livelihoods across the region.
Outputs and Activities	**Output 1.1:** Harmonized regional policies supporting low-carbon climate-resilient agriculture adopted. **Activity:** Facilitate policy dialogues and workshops to harmonize regional policies on climate-smart agriculture. **Output 1.2:** Financial incentives for farmers and agribusinesses adopting sustainable practices and technologies developed and implemented. **Activity:** Develop and promote financial incentive mechanisms such as subsidies or grants to encourage adoption of climate-smart practices. **Output 1.4:** Farmers and agribusinesses equipped with knowledge and skills to implement and scale-up climate-smart technologies. **Activities:** • Conduct comprehensive training programs on climate-smart practices and technologies. • Develop and disseminate guidelines for low-emission farming techniques. • Promote knowledge-sharing platforms for exchanging best practices in climate-smart agriculture.
Crosscutting themes	Gender and social inclusion; Technology transfer; Policy harmonization; Private sector engagement.
Links to new RIF proposals	• Boosting Safe Vegetable Production Resilient to Climate Change through Application of Smart Technology in Cambodia and Laos (Cambodia, Lao PDR) • Climate-Resilient AgriFood Systems for a Sustainable Development of Vulnerable Upland Communities (CRAFS) (Viet Nam) • Promoting the application of green water management (GWM) into agricultural production in Central Highlands of Viet Nam (Viet Nam) • Intervention Approach in the Mekong Region to Ensure Food Security and Safety in the Time of COVID-19 Pandemic (Thailand) • Diversifying crops towards zero waste saline agriculture in Coastal provinces of Viet Nam (Viet Nam)
Funding needed	US$ 18 million
Potential stakeholders	ADB, FAO, National Ministries of Agriculture, NGOs, Private Sector

Output 2	Food safety, product quality, and access to markets improved
Countries	All GMS countries
Project name	Advancing Food Safety and Market Access through Harmonized Standards
Rationale	Inconsistent food safety standards and inadequate inspection protocols limit the GMS region's ability to access premium markets and ensure consumer safety. This project focuses on harmonizing food safety standards, building the capacity of food safety authorities, and promoting certification schemes and traceability systems. These efforts will enhance product quality, reduce food safety incidents, and open up new market opportunities for GMS agricultural products.
Outputs and Activities	**Output 2.1:** Minimum food safety standards and inspection protocols developed and implemented. **Activities:** • Harmonize regional food safety standards with international benchmarks. • Conduct capacity-building workshops for national food safety authorities. **Output 2.3:** Certification schemes and digital traceability systems deployed to enhance food safety and quality control across value chains. **Activities:** • Implement regional certification schemes for key agrifood products. • Develop and deploy digital traceability systems for food products. • Conduct training programs for food safety inspectors, producers, and processors. • Launch consumer awareness campaigns to increase demand for certified, high-quality products.
Crosscutting themes	Gender and youth inclusion; Technology transfer; Market access; Regional cooperation.
Links to new RIF proposals	• Establishment of the GMS Regional Food Safety Training Center (Thailand, Cambodia, PRC, Lao PDR, Viet Nam) also in Investment • Construction of Digital Inspection Technology Platform for Animal Feed Quality & Safety (Lao PDR, PRC) also in Investment • Intervention Approach in the Mekong Region to Ensure Food Security and Safety in the Time of COVID-19 Pandemic (Thailand) • Strengthening the capacity on applying digital technology to improve the value of agricultural product supply chains for agricultural Cooperatives in Viet Nam (Viet Nam) • Empowering Small-Scale Farmers: Enhancing Agricultural Product Value and Local Identity Agriculture through Tropical Agricultural Technology Transfer for Sustainable Food Security and Safety in the Mekong Region (Thailand, Cambodia, Lao PDR, Myanmar, and Viet Nam) • Agro-base Crop Value Chain for Export in Lao PDR (Lao PDR)
Funding needed	US$ 12 million
Potential stakeholders	ADB, FAO, National Food Safety Authorities, Private Sector, Certification Bodies

Output 3	Product diversity, food security and value chain efficiency enhanced
Countries	All GMS countries
Project name	Innovating Value Chains for Diverse and High-Value Agrifood Products
Rationale	The GMS region needs to adapt to evolving consumer demands for diverse and high-value agricultural products. This project aims to empower smallholders and MSMEs by providing training on diversified cropping systems and innovative business models. Additionally, it promotes the adoption of digital platforms and efficient value chain practices to reduce post-harvest losses and improve market access, thereby enhancing the overall competitiveness of GMS agrifood products.
Outputs and Activities	**Output 3.1:** Product diversity enhanced. **Activities:** • Provide training and technical support to farmers and agribusinesses on diversified cropping systems and high-value products. • Facilitate regional cooperation on best practices in product diversification. **Output 3.2:** Digital platforms and innovative business models to streamline value chains adopted. **Activities:** • Promote the adoption of digital platforms among smallholders and MSMEs to enhance market linkages. • Develop and promote innovative business models that improve value chain efficiency and reduce losses.
Crosscutting themes	Gender and social inclusion; Technology adoption; Market access; Private sector engagement
Links to new RIF proposals	• Strengthening Farmer Livelihood in GMS Countries by Improving Cashew Value Chain (Cambodia, Lao PDR, Viet Nam) • Enhancing Farming Practices Based on Maize on Sloping Lands in Lao PDR and Viet Nam (Lao PDR, Viet Nam) • Promoting cooperation in AgTech-FoodTech research utilization to develop the economy, trade, and international investment for Korat-Kunming-Chengdu-Chongqing-Guangxi-Nanning (Thailand, Lao PDR, and PRC) also in TA2 • Promoting Sustainable Cattle Farming in Laos through Crossbreeding and Artificial Insemination • Promoting cooperation in AgTech-FoodTech research utilization to develop the economy, trade, and international investment for Korat-Kunming-Chengdu-Chongqing-Guangxi-Nanning (Thailand, Lao PDR, and PRC) • Collaborative Network Development and Empowerment of Researchers, Farmers, and Sugar mills for Sustainable and Green Production of Sugarcane in the Mekong Region (Thailand, Cambodia, PRC, Lao PDR, Myanmar, and Viet Nam) • Strengthening the capacity on applying digital technology to improve the value of agricultural product supply chains for agricultural Cooperatives in Viet Nam (Viet Nam) also in TA2 • Empowering Small-Scale Farmers: Enhancing Agricultural Product Value and Local Identity Agriculture through Tropical Agricultural Technology Transfer for Sustainable Food Security and Safety in the Mekong Region (Thailand, Cambodia, Lao PDR, Myanmar, and Viet Nam) also in TA 2
Funding needed	US$ 10 million
Potential stakeholders	ADB, National Ministries of Agriculture, NGOs, Private Sector, Research Institutions

Annex 3. Design and Monitoring Framework

Performance Indicators	Data Sources and Reporting Mechanisms
IMPACT: Climate resilience, productivity, market access and agrifood investment in the GMS transformed	
OUTCOME: Safe and quality agrifood systems, climate resilience, environmental sustainability, and food and nutritional security improved	
OUTPUT 1. Resilient and sustainable agrifood systems practices enhanced and agricultural livelihoods improved	
a. A pipeline of climate-resilient and green investment projects for public and private sector of at least $1billion leveraged b. At least 6 new gender-responsive and socially inclusive strategies and policies on climate action and environmental sustainability supported	
1.a: 25% reduction in GHG emissions from agriculture by 2030 **1.b**: 25% increase of farmers adopting climate-smart practices by 2030 **1.c**: 15% increase in average household income from agriculture by 2030	• National agricultural GHG inventories • Surveys and reports from agricultural extension services • Household income surveys and impact assessments
Sub Output 1.1: Harmonized regional policies supporting low-carbon, climate-resilient agriculture adopted	
1.1.a: At least 2 regional policies on low-carbon, climate-resilient agriculture harmonized by 2027 **1.1.b**: All GMS countries implementing at least 1 harmonized policy by 2030 **1.1c**: Agrifood youth centric entrepreneurship policy formulated in at least 3 countries	• Government policy documents • Regional cooperation agreements
Sub Output 1.2: Financial incentives for farmers and agribusinesses adopting sustainable practices and technologies developed and implemented	
1.2.a: At least 5,000 farmers and agribusinesses per country receiving incentives by 2030 **1.2.b**: At least $50 million disbursed for sustainable practices initiatives by 2030	• National and regional agriculture funding reports • Monitoring reports from financial institutions
Sub Output 1.3: Partnerships that fund and scale up CSA initiatives and infrastructure established	
1.3.a: At least 5 major PPPs formed to scale up CSA initiatives **1.3.b**: At least $100 million in investments secured by Mekong countries to fund and scale up CSA initiatives and infrastructure **1.3c**: Investment in at least one agro-industrial park or agro-demonstration park related to CSA started in each GMS country.	• Partnership agreements and funding reports • Progress reports from TAs and other CSA projects

Sub Output 1.4: Farmers and agribusinesses equipped with knowledge and skills to and scale-up climate-smart and low-emission technologies and innovations implemented	
1.4.a: At least 10,000 farmers and agribusinesses trained to implement and scale-up climate-smart and low-emission technologies and innovations **1.4.b**: At least 5 climate-smart practices and 5 low-emission technologies adopted **1.4c**: At least 2 study tours for government and agriculture association representatives to successful projects in the GMS organized. **1.4d**: At least 2 regional capacity building workshops for stakeholders to create awareness on CSA organized.	• Training reports from extension services and NGOs • Government reports • Progress reports from Tas

OUTPUT 2. Food safety, product quality and access to markets improved	
2.a: At least 5% increase in certified products **2.b**: At least 15% increase in export of premium agrifood products **2.c**: At least 30% reduction in food safety incidents	• Certification agency reports • Trade and export data • Regional and/or national food safety monitoring systems
Sub Output 2.1: Minimum food safety standards and inspection protocols developed and implemented	
2.1.a: At least 1 regional food safety and/or quality standard developed by 2027 **2.1.b**: GMS countries adopt food safety standards by 2030 **2.1.c**: Food safety inspections increased by at least 30% across the subregion	• Government food safety regulations • Inspection and compliance reports • Progress reports from Tas
Sub Output 2.2: Partnerships to develop infrastructure for food safety testing, certification and market access established	
2.2.a: At least 5 new or upgraded food safety testing and certification centers **2.2.b**: At least 50 agribusinesses supported with certification and market access **2.3c**: At least 2 regional exhibitions with agriculture private sector organized to showcase new technologies, equipment and practices.	• Reports from food safety centers and certification bodies • Reports from extension services and NGOs • Progress reports from Tas
Sub Output 2.3: Certification schemes and digital traceability systems to enhance food safety and quality control across value chains deployed	
2.3.a: At least 2 key agri-products for export established subregional traceability systems **2.3.b**: At least 5 smallholders cooperatives and 5 MSMEs in identified value chains certified through targeted support	• Certification and traceability system reports • Monitoring and evaluation reports from agrifood sector stakeholders • Progress reports from Tas

OUTPUT 3. Product diversity, food security and value chain efficiency enhanced	
3.a: 15% increase in product diversity, fueled by the availability of plant-based proteins, meat alternatives and innovative protein products **3.b**: Diversified products contributing to at least 5% of the nutritional intake for targeted populations **3.c**: At least 30% reduction in post-harvest losses	• Market surveys and trade reports • Post-harvest monitoring data • Food security and nutrition monitoring systems • Progress reports from Tas
Sub Output 3.1: Product diversity enhanced	
3.1.a: At least 500 more farmers adopting diversified crop and livestock systems **3.1.b**: At least 100 agribusiness trained in producing and processing high-value and non-traditional agrifood products, including plant-based and innovative protein products, through targeted support	• Agricultural production and market data • Reports from extension services and NGOs • Progress reports from Tas
Sub Output 3.2: Key value chain infrastructure increased	
3.2.a: At least 2 new or upgraded logistics or post-harvest infrastructure facilities, such as cold chain storage	• Infrastructure development reports • Progress reports from Tas
Sub Output 3.3: Digital platforms and innovative business models to streamline value chains adopted	
3.3.a: At least 500 smallholders and MSMEs using digital platforms for trade and business activities **3.3.b**: At least 100 smallholder cooperatives and MSMEs trained on innovative business models for agrifood product trade and marketing **3.4c**: At least 2 interactive user-friendly digital platforms on weather, climate smart agriculture, agricultural inputs, extension services, crop commodity prices, and knowledge tools in a youth and gender sensitive manner developed.	• Digital adoption reports • Reports from extension services and NGOs • Progress reports from Tas

GMS 2030 Kunming Strategic Framework for Transformation of Agrifood Systems

About the GMS Working Group on Agriculture

The Working Group on Agriculture (WGA) provides overall leadership and direction for ADB's GMS Agriculture Program and its current phase, the GMS Sustainable Agriculture and Food Security Program, in the Greater Mekong Subregion. WGA also plays an important role in facilitating cross-sector agricultural collaboration within the six countries in the subregion. The working group members are nominated senior government officials from the agriculture ministries of each GMS country.

About the Asian Development Bank

ADB's vision is an Asia and Pacific region free of poverty. Its mission is to help its developing member countries reduce poverty and improve the quality of life of their people. Despite the region's many successes, it remains home to two thirds of the world's poor: 1.7 billion people who live on less than $2 a day, with 828 million struggling on less than $1.25 a day. ADB is committed to reducing poverty through inclusive economic growth, environmentally sustainable growth, and regional integration.

Based in Manila, ADB is owned by 67 members, including 48 from the region. Its main instruments for helping its developing member countries are policy dialogue, loans, equity investments, guarantees, grants, and technical assistance.

Asian Development Bank

6 ADB Avenue, Mandaluyong City

1550 Metro Manila, Philippines

www.adb.org