



SUSTAINABLE AGRI-FOOD SYSTEMS FOR THAILAND AND CAMBODIA:

Leveraging Agroecology and Healthier
Consumption Environments

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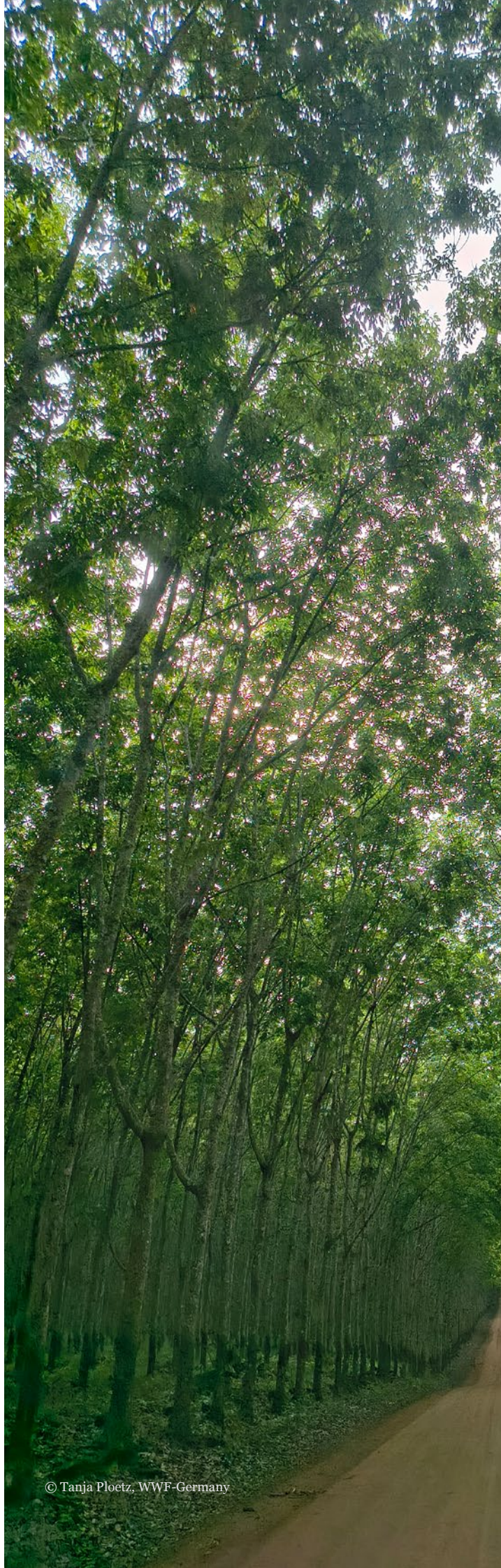
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EXECUTIVE SUMMARY

Introduction and purpose

This study has two objectives:



1 To examine the policies and market forces that are driving the negative impacts to both nature and smallholder farmer livelihoods in Thailand and Cambodia.

2 To examine barriers to transformation and identify policy solution pathways towards sustainable agri-food systems through the scale up of diverse, agroecological, and conversion-free production systems alongside sustainable consumption patterns.

The research employed a mixed-methods approach, including literature review, stakeholder interviews, and field observations.

Key findings:

Drivers and impacts of the current agri-food system model

1. Shifts in diets and agri-food system

production: Both Cambodia and Thailand are experiencing a dual shift:

- Changing consumption patterns towards more ultra-processed foods (UPFs), animal protein products, and ready-made convenience products, fuelled by industry's commercial interests.
- A transition from small-scale, diverse, subsistence farming to industrialized, input-intensive agriculture of monocultures and cash crops.

2. Main drivers of these shifts: The key drivers of these shifts include a range of government policies that support industrial and export-oriented agriculture in detriment of smallholder sustainable production, coupled with a rising offer of cheap meat (and therefore of cheap animal feed) that responds to an increase in demand. Additionally, foreign investment has also driven these changes, particularly from importer markets like China or Europe, which have applied insufficient sustainability requirements.

3. Dietary and agri-food system

production shifts are the primary drivers of severe environmental

degradation: The expansion of this agro-industrial model has driven the growth in the cultivation of cash crops, such as maize used as animal feed or rubber, in harmful monoculture systems, which have been the primary drivers of deforestation, land conversion, and habitat loss in the region during the last 20 years.

4. Dietary and agricultural production shifts also drive health and social risks:

- **Health:** Agrochemical use has been increasing rapidly due to the expansion of industrial agriculture, causing farmer health issues and dangerous residue levels in food products. The increasing offer and consumption of ultra-processed foods is causing an increase in non-communicable diseases.
- **Social:** The “contract farming” models that are frequently used to enable agro-industrial cropping systems often leave smallholders economically vulnerable, with unfair prices and with unpredictable incomes.



Diverging national contexts:

- **Thailand** has a strong policy foundation on which to materialize Sustainable Consumption and Production (SCP) in agri-food systems, as well as a growing and vibrant organic movement. Public awareness is on the rise, particularly due to both the air pollution crisis caused by agri-food systems as well as campaigns demonstrating high pesticide residue levels in vegetables, which led the government to ban pesticides.¹
- **Cambodia** has drafted an “SCP Roadmap” but its implementation remains weak. The country’s organic movement is more residual when compared to the Thai’s, and sustainable production of agri-food products for the domestic market is rather minimal. Cambodia’s agri-food policy heavily favours large-scale, industrial agriculture, often at the expense of smallholders and environmental protection, while a recent push on so-called “modern cooperatives” remains unclear.

Barriers to sustainable agri-food systems

Significant barriers to more sustainable agri-food systems persist in both countries, including:

- **Consumer behaviour:** Price is the dominant factor in food choices, with low willingness to pay (more) for sustainable products, especially in Cambodia.
- **Governance:** There is a lack of policy coherence, exemplified for instance by export-led growth strategies in direct conflict with sustainability goals. Enforcement of existing regulations that could lead to positive outcomes is often weak.
- **Market structures:** Export markets for key commodities (e.g., cassava) offer no price premium for sustainable practices.



Global organic farmland has
increased by

**103% over the
past decade**

Contract farming is primarily a tool to ensure market access, but its potential as a vehicle for more ecological practices is not used.

- **Knowledge gaps:** Public agri-food advisory (extension) services are lacking or insufficient and often replaced by private commercial interests such as agrochemical vendors, creating a concerning conflict of interest.

Conclusions and Opportunities

- **Thailand** is well positioned to scale its existing successes and unfold its policies. The main opportunity lies in strengthening and replicating pilot projects, and implementing supportive policies (e.g., SCP strategies, green credit schemes). Alongside, leveraging the increasing awareness on food-health-environment nexus, the launch of nationwide awareness campaigns that connect consumer health to their diets, and in turn to environmental sustainability could lead to significant change. Addressing food labelling, correcting the current multiplicity of labels that confuses consumers, would help trigger more consumer action.
- **Cambodia** faces a “chicken and egg” dilemma: low consumer demand for sustainable products does not stimulate production, and such low supply tends to stifle demand as motivated consumers cannot find the sustainable products that they would be willing to buy. Breaking such a cycle would require behaviour change campaigns focused on certain niche target populations (higher income consumers that may have more willingness to pay), centred around human health concerns as a primary entry point. Current policies promoting “modern agricultural communities” risk further entrenching industrial models unless sustainability criteria are integrated.

Overall, systemic transformation in any of the two countries will require addressing both production and consumption simultaneously. It must be emphasized that no silver bullets exist and that solutions must be nuanced to the local context. Merely promoting sustainable vegetables will not lead to stopping further deforestation to produce animal feed crops; a reduction in meat production and consumption (both locally and globally) is ultimately necessary to reduce pressure on land. Policy coherence and integration is key.

Strategic policy recommendations for both Thailand and Cambodia

What follows are a set of key policy recommendations that can be applied in both Thailand and Cambodia:

- **Support smallholders, small farmers and landless peasants:** Redesign extension programmes and increase financial support mechanisms to help vulnerable farmers initiate and transit the transformation process to sustainable practices.
- **Redirect subsidies and increase de-risking investments to nature-positive production driving social well-being:** Redirect agri-food subsidies from harmful production practices as well as increase de-risking investments to increase nature-positive production of healthy foods that drive fair livelihoods. Create incentives for farmers to initiate transitions to nature-positive production.

- **Promote fairer prices for farmers and more equal benefit sharing** of profits across value chain actors.
- **Increase public awareness, aim to shift social norms:** Launch compelling campaigns on the links between healthy diets, sustainable food, and environmental conservation.
- **Promote healthy, sustainable foods:** Protect and promote indigenous/traditional, plant-based gastronomy and sustainable food cultures.
- **Optimize land use through agroecology:** Halt the conversion and support the restoration of ecosystems. Promote agroecological practices on existing arable land.



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Recommendations for practitioners, civil society organizations and other stakeholders:

Thailand:

Support smallholders, small farmers and landless peasants: Deepen collaboration with government reforestation and land-conversion programmes (e.g., in Mae Chaem).

Optimize land use: Collaborate in the design and implementation of Thailand's ongoing policy efforts to transition maize-based monocropping systems towards more sustainable land use, including reforestation and agroecology approaches in coordination with the the Ministry of Agriculture and Cooperatives and the Royal Forest Department. Mae Chaem is widely recognised as a key landscape for piloting such transitions, given its history of maize expansion and ongoing restoration initiatives.

Redirect subsidies and increase de-risking investments to nature-positive production that drives social well-being: Collaborate with financial institutions such as the Bank for Agriculture (BAAC) to refine, replicate and scale its green credit schemes aligned to the Thai government's SCP Roadmap and the "Bio-Circular-Green" (BCG) strategy.

Cambodia:

Increase public awareness: Prioritize targeted behaviour change and public awareness campaigns focused on three interconnections:

- Nutrition, agricultural production, and health
- Agrochemicals and food
- Meat consumption, industrial cassava/maize plantations, and air pollution
- *Bonus:* Issues of waste reduction and recycling

Support smallholders: Shift the focus of agri-food production projects from Good Agricultural Practices (GAP) to organic certification in order to better align with the global human and planetary targets.

BACKGROUND AND INTRODUCTION

Agri-food systems across the globe are at a critical juncture. Southeast Asia is no exception. Thailand, Cambodia and other countries in the region are experiencing rapid economic growth, urbanization, and dietary change, all of which are having far-reaching implications for livelihoods, public health, and the environment. The agri-food sector has also experienced intense growth and shifting dynamics. While these significant changes have contributed to lifting millions of people out of poverty, they have also ushered in a model of industrial agri-food production that is characterized by monoculture plantations, intensive chemical use, and the conversion of natural ecosystems. Whereas this model can generate higher revenues and profits for some actors, it does not contribute to resolving the multiple issues typically found in rural agricultural areas. In other words, the expansion of this industrial model prioritizes short-term economic gains – through cash crop and/or export commodities – over long-term sustainability, social equity, and ecological resilience.

The consequences of this pathway are becoming increasingly evident. The Mekong region, a global hotspot for biological and cultural diversity, is under threat from the rapid conversion of natural habitat, largely driven by the demand for land to grow cash crops such as cassava, maize, and rubber. Concurrently, shifting consumption patterns towards highly processed foods and increased meat consumption are increasing levels of non-communicable disease rates and exerting an unprecedented and unsustainable strain on natural resources. Smallholder farmers, which represent the backbone of rural economies in the region, are often locked into a cycle of dependence on costly agricultural inputs (pesticides, fertilizers, seeds, etc.) and volatile international markets. In turn, their already vulnerable situation is not remedied by the growing trend of contract farming models offered by (more) powerful companies, which fail to consistently deliver the promised benefits or security, affecting farmer resilience.



**By 2019,
only 0.46%**

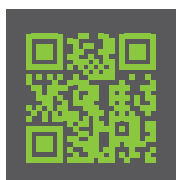
**of Cambodian farmland
was certified organic**



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Recognizing these interconnected challenges and the urgency to avoid multiple impending crises (climate, biodiversity, cost of living, etc.), there is a growing consensus in the global community on the need to fundamentally transform food systems. This is reflected in international frameworks like the Sustainable Development Goals (SDG), the UNFCCC COP28's Global Goal on Adaptation's inclusion of food and agriculture (and the related voluntary UAE Declaration on Sustainable Agriculture, Resilient Food Systems, and Climate Action) as well as the food-related targets embedded in the Kunming-Montreal Global Biodiversity Framework. Particularly, a growing emphasis on **agroecology** has been poised as a key approach that holistically integrates ecological principles, social equity, and economic viability.

This report reiterates the imperative for change. It was commissioned by WWF's project "**Sustainable consumption and production in Thailand and Cambodia – Phase II**" (SCP2). The project's overarching goal is to promote SCP patterns within agri-food systems.



<https://www.wwf-scp.org>

Purpose and scope of this study

Within this complex situation, the report is designed to provide a clear-eyed analysis of the current state and future potential of agri-food systems in Thailand and Cambodia. It has two primary objectives:

- 1 To provide a summary diagnosis of the problem:** Provide a concise overview of the negative impacts caused by the recent expansion of large-scale, commercial agriculture on both nature and smallholder farmers. This involves shedding light on the policies, market dynamics, and key actors driving this change.
- 2 To identify solutions:** Examine the benefits and potential of a range of institutional support mechanisms and policy measures that can enable a shift towards diverse, agroecological, and conversion-free production systems, alongside consumption-level measures for improving livelihoods and promoting sustainable food environments.

By examining both the challenges and the opportunities, this study aims to inform policymakers, project implementers, and stakeholders on how to effectively navigate away from a dysfunctional and damaging model towards one that ensures **sustainable livelihoods, healthy ecosystems, and food and nutrition security for present and future generations**. The following sections detail on the methodology, findings, and actionable recommendations derived from this investigation.

Farmers who consult
pesticide sellers

use **251% more**
pesticides

ABOUT THIS STUDY

The WWF project “Sustainable consumption and production in Thailand and Cambodia Phase II” – part of the WWF initiative **Future Food Together (FFT)**² – promotes the adoption of sustainable consumption and production (SCP) approaches in agri-food systems in two Southeast Asian countries, Cambodia and Thailand, as well as globally by contributing to international and multi-lateral policy processes, including through leading platforms like the One Planet network’s Sustainable Food Systems Programme.

In both countries, the project delivers simultaneous interventions across the agri-food system, from production to consumption, aimed at generating an increasing supply of sustainable food products that is matched by an increasing demand, contributing to the country’s climate and biodiversity commitments.

In Thailand, FFT promotes the diversification of crops and move to more sustainable agricultural practices such as agroecological and organic production, accompanied by reforestation efforts. Key interventions aim at phasing out maize monocultures in pilot areas by convening multiple actors, fostering collaboration, providing technical support, and developing marketing channels at local level and in urban retailing. In parallel, consumers are engaged through both campaigns as well as capacity building workshops and convenings to foster their potential as agents of change.



Similarly, in Cambodia, FFT also focuses on pilot production sites in Monduliri province, which is facing increasing land conversion pressures from cassava, rubber and other cash crop production. Together with a range of local stakeholders, the project supports farmers to shift agricultural production methods towards sustainability, develop market access and food value chains with commercial actors to reach new markets, and connect with the growing green consumer base in urban and peri-urban areas.

WWF’s Future Food Together’s global policy workstream, WWF’s Greater Mekong Programme, WWF’s Food & Agriculture Practice, and WWF-Cambodia’s and WWF-Thailand’s strategies

WWF’s FFT works at global and multilateral levels, delivering a range of complementary interventions for the promotion and uptake of sustainable consumption and production (SCP) patterns in food systems, agricultural and forestry value chains.

At the global level, the initiative particularly focuses on raising awareness and promoting the uptake of the sustainable food systems approach, on advocating for more coherent and integrated measures that tackle production as well as consumption (and disposal), and on promoting more inclusive governance mechanisms to address power imbalances, system lock-ins, path dependencies, and matters of inequality and agency. The initiative advocates these solution frameworks and approaches in multilateral and global policy processes in a range of areas that are connected through food: climate, biodiversity, all forms of inequality, desertification, deforestation, poverty eradication, and economic trade, among others.

To do this, FFT is engaged in the One Planet Network (OPN), supporting WWF's co-lead role in the OPN's Sustainable Food Systems Programme³ as well as membership in the Multi-stakeholder Advisory Committee of the OPN's Consumer Information Programme⁴. OPN is a global community of practitioners, policymakers and experts, including governments, businesses, civil society, academia and international organizations. It is the official implementation mechanism of the cross-cutting SDG 12: ensuring sustainable patterns of consumption and production.

Through WWF's Greater Mekong Programme, with offices in Cambodia, Laos, Myanmar, Thailand and Vietnam, WWF is working with government, industry, NGO partners, local communities and civil society to secure a future in which people's daily actions support biodiversity conservation and sustainable use of natural resources. Box 1 provides an overview of WWF's global Food & Agriculture Practice. In turn, Box 2 provides a quick glance into the strategies of both WWF-Cambodia and WWF-Thailand.

BOX 1: WWF'S FOOD & AGRICULTURE PRACTICE: A GLOBAL FRAMEWORK FOR TRANSFORMATION

The transformation of food and agricultural systems is crucial to WWF's mission to reverse nature loss and limit the impacts of climate change on people and the ecosystems we care about.

Unsustainable food and agricultural systems are the single biggest threat to biodiversity, contribute approximately one-third of global greenhouse gas emissions, and leave billions either hungry or suffering from diet-related diseases. If current trends continue, unsustainable agrifood production, consumption and waste will increase, further eroding nature and compromising climate resilience as well as food and nutrition security. Yet food and agriculture systems can be a major part of creating a future in which people and nature thrive in harmony.

By improving food and agricultural systems through just transitions that secure nature from further conversion, overfishing and degradation, and scale nature-positive practices, it is possible to deliver long-term benefits at four significant levels (the 4Ps, see also Figure 1):

- **Planet:** Scaling mechanisms – policy, markets and the financial system – support nature-positive food and agricultural systems that deliver food and nutrition security, while avoiding negative tipping points and triggering positive ones.
- **Places:** Nature-positive production protects nature from deforestation and conversion, sustainably manages land and water, and restores degraded ecosystem health.
- **People:** Voices of under-represented groups in global and local food and agricultural systems decision-making are included, while everyone's right to sustainable, healthy and nutritious food is met.
- **Prosperity:** The economic and social benefits of nature-positive food and agricultural systems generate and fairly distribute wealth and well-being for nations and their people.

Food and agricultural systems transformations cannot be considered truly or sustainable if they do not progress all 4Ps.

FIGURE 1: THE 4 PS IN WWF'S GLOBAL FOOD STRATEGY



FOOD & AGRICULTURE 4P FRAMEWORK

PLANET PATHWAY

Scaling mechanisms - policy, markets and the financial system - support nature-positive food and agricultural systems, that deliver food and nutrition security, while avoiding negative tipping points and triggering positive ones.

Nature-positive production protects nature from deforestation and conversion, sustainably manage land and waters, and restore degraded ecosystem health.

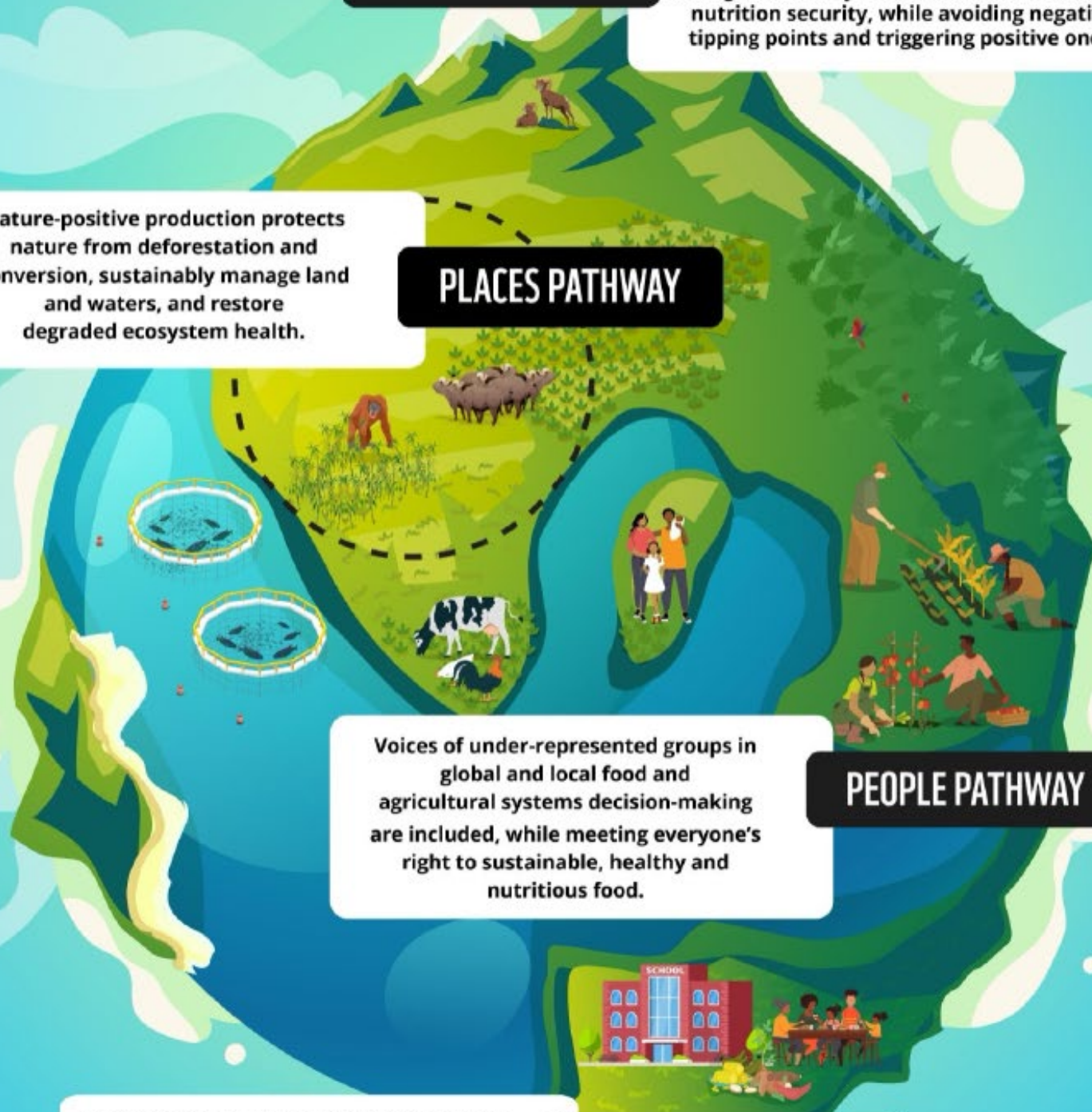
PLACES PATHWAY

Voices of under-represented groups in global and local food and agricultural systems decision-making are included, while meeting everyone's right to sustainable, healthy and nutritious food.

PEOPLE PATHWAY

The economic and social benefits of nature-positive food and agricultural systems generate and fairly distribute wealth and well-being for nations and their people.

PROSPERITY PATHWAY



WWF applies a systemic approach to deliver these outcomes by focusing on three interconnected solutions: scaling nature-positive production practices, shifting to healthy and sustainable diets, and radically reducing food loss and waste.

Although WWF works all the way across value chains and in more than 90 countries to implement context-specific solutions that deliver for nature, climate and people, four Impact

Accelerators have been identified to deliver transformation at scale and pace required: In-country policy development and implementation; Global value chain and agrifood market transformation; Smallholder adoption of nature-positive agriculture practices in high biodiversity landscapes and Leveraging the power of retailers and food service providers to scale nature-positive food systems.

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In Thailand, only 5 farms are
certified COrAA organic, and
another 10 farms
CamOrganic
organic

BOX 2: WWF-CAMBODIA AND WWF-THAILAND STRATEGIES FOR NATURE-POSITIVE AGRI-FOOD SYSTEMS (FY2026–FY2030)

WWF offices in Thailand and Cambodia have developed ambitious five-year strategic plans that prioritize the transformation of agri-food systems as a core pathway to achieving conservation outcomes. While both strategies share a common vision rooted in WWF's global framework, they reflect the distinct national contexts, challenges, and opportunities present in each country.

WWF-Thailand Strategy

WWF Thailand's FY2026–FY2030 strategy actively promotes a shift towards sustainable agri-food systems, building on the country's relatively strong policy landscape and growing public awareness. Key elements include:

- **Market transformation:** The strategy seeks to change behaviour in the corporate sector towards alignment with environmental, social and governance national targets. This also includes financial markets and institutions, promoting their transformation and exploring innovative financial mechanisms such as conservation bonds and biodiversity credits.
- **Community engagement:** The strategy targets partnerships with 50 communities for sustainable forest management and supports at least 30 communities in implementing agroforestry and sustainable natural resource management practices.
- **Policy alignment:** WWF Thailand aligns its work with national frameworks such as the Bio-Circular-Green (BCG) economic model and engages with government programmes, including the Mae Chaem pilot aimed at converting maize plantations to sustainable land uses.

WWF-Cambodia Strategy

WWF Cambodia's FY2026–2030 strategy is anchored in two landscape-based programmes and one overarching climate/footprint programme, addressing the root drivers of environmental degradation, including agricultural expansion.

- **Eastern Plains Landscape:** Protecting the largest remaining dry forest ecosystem in Indochina through law enforcement, land-use planning, and Indigenous Bunong community empowerment with sustainable value chains for wild honey, rubber, and rice.
- **Mekong Flooded Forest:** Safeguarding freshwater biodiversity—including the Irrawaddy dolphin—by maintaining free-flowing rivers, restoring wetlands, securing land tenure for community-based organizations and supporting them to adopt sustainable pro-conservation practices, and supporting community-based fishery co-management.
- **Climate Change & Footprint Programme:** Addressing systemic drivers through fostering sustainable livelihoods from food and non-food commodities, Nature-based Solutions (NbS) such as forest landscape restoration, improving waste management, fostering community eco-tourism initiatives, and promoting low-cost, low-carbon, low-conflict renewable energy systems to achieve carbon neutrality, free-flowing rivers and reduced pressure on natural habitats.

Both country strategies operationalise WWF's Food and Agriculture Global Framework – leveraging the Impact Accelerators to deliver outcomes across the 4Ps (see Box 1) – adapted to their respective national contexts and the given opportunities.

METHODOLOGY

The study used a mixed-methods approach, to investigate the drivers, impacts, and potential pathways for transforming agri-food systems in Thailand and Cambodia towards greater sustainability. The methodology was structured to provide a holistic, evidence-based analysis, integrating secondary data with primary qualitative insights.

4.1

Research Design and Conceptual Framework

The study's research design is grounded in established socio-ecological systems and transition theory frameworks. The research design integrated two key academic lenses to guide investigation:

- **The multi-Level perspective (MLP) on socio-technical transitions:** This framework structured the analysis of how incumbent, unsustainable agri-food systems are maintained and how alternatives emerge. It examined the interaction between broad external trends (the landscape), the dominant industrial agricultural regime (the regime), and innovative practices like agroecology (the niche). This lens helped identify systemic barriers and potential pathways for scaling alternatives.



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- **A holistic food systems approach:** The research was framed by an integrated understanding of food systems, which considers the food system in its totality, taking into account all the elements, their relationships and related effects. It is not confined to one single sector, sub-system (e.g. value chain, market) or discipline, and thus broadens the framing and analysis of a particular issue as the result of an intricate web of interlinked activities and feedbacks. This ensured analysis considered the interconnected activities (production, consumption), outcomes (livelihoods, environment), and drivers (policy, markets) of the entire system, rather than focusing on isolated components.

4.2

Data Collection Methods

4.2.1. Literature Review Approach

The literature review includes a comprehensive review of relevant academic literature, policy documents, and reports to establish the current knowledge base on the topic (both on the impacts of the current model, and the benefits of transitioning to a sustainable model). This will include analysis of case studies focusing on successful sustainable agri-food models within the target region. These case studies will explore the specific elements of the model that contribute to sustainability. Particular focus will be placed on the role of institutional support mechanisms and policy measures enabling these practices as well as the impact on both production and consumption levels along the value chain.

A number of documents with relevance to the project region have been provided by the project team. However, the literature review will not be limited to the documents provided by the team. A selection of case studies from other regions around the globe will be incorporated into the analysis to identify transferable best practices and lessons learned. A full list of reviewed literature can be found in section 10.

It has to be noted that most Thai policy documents are only available in Thai language. Due to time constraints a full translation was often not possible. Therefore, this review is not complete and might exclude some essential pieces of policy and legislation.

4.2.2. Primary Qualitative Data Collection and Limitations

Semi-structured interviews were conducted with a diverse group of stakeholders to collect in-depth qualitative data on their experiences and perspectives regarding the current agri-food system, as well as sustainable agri-food practices. Participants included farmers, policymakers, industry representatives, marketing agents, local NGOs, and consumer representatives. Detailed interview guides were developed based on the stakeholder groups identified. The interview guides aimed to gather insights on stakeholders' knowledge and attitudes toward sustainable practices, perceived barriers and enablers to adopting such practices, the effectiveness of existing institutional support and policy measures, and consumer preferences and purchasing behaviours related to sustainable agri-food products.

Different approaches were applied in the two countries studied. In Thailand, the primary focus was on field research. The consultant visited selected project sites in Chiang Mai and Nan provinces, as well as areas near Bangkok. This fieldwork was complemented by interviews and discussions with government institutions, bank representatives, farmers and communities, and researchers. However, due to time and budget constraints, it was not possible to collect a sufficiently large body of empirical data.

In Cambodia, only limited field research was planned due to budget limitations and the author's own expertise. The main focus here was on interviews and discussions with government officials, researchers, certification bodies, an NGO network, as well as a critical review of existing studies and research documents. Additional conversations were held with farmers and farmer associations.



REVIEWED LITERATURE

Conceptualising Sustainable Consumption and Production in Agri-Food Systems & Analysing Policy Frameworks and Trends in Cambodia and Thailand

The High-Level Panel of Experts on Food Security and Nutrition (HLPE) of the Committee on World Food Security defines a sustainable food system (SFS) as a “*food system that ensures food security and nutrition for all in such a way that the economic, social and environmental bases to generate food security and nutrition of future generations are not compromised.*”⁵

Sustainable Consumption and Production (SCP) is a holistic approach to minimising negative environmental impacts from consumption and production systems, while promoting quality of life for all.⁶ At the UN Conference on Environment and Development, held in Rio de Janeiro in 1992, sustainable consumption and production (SCP) was recognised as an overarching theme to link environmental and development challenges. The conference’s final report, Agenda 21, states that the major cause of the continued deterioration of the global environment are unsustainable patterns of consumption and production.⁷ The UN defines Sustainable Consumption and Production as “*The use of services and related products, which respond to basic needs and bring a better quality of life while minimising the use of natural resources and toxic materials as well as the emissions of waste and pollutants over the life cycle of the service or product so as not to jeopardise the needs of future generations.*”⁸



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Food systems emit over
17 billion
tonnes of CO₂e annually,
with agricultural production
and land-use change making
up over **70 percent** of food
systems emissions.

The Paris Agreement sets an ambitious goal for climate change mitigation that requires urgent action in all sectors. Parties agreed to limit the increase in global average temperature to well below 2°C above pre-industrial levels, while pursuing efforts to limit warming below 1.5°C at the end of the century. For food systems, this implies a rapid overhaul of how we produce, distribute and consume food – by shifting towards nature-positive production, reducing food loss and waste and transitioning towards healthy and sustainable diets. (...)

Measures at the food production-level (like addressing land-use change and agricultural emissions) combined with demand-side measures (like reducing food loss and waste) could contribute to around 20 percent of the global mitigation needed in 2050 to deliver on the 1.5°C Paris Agreement target. Of the emissions mitigation resulting from nature-based solutions, 80 percent of 2030 mitigation opportunity is closely linked to food systems.”⁹

A global dietary shift is underway, moving away from diverse, plant-based diets toward those high in sugar, fats, and highly processed and animal-sourced foods. This trend has serious repercussions for both public health and the environment. The rising consumption of these foods is linked to increasing rates of obesity and diet-related diseases. Furthermore, such products are typically more resource-intensive, requiring greater energy, water, and packaging. Animal production in particular is a leading driver of greenhouse gas emissions, biodiversity loss, and land and water use.

Conversely, shifting to healthier, more sustainable diets low in processed foods and animal protein offers a dual benefit: it improves human and animal welfare while significantly reducing our ecological footprint. Therefore, dietary guidelines that promote wholesome, plant-based diets can play a crucial role in enhancing public health, reducing GHG emissions and achieving positive environmental outcomes.¹⁰

While global trends show a move toward less healthy habits in some areas, there is a concurrent and growing worldwide demand for sustainable products, particularly organic food. This is evidenced by recent statistics from IFOAM and FiBL, which show a significant rise in global organic production and consumption.¹¹ Compared to 2000, when 14 million hectares were under organic production, organic agricultural land has increased nearly sevenfold (2023). During the last 10 years, organic agricultural land increased by 103%.¹²

Trends in meat consumption reveal a global disparity. While stable or increasing in developing nations, it is declining in many Western countries. For instance, after nearly doubling between 1961 and 2019, average meat consumption in the West has since stabilized. Germany exemplifies this shift, with per capita consumption falling from 89 kg in 2010 to approximately 70 kg in 2022. In contrast, the average in Least Developed Countries remains significantly lower, at around 12 kg per capita.¹³

Supporting this shift toward sustainability, the EU passed a new regulation in 2023 (EU 2023/1115) to ensure products consumed are ‘deforestation-free’. By regulating key commodities like cattle, soy, coffee, cocoa, palm oil, rubber, and timber – as well as their derived products – the law aims to reduce the EU’s contribution to global deforestation or forest degradation, thereby cutting greenhouse gas emissions and biodiversity loss. The new regulation is part of a broader plan of action to tackle deforestation and forest degradation first outlined in the 2019 Commission Communication on Stepping up EU Action to Protect and Restore the World’s Forests. This commitment was later confirmed by the European Green Deal, the EU Biodiversity Strategy for 2030 and the Farm to Fork Strategy.¹⁴

Parallel efforts are underway in Southeast Asia. ASEAN member states launched the ‘ASEAN Regional Guidelines for Sustainable Agriculture’¹⁵ in 2022 and the ‘Policy Guidelines

on Agroecology Transitions in ASEAN¹⁶ in 2024. Both guidelines aim to provide a framework to transition towards sustainable agricultural production. Furthermore, ASEAN adopted the ‘ASEAN Standard for Organic Agriculture’ (ASOA) in 2014 as a framework for sustainable agriculture production under organic schemes.¹⁷ In 2018, ASEAN adopted guidelines on promoting responsible investment in food, agriculture and forestry.¹⁸ Furthermore, the concept of Sustainable Consumption and Production is being advanced across ASEAN, including in Thailand and Cambodia, through the promotion of sustainable and green public procurement, for which relevant laws and guidelines have been drafted.

Policy Framework Thailand

Thailand has established comprehensive policy frameworks for Sustainable Consumption and Production (SCP), though their implementation remains a work in progress. The core principle of SCP is integrated into the National Economic and Social Development Plan (NESDP), which is itself guided by the His Former Majesty’s “Sufficiency Economy” philosophy, a cornerstone of the

national development agenda. This overarching plan provides a strategic framework, defining goals and assigning responsibilities for achieving sustainable socio-economic development within a healthy environment.

Thailand’s 20-Year National Strategy (2018-2037) (Thailand, National Economic and Social Development Council [NESDC] 2019) includes a sub-strategy on agriculture and sustainable development which highlights promoting safe, biological and smart agriculture, green economy, ecosystem services and environmental quality. The Ministry of Agriculture and Cooperatives has enacted the 20-year Agricultural and Cooperatives Strategy (2017-2036), which focuses on promoting farmer institutions, increasing farming efficiency, escalating the adoption of product standards, and balancing agricultural resource use with sustainability. Overall, the Thai government is championing a Bio-Circular-Green (BCG) economic model as a national agenda. This commitment is reflected in the strategies of various line ministries and is further demonstrated by the adoption of Green Public Procurement (GPP) policies.



Thailand drafted a Thai National SCP Roadmap (2017-2037).¹⁹ In order to support the implementation of this roadmap, the Thai Sustainable Consumption and Production Network (Thai SCP Network) was established in 2018 by the 1) Asia Pacific Roundtable on Sustainable Consumption and Production (APRSCP) Foundation, 2) the Department of Environmental Quality Promotion (DEQP) under the Ministry of Natural Resources and Environment and 3) the Technology and Informatics Institute for Sustainability (TIIS) under the National Science and Technology Development Agency.

In 2024, the Thai parliament passed the first reading of the Clean Air Act, which consolidated seven different legislative drafts to systematically address the country's air quality crisis. This legislation introduces robust mechanisms to monitor supply chains, specially linking air pollution to agricultural practices – such as the cultivation of maize for animal feed, sugarcane and cassava. Significantly, the bill recognizes low air quality as both a domestic and transboundary issue, granting the state powers to manage pollution sources originating outside national borders linked to industrial investments.

Thailand's agricultural standards governance system operates under the Ministry of Agriculture and Cooperatives, with the National Bureau of Agricultural Commodity and Food Standards (ACFS) serving as the lead agency for policy and standard development under the Agricultural Standards Act B.E. 2551 (2008), providing a framework for establishing and implementing agricultural standards to improve the quality and safety of agricultural products, facilitating their export and promoting sustainable agricultural practices. It aims to harmonize standards with international norms and enhance the competitiveness of Thai agricultural products. ACFS works in coordination with technical departments such as the Department

of Agriculture, Department of Livestock Development, Department of Fisheries, and the Rice Department, which act as inspection and certification bodies for both organic and non-organic agricultural products.

For non-organic agricultural products, key systems include GAP (Good Agricultural Practices) and GMP (Good Manufacturing Practices), which emphasize consumer safety, hygiene in the production process, and regulated use of chemical inputs. The government uses certification marks such as the Q Mark and Thailand GAP to communicate to domestic and international consumers that these products meet minimum safety and hygiene standards. For organic agricultural products, in addition to domestic standards such as Organic Thailand and the Participatory Guarantee System (PGS) used in local markets, there is communication through internationally recognized certification marks such as EU Organic, USDA Organic (USA), JAS (Japan), and Canada Organic. Products intended for export must be certified by bodies that are recognized as equivalent by the destination country.

Consumer awareness of organic products in Thailand has been steadily increasing, particularly among urban residents, middle-to high-income groups, health-conscious individuals, families with young children, chronic disease patients, and those with access to information through green markets or organic consumer networks. However, significant gaps remain among low-income groups, informal workers, rural communities, and youth—many of whom, despite being familiar with the term “organic,” still confuse it with “chemical-free” or “natural.” Major barriers are not only the higher price point and uncertainty about the credibility of certification labels but also limited access – especially in areas that still rely on traditional markets and local shops where labelling and communication are lacking.

In this context, civil society organizations play a vital role in raising public awareness around safe food, organic agriculture, and environmental sustainability. Organizations such as ThaiPAN publish data on pesticide residues in a and vegetables, GreenNet promotes alternative markets and PGS certification systems, and City Farm project under Sustainable Agriculture Foundation (Thailand), encourages urban households to grow their own food. Meanwhile, BioThai links biodiversity with food system rights, and the Foundation for Consumers advocates food safety, transparent labelling, and consumer protection. Additionally, the campaign “Food 4 Change”, a collaborative initiative among various partners, plays a crucial role in public education – emphasizing that “food is not just about eating, but a tool for system transformation.” It connects eating behaviour with issues such as environmental sustainability, fairness in the food supply chain, and public policy. Altogether, these efforts underscore that civil society is a driving force in expanding public understanding and pushing for food system transformation at both the structural and community levels.

Policy Framework Cambodia

The Royal Government of Cambodia (RGC) has demonstrated a commitment to sustainable development through various national policies and strategies, including the National Socio-Economic Development Plan and the Rectangular Strategy. This commitment is further articulated in the Circular Economy Strategy and Action Plan (2021), which aims to advance sustainable production and consumption.²⁰

This comprehensive document identifies key sectors for intervention and provides a detailed action plan featuring short-, medium-, and long-term goals with clearly assigned responsibilities for action.²¹ The Ministry of Environment (MoE) holds overall responsibility for the roadmap, which explicitly promotes organic agriculture, the reduction of chemical fertilizers and pesticides, and addresses issues of illegal deforestation. The Ministry of Agriculture, Forestry and Fisheries (MAFF) is tasked with leading agricultural actions.



Although Cambodia's organic agriculture sector developed rapidly in the early 2000s, it remains relatively small compared to its full market potential. Consumer awareness grew notably for a time, evidenced by an increasing number of shops and supermarkets selling organic products. This trend continued until 2019/2020, when it began to decline. By 2019, only 0.46% of Cambodian farmland was certified organic, totaling approximately 25,757 hectares. The most recent data from 2023 shows this figure has only increased to 0.6%.²²

The domestic certification body, the Cambodian Organic Agriculture Association (COAA), was established in 2006. In 2019, the government introduced a national organic agriculture policy, complete with regulations and a label for certified local produce (CamOrganic), overseen by MAFF. However, this initiative has faced challenges related to its credibility.²³ COAA has since scaled back its certification role and now primarily offers training and support for international certification in collaboration with Ecocert. Currently, only five farms are certified by COAA and ten vegetable farmers are certified under CamOrganic, with the majority of Cambodia's organic producers being certified for the international market.

The dominant export certification schemes are USDA NOP and EU Organic, joined more recently by the Japanese Agricultural Label (JAS). The China National Organic Product Standard is also gaining popularity. Cereals, primarily rice, account for 92% of the organically certified land. Other certified crops include pepper, cashew nuts, herbs, fruits, and cassava. While the Department of Horticulture and Subsidiary Crops within MAFF coordinates organic actions, this is not currently a key priority for the ministry.

MAFF also developed the Cambodian Good Agricultural Practices (CamGAP) standard, which includes an environmental management module, under Ministerial Proclamation No. 099 MAFF (2010). CamGAP certification is provided directly by MAFF's General Directorate of Agriculture (GDA), while third-party certifications like ASEANGAP and GlobalGAP are also available.

Despite these frameworks, national agricultural policies primarily focus on promoting industrial agriculture for export. Small-scale farming, environmental protection, and health and nutrition considerations are not prioritized. The World Bank has emphasized the need to integrate environmental sustainability more deeply into agricultural policy, noting that agricultural expansion is occurring at the expense of forest land and leading to soil degradation.²⁴

To promote inclusive development, the RGC, the private sector, and development actors are advocating for contract farming. This model is intended to provide smallholder farmers with better access to technology, quality seeds, technical advice, financial support, and secure markets, thus improving their knowledge, skills, income and livelihoods. A 2011 Sub-decree provides guidelines for handling contract farming arrangements and disputes. A formal Law on Contract Farming is under review by the Council of Jurists of Office and expected to be enacted soon.²⁵

**Only 0.6% of
Cambodian
farmland
was certified organic in 2023**

Furthermore, Cambodia approved a National Cassava Policy in 2020²⁶, which aligns with FAO guidelines for sustainable cultivation.²⁷ Cassava is a major cash crop for farmers in Cambodia, with planting areas expanding from less than 26,000 ha in 2003 to 400,000 ha in 2011²⁸ and 656,868 ha in 2021. More than 12 million tons of Cassava are produced annually in Cambodia²⁹, with the main export markets being Thailand and Vietnam.

In 2021, the Council for Agricultural and Rural Development (CARD) led the development of a Roadmap for Food Systems for Sustainable Development. CARD is an interministerial body under the Prime Minister's Office responsible for coordinating all activities connected to food security and nutrition. The food systems roadmap outlines the importance of agriculture and healthy diets in strengthening Cambodia's food systems³⁰. It aligns with existing policy frameworks and emphasizes areas that require accelerated action, including under the Rectangular Strategy Phase IV, the National Strategic Development Plan 2019-2023,

Cambodia's Sustainable Development Goals 2016-2030, the Third National Strategy for Food Security and Nutrition (3rd NSFSN) 2024-2028, Social Protection Policy Framework 2016-2025, relevant sectoral strategies, including the Agriculture Sector Strategic Development Plan 2019-2023, Industrial Development Policy 2015-2025 and others.

The National Strategy for Food Security and Nutrition is currently under revision. Both, the National Strategy for Food Security and Nutrition as well as its Roadmap focus mainly on issues of food security, covering malnutrition and undernutrition. They do also mention healthy diets, including the promotion of fruits and vegetables, improving school feeding schemes and responsible consumer behaviour.³¹

Although Cambodia has legislation governing air quality control³² and waste management³³—covering collection, disposal, and separation—enforcement is often lacking. Notably, existing waste management laws do not address waste generated along agricultural value chains.

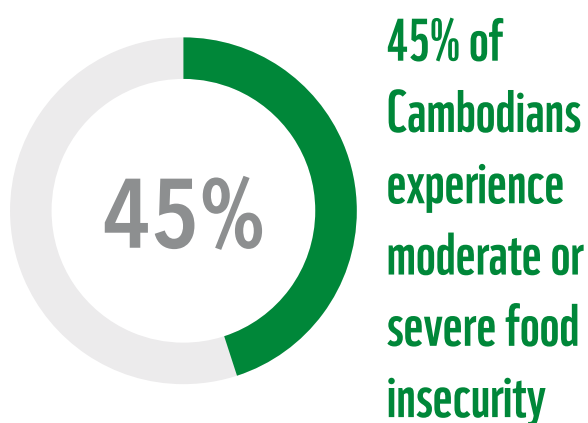


THE EXPANSION OF LARGE-SCALE AGRICULTURE: DRIVERS AND IMPACTS

Significant **transformations** are underway within the food systems of Cambodia and Thailand. Key changes include shifting dietary habits, characterized by rising consumption of highly processed and unhealthy foods, more convenience products driven by busier lifestyles, and an increasing frequency of take-away meals replacing home cooking. Growing incomes have also led to higher meat consumption. Furthermore, aggressive marketing plays an important role in changing eating habits.³⁴

While **food security** is no longer a primary concern for most of the Thai population, it remains a serious challenge in Cambodia. According to the Food and Agriculture Organization (FAO), 45% of Cambodians experience moderate or severe food insecurity. Despite robust economic growth over the past two decades, inequalities in access to nutritious food persist³⁵, resulting in the simultaneous existence of undernutrition and overnutrition. This dual burden contributes to rising levels of non-communicable diseases (NCDs) such as diabetes, cancer, and mental health disorders.³⁶

Despite rising national incomes, food production in both countries operates under significant cost pressures. Most consumers are highly price-sensitive, making food purchasing decisions primarily based on costs.³⁷ This aligns with Engel's Law, which posits that as income rises, the proportion spent on food decreases while spending on other goods and services increases.³⁸



Concurrently, agricultural systems are shifting from small-scale subsistence farming to **industrialized production**. Beyond the scaled-up cultivation of rice and vegetables, local governments have actively promoted cash crops like cassava, maize, rubber, and cashew. The expansion of these crops has been a major driver of land conversion and deforestation. This growth is largely fuelled by rising demand for animal feed to support industrial livestock operations, which produce cheap meat for domestic and export markets (notably Vietnam and China) due to economies of scale and specific labour conditions.

Cambodian **agricultural policy** emphasizes industrialization, efficiency, and increased yields, primarily to meet export demand. The goal is for the sector to contribute a larger share of GDP and help achieve middle-income country status by 2030. Consequently, the Royal Government of Cambodia (RGC) aggressively promotes industrial cash crops, which have largely replaced subsistence farming and significantly contributed to deforestation and forest degradation. Small-scale farming has been neglected in most policies and is often characterized by officials as backward and inefficient. A substantial portion of the fruits and vegetables consumed in Cambodia are now imported. Similar trends are evident in Thailand, where policies favour large-scale industrial agribusiness for domestic and export markets over smallholders. Maize and cassava cultivation for animal feed has driven large-scale land conversion in Northern and Northeastern Thailand, as well as in border provinces of Laos, Myanmar, and Cambodia.

To date, Cambodia has primarily exported raw commodities. New strategies aim to significantly increase the share of processed agricultural products within the country, a shift intended to be supported by foreign investment, as Cambodian small and medium-sized enterprises (SMEs) in agro-processing remain rare.

Export strategies largely lack sustainability measures. China is a major market for Cambodian agricultural products, but its demand does not include sustainability requirements. Export standards to China are limited to phytosanitary rules, which often necessitate chemical post-harvest treatments. Secondary export markets include Vietnam, Thailand, and Singapore. With the exception of European and US markets, most export markets have minimal sustainability requirements. Past rejections of exports, such as two containers of Cambodian pepper by European authorities, have been viewed by Cambodian officials as a serious threat to the country's export reputation. Despite this, the state has shown little interest in strengthening controls for food safety or minimizing harmful residues.

Cambodian agricultural authorities are attempting to integrate smallholders into industrialization and commercialization strategies through an initiative called "new modern agricultural communities." This model aims to reduce production costs through land consolidation, bulk input purchasing, structured production plans aligned with market demand, production contracts, low-interest loans, and improved market access.³⁹ However, as the model involves land collectivization, its impact on individual farmers' incomes remains uncertain. Furthermore, extension services tend not to promote sustainability criteria but instead encourage land conversion and agrochemical use.

Contract farming has been promoted to strengthen farmers' positions, but experiences in both countries are mixed. While some farmers benefit from guaranteed markets and better prices, others report negative outcomes. Most contracts lack fixed prices, with payments set weekly or monthly based on fluctuating market prices, sometimes with a small premium. This makes it impossible for farmers to forecast their income at harvest. They are often legally obligated to sell to the contractor, forfeiting the

chance to seek better prices elsewhere. Breaches of contract by both companies and farmers are common when market conditions change.

While Thailand is looking back on a long history of contract farming – and has gained experiences on its advantages and problems⁴⁰ – in Cambodia, contract farming is still quite uncommon for vegetables.⁴¹ It is more common for the marketing of Cambodian industrial crops such as cassava or sugar cane. Few contracts specify farming practices (e.g., conventional, Good Agricultural Practices (GAP), or organic) or restrict agrochemical use. These obligations often require higher investments, potentially leading to debt, and contract farming is not viewed as a tool for improving sustainability, functioning primarily as a marketing mechanism.

Pesticide use is rising rapidly across Southeast Asia.⁴² In Thailand, average application rates increased by 6.8% annually, in Cambodia, it grew by 61% annually between 2003 and 2012, and by 92% since 2008. With over 1300 pesticide products on the Cambodian market⁴³ (compared to roughly 500 approved active substances in the EU), farmers often misunderstand application instructions and restrictions despite mandatory Khmer labelling. Farmers in both countries consider pesticides essential, and labour shortages have increased herbicide use as a substitute for manual weeding; herbicides accounted for 81% of all agrochemicals used in Thailand in 2012.

The lack of a functional advisory system for smallholders creates a vacuum often filled by agrochemical sales representatives, creating a clear conflict of interest. While civil society organizations offer advice, studies show that farmers who consult pesticide sellers use 251% more pesticides, while those who seek advice from peers use 45% less. Pesticide use is also significantly lower when women manage pest control (42% less pesticide use) or when farmers adopt biopesticides (31% less pesticides).⁴⁴ The

surge in pesticide use leads to unsafe practices, posing health risks to users, consumers, and the environment. Numerous studies confirm high pesticide residues in fruits and vegetables in both countries, with Cambodian leafy vegetables among the most contaminated in the region.^{45 46}

In Thailand, the introduction of GAP **standards** in the late 1990s was not able to reduce pesticide use substantially, as GAP certification does not guarantee pesticide-free produce or prevent high residue levels.⁴⁷ Cambodia has recently promoted GAP standards, but interviews and observations indicate a situation similar to Thailand's. The Thai government is aware of the pesticide overuse in agricultural production. A recent nationwide blood screening of officials revealed pesticide residues in a high percentage of individuals, for example, in a pre-school visited during this mission 9 out of 10 officials had been tested positive. As a result, the Thai School Lunch Programme⁴⁸ to improve the quality of school meals was strengthened.

Thailand has a robust organic movement. Demand and availability for organic products are high in urban centres like Bangkok and Chiang Mai but significantly lower in rural areas. The country has official organic standards

and labels, though enforcement and clarity of labelling are often inconsistent. In Cambodia, organic agriculture is not broadly supported by civil society. Past projects led to the creation of the Cambodian Organic Agriculture Association (COraA), which developed an organic standard and was long the sole certifier. In 2020, the Cambodian Ministry of Agriculture, Forestry and Fisheries introduced a competing standard (CamOrganic), causing confusion in the sector. At present, only five farms are certified COraA organic, and another ten farms CamOrganic organic.

Plastic waste is a significant issue in agricultural value chains. As rural populations in both countries are diversifying sources of income with wage labour besides agriculture, the farm workforce shrinks. This leads to greater mechanization and increased use of agrochemicals and plastic mulch films for weed control. It also incentivizes a shift away from labor-intensive crops like vegetables towards less demanding crops like maize, cassava, or cashews. Improper disposal of agrochemical packaging and plastic mulch films poses serious environmental risks. Furthermore, modern supply chains for transport and distribution use excessive packaging materials.



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More than 1,300
pesticide products are available
on the Cambodian market

Globally, 1.3 billion tonnes of food are lost or wasted annually, representing one-third of all food produced for human consumption (3.9 billion tonnes). The extent of **food loss and waste** varies greatly by regions.⁴⁹ (A definition of food losses and waste along with a few other definitions can be found in Annex 5.) The FAO identifies reducing this loss and waste as crucial for improving food security and nutrition, reducing greenhouse gas (GHG) emissions, and easing pressure on natural resources. A goal embedded in the UN's Sustainable Development Target 12.3 calls for halving per capita global food waste at retail and consumer levels and reducing food loss along production and supply chains by 2030.⁵⁰ Reducing losses early in the supply chain is most effective for improving food security, while reducing waste at the retail and consumer level is best for cutting GHG emissions.

Studies on food loss and waste in Thailand and Cambodia are limited and often rely on estimates. One comparative study found food loss as a percentage of GDP is much higher in Cambodia (1.60%) than in Thailand (0.17%) or Malaysia (0.07%), reflecting less developed post-harvest technology, processing, and transportation infrastructure in Cambodia.⁵¹ Another study attributes high food losses in Cambodia to inadequate storage and distribution infrastructure, with most food sold through informal markets like small shops, street vendors, and local wet markets. Supermarkets and fast-food outlets are growing in number, mainly to be found in developed (urban) areas.⁵²

Initiatives to reduce food loss and waste exist in both countries but primarily focus on the retail and consumer level. In Thailand, this is part of the government's circular economy initiative involving food rescue, distribution, and composting at local markets. Research shows that marketing through supermarkets

leads to high losses from cosmetic sorting, while local markets are more efficient (sometimes, discarded vegetables even end up back on local markets).⁵³ The study suggests that, alongside technological advances in the modernization of food value chains, preserving traditional marketing pathways and finding outlets for non-standard produce is key to reducing waste.⁵⁴ Cambodia lacks a comprehensive policy on food loss and waste. Isolated initiatives include using cashew apples for vinegar and juice, processing non-compliant cashew nuts into butter, and preserving seasonal fruit surpluses (e.g., drying mangoes, making jam). A few local NGOs have begun initial research to quantify the problem.

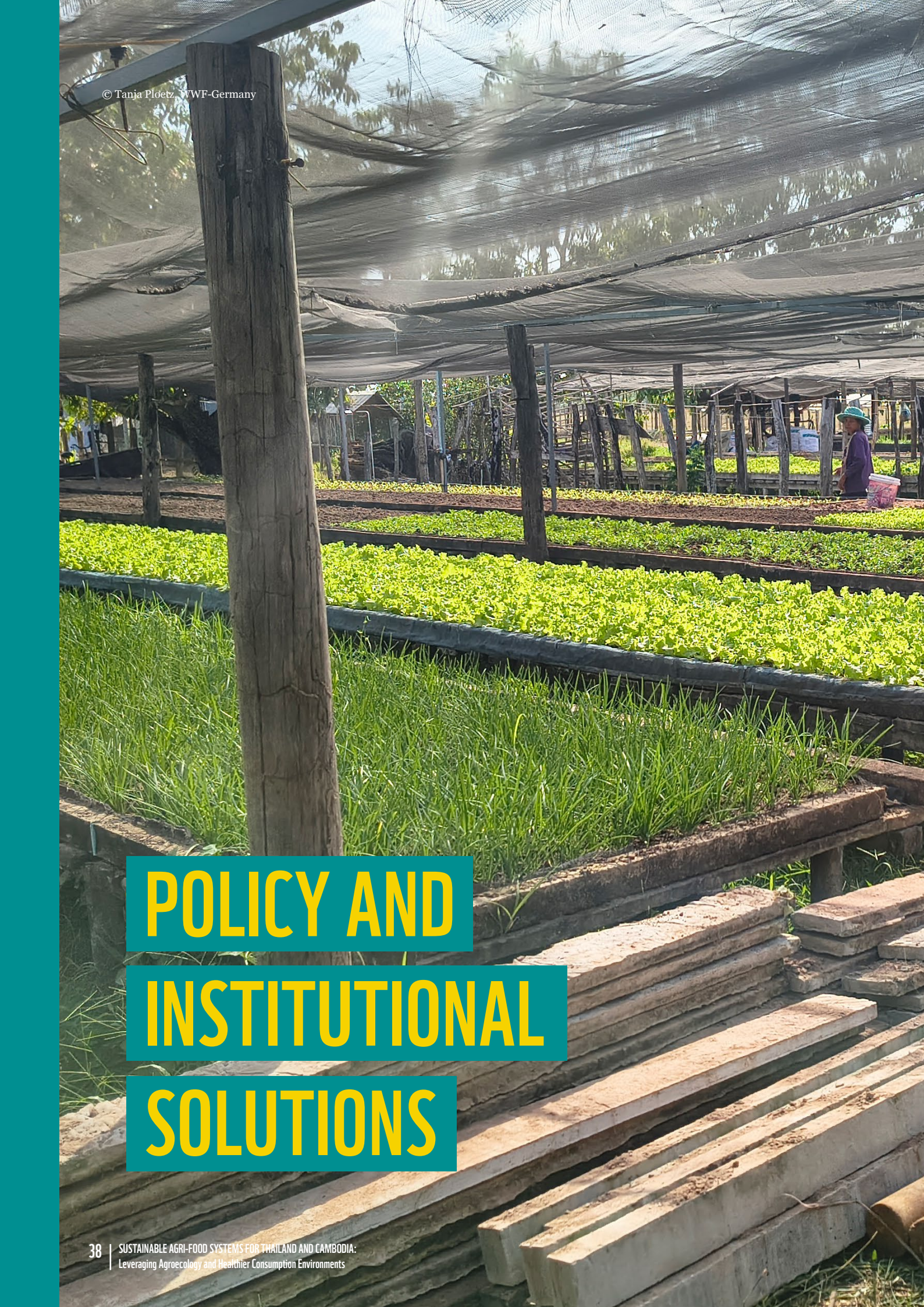
In Thailand, **air quality** and its connection to regional wildfires is a topic of intense public debate. The government has prioritized improving air quality, reaffirmed by the proposed Clean Air Act, and is increasing efforts to combat deforestation and agricultural land conversion.⁵⁵ Authorities are trying to limit the burning of crop residues and land clearance, with burning bans in place during dry season, and any burning requiring a special permit.

While there is broad public awareness of air pollution's health risks in Thailand, most people do not connect it to practices used in sugarcane, maize, and cassava cultivation. The National Council for Economic and Social Development (NESDC) reported that 12.3 million Thais suffered health problems from air pollution in 2024, with the North and Northeast regions most affected. Within the first two months of 2025, more than 980,000 cases of illnesses related to air pollution were registered.⁵⁶ Due to political pressure from Thailand, Cambodian media have recently begun covering air pollution. However, it has not yet become a significant public concern in Cambodia, and the links between air quality and land use systems are not publicly discussed.

In Thailand, more than 980,000

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POLICY AND INSTITUTIONAL SOLUTIONS

7.1

Production and Supply Chains

The policy frameworks in both Thailand and Cambodia present opportunities to scale up diverse, agroecological production systems that avoid land conversion, alongside developing better consumption systems and resilient livelihoods.

7.1.1. Land conversion

As has been mentioned, both countries continue to face the challenge of **conversion of forested land** and other natural habitats into agricultural land. This is largely driven by the industrial-scale cultivation of crops for animal feed, bioenergy, and the food industry. Rising demand, fuelled by changing lifestyles and diets, makes this trend difficult to curb. Thailand has initiated government programmes to address this, employing legal action against illegal land conversion and burning, while offering preferential interest rates for sustainable practices and forest rehabilitation. The Ministry of Agriculture and Cooperatives, in partnership with the Royal Forest Department, has launched a pilot project in Mae Cham District to reforest 60,000 rai of former maize farmland through agroforestry and forest restoration methods. This initiative is intended to form part of the broader programmes to curb deforestation and land conversion. Cambodia has policies to protect and prevent forest land conversion through Community Protected Areas and Community Forestry (managed by the communities). The country has put some efforts into curbing

deforestation through regulations, reforestation and law enforcement. Timber exports have been stopped, and the deforestation has been slowed down, though it is still happening.

7.1.2. Better production practices

In Thailand, demand from both domestic and international markets has driven significant growth in the cultivation of sustainably produced fruits and vegetables in recent years. This stands in stark contrast to Cambodia, where the cultivation of and demand for sustainably produced goods for local consumption has declined. Organic certification in Cambodia remains limited to a small number of high-value export products.

In this sense, efforts to **introduce sustainable production systems** for cassava and maize cultivation – such as mixed cropping, agroforestry, or organic production – have faced challenges. In Cambodia, initiatives promoting climate-smart agriculture for cassava have largely failed, as farmers strongly prefer monocropping. The situation for maize is more varied: production for local consumption is often integrated with other crops, while large-scale cultivation for animal feed is invariably monocropped due to mechanization and labour requirements.

Promoting sustainable cultivation should emphasize health benefits, as it is safer for both farmers and consumers. For instance, concerns about agrochemical poisoning, notably from Chinese-owned banana plantations in Laos in the 2000s, significantly boosted the adoption of organic agriculture there. A similar awareness arose in Thailand following mass blood screening of state officials after a civil society campaign placed the spotlight on the issue. As a result, Thailand established a programme for blood screening of farmers conducted by Subdistrict Health Promoting Hospitals (*Ror Por Sor Tor*) under the Ministry of Public Health.

This mechanism is ultimately aimed at raising awareness among the farmers themselves about the dangers of agricultural chemicals. The programme provides risk assessments, monitoring, prevention and treatment of health impacts from exposure to hazardous chemicals, particularly among farmers at high risk from substances such as organophosphates and carbamates. This awareness can lead to changes in farming practices, such as reducing or eliminating the use of hazardous chemicals, adopting the use of biopesticides, or shifting toward organic or safe agricultural production methods. However, the government programme is limited in scope.

In Cambodia, many smallholder farmers already demonstrate an understanding of these risks. Commercial rice growers often use pesticides on their main crop but reserve a separate plot for their own consumption, farmed without chemicals. This awareness provides an entry point to promote sustainability in commercial, export-oriented rice production, especially given growing international demand for organic and sustainably produced rice. Income is another critical factor. While prices for sustainable produce are only marginally higher, production costs can be significantly lower, leading to reduced debt levels for farmers practicing these methods.

7.1.3. Market access

Marketing remains a major challenge for smallholders. Contract farming has been heavily promoted in the region to establish stable sales channels. However, this can create dependency on a single buyer without guaranteeing economic benefits. To be more effective, contracts should offer premium prices for commitment and include clauses that mandate sustainable practices. This, in turn, depends on greater market and buyer interest in sustainability.

Thailand has seen a rise in sustainable consumption, made possible by an increase in local supply. Conversely, sustainable consumption has regressed in Cambodia. Organic or sustainable products are primarily grown for Western export markets (e.g., rice, pepper, cashew, palm sugar), and local certification systems (e.g. COrAA or CamOrganic) have sharply declined. Their market share has often been taken by products with local Good Agricultural Practices (GAP) certification, though these are rarely visibly labelled. While GAP represents an improvement over conventional farming, its regulations and controls are insufficient to prevent chemical residues.

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7.2

Consumption and Food Environments

While a basic understanding of the importance of raising public awareness of healthy and sustainable consumption already exists in Thailand, significant work remains. Awareness campaigns should be integrated with general nutritional guidance and education on healthy diets.

Achieving sustainable consumption in the long term requires a shift in eating habits. Key changes may include a return to home cooking, reduced intake of processed foods, greater consumption of regional and seasonal produce, less food waste, and lower consumption of meat and animal products in order to mitigate.

7.2.1. Labelling and other consumer-facing information

Labelling is inadequate in both countries. Thailand uses multiple labels for sustainable food, but they are not always visible or consistent. Cambodia's label for local organic products⁵⁷ is scarcely used. Both countries would benefit from standardizing labels and regulating their use to build consumer trust and improve the visibility of local sustainable products. Furthermore, promoting local marketing is essential. In Thailand, sustainable products are present in most local markets but are often not labelled or separated from conventional goods. In Cambodia,

sustainably produced and labelled products are greatly absent from wet markets and are only available in a limited selection at a few specialized supermarkets in Phnom Penh. Currently, food choices are predominantly based on price and appearance, with restaurants showing little interest in sustainably sourced ingredients.

7.2.2. Leveraging human health concerns

Shifting lifestyles also influence agricultural trends. Despite rising incomes, demand is growing for cheap processed and semi-processed foods and meat – pressuring producers to prioritize efficiency and low costs. Government initiatives in both countries have begun to address healthy and sustainable consumption, although the primary focus remains on food safety, security and nutrition^{58 59}. Cambodia's Ministry of Labour is piloting initiatives to improve nutrition in workplaces, particularly in the garment sector. However, these efforts currently focus only on food security and dietary needs and do not address broader environmental aspects of sustainable consumption. In Thailand, authorities are tackling the high consumption of sugar and salt. This includes the implementation of the final phase of the sugar tax in April 2025, following its initial introduction in 2017, and the ongoing preparation of a salt tax targeting high sodium processed foods.^{60 61}

Recent food safety controls in Thailand have significantly influenced public awareness and purchasing behaviour. Authorities are increasingly testing domestic and imported fruits and vegetables for chemical residues exceeding legal limits, and the results are published openly. In contrast, similar studies in Cambodia are typically confined to academic research and are not used to inform or warn the public. Making food safety data more accessible could positively impact consumer behaviour and encourage sustainable consumption.

A similar dynamic exists regarding air quality. A more robust public discussion on air pollution and its link to land use could raise awareness about sustainable production and consumption. In Thailand, air quality is a topic of widespread public debate, though its connection to land conversion and meat consumption is not always made. In Cambodia, this discussion has not yet begun, as air pollution is not currently a major public concern.

7.3

Economic Development, Finance and Governance

As has been seen in the above sections, both countries have launched a range of government programmes and initiatives in the areas of economic development, finance and their own governance and institutional architecture that profoundly drive the impact caused by both consumption and production of agri-food products. Such policies have plenty of room for enhancement and improvement, with great potential to seize the opportunity presented by sustainable agri-food systems.

7.3.1. Leveraging equity-driven policies and price incentives

Barriers to sustainable consumption practices include economic and resource constraints, social and cultural norms, and knowledge gaps.⁶² A key set of obstacles are

the low consumer awareness of the impacts of food choices, together with a lack of available income exacerbated by the cost-of-living crisis, as well as an unwillingness – or lack of incentive – to pay premium prices for higher-quality products. Consumer decisions are often based solely on appearance and price. Government policies are not contributing to overcome this set of interrelated issues: insufficient welfare programmes and safety nets for vulnerable people addressing inequalities and fostering resilience (e.g., cash transfer programmes); a lack of fiscal and other types of incentives to promote sustainable consumption choices; scarcity of reliable sustainability information; and insufficiency of regulation of food environments. Equity is a foundational component of sustainability. If inequalities are stark, there are less resources dedicated to protecting vulnerable communities and nature. Governments have at their disposal a vast range of policies through which to drive social and environmental equality, as prescribed by the CFS Policy Recommendations on Food Security and Nutrition⁶³ and by WWF's report "Sustainability Without Justice? Equity-Driven Strategies for Food Systems Transformation from Selected Case Studies". Learn more about the report in Box 3.

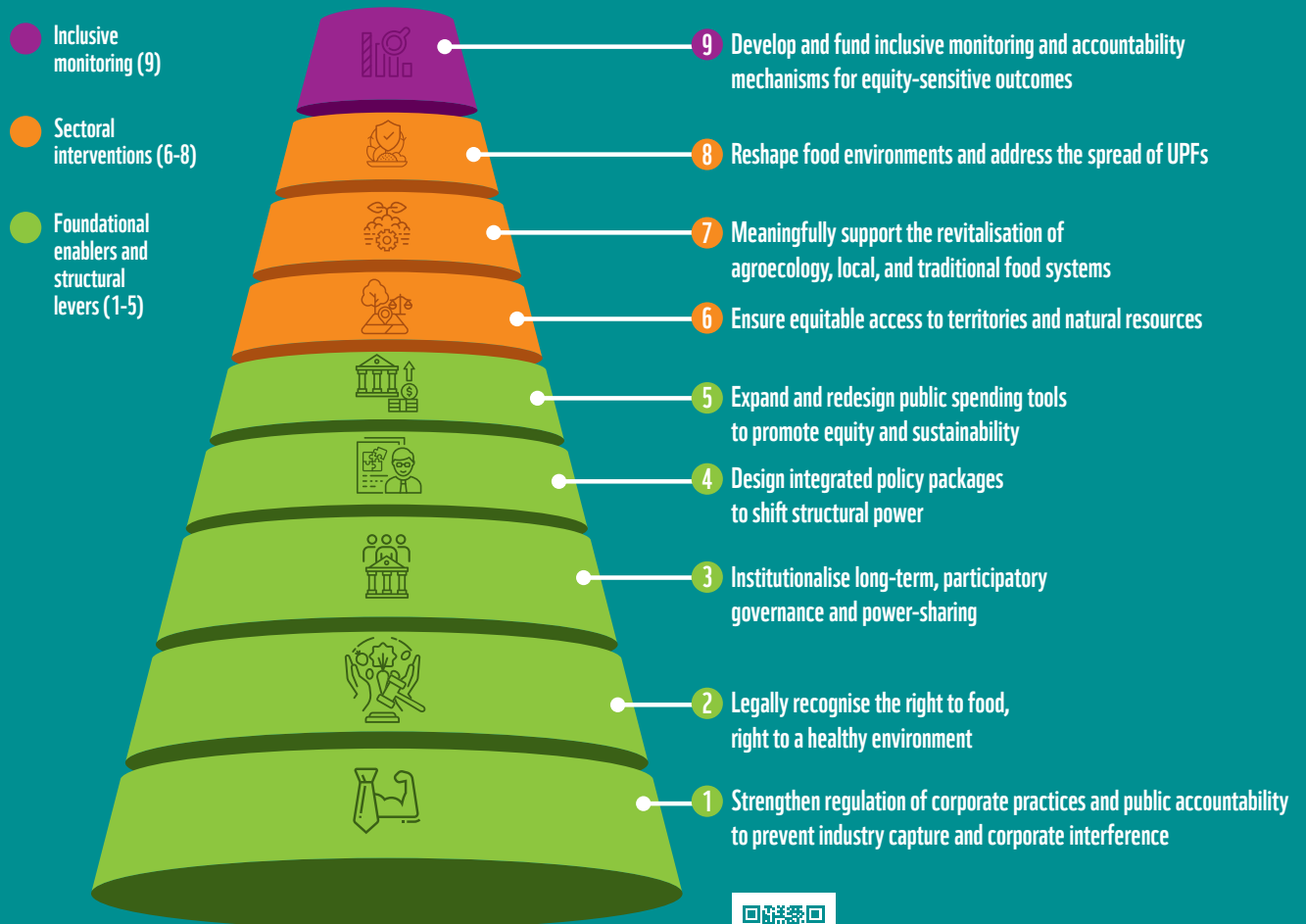


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BOX 3: SUSTAINABILITY WITHOUT JUSTICE? EQUITY-DRIVEN STRATEGIES FOR FOOD SYSTEMS TRANSFORMATION FROM SELECTED CASE STUDIES

A recent WWF report provides insights into practical solutions for tackling the structural inequities in global food systems that are a key barrier to their urgently needed transformation. Although global food production has increased significantly, current food systems remain misaligned with the principles of equity, public health, and environmental sustainability. These inequities, whether they manifest as unequal access to resources, social exclusion or power imbalances in shaping systems and their outcomes, are not peripheral issues – rather, they are core drivers of the systemic failure we witness. Addressing them is crucial to unlocking currently entrenched dysfunctional systems and redirecting them

toward a sustainable and just path. Equity-sensitive strategies that prioritise people, the planet, and prosperity must be at the heart of this transformation. Applying this equity lens across the domains of production, consumption, and governance, the WWF report demonstrates how equity-sensitive strategies can act as powerful entry points to disrupt systemic lock-ins and identifies key leverage points to catalyse equitable transformation. The report underscores the need to reframe food as a human right and a public good, thus re-balancing its current treatment as a commodity governed by deregulated and financialized markets. It offers nine case studies from across the globe as good examples and identifies nine policy recommendations across three categories.



<https://www.wwf-scp.org/equity-driven-strategies/>

7.3.2. Economic strategies to foster SCP

In 2021, Thailand introduced the Bio-Circular-Green (BCG) economic model as a national strategy for achieving sustainable and inclusive growth. Under this framework, the Bank for Agriculture and Agricultural Cooperatives (BAAC) offers reduced-interest loans for environmentally or sustainability focused projects. Currently, five types of loans are subsidized: (1) for BCG-oriented entrepreneurs, (2) for converting farmland into forest plantations or agroforestry systems, (3) to support bioenergy, (4) to advance the circular economy, and (5) “green credits” covering activities from food safety and air quality to community-based tourism. Complementing government efforts, civil society organizations in Thailand have initiated projects to promote circular economy practices – including recycling, waste reduction, and local food chains such as urban farms.

7.3.3. Land access and tenure

In Cambodia, a new “Land Granting and Forest Protection Programme for Sustainable Development” was launched in February 2025. It aims to provide land to landless households, prevent encroachment on state land, and encourage public involvement in forest conservation. While implementation details are not yet available, the programme is expected to follow an adapted version of the earlier Social Land Concession (SLC) model under the Land Allocation for Social and Economic Development (LASED) project. Economic Land Concessions (ELCs) in Cambodia were established under the 2001 Land Law. The legal framework for their implementation, including specific procedures and criteria, was further defined by Sub-decree No. 146 on Economic Land Concessions, which was passed in December 2005. As economic land concessions mostly ended up extracting existing resources only, without doing the needed development of the land (in terms of providing infrastructure, labour, etc.), a ban on new ELCs was introduced in 2012.

Further land policy actions available to governments are also discussed in WWF’s report on equity-driven strategies “Sustainability Without Justice?” (see Box 2).

7.3.4. Extension services and market-shaping approaches

Recently, Cambodia’s Ministry of Agriculture, Forestry and Fisheries (MAFF) began establishing a new national extension service by appointing Commune Agricultural Officers (CAOs) directly under the Ministry – bypassing decentralized structures at the provincial and district levels. MAFF is also promoting a new model of market-oriented Agricultural Cooperatives (ACs) that emphasize contract farming and include a “land consolidation” component for collective land management.

7.3.5. Private sector’s role

Many Thai companies have integrated Corporate Social Responsibility (CSR) into their operations, using it to support local sustainability projects such as urban farms and agricultural innovations. In Cambodia, CSR has not yet become embedded in business culture. In both countries, there is significant potential to leverage CSR commitments more effectively to advance sustainable consumption and production.

7.3.6. Industrial export markets’ standards

Demand from large agro-industrial companies has led to food value chains that might comply with certain indicators but often lead to less agro-biodiverse and more concentrated agri-food systems. This trend reduces resilience to climate change, increases vulnerability to pests and diseases, and necessitates greater investment in fertilizers, pesticides, and irrigation. Although climate-smart and soil-conserving agriculture offers more diversified and adaptive solutions, such methods remain the exception. Furthermore, international regulations – such as the EU’s Regulation on Deforestation-free Supply Chains and the Corporate Sustainability Due Diligence Directive (CSDDD) – will oblige export-oriented food products to ensure verifiable

sustainable practices. At the same time, it has led to a strong expansion of the cultivation of animal feed such as corn and cassava for industrial meat production.

7.3.7. Policy convergence and coherence

Some government policies are contradictory: while sustainability is promoted in certain sectors, other strategies prioritize mass production and agricultural exports to boost GDP. These two approaches are difficult to reconcile. Overall, policy convergence and coherence are lacking, rendering multiple positive outcomes more difficult to achieve.

Global commitments pledged by Cambodia and Thailand on climate and biodiversity provide a unique opportunity to implement coherent reforms that foster convergence of the multiple interrelated areas that have food as a nexus. WWF together with a broad partnership of organizations has developed a series of resources to guide policymakers in their embedding of agri-food systems actions into their national climate and biodiversity strategies. Of particular relevance is the publication “Breaking silos: Enhancing synergies across NDCs and NBSAPs.” Read more in Box 4.

BOX 4-A: POLICY CONVERGENCE AND COHERENCE IN AGRI-FOOD SYSTEMS BY ACHIEVING SYNERGIES ACROSS NDCs AND NBSAPs

Tackling the ongoing climate and biodiversity crises requires concerted and coordinated efforts to decarbonize economies, reverse nature loss, adapt to climate change, ensure food security, and achieve Sustainable Development Goals. These efforts are inextricably linked and cannot be achieved independent of one another. However, international conventions addressing these crises have evolved and worked in silos: governments must deliver, on one hand, their climate targets - known as Nationally Determined Contributions (NDCs), established under the Paris Agreement -, and on the other hand, their biodiversity targets – known as National Biodiversity Strategy and Action Plans (NBSAPs) under the Convention on Biological Diversity and its recently approved Kunming-Montreal Global Biodiversity Framework.

Strengthening synergies between NDCs and NBSAPs is one important step toward

ensuring the integration of climate and biodiversity efforts. Capitalizing on these opportunities can increase these national strategies’ coherence, reduce their duplication, and efficiently utilize the resources needed for their development, implementation, monitoring, and reporting. Ensuring that NDCs and NBSAPs complement each other can also help ensure that strategies to address the climate and biodiversity crises avoid counterproductive measures while maximizing positive climate-biodiversity outcomes all at once. In this context, this paper reviews synergies in developing and implementing national plans and communications under the UNFCCC Paris Agreement and the GBF of the CBD. This paper: i) overviews the guidance for formulation and implementation of these policy documents, ii) identifies key synergies and risks across climate change and biodiversity actions, and iii) sets out recommendations for conventions, policymakers, and public-private initiatives for enhancing the cohesion between NDCs and NBSAPs.



https://www.panda.org/wwf_news/?10327441/Breaking-Silos-Enhancing-Synergies-between-NDCs-and-NBSAPs

BOX 4-B: WHAT ACTIONS IN FOOD SYSTEMS CAN TACKLE CLIMATE CHANGE? THE FOOD FORWARD NDCS GUIDANCE TOOL

Together with Climate Focus and supported by the Federal Ministry for Economic Cooperation and Development and GIZ, WWF developed a guidance tool to support the enhancement and implementation of NDC ambitions for agriculture and food systems transformation. It is designed to help countries strengthen their NDCs by providing easy and accessible content to identify policy measures and practices and information about their climate change mitigation, adaptation and sustainable development benefits.

Food Forwards NDCs is a consolidated collection of guidance in more than 30 specific areas of food systems transformation, organized across five priority areas – namely, food environment, food governance, food production, food supply chains and food consumption. The content can be used to identify relevant policy options, implementation measures, their climate and sustainable development benefits, potential trade-offs and examples of their implementation in practice.



<https://foodforwardndcs.panda.org/>

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BOX 4-C: WWF'S NBSAP TRACKER

Equally important to climate action for food systems is political commitment to protecting nature and reversing biodiversity loss. With one million species at risk of extinction, effective National Biodiversity Strategies and Action Plans (NBSAPs) are crucial for global biodiversity conservation. NBSAPs outline a country's plan on how to protect and restore nature. NBSAPs are critical for mobilizing action across the board and securing funding for biodiversity recovery. The UN Global Biodiversity Framework – agreed in 2022 – sets a decisive roadmap to reverse biodiversity loss by 2030. This framework requires all 196 participating countries to revise their NBSAPs to align with these ambitious goals.

WWF developed a comprehensive checklist to support countries when revising their NBSAPs which also forms the basis for WWF's critical review of what countries have submitted to the UN – the NBSAP Tracker. It systematically analyses if these plans are ambitious, actionable, and aligned with the Global Biodiversity Framework, and delivered on time.

1. **Ambition:** targets should align with the Global Biodiversity Framework's 23 targets and address specific national drivers of biodiversity loss.
2. **Whole of Government & Society Approach:** governments should work across all ministries to implement their NBSAPs and ensure inclusion of all stakeholders, such as civil society, Indigenous Peoples, and the private sector.
3. **Means of Implementation:** NBSAPs need to provide actionable steps, measurable objectives, and necessary resources.
4. **Human Rights-Based Approach:** the NBSAP implementation needs to respect land rights and address gender imbalances and marginalized groups.
5. **Tracking Progress & Accelerating Action:** governments need to implement robust monitoring systems to track progress and adjust strategies when needed.

How do Cambodia and Thailand currently perform (at time of writing the NBSAP report)?

Cambodia: Current work is being done to revise the current status of biodiversity in Cambodia to obtain baseline data and identify key drivers of biodiversity loss. This will lead to new targets and a new NBSAP.

Does it include all 23 targets?	MIXED
Does it apply a drivers approach?	UNCLEAR
Does it tackle the most relevant issues for this region?	UNCLEAR
Is it action oriented? e.g. does it specify resource needs and identify how these will be achieved?	

No action plans have been submitted and several targets are outdated with timelines in the past. There are targets that include alignment to national policy but they remain high-level and outdated: "By 2020, at the latest, biodiversity values have been integrated into national and sub-national development and poverty reduction strategies and planning processes."

With regards to resource mobilization, the targets were also previous targets and not updated.

More detailed action plans are expected to be included in the full NBSAP, which will be submitted after COP16.

Does it include action plans?	POOR
Does it make links to national policy?	MIXED
How does it include IPs and LCs?	

There is a National Target that by 2020 traditional knowledge, innovation and practices of indigenous and ethnic minorities is subject to national legislation, integrated and reflected in the implementation of the CBD and the NBSAP with participation from communities. However, it is unclear if this target will still apply to the 2030 deadline.

How well does it include IPLCs?	MIXED
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NBSAP WE NEED CHECKLIST AREAS

Ambition: Is it aligned to the global mission? Is it integrated in the national context? Does it address key drivers?	22%
Whole of Government & Society: Does it outline high-level coordination in the government? Does it integrate with national policy? Is it inclusive and transparent?	50%
Means of Implementation: Is it based on cross-convention alignment? Does it include a budget or financing mechanism? Does it address international support & capacity needs?	38%
Human Rights Based Approach: Does it apply human rights principle? Does it provide land rights to IPLCs? Does it include a Gender Action Plan?	38%
Tracking & Monitoring: Does it include headline indicators? Does it develop a national reporting system?	67%

Thailand: For Thailand, please visit the NBSAPs tracker webpage through this link:
https://wwf.panda.org/act/nbsap_tracker_check_your_countrys_nature_progress/

CONCLUSIONS

8.1

Thailand

Thailand's existing policy framework is conducive to sustainable consumption and production. Despite this, the proportion of sustainably produced food remains relatively low and is not widely available across the country, with significant disparities existing between urban and rural areas. In major cities, demand for sustainably grown fruits and vegetables – particularly organic – is rising, and consequently, sustainable production is concentrated near these urban centres. In contrast, rural areas see less prominence of such practices due to lower local demand and production. Nevertheless, a gradual increase in sustainably produced fruits and vegetables is observable across the country.

Public awareness of healthy and sustainable nutrition is fairly high, largely driven by health concerns. This was partially heightened by the screening of farmers and state officials for pesticide residues in their blood. Regular testing of agricultural products for pesticides, coupled with the public release of this data and warnings about affected produce, has further raised awareness. Additionally, public discourse often links air pollution to agricultural practices, such as crop residue burning, deforestation, and land conversion. However, the interconnections between pesticide residues, land degradation, air pollution, and consumer food choices are not sufficiently explained or widely understood.

Although state institutions are making efforts through favourable programmes, their impact remains insufficient to enable widespread sustainable consumption in Thai society. Furthermore, the labelling of sustainably produced agri-foods lacks uniform regulation and is often confusing. A common issue is the misrepresentation of produce grown under Good Agricultural Practice (GAP) standards as being sustainably produced.



Thailand's Mae Chaem restoration programme aims to convert

9,600 Hectares

of former maize land into sustainable land use.

8.2

Cambodia

Cambodia has established a foundational policy framework for sustainable consumption and production (SCP), including key guidance documents like the SCP Cambodia Roadmap 2030. However, the implementation of this roadmap remains unclear and has yet to be rolled out across all sectors. While the Ministry of Environment (MoE) and other agencies have been assigned responsibilities, their fulfilment is not yet evident or clearly regulated.

A significant barrier is the limited awareness of SCP among both the public and private sectors, as well as consumers. Sustainable products attract little interest, and issues like health, air pollution, and the link between consumption and production methods are not part of public discourse. Consumer behaviour is primarily driven by price, availability, and appearance, with little willingness to pay a premium for sustainable options.

The industrial cultivation of cassava for export as animal feed or for biogas production as well as large-scale cashew nut production and export to China and Vietnam offer little incentives for sustainable practices. While technically feasible, past attempts at sustainable cassava cultivation have seen limited success. A particular challenge is that “organic” cassava is often grown on freshly cleared forest land, leveraging its initial fertility. This approach is unsustainable without soil regeneration and risks encouraging further deforestation. Since the crop is destined for the low-quality animal feed market, there is no commercial drive for better practices.

Furthermore, national policy favours large-scale, agro-industrial production. This is evident in the promotion of modern agricultural cooperatives that consolidate land for mechanized, high-input farming, and in the numerous investments in large-scale, export-oriented concession areas.

Consequently, the range of sustainable agri-food products is very limited. Organic food is scarce on local markets, often replaced by GAP-certified alternatives, making it difficult even for conscious consumers to make sustainable choices. GAP should be viewed as a transitional step toward more sustainable methods, with organic certification as the ultimate goal.

The overall situation creates a “chicken-and-egg” dilemma: low supply stifles demand, and low demand discourages local sustainable production, making it challenging to identify strategic entry points.

For this study, it is crucial to distinguish between two separate systems: a) industrial cashew nut and cassava production on large plots, and b) fruits and vegetables grown on different land by smallholder farmers and marketed through separate supply chains. Making fruit and vegetable cultivation more sustainable is technically easier, but – as has been mentioned – it depends on stronger consumer demand. Promoting sustainable production of fruits and vegetables alone cannot stop the forest conversion driven by cashew nut and cassava cultivation. However, it can positively influence consumer behaviour and, in turn, reduce the rate of expansion of such industrial crops. Achieving far-reaching success will require a combination of measures, including the strict enforcement of laws against illegal forest encroachment and burning. Ultimately, a substantial reduction in deforestation due to cassava will only be achieved through a decrease in meat consumption in major meat consumption countries, which drives the demand for animal feed.





COUNTRY-SPECIFIC RECOMMENDATIONS

9.1

Thailand

Thailand possesses a comparative advantage over its neighbours, with favourable policy frameworks and higher consumer awareness of sustainable food systems among segments of the population. This presents a significant opportunity to build on existing experiences and scale up activities across the country.

Based on this study's findings, the following country-specific policy recommendations are proposed:

1. Support smallholders, small farmers and landless peasants

Redesign development and extension programmes to include all farmers and fisherfolk, particularly women. These programmes should provide financial assistance and help develop new business models, infrastructure, and assets to produce nutritious, sustainable, traditional foods and improve market access.

Action: Further develop contract farming approaches by integrating sustainability criteria and exploring clearer payment schemes.

2. Increase public awareness

Launch engaging communication and behaviour change campaigns to promote healthy, sustainable diets and reduce food loss and waste.

3. Promote healthy, sustainable, and traditional foods

Protect and promote food cultures associated with good nutrition by supporting traditional foods and protein sources (e.g., legumes, nuts, and nutri-cereals). This should be achieved through public campaigns and by providing information about healthy, traditional dishes.

4. Optimize land use

Maximize the potential of all agricultural land by using it primarily for human food production. Optimize crop yields through practices that use water and fertilizers more efficiently, reduce chemical pollution, preserve ecosystem functions, and contribute to resilient landscapes.

5. Strategic collaboration for scaling impact

To scale up successful projects, collaborate with government programmes, particularly in the pilot area of Mae Chaem in Chiang Mai Province.

Key opportunity: Partner with the Ministry of Agriculture and Cooperatives and the Royal Forest Department on their programme to convert maize plantations to forested areas. Mae Chaem has been selected as a pilot site to convert 60,000 rai of maize into sustainable land use.

Proposed role: WWF Thailand could position itself as a partner in designing and implementing this pilot Forest Landscape Restoration programme.

Specific advocacy: Advocate for the establishment of clear land use rules as part of land use certification. This could define a ratio of land for forest restoration versus land for agricultural use within an agro-forestry system. Such an initiative could become a model for a national programme to limit deforestation.

6. Redirect subsidies and incentivize sustainable production

Redirect agricultural subsidies away from harmful practices and increase de-risking investments to encourage nature-positive production of nutritious foods.

Financial collaboration: Explore collaboration with the Bank for Agriculture and Agricultural Cooperatives (BAAC) under its Bio-Circular-Green (BCG) economic model. WWF could support BAAC in refining the technical guidelines and standards for its BCG credit scheme, building on the existing collaboration in the Mae Chaem pilot project.

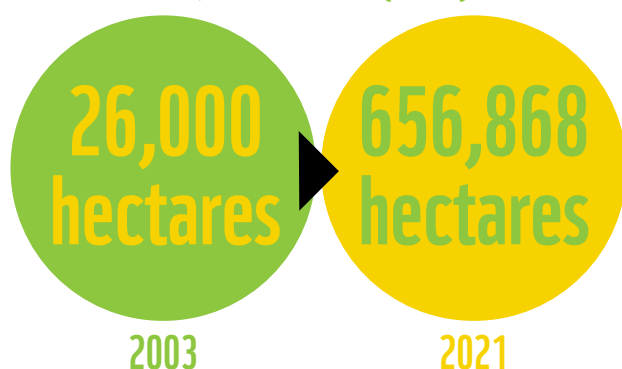
7. Engage the private sector

Explore partnerships with private companies under their Corporate Social Responsibility (CSR) commitments, focusing on supporting organic farming initiatives and forest restoration activities.

8. Foster multi-stakeholder partnerships

Connect with a wide range of stakeholders in Thailand to collaborate on national awareness campaigns aimed at changing consumer behaviour and promoting sustainable consumption and production. The overarching focus of all activities should be on replicability, high visibility, clear potential for a national rollout, and generating actionable policy recommendations.

Cassava cultivation expanded from less than 26,000 hectares (2003) to 656,868 hectares (2021)



9.2 Cambodia

Considering the national policy framework and country-specific conditions, this study proposes the following recommendations for Cambodia:

1. Support smallholders

Redesign agricultural development and extension programmes to be inclusive of all farmers and fishers, including women. These programmes should provide financial assistance and support the development of new business models, infrastructure, and assets to cultivate nutritious, sustainable, traditional foods and improve market access.

2. Promote agripreneurship by supporting small enterprises

Foster a new generation of agricultural entrepreneurs by providing targeted support to small and medium enterprises (SMEs) in the agri-food sector.

3. Increase public awareness through targeted campaigns

Given the current low level of consumer awareness, a primary focus should be placed on comprehensive Behaviour Change Communication (BCC) campaigns. These campaigns must be engaging and clearly illustrate the connections between:



- **Nutrition, agriculture and health:** Emphasizing how food choices impact personal well-being. Health concerns are identified as the most effective entry point for shifting consumer behaviour. These campaigns should align with governmental efforts on boosting food fortification and also integrate messages on food loss and waste, overall waste reduction and recycling.
- **Agrochemicals and food safety:** Highlighting the effects of pesticides and fertilizers on food, soils and nature.
- **Consumption patterns and environmental impact:** Linking industrial-style cultivation of crops with issues such as deforestation, agricultural residues, air pollution from burning, food processing and transport, etc.

4. Promote healthy, sustainable and traditional foods

Revitalize food cultures associated with good nutrition by supporting traditional foods and protein sources (e.g., legumes, nuts, and nutriceals). This can be achieved through public awareness campaigns and by providing accessible information about healthy, traditional dishes.

5. Optimize land use

Maximize the productivity of existing agricultural land for human food production. This involves adopting better practices that optimize crop yields, use water and fertilizers more efficiently, reduce chemical pollution, and preserve ecosystem functions to build resilient landscapes.



Recommendations for ongoing and future projects:

- **Pivot in Monduliri province:** It is recommended to continue pilot activities in Monduliri but shift the focus from promoting Good Agricultural Practices (GAP) to organic agriculture. This transition aligns more closely with WWF's core mission. Within this context, further develop contract/modern farming models to incorporate and incentivize sustainability through clear payment schemes.
- **Integrate marketing and labelling:** Complement production pilots with initiatives that promote labelling and marketing for sustainable, and preferably organic, products. A sustainable contract farming approach can be a key model for this.
- **Build strategic alliances:** To maximize impact and align with WWF's mission, pilot activities should be combined with public awareness campaigns. However, it is important to note that some of these topics are not yet government priorities and may carry reputational risks. To mitigate these risks, it is advised to form alliances with other organizations operating in Cambodia.

Cambodia produces more than
12 million tonnes
 of cassava annually

A photograph of three people standing outdoors, each holding a young tree sapling in a black plastic nursery bag. The person in the center is a woman wearing a large, wide-brimmed straw hat, a red long-sleeved shirt, and a green and white patterned scarf. She is smiling and looking towards the camera. To her left is a man wearing a light-colored striped shirt and a dark cap, also smiling. To her right is another woman wearing a light pink shirt, looking down at the sapling she is holding. The background shows a clear sky and some greenery.

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SELECTED TERMS AND DEFINITIONS

Agrochemicals: “An agrochemical or agrichemical is a chemical product used in industrial agriculture. Agrochemical typically refers to biocides (pesticides including insecticides, herbicides, fungicides and nematicides) alongside synthetic fertilizers. It may also include hormones and other chemical growth agents”.⁶⁴

Agroecology: The FAO defines agroecology as “an integrated approach that simultaneously applies ecological and social concepts and principles to the design and management of food and agricultural systems. It seeks to optimize the interactions between plants, animals, humans, and the environment while taking into consideration the social aspects that need to be addressed for a sustainable and fair food system.

Agroecology is integral to FAOs Common Vision for Sustainable Food and Agriculture and is a key part of the global response to this climate of instability, offering a unique approach to meeting significant increases in our food needs of the future while ensuring no one is left behind. It addresses the need for socially equitable food systems within which people can exercise choice over what they eat and how and where it is produced.⁶⁵

Agroforestry: FAO defines agroforestry as follows: “Agroforestry is the collective term for land-use systems and technologies in which woody perennials (e.g. trees, shrubs, palms or bamboos) and agricultural crops or animals are used deliberately on the same parcel of land in some form of spatial and temporal arrangement.”⁶⁶

Conversion-free supply chains: Commodity production that does not cause or contribute to the conversion of natural ecosystems. In the context of Cambodia and Thailand, this conversion refers mainly to deforestation for the growing of maize and cassava, and other cash crops like rubber and cashew nut. In other regions, these include - beside deforestation - the conversion of savannahs, grasslands, woodlands, peatlands, rivers, wetlands and mangroves, among others.⁶⁷

Food Loss and Waste: FAO defines food losses and waste as follows: “Food losses refer to the decrease in edible food mass throughout the *part of the* supply chain that specifically leads to edible food for human consumption. Food losses take place at production, postharvest and processing stages in the food supply chain (Parfitt *et al.*, 2010). Food losses occurring at the end of the food chain

(retail and final consumption) are rather called “food waste”, which relates to retailers’ and consumers’ behaviour. (Parfitt *et al.*, 2010). “Food” waste or loss is measured only for products that are directed to human consumption, excluding feed and parts of products which are not edible. Per definition, food losses or waste are the masses of food lost or wasted in *the part of* food chains *leading to* “edible products going to human consumption”. Therefore, food that was originally meant to human consumption, but which fortuity gets out the human food chain is considered as food loss or waste even if it is then directed to a non-food use (feed, bioenergy...). This approach distinguishes “planned” non-food uses to “unplanned” non-food uses, which are hereby accounted under losses.”⁶⁸

GAP: Good Agricultural Practices (GAP) is a voluntary certification program which verifies through an audit that sound food safety practices are being used. The key principles of Good Agricultural Practices (GAP) are centred around four main pillars: food safety, environmental protection, worker welfare, and economic viability.

Organic Agriculture is a production system that sustains the health of soils, ecosystems, and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Organic Agriculture combines tradition, innovation, and science to benefit the shared environment and promote fair relationships and good quality of life for all involved.⁶⁹

Regenerative Agriculture: Regenerative agriculture describes holistic farming systems that, among other benefits, improve water and air quality, enhance ecosystem biodiversity, produce nutrient-dense food, and store carbon to help mitigate the effects of climate change. These farm systems are designed to work in harmony with nature, while also maintaining and improving economic viability (FAO).

Regenerative agriculture is a harm-reduction approach that aims to restore ecosystems and add to nature's richness (Rainforest Alliance).

Sustainable Consumption and Production (SCP): “The use of services and related products, which respond to basic needs and bring a better quality of life while minimising the use of natural resources and toxic materials as well as the emissions of waste and pollutants over the life cycle of the service or product so as not to jeopardise the needs of future generations”.⁷⁰

A Sustainable Food System (SFS) is a food system that delivers food security and nutrition for all in such a way that the economic, social and environmental bases to generate food security and nutrition for future generations are not compromised.⁷¹





Endnotes

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