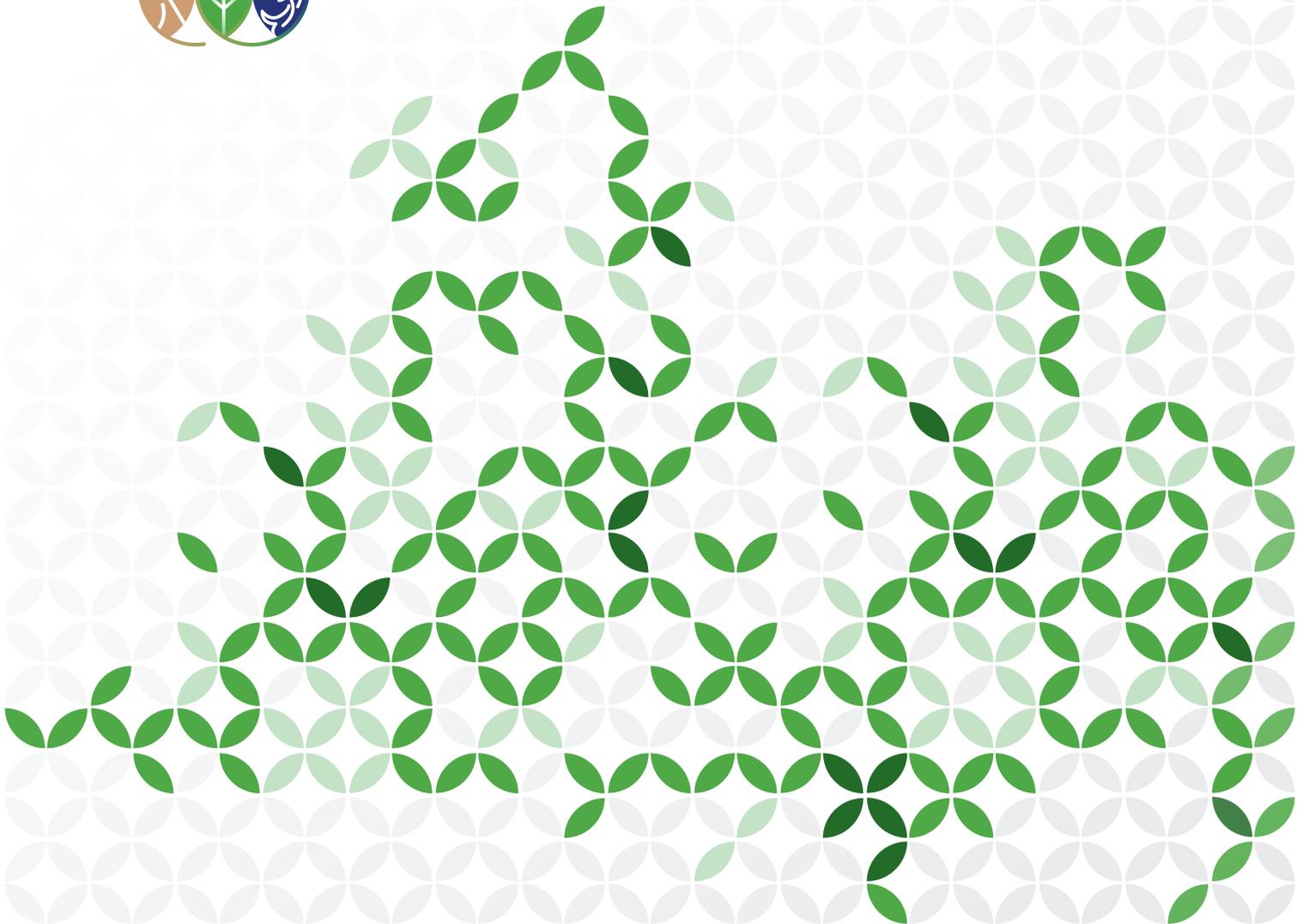




MINISTRY OF AGRICULTURE
AND FOOD SECURITY

NATIONAL FOOD SECURITY POLICY 2030





Design Rationale

The design of the National Food Security Policy 2030 reflects the vision of the plan: Transforming Malaysia's Agrofood System to be Efficient, Resilient, Sustainable, and Inclusive by 2030.

Agrofood products are food commodities made from crops, livestock, and fisheries. These three elements are not independent but mutually reinforcing, contributing to a holistic and robust agrofood sector.

The design's organic pattern symbolises the government's commitment to continuous improvement and adaptation within the agrofood system. It represents the dynamic and evolving nature of the transformation process and the nation's flexibility in pursuing these goals.

The colour palette further reinforces the connection to the agricultural sector:
Green symbolises crop,
Earth tones represent livestock,
and Blue signifies fisheries.

Just as these sectors are interconnected, so too are the principles of efficiency, resilience, sustainability, and inclusivity, working together to create a stronger and more secure food system for Malaysia.

e ISBN No: 978-983-9863-79-6

Published by:



MINISTRY OF AGRICULTURE
AND FOOD SECURITY

Wisma Tani, No. 28, Persiaran Perdana,
Presint 4, Pusat Pentadbiran,
Kerajaan Persekutuan, 62624 Putrajaya.

Tel : 03 - 8000 8000

Email : pro@kpkkm.gov.my

© **Ministry of Agriculture and Food Security**

MAFS, 2026

All rights reserved.

No part of this document may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without prior permission from the Ministry of Agriculture and Food Security (MAFS).

The information in this document has been updated as much as possible until the date of publication.



Cataloguing-in-Publication Data

Perpustakaan Negara Malaysia

A catalogue record for this book is available
from the National Library of Malaysia

eISBN 978-983-9863-79-6

TABLE OF CONTENT

LIST OF TABLES	6
LIST OF FIGURES	6
ABBREVIATION	8
GLOSSARY	12
FOREWORD BY PRIME MINISTER	16
FOREWORD BY MINISTER OF AGRICULTURE AND FOOD SECURITY	18
FOREWORD BY SECRETARY GENERAL OF MINISTRY OF AGRICULTURE AND FOOD SECURITY	20
1.0 PURPOSE OF THE NFSP 2030	23
Overview	24
Scope and Coverage	25
2.0 FOOD SECURITY DEFINITION AND GLOBAL LANDSCAPE	29
Food As a Basic Human Need	30
Achieving Food Security	31
Food Security and Nutrition	33
Food Security and Sustainable Development Goals	34
Sustainable Food Systems: A Transformative Approach	35
Global Landscape	38
Mega Trends Influencing Food Security	42
3.0 MALAYSIA FOOD SECURITY LANDSCAPE	55
Malaysia's Food Security Performance in a Global Context	56
Malaysia Agricultural Landscape	58
Malaysia's Agriculture's GDP Contribution	58
Value Added of Agrofood Across Economy Sectors	60
Agriculture Sub-sector	61
Malaysia Agricultural Land	65
Top Agriculture Producers and Share of Total Output	66
Malaysia's Agricultural Workforce	67
Labour Productivity in the Agriculture Sector	69
Micro-Level Analysis of Malaysia's Food Security	70
Consumption Trends among Malaysians	70
Household Expenditure on Food	72
Nutritional Landscape	75
Malaysia Food Security Trends	77
Policy Response	83
State-Level Policies	87
Vulnerable Groups	89
Future of Food	92
Key Food Items	100

4.0 KEY CHALLENGES IN MALAYSIA AGROFOOD SYSTEMS	103
Agriculture GHG Emissions	105
Sustainable Practice in Agriculture	106
Food Systems Resilience	108
Food Supply Chain, Consumer Behaviour and Food Environment	114
Food Safety	128
Information, Guideline and Advertising	129
5.0 NATIONAL FOOD SECURITY POLICY 2030: TOWARDS TRANSFORMATIVE AGROFOOD SYSTEMS	131
POLICY STATEMENT	132
VISION	132
OBJECTIVES	133
MISSION-BASED STRATEGY	133
GOALS AND TARGETS	140
MISSION 1: EFFICIENT AND PRODUCTIVE AGRICULTURE	144
MISSION 2: SUSTAINABLE AND RESILIENT AGROFOOD SYSTEMS	163
MISSION 3: SAFE FOOD AND HEALTHY DIET FOR ALL	182
MISSION 4: INCLUSIVE LIVELIHOOD AND ECONOMIC GROWTH	196
ENABLERS	202
GOVERNANCE AND MONITORING MECHANISM	210
6.0 CONCLUSION	215
7.0 REFERENCES	217

LIST OF TABLES

1:	GDP and Value Added of Agrofood Across Economy Sectors	60
2:	Population by State, Malaysia, 2023 ^P	77
3:	Percentages of Population by Age Group and State, Malaysia, 2023 ^P and 2030 (%)	78
4:	Urbanisation Rate by State, Malaysia, 2000 to 2019 (%)	79
5:	Observed Seasonal Precipitation	81
6:	Lost Productivity Due to Deaths of Workers from Selected NCDs Attributable to Specific Risk Factors, Malaysia, 2017	82
7:	List of Ministerial Policies Related to Food Security	86
8:	List of State Policies Analysed in This Policy	88
9:	Food Systems Domain and Food Systems Diplomacy Goals with Key Dimensions	113
10:	Total Cost Reductions for Machinery Provided to Participants	162

LIST OF FIGURES

1:	Maslow's Hierarchy of Needs	30
2:	Six Dimensions of Food Security	31
3:	Malnutrition Impact on Social and Economy	33
4:	SDGs Related to Food Security	34
5:	Sustainable Food System Framework	36
6:	Regional 2000, 2008, 2016, and 2024 Global Hunger Index Scores	39
7:	The Average Cost of A Healthy Diet (2017-2022)	40
8:	Regional 2022 Global Food Security Index Scores	41
9:	Projected World Population Growth, 2024 - 2050 (persons in billion)	42
10:	Global Average Temperature Anomaly, 1990 - 2023 (°C)	45
11:	Global Precipitation, 1990 - 2023 (mm)	46
12:	Daily vegetable oil prices in 2021-2022 (USD per tonne)	49
13:	GDP by Kind of Economic Activity at Constant 2015 Prices (RM billion)	58
14:	GDP by Agriculture Sub-Sector at Constant 2015 Prices (RM billion)	59
15:	Production and Value of Paddy, Crop, Livestock, and Fishery Sector, 2023 and 2024	61
16:	Production and Production Value by Major Crop Commodities, 2023 and 2024	62
17:	Production and Value of Production of Main Livestock Commodities, 2023 and 2024	63
18:	Production and Value of Production of Fishery Sector, 2023 and 2024	64
19:	Agriculture Land Use by States, 2023	65
20:	Agriculture Production by States, 2023	66
21:	Gender Distribution in Agricultural Sub-Sectors, 2022	67
22:	Number of Employed Persons in Agriculture, Forestry, and Fishing Sector by Age Group ('000), 2019-2024	68
23:	Annual Labour Productivity, Value Added Per Hour Worked in Agriculture (RM), 2019 - 2024	69
24:	Composition of Mean Monthly Household Consumption Expenditure by Main Group, 2022	72

LIST OF FIGURES

25:	Monthly Expenditure on Food and Beverage Away From Home and Food At Home, 2016-2022 (RM)	72
26:	Total Expenditure for Food At Home and Food Away From Home by States (2022)	73
27:	Top 5 Food Items for Food Away from Home	74
28:	Malnutrition Rates Amongst Malaysians, 2016-2023	75
29:	Observed Average Annual Mean Temperature Malaysia 1991-2023 (3 Decade Time Series)	80
30:	Malaysia's Total Expenditure in Health 2011 – 2022	82
31:	Food Policy in Malaysia	84
32:	Malaysian Food Pyramid (2020)	100
33:	Malaysia's 2019 GHG Inventory	105
34:	Contributors to Malaysia's Agricultural Emissions	106
35:	Malaysia's Top Importers for Various Food Items 2023	110
36:	Percentage of Prevalence of Undernourishment (PoU) from The Total Population in Malaysia	121
37:	Malaysia's Current Malnutrition Level Among Children and Adults	122
38:	Composition of Mean Monthly Household Consumption Expenditure by Main Group, 2022	123
39:	Percentage of Monthly Household Consumption Expenditure on Food at Home and Food Away from Home, 2019 and 2022	124
40:	Composition of Monthly Household Consumption Expenditure by Strata, Malaysia, 2022	125
41:	Top 5 Items by Highest Percentage of Expenditure on Food Away from Home, 2022	126
42:	Food Safety Issues Across the Supply Chain	128
43:	National Food Security Policy 2030	134
44:	Proposed interventions throughout the value chain in National Food Security Policy 2030	136
45:	Key Intervention in Agrofood Systems	138
46:	Three Values of Smart Food Supply Chain System	148
47:	Taipei's Auction Centre	154
48:	Auction Centre with Various Advanced Machinery	154
49:	Irrigation water recycling facility at IADA Kerian, Perak	169
50:	Concrete structure measuring 40m x 40m x 3.5m (left) and channels to divert water for irrigation (right)	170
51:	Thailand Rotational Closure in the Gulf of Thailand	173
52:	Custodian of Food Loss and Food Waste Index	179
53:	Scope of Food Loss Index	180
54:	Prevalence of obesity among children and adolescents aged 5 to 19 years in Japan	185
55:	Singapore's Nutri-Grade labelling	192
56:	Young Agropreneur Grant	205

ABBREVIATION

°C	Degree Celsius
€	Euros
%	Per Cent
AIFS	ASEAN Integrated Food Security
APEC	Asia-Pacific Economic Cooperation
ASEAN	Association of Southeast Asian Nation
BSF	Black Soldier Fly
BUR2	Second Biennial Update Report
CAZRI	Central Arid Zone Research Institute
CFS	Committee on World Food Security
CH ₄	Methane
CO ₂	Carbon Dioxide
COVID-19	Coronavirus Disease 2019
CPO	Crude Palm Oil
CPTPP	Comprehensive and Progressive Agreement for Trans-Pacific Partnership
DAN 2.0	<i>Dasar Agromakanan Negara 2021-2030</i>
DPKM 2.0	<i>Dasar Pemakanan Kebangsaan Negara 2.0</i>
DPS	<i>Bahagian Dasar dan Perancangan Strategik</i>
DAKN 2030	<i>Dasar Agrikomoditi Negara 2021-2030</i>
DALYs	Disability-Adjusted Life Years
DJF	December-January-February
DKBK	<i>Dasar Kepelbagaian Biologi Kebangsaan 2022-2030</i>
DOA	Department of Agriculture
DOF	Department of Fisheries
DOSM	Department of Statistics
DSMN Action Plan	National Food Security Action Plan 2021-2025
F&B	Food and Beverage
FAO	Food and Agriculture Organization, United Nations
FFS	Farmers Field School
FGD	Focus Group Discussion
FLI	Food Loss Index
FLW	Food Loss and Waste
FMD	Foot-and-Mouth Disease
FPI	Food Price Index
FSC	Food Security Council
FSCC	Food Security Coordination Committee
FSD	Food Systems Diplomacy
FTA	Free Trade Agreement
GDP	Gross Domestic Product

GFSI	Global Food Security Index
GHG	Greenhouse Gas
GHI	Global Hunger Index
GRASP 2030	<i>Gotong Royong Atasi Susut & Limbah Pangan di Tahun 2030</i>
HiTS	<i>Program Hidangan Berkhasiat di Sekolah</i>
HLPE	High Level Panel of Experts
HoReCa	Hotel, Restaurant, and Catering
IDI	In-Depth Interview
IFAD	International Fund for Agriculture Development
IoT	Internet of Thing
IPLC	Indigenous People and Local Community
IPM	Integrated Pest Management
IPPU	Industrial Processes and Product Use
IUU	Illegal, Unreported, and Unregulated
JAM	Jelajah Agropeneur Muda
JJA	June-July-August
KAGUMN	<i>Pelan Induk Perancangan Guna Tanah Kawasan Sumber Makanan Negara</i>
kg	Kilogram
KK	Kedah-Kelantan
km	Kilometre
KSU	Ketua Setiausaha
LPP	Lembaga Pertubuhan Peladang
LMICs	Low- or Middle-Income Countries
LZNK	Lembaga Zakat Negeri Kedah
MADA	Muda Agricultural Development Authority
MAFS	Ministry of Agriculture and Food Security
MAH	Malaysian Association of Hotels
MAM	March-April-May
MAQIS	Malaysian Quarantine and Inspection Services
MDG	Malaysian Dietary Guidelines
mm	Millimetres
MNHA	Malaysia National Health Accounts
MOH	Ministry of Health
MOSTI	Ministry of Science, Technology, and Innovation
MP	Malaysia Plans
MSCAP 2020-2030	Melaka State Climate Action Plan 2020-2030
mt	Metric Tonne
N ₂ O	Nitrous Oxide
NAFAS	Pertubuhan Peladang Kebangsaan

ABBREVIATION

NAFP 2011-2020	National Agrofood Policy 2011-2020
NAFP 2.0	National Agrofood Policy 2021-2030
NAP I	National Agricultural Policy I
NAP II	National Agricultural Policy II
NAP III	National Agricultural Policy III
NAP 2.0	National Agrofood Policy 2021-2030
NC3	2018 Malaysia Third National Communication
NCDs	Non-Communicable Diseases
NETR	National Energy Transition Roadmap
NFSP 2030	National Food Security Policy 2030
NFSC	National Food Security Council
NGO	Non-Governmental Organization
NHMS	National Health and Morbidity Survey
NKEAs	Agriculture National Key Economic Areas
NRES	Ministry of National Resources and Environmental Sustainability
NTM	Non-Tariff Measure
PB-APAs	Plant-Based Animal Product Alternatives
PCC	Per Capita Consumption
PIBG	<i>Persatuan Ibu Bapa dan Guru</i>
PITAS2030	Pelan Induk Terengganu Sejahtera 2030
PKC	Palm Kernel Cake
PoU	Prevalence of Undernourishment
PPP dollars	Purchasing Power Parity dollars
PPP	Public-Private Partnership
PSP	<i>Program Sarapan Pagi</i>
R&D	Research and Development
R&D&C&I	Research, Development, Commercialisation, and Innovation
RCEP	Regional Comprehensive Economic Partnership
RFN4	Rancangan Fizikal Negara 4
RM	Malaysian Ringgit
RMK13	<i>Rancangan Malaysia Ketiga Belas</i>
RMT	<i>Rancangan Makanan Tambahan</i>
ROI	Return on Investment
RWH	Rainwater Harvesting
SDG	Sustainable Development Goals
SE	Social Enterprise
SMART SBBA	<i>SMART Sawah Berskala Besar Asnaf</i>
SME	Small and Medium Enterprise
SON	September-October-November

SPS	Sanitary and Phytosanitary
TAPMC	Taipei Agricultural Products Marketing Corporation
TBT	Technical Barriers to Trade
TFR	Total Fertility Rate
TKSU	<i>Timbalan Ketua Setiausaha</i>
UAM	<i>Unit Agropeneur Muda</i>
UN	United Nations
UNCCD	United Nations Convention to Combat Desertification
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNICEF	United Nations Children's Fund
USD / US\$	United States Dollar
VA	Voluntary Agreement
WFE	Water-Food-Energy Nexus
WHO	World Health Organization

GLOSSARY

Agritech	The collection of scientific techniques that are used to enhance plants, animals and microorganisms, offering benefits to farmers, the environment and consumers
Agrofood	Food commodity or products made from crops, livestock, or fisheries
Agrohub	A networked innovation system of agro-production, processing, logistics, marketing, training and extension services, located in a District Municipality
Alternative Protein	Proteins produced from plants or animal cells, or by way of fermentation
Aquaculture	Propagation of fish seed or the raising of fish through husbandry during the whole or part of its life cycle
Arable Land	Land defined by the FAO as land under temporary crops (double-cropped areas are counted once), temporary meadows for mowing or for pasture, land under market or kitchen gardens, and land temporarily fallow
Asnaf Community	Consists of individuals who need financial assistance to meet their basic needs.
Blockchain	Digital ledger system in a decentralised database network that is democratic, incorruptible, efficient, verifiable, transparent, traceable and holds permanent record of every transaction
Broodstock	Refers to the reproductively mature adults in a population that breed (or spawn) and produce more individuals (offspring or progeny)
Circular Economy	Model of production and consumption, which involves sharing, leasing, reusing, repairing, refurbishing and recycling existing materials and products as long as possible, in this way, the life cycle of products is extended
Disability-Adjusted Life Years	The sum of the years of life lost to due to premature mortality (YLLs) and the years lived with a disability (YLDs) due to prevalent cases of the disease or health condition in a population
Double Burden of Malnutrition	Consists of both undernutrition and overweight and obesity, as well as diet-related noncommunicable diseases
Dry Spells	The number of days where daily precipitation is less than 0.5 mm
Enteric Fermentation	A natural part of the digestive process in ruminant animals such as cattle, sheep, goats, and buffalo
Entomophagy	The practice of consuming insects
Environmental Stewardship External Shocks	The responsible use and protection of the natural environment through conservation and sustainable practices to enhance ecosystem resilience and human well-being
Feedstuff	Food for farm animals, especially food that has been processed
Feed Efficiency	The ratio of mean daily weight gain to mean daily feed consumption over a given period
Food Systems Diplomacy	A framework that helps international actors consider and engage with negotiations that influence the food system, aiming to reframe global food governance by balancing health, social, environmental, and economic aspects
Free Trade Agreements (FTAs)	An agreement between two or more countries, where the countries involved have agreed to provide preferential treatment in each other's markets

Globalisation	The process by which people and goods move easily across borders
Granary Areas	An area that has major irrigation schemes and is normally more than 4000 hectares
Gross Domestic Product (GDP)	The standard measure of the value added created through the production of goods and services in a country during a certain period
High-Density Nutrition	Also known as nutrient-dense food, it refers to food that is high in nutrients but relatively low in calories
Household Consumption Expenditure	The amount of spending made by resident households to meet their everyday needs
Industrialisation	The period of social and economic change that transforms a human group from an agrarian society into an industrial society, involving the extensive re-organisation of an economy for the purpose of manufacturing
Intercropping	Practice of planting two or more crops simultaneously in the same field
Iodised Salt	Salt fortified with iodine
Legumes	A special group of plant species that includes crops such as peas, beans, and clovers
Liming	The application of mineral calcium and magnesium compounds, mainly carbonates, oxides, hydroxides, or a mixture of them and, more rarely, silicates into acidic soils
<i>Linut</i>	A sticky porridge-like delicacy which combines sago flour and hot water
Micronutrient	Substances in food, feed or soil that are essential for human, animal or crop and required in small amounts
Millet	Encompass a diverse group of small-grained dryland cereals
Monocropping	Cultivation of a single crop on the same land, year after year, using agrochemicals to control pests and fertilise soil
Mycoprotein	An alternative, nutritious protein source with a meat-like texture made from <i>Fusarium venenatum</i> , a naturally occurring fungus
Mycotoxins	Naturally occurring toxins produced by certain moulds (fungi) and can be found in food
Neophobia	The fear of trying unfamiliar foods
Net-Zero	Cutting carbon emissions to a small amount of residual emissions that can be absorbed and durably stored by nature and other carbon dioxide removal measures, leaving zero in the atmosphere
Non-Communicable Diseases (NCDs)	Also known as chronic diseases, they tend to be of long duration and are the result of a combination of genetic, physiological, environmental and behavioural factors
Overnutrition	Refers to the excessive intake of nutrients, which can lead to health problems such as overweight and obesity
Per Capita Consumption (PCC)	A statistical measure of a country's consumption of resources per person
Piecemeal	Done or happening gradually at different times and often in different ways, rather than carefully planned at the beginning
Plantation Agriculture	The production of commodity crops by large-scale agribusiness organisations

Precision Agriculture / Farming	Use of information technology in the provision, processing, and analysis of spatial and temporal data from various sources to help make decisions in farm management
Precision Fermentation Technologies	Involves the use of genetically modified microorganisms to produce high-value compounds such as proteins, enzymes, and other bioactive molecules
Price volatility	Indicates how much and how quickly the price of a commodity changes over time
Public-Private Partnerships (PPPs)	A long-term contract between a private party and a government entity, for providing a public asset or service
Pulses	The edible seeds of leguminous plants cultivated for both food and feed
Return Period	A statistical measurement that describes how likely a hazard event is to occur at, or above, a specific intensity within a time frame defined by a probability
Smart Systems / Smart Farming	Managing farms using modern Information and communication technologies to increase the quantity and quality of products while optimising the human labour required
Stunting	The impaired growth and development that children experience from poor nutrition, repeated infection, and inadequate psychosocial stimulation
Subsistence Farming	Agricultural activity to produce food which is predominantly consumed by the farming household
Ultra-Processed Foods	Foods which contain formulations of ingredients, mostly of exclusive industrial use, typically created by a series of industrial techniques and processes
Undernutrition	<i>Manifests in four broad forms: wasting, stunting, underweight, and micronutrient deficiencies</i>
Value-Chain Integration	The process by which multiple enterprises within a shared market segment collaboratively plan, implement and manage the flow of goods, services and information along the value system (chain)
Waste Valorisation	Refers to any industrial processing activities aimed at reusing, recycling, or composting from wastes, useful products, or sources of energy
Wasting	Low weight-for-height



FOREWORD BY PRIME MINISTER



NFSP 2030 is our collective promise to secure efficient, resilient, inclusive and sustainable agrofood systems for Malaysia, recognising that food security is a shared responsibility



**YAB DATO' SERI
ANWAR BIN IBRAHIM**

Prime Minister

Malaysia remains steadfast towards building a resilient and sustainable economy, backed by strong growth of the agrofood sector to ensure the nation's food security. The Government is responsible towards the Rakyat for providing affordable access to safe and nutritious food supply at all times, through sustainable agriculture practices and good governance of the entire value chain. Aligned with this commitment, the National Food Security Policy 2030 (NFSP 2030) has been developed to ensure that Malaysia's agrofood systems are efficient, resilient, inclusive and sustainable in safeguarding food security for every Rakyat.

The NFSP 2030 addresses the pressing global challenges of supply chain disruptions including climate change and geopolitical uncertainties as well as changes in consumption pattern and dietary needs. It acknowledges the limitations to produce locally due to unavailability of natural resources, inclement weather and uneconomical production are inevitable. Nevertheless, these constraints can be mitigated through import strategy, diversification of sources, technological advancements and advocacy for change in consumers' lifestyle and preferences.

Recognising the importance of balanced regional development, the Policy also emphasises localised solutions that leverage Malaysia's unique geographical and cultural diversity. These targeted initiatives aim to bridge economic disparities, unlock regional potential and create equitable opportunities, ensuring that prosperity is shared, not concentrated.

This Policy is not merely a policy document; it is a transformative national agenda. It envisions Malaysia's agrofood systems as key drivers to economic growth, social equity and environmental sustainability. This is in line with the MADANI Economy framework that focuses on two key thrusts: "Raising the Ceiling" to boost economic growth and national competitiveness, and "Raising the Floor" to improve the quality of life and well-being of the Rakyat.

Food security is a shared responsibility that calls for collaboration between government agencies at all levels, industry players, research institutions, universities and civil society. NFSP 2030 represents a Whole-of-Nation effort, with collaborative partnerships forming the cornerstone of its successful implementation. Together, let us commit to building efficient, resilient, inclusive and sustainable agrofood systems that benefit every Rakyat, today and for generations to come.

FOREWORD BY MINISTER OF AGRICULTURE AND FOOD SECURITY



*NFSP 2030
will support the
implementation of
existing policies,
recommend
improvements to ongoing
initiatives and introduce
new strategies aligned
with the sector's
evolving needs*



**YB DATUK SERI
HAJI MOHAMAD
BIN SABU**

Minister of Agriculture and
Food Security

Malaysia's agrofood sector is a vital pillar of our nation's development, driving economic growth, supporting livelihoods, and ensuring food security for the Rakyat. In 2024, the agrofood's contribution across economic sectors to the GDP was significant, amounting to 11.5%. This contribution reflects Malaysia's ability to produce agricultural products and supply raw materials, provide employment opportunities, boost infrastructure development, as well as to ensure that every household has access to safe, nutritious and affordable food. The sector's role extends far beyond its primary function of feeding the nation, it is also instrumental in shaping a sustainable and resilient future for Malaysia.

For decades, Malaysia's agricultural policies have prioritised on increasing productivity, ensuring food availability and addressing challenges related to food security. However, the rapidly evolving global landscape, characterised by supply chain disruptions, climate change, geopolitical uncertainties and unhealthy dietary habits, demands for a more forward-thinking approach. In response, the National Food Security Policy 2030 (NFSP 2030) has been developed as a strategic roadmap towards efficient, resilient, inclusive and sustainable agrofood systems.

The NFSP 2030 aims to transform Malaysia's agrofood sector into a sustainable engine of growth, in alignment with the values of Malaysia MADANI that embraces sustainability, prosperity and compassion. This transformation focuses on delivering sufficient, safe and nutritious food that meets the dietary needs and preferences of the Rakyat. It also seeks to enhance the competitiveness and productivity of the agrofood sector while building a resilient system capable of withstanding external shocks and disruptions.

The NFSP 2030 will support the implementation of existing policies, recommend improvements to ongoing initiatives and introduce new strategies aligned with the sector's evolving needs. The commitment and dedication of all stakeholders are crucial in ensuring the successful implementation of NFSP 2030. Let us work together to position Malaysia as a more food-secure nation, ensuring sustainable food systems for future generations.

FOREWORD BY SECRETARY GENERAL OF MINISTRY OF AGRICULTURE AND FOOD SECURITY



*NFSP 2030
is a transformative
agenda designed to
address food security
challenges through a
mission-based
approach*



**DATUK SERI
ISHAM BIN ISHAK**

Secretary General of
Ministry of Agriculture and
Food Security

The global population is projected to reach 9.7 billion by 2050. In this regard, the global food consumption is projected to rise by 1.1% annually, reaching 20.6 million teracalories by 2033, with 94% of the growth driven by middle-and low-income countries due to economic, demographic and dietary preference (OECD-FAO Agricultural Outlook 2024-2033). However, climate change, resource scarcity, urbanisation, shift in dietary and lifestyle as well as issues of food loss and waste require strategic and transformative solutions to ensure the resilience and sustainability of national agrofood systems.

The National Food Security Policy 2030 (NFSP 2030) is designed to address these challenges through a mission-based approach focusing on four (4) key areas - enhancing agricultural productivity and efficiency; strengthening resilience and sustainability; ensuring food safety and healthy diets for all; and promoting inclusive livelihoods and economic growth. These four (4) missions are driven by six (6) enablers - governance and policy; human capital; data; Research, Development, Innovation, Commercialisation and Economy (RDICE) and technology; finance; and communication - which collectively sets forth a comprehensive framework of strategies that span the entire food supply chain.

Through this mission-based approach, the NFSP 2030 integrates efficiency, resilience, inclusivity and sustainability into every aspect of the agrofood systems. These efforts align with Malaysia's broader development agenda under the Ekonomi MADANI framework, contributing to economic growth, public well-being and national prosperity, while also fostering a sustainable food production ecosystem for the present and future generations.

The NFSP 2030 is an ambitious and transformative agenda which serves as a testament to our collective commitment and unwavering dedication to safeguard the well-being of the Rakyat. Together we have the ability to shape the future of food systems through technology advancement, sustainable practices and responsible consumption, ultimately ensuring food security for all.



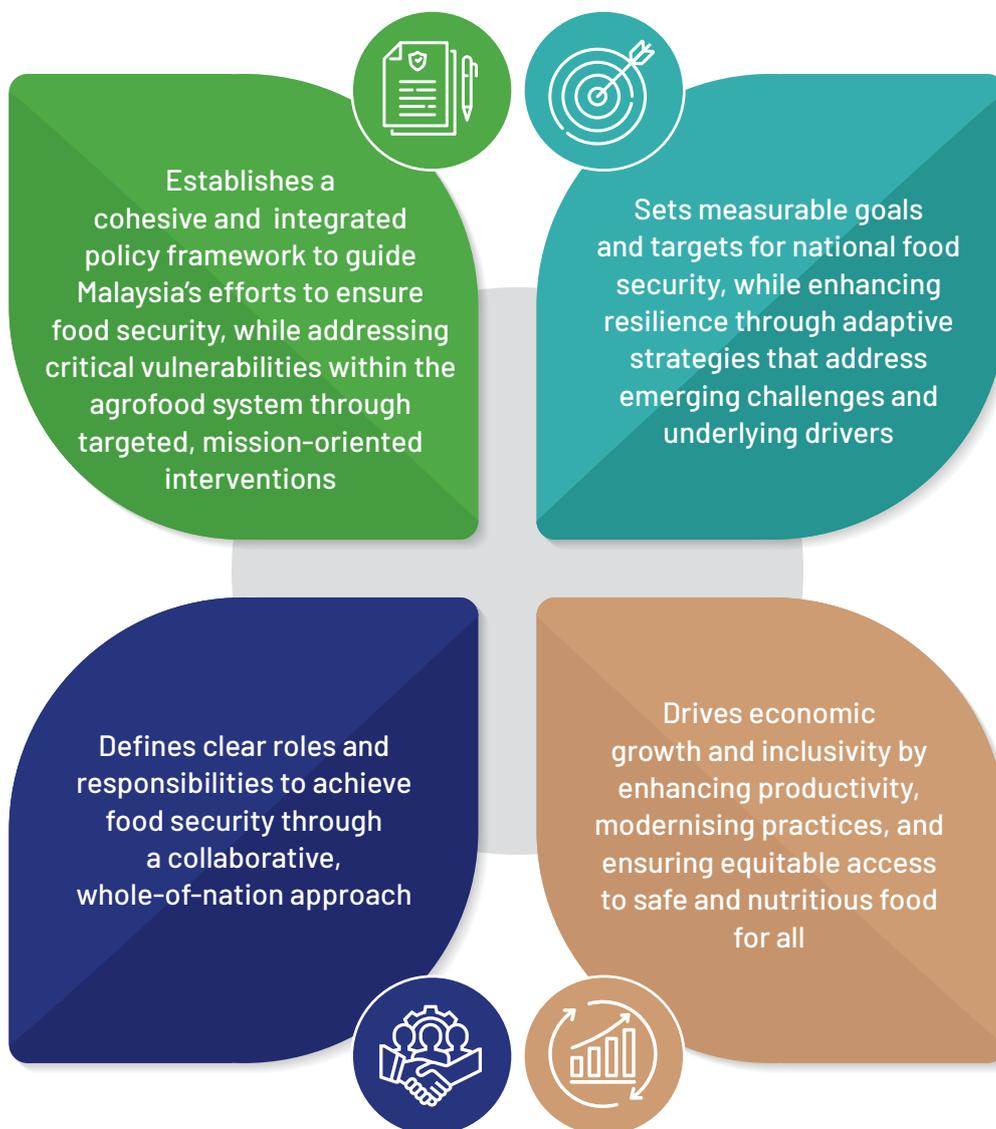


**PURPOSE OF
THE NFSP
2030**

1.0 PURPOSE OF THE NFSP 2030

Overview

The National Food Security Policy 2030 (NFSP 2030) is a transformative policy framework designed to safeguard Malaysia's food security while promoting sustainability, inclusivity, and resilience across the agrofood system. The policy establishes a strategic pathway towards a food-secure nation by addressing key challenges and aligning national food security policies with domestic priorities and international best practices.



Scope and Coverage

The NFSP 2030 is a strategic framework designed to address Malaysia's food security challenges holistically, ensuring the availability of safe, nutritious, and affordable food for all Malaysians. Recognising the complexities and interdependencies of agrofood systems, the policy outlines a comprehensive approach to strengthen resilience, sustainability, and inclusivity across all dimensions of food security.

This scope encompasses the entire agrofood system, from production and distribution to consumption and waste recovery, while prioritising key commodities and addressing systemic vulnerabilities. It integrates stakeholder collaboration, innovative strategies, and measurable outcomes to create a robust, adaptive agrofood system capable of meeting current and future challenges.

To ensure the

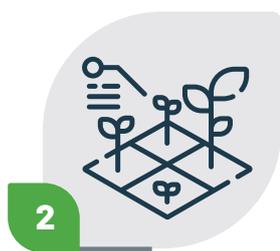
RESILIENCE and SUSTAINABILITY

of Malaysia's food security, the NFSP 2030 outlines clear Missions to achieve its desired Goals, with consideration of:



Alignment with 3 national policies and 19 ministerial policies

The NFSP 2030 ensures alignment with key national policies, including the MADANI Framework, Rancangan Malaysia Ketiga Belas (RMK13), Rancangan Fizikal Negara 4, and a total of 19 other ministerial policies that intersect with food security. The focus is on aligning with the National Agrofood Policy 2021-2030 (NAP 2.0) and the National Food Security Action Plan 2021-2025 (DSMN Action Plan). This alignment not only addresses critical challenges in ensuring food security but also promotes coherence and synergy across diverse policy frameworks. It also prevents duplication of initiatives, harmonises efforts across sectors, and ensures the efficient use of resources to achieve shared national goals.



Transforming agrofood systems for resilience, sustainability, and inclusivity

The NFSP 2030 prioritises a holistic transformation of Malaysia's agrofood systems to strengthen domestic production capacities, enhance self-reliance, and build resilience against economic and environmental shocks.



Enhancing inclusivity for vulnerable groups

The NFSP 2030 ensures equitable access to safe, nutritious, and affordable food, particularly for vulnerable groups such as low-income households and marginalised communities. It focuses on addressing disparities in food access and fostering greater participation in agrofood systems to ensure equitable benefits and improved livelihoods.

The NFSP 2030 represents a

COLLABORATIVE EFFORT

between the Government, private sector, academia, and other key stakeholders, leveraging collective expertise and resources to address Malaysia's food security challenges. It is a participatory document developed through extensive engagement and consultations, including:

1 In-Depth Interviews (IDIs)

One hundred twenty-one (121) IDIs were conducted with stakeholders from across the agrofood system, including agricultural producers, processors, government agencies, ministries, media, and Non-Governmental Organisations (NGOs), to gather targeted insights and recommendations.

2 Focus Group Discussions (FGDs)

Six (6) FGDs were facilitated with diverse stakeholder groups to capture varied perspectives and consensus on food security challenges and solutions.



3 State-Level Engagements

Visits to twelve (12) states provided localised insights and grounded the policy in the realities of regional challenges and opportunities.

4 Strategic Workshops

Two (2) strategic workshops were conducted. A visioning workshop was held at the outset of the study to define the overarching objectives and direction of the policy. A validation workshop was held to review and refine the proposed missions, strategies, and goals, ensuring alignment with stakeholder expectations.





**FOOD SECURITY
DEFINITION AND
GLOBAL
LANDSCAPE**

2.0 FOOD SECURITY DEFINITION AND GLOBAL LANDSCAPE

Food As a Basic Human Need

Food is fundamental for human survival, providing the essential nutrients and energy required for bodily functions, growth, and repair. It is not only critical for sustaining life but also plays a key role in maintaining physical health, which in turn supports mental and emotional well-being¹.

Maslow's Hierarchy of Needs highlights food's pivotal role in human existence, positioning it at the foundation of the pyramid alongside water and shelter as essential physiological requirements for survival. The theory asserts that until fundamental needs such as food, water, and shelter are met, individuals are unable to prioritise higher-level needs such as safety, social connection, esteem, or self-actualisation.

The overwhelming urgency of hunger can dominate cognitive and emotional capacity, making it exceedingly difficult to focus on building

relationships or pursuing personal growth when the fundamental need for sustenance remains unmet. Thus, individuals can prioritise food acceptability and quality only after their physiological needs are met, aligning with the next level of Maslow's hierarchy on safety and security. This progression enables consumers to explore a diverse range of food choices that not only satisfy hunger but also contribute to overall well-being, social integration, and a stronger sense of cultural identity².

This fundamental principle highlights that food serves as a critical enabler for individuals to move beyond basic survival, allowing them to engage in more complex social, physiological, and personal development pursuits.

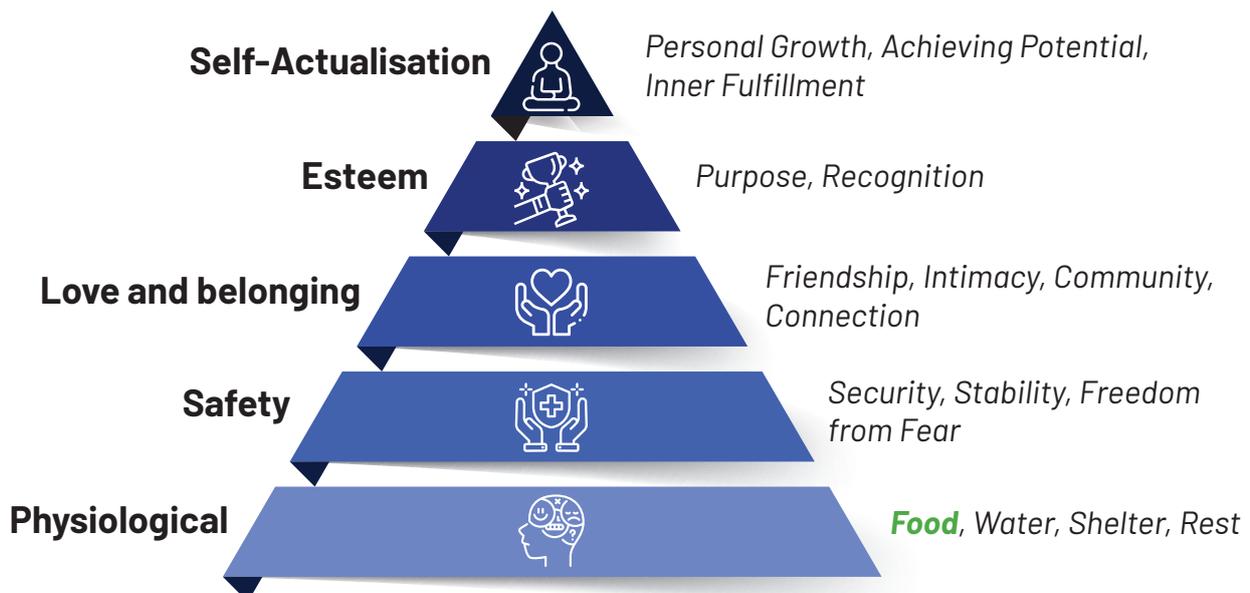


Figure 1: Maslow's Hierarchy of Needs

¹National Geographic. (n.d.). Education: Food.

²Maslow, A. H. (1943, July). A theory of human motivation. *Psychological Review*, 50(4), 370–396.

Achieving Food Security

The concept of food security has evolved significantly since its initial introduction at the 1974 World Food Conference. The widely recognised definition, established during the 1996 World Food Summit and articulated in the Rome Declaration on World Food Security, states:



Food security is a condition in which all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life³

Achieving national food security requires more than ensuring the mere availability of food. It necessitates a comprehensive, multidimensional framework that integrates six interdependent dimensions: availability, accessibility, utilisation, stability, sustainability, and agency.

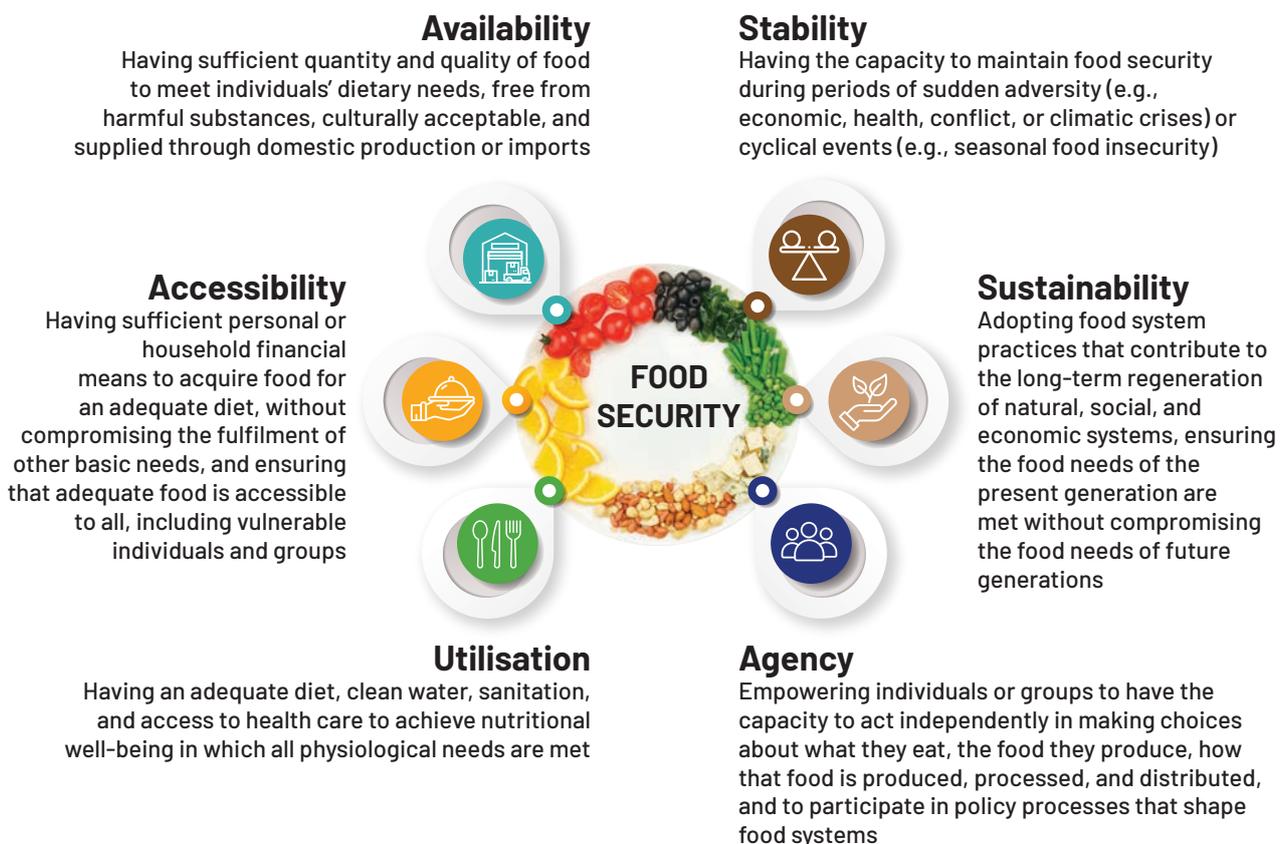
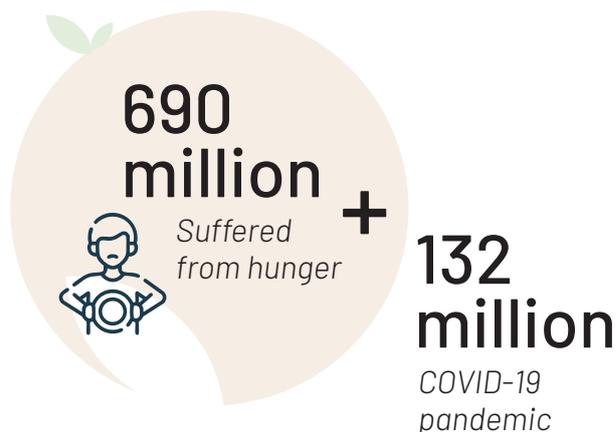


Figure 2: Six Dimensions of Food Security

³FAO. (1996, November 13). Rome declaration on world food security. World Food Summit.

The term 'food security', at both the global and national levels, has often been used with a focus on supply-side issues, particularly a country's capacity to ensure sufficient food to meet the population's needs or demands, whether through domestic production or food imports⁴. However, despite producing enough food to feed the global population, an estimated 690 million people experienced hunger even prior to the Coronavirus Disease 2019 (COVID-19) pandemic.

Additionally, millions more suffered from micronutrient deficiencies, and there was an alarming increase in the number of people who were overweight, transcending age groups, socioeconomic classes, and national boundaries.



The right to food constitutes a fundamental entitlement of every individual, whether alone or in community with others, to have physical and economic access, at all times, to food that is sufficient, adequate, and culturally acceptable; food that is produced and consumed in a sustainable manner, thereby safeguarding access for future generations⁶

The COVID-19 pandemic further exacerbated the situation, increasing the number of undernourished individuals by an estimated 132 million, thereby underscoring both the significance and fragility of agrofood systems⁵. While the availability of food remains a key concern, food security equally relies on ensuring accessibility and affordability, ensuring that low-income households can fulfil their nutritional needs without incurring financial distress. Achieving true food security requires a comprehensive approach that addresses all critical dimensions, ensuring stability, sustainability, and equitable access for all.

Additionally, the definition of food security at the Summit aligned with the right to adequate food and the inherent right of every individual to be free from hunger. The UN Committee on Economic, Social, and Cultural Rights, in General Comment No. 12 on 'The Right to Adequate Food' (1999), outlined the core obligations and normative content associated with this right.



⁴Ecker, O., & Breisinger, C. (2012). The food security system: A new conceptual framework [IFPRI Discussion Paper 01166]. IFPRI.

⁵FAO. (2021). FAO Strategic Framework 2022-2031.

⁶De Schutter, O. (2009). Dialogue on globalization: International trade in agriculture and the right to food [Occasional Paper No.46]. Geneva, Switzerland, Friedrich-Ebert-Stiftung

Food Security and Nutrition

In 2009, The Committee on World Food Security (CFS) formally adopted the term “food security and nutrition” to acknowledge the importance of nutrition as an integral component of food security policies⁷. The transition from focusing solely on food security to incorporating nutrition highlights the need for comprehensive, sustainable agrofood systems that ensure not only adequate food availability but also improved nutritional outcomes. Nutrition reflects the adequacy, balance, and diversity of diets consumed by individuals. A food-secure system ensures not just sufficient calories but also the availability of foods rich in essential nutrients such as proteins, vitamins, and minerals. Poor nutrition is often a result of inadequate access to nutrient-dense foods, even when calorie requirements are met⁸.

The economic cost of malnutrition is substantial, impacting both individuals and economies. Chronic malnutrition in children leads to long-term consequences such as reduced stature, poor academic performance, lower economic productivity, and diminished earnings in adulthood⁹. Individuals affected by stunting contribute less to the economy due to decreased productivity¹⁰. Additionally, diseases associated with chronic malnutrition incur significant healthcare costs.

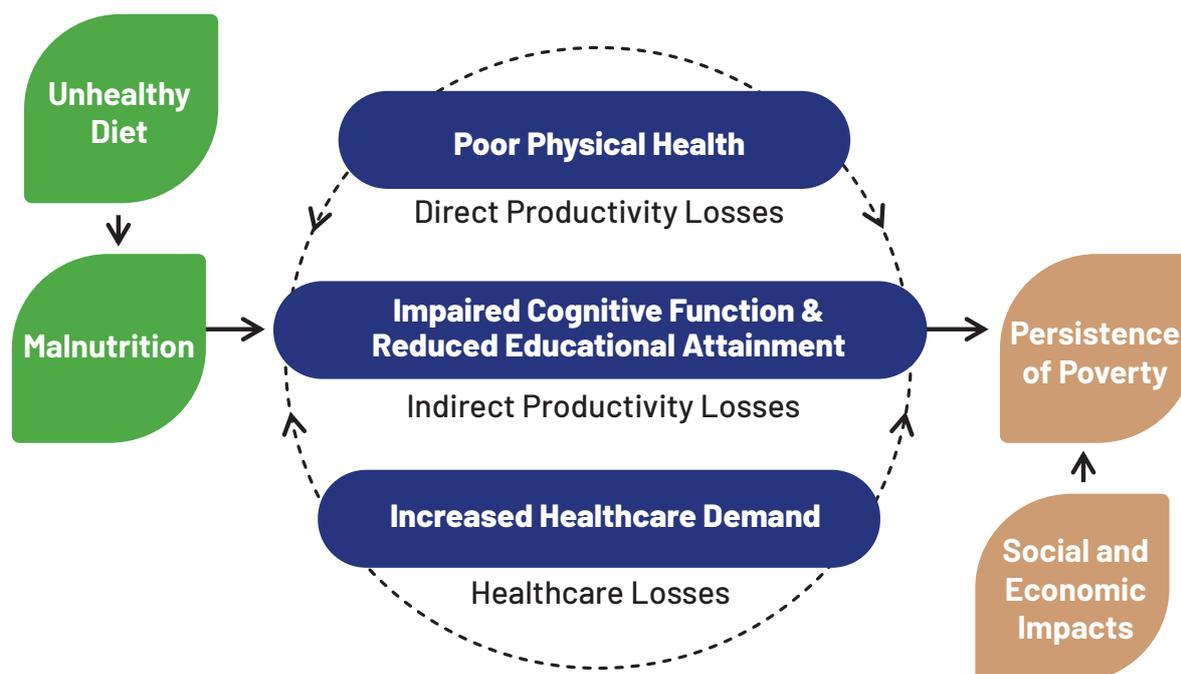


Figure 3: Malnutrition Impact on Social and Economy

⁷CFS. (2014). Global strategic framework for food security and nutrition.

⁸HLPE. (2017). Nutrition and food systems [HLPE Report 12]. A report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security, Rome.

⁹Hoddinott et al. (2012). Investments to reduce hunger and undernutrition [Paper presentation]. 2012 Global Copenhagen Consensus, Lowell, MA, USA.

¹⁰Alderman et al. (2006). Long term consequences of early childhood malnutrition. *Oxford Economic Papers*, 58(3), 450–474.

Food Security and Sustainable Development Goals

Food security is intricately tied to the United Nations Sustainable Development Goals (SDGs), particularly SDG 2, which seeks to “end hunger, achieve food security and improved nutrition, and promote sustainable agriculture”. Ensuring food security directly supports the eradication of hunger (SDG 2.1) and the fight against all forms of malnutrition (SDG 2.2), while fostering sustainable agricultural practices. The achievement of these targets necessitates a focus on the core pillars of food security, namely the availability, accessibility, and affordability of nutritious food.

Beyond SDG 2, food security plays a pivotal role in advancing multiple SDGs, as it has far-reaching implications for health, education, economic growth, and environmental sustainability. Addressing food security ensures access to sufficient, safe, and nutritious food for all, while simultaneously driving progress in poverty reduction, enhanced health outcomes, gender equality, and climate resilience. This interconnectedness highlights its role as a foundational element of sustainable development, reinforcing the importance of coordinated global efforts to achieve the SDGs.



Figure 4: SDGs Related to Food Security

Sustainable Food Systems: A Transformative Approach

There is increasing recognition of the need to adopt a food systems approach in shaping food security and nutrition policies to ensure a more comprehensive, integrated, and sustainable response to global challenges. This approach acknowledges the complexity and interconnectivity of all elements within the food system, encompassing production, processing, distribution, consumption, and waste management.

The current global food systems are increasingly recognised as unsustainable, placing immense pressure on natural resources, land, and ecosystems, while contributing up to one-third of global Greenhouse Gas (GHG) emissions¹¹. Despite their critical role in sustaining populations, these systems do not equitably provide healthy and nutritious food. Today, one in ten people is undernourished, while one in four is overweight, highlighting the growing paradox of malnutrition in all its forms¹².

In 2022, an estimated 35.4% of the global population, equivalent to 2.83 billion people, could not afford a healthy diet¹³. This figure has likely increased, driven by the rising average cost of a healthy diet throughout the year. Small-scale producers, despite playing a critical role in food production, remain among the most vulnerable actors within food systems. In 2020, they represented approximately half of the one billion people experiencing hunger, highlighting the structural inequities that continue to persist within global food supply chains¹⁴.

The Food and Agriculture Organization of the United Nations (FAO) emphasises the urgent need to transition towards sustainable food systems in response to the growing challenges related to food security and nutrition, especially in light of mounting global environmental, social, and economic pressures. Food systems are deemed sustainable when they:



Deliver food security and nutrition for all in a manner that does not compromise the economic, social, or environmental foundations required to ensure food security and nutrition for future generations¹⁵



Sustainable food systems are regarded as essential to achieving the SDGs, particularly SDG 2 which focuses on ending hunger and promoting sustainable agriculture¹⁶.

Building on this understanding, the conceptual framework presented in Figure 5 provides a structured approach to transforming food systems in accordance with the principles of sustainability, resilience, and equity. This framework integrates the six dimensions of food security while recognising the interconnections between food systems and broader systems, including health, energy, and the environment. It serves as a guiding tool for the NFSP 2030 in implementing systemic, evidence-based interventions that promote sustainable food production, ensure equitable distribution, and improve nutrition outcomes.

¹¹Crippa et al. (2021). Food systems are responsible for a third of global anthropogenic GHG emissions. *Nature Food*, 2, 198–209

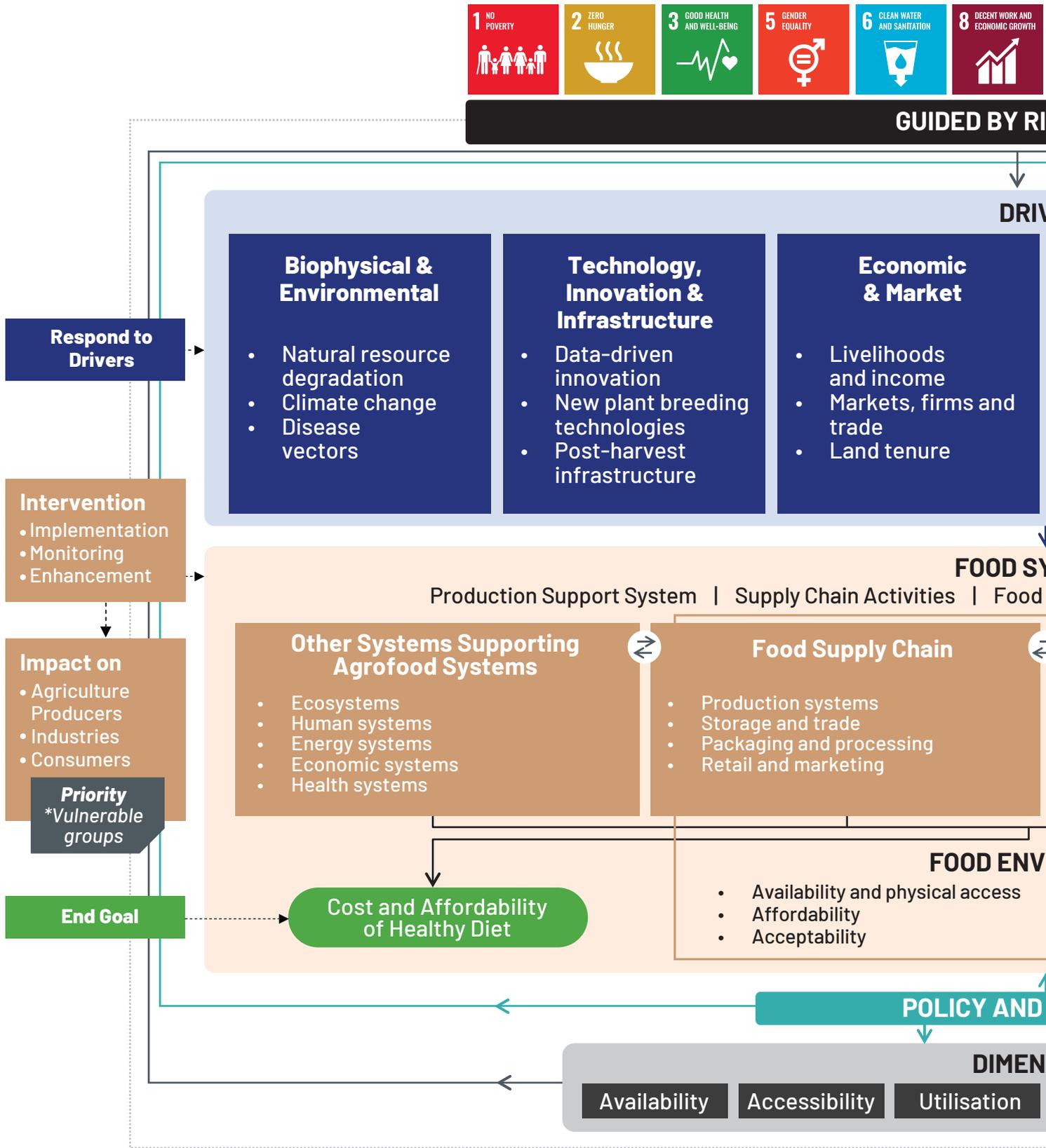
¹²von Braun et al. (2021, August 30). Food systems: Seven priorities to end hunger and protect the planet. *Nature*.

¹³FAO, IFAD, UNICEF, WFP, & WHO. (2023). *The state of food security and nutrition in the world 2023: Urbanization, agrifood systems transformation and healthy diets across the rural-urban continuum*.

¹⁴World Economic Forum. (2011). *Realizing a new vision for agriculture: A roadmap for stakeholders*.

¹⁵HLPE. (2020). *Food security and nutrition: Building a global narrative towards 2030 [HLPE Report 15]*. A report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security, Rome.

¹⁶HLPE. (2020). *Food security and nutrition: Building a global narrative towards 2030 [HLPE Report 15]*. A report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security, Rome.



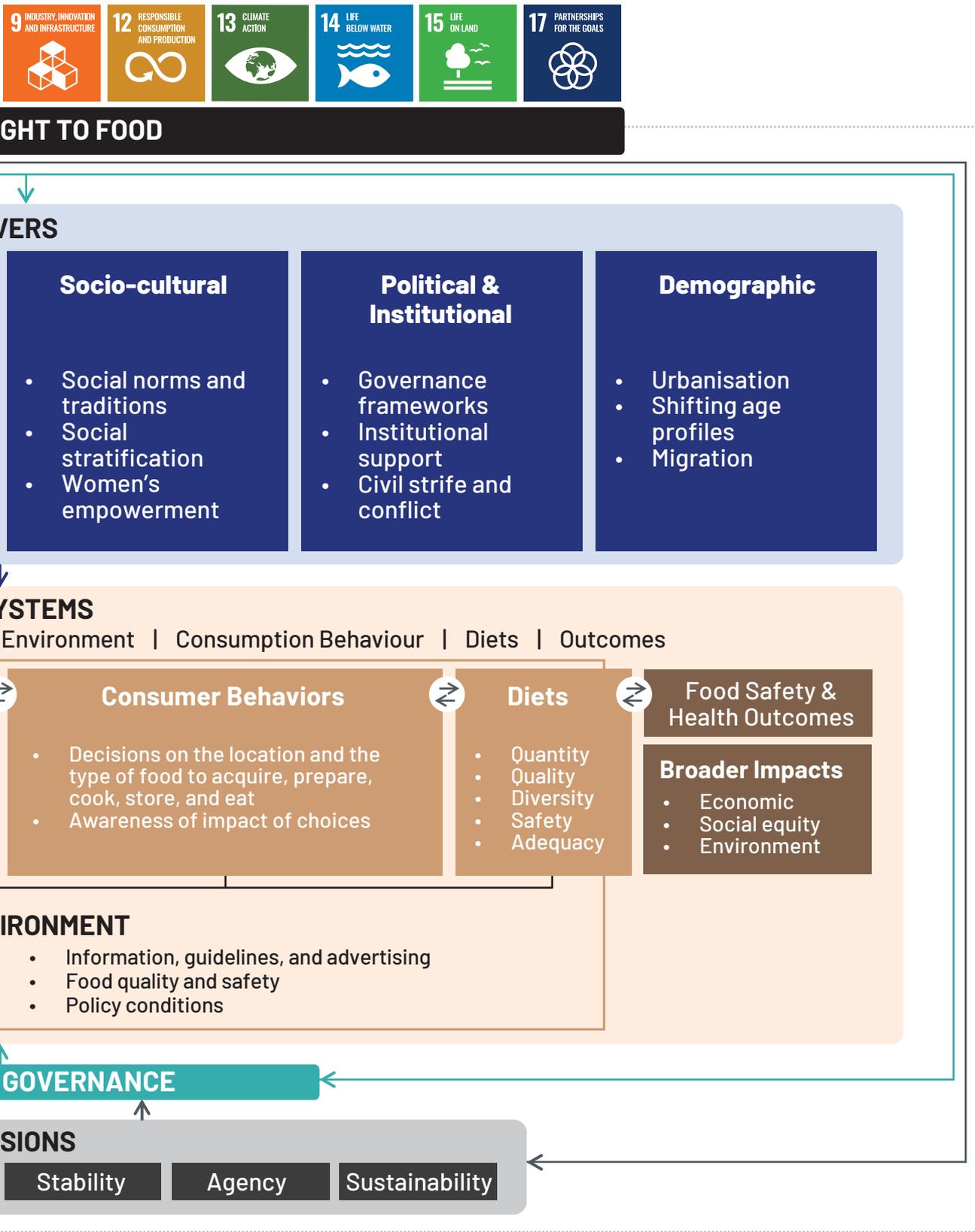


Figure 5: Sustainable Food System Framework

Global Landscape



Global Landscape of Food Security

Global food security has faced significant setbacks in recent years, revealing deep-rooted systemic vulnerabilities and exacerbating global inequalities. Although there was initial optimism for recovery following the COVID-19 pandemic, the compounded impacts of economic disruptions, geopolitical tensions, climate change, and widening income disparities have reversed much of the progress toward achieving Sustainable Development Goal 2: Zero Hunger (SDG 2). These interconnected challenges have led to rising levels of hunger, malnutrition, and food insecurity across economic, environmental, and social dimensions, underscoring the fragility and inequity of the global food system.

Hunger, Undernourishment, and Food Insecurity

Hunger and undernourishment levels have escalated globally. After remaining relatively stable from 2015 to 2019, the Prevalence of Undernourishment (PoU) rose sharply from 7.5% in 2019 to 8.5% in 2020, primarily due to the economic repercussions of the COVID-19 pandemic. This upward trend continued into 2022, reaching 9.1%¹⁷. If current trajectories persist, projections suggest that nearly 670 million people, equivalent to 8% of the global population, will still face hunger by 2030, mirroring levels seen in 2015 when the 2030 Agenda for Sustainable Development was launched¹⁸. As of 2023, the global PoU remains at 9.1%, underscoring persistent challenges in ensuring adequate food access, particularly for vulnerable populations.

Food insecurity has intensified in parallel. The global prevalence of moderate or severe food insecurity surged in 2020 and has remained elevated through 2023. In 2023, approximately 2.3 billion people or equivalent to nearly 30% of the global population are moderately or severely food insecure. Among these, 10.7% endured severe food insecurity¹⁹. These figures reflect a worsening situation for millions, especially in regions grappling with economic instability, conflict, and climate-induced production shocks.

¹⁷FAO. (n.d.). SDG indicators data portal - Indicator 2.1.1 - Prevalence of undernourishment.

¹⁸FAO, IFAD, UNICEF, WFP, & WHO. (2022). The state of food security and nutrition in the world 2022: Repurposing food and agricultural policies to make healthy diets more affordable

¹⁹FAO. (n.d.). SDG indicators data portal - Indicator 2.1.2 Prevalence of moderate or severe food insecurity in the population, based on the Food Insecurity Experience Scale.

Global Hunger Index (GHI)

The Global Hunger Index (GHI) provides further insights into the global hunger landscape. In 2024, the GHI score stood at 18.3, classified as moderate, a slight improvement from 18.8 in 2016 yet still indicative of ongoing food insecurity challenges. Of the 130 countries evaluated, approximately 32% reported serious or alarming hunger levels with GHI scores above 20. Notably, progress toward achieving the SDG target of ending hunger by 2030 remains inadequate, with many countries either stagnating or experiencing deteriorating scores since 2016.

Regional disparities are especially pronounced. Sub-Saharan Africa and South Asia reported the highest GHI scores in 2024, at 26.8 and 26.2, respectively. In Sub-Saharan Africa, factors such as undernourishment, child mortality, and conflict-driven displacement have fuelled hunger rates. In South Asia, child undernutrition persists due to a combination of poverty, inadequate dietary diversity, and limited healthcare access. Across both regions, climate change and political instability have emerged as key drivers of food insecurity.

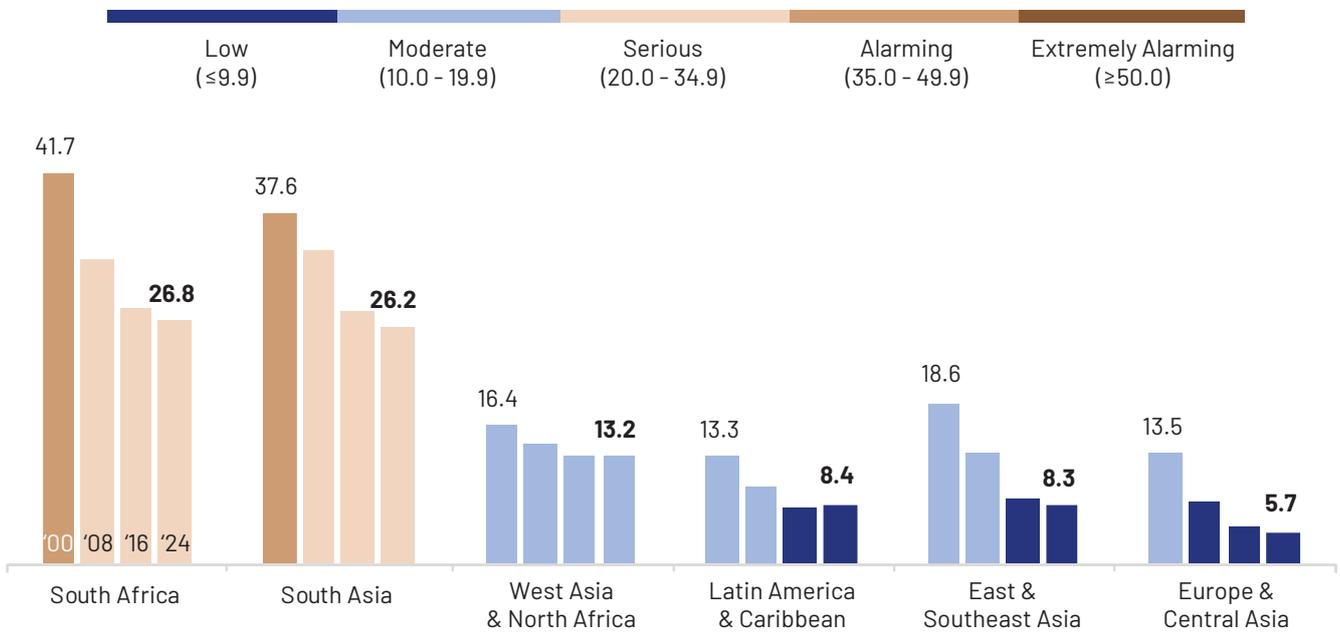


Figure 6: Regional 2000, 2008, 2016, and 2024 Global Hunger Index Scores

Food Price Volatility and Affordability of Healthy Diet

Economic shocks, geopolitical conflicts, and climate variability have amplified global food price volatility, severely impacting food affordability and access. According to the FAO Food Price Index (FFPI), global food prices remained elevated throughout 2024 at 122.0, with essential commodities integral to food security experiencing significant price surges.

The Vegetable Oil Price Index saw a notable increase, averaging 9.4% higher than in 2023, driven by tightening global supplies. The Meat Price Index also rose by 2.7%, supported by higher quotations for bovine, ovine, and poultry meats. Meanwhile, the Dairy Price Index increased by 4.7%, mainly due to a surge in butter prices.

In contrast, the Sugar Price Index experienced a significant drop, averaging 13.2% lower than in 2023, largely due to improved sugarcane crop prospects in key producing countries²⁰. These staples form the dietary backbone for many LMICs, making their price fluctuations particularly detrimental.

Elevated prices not only strain household budgets but also reduce dietary quality, disproportionately affecting vulnerable populations.

The cost of a healthy diet has similarly been impacted by these price dynamics. In 2022, the global average cost of a healthy diet reached 3.96 Purchasing Power Parity (PPP) dollars per person per day, marking a notable increase of 26.5% from 3.13 PPP dollars in 2017²¹. Additionally, approximately 2.8 billion people or nearly 35.4% of the global population, were unable to afford a healthy diet²². The situation is especially dire in LMICs, where food expenditures can account for up to 60% of household income. Rising food costs force many households to resort to cheaper, calorie-dense yet nutrient-poor foods, escalating the risks of malnutrition, micronutrient deficiencies, and diet-related chronic diseases.

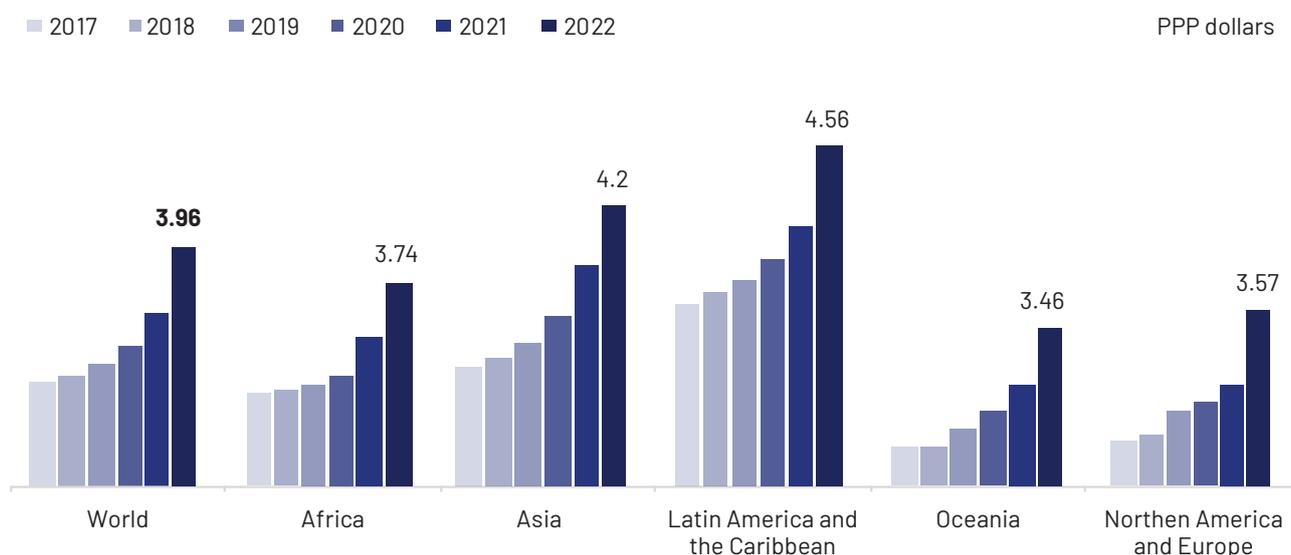


Figure 7: The Average Cost of A Healthy Diet (2017-2022)

²⁰FAO. (2025). FAO Food Price Index.

²¹FAO, IFAD, UNICEF, WFP, & WHO. (2024). The state of food security and nutrition in the world 2024: Financing to end hunger, food insecurity and malnutrition in all its forms.

²²FAO, IFAD, UNICEF, WFP, & WHO. (2023). The state of food security and nutrition in the world 2023: Urbanization, agrifood systems transformation and healthy diets across the rural-urban continuum.

Global Food Security Index (GFSI)

The Global Food Security Index (GFSI) provides a comprehensive assessment of food security through four dimensions: (i) affordability, (ii) availability, (iii) quality and safety, and (iv) sustainability and adaptation.

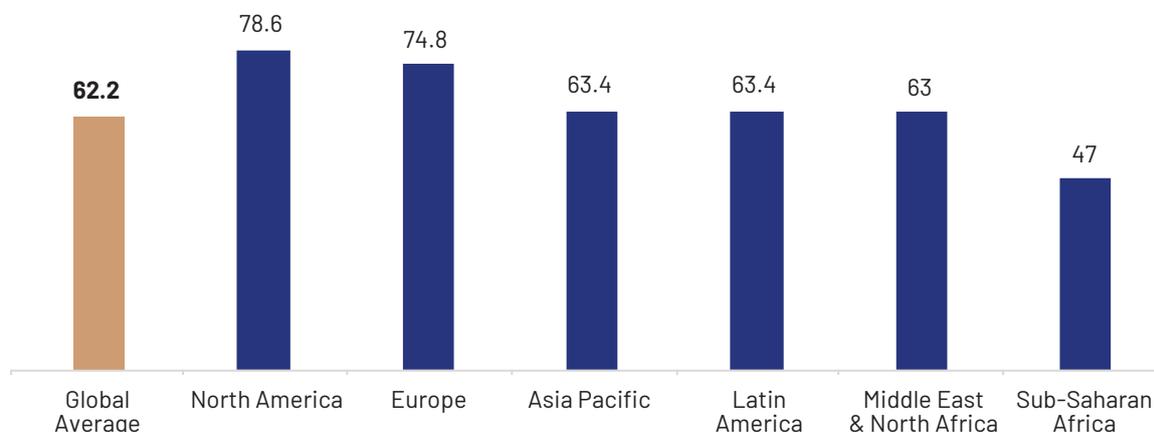


Figure 8: Regional 2022 Global Food Security Index Scores

In 2022, the GFSI reported an average global score of 62.2 out of 100, a slight decline from 62.6 in 2019, highlighting enduring challenges across several dimensions of the food system:



Affordability

The affordability score decreased from 71.9 in 2019 to 69.0 in 2022, reflecting weakened financial safety nets and reduced trade freedom. Rising food prices has strained household purchasing power, making nutritious food less accessible, particularly for marginalised communities.



Availability

With a score of 57.8 in 2022, the availability dimension highlights significant disruptions in food supply chains. Ongoing conflicts in key agricultural regions, export restrictions, and logistical inefficiencies have contributed to constrained food availability, further exacerbating food insecurity in vulnerable areas.



Quality and Safety

The quality and safety pillar experienced a decline from 67.1 in 2019 to 65.9 in 2022. This decline highlights persistent shortcomings in national nutrition plans, weakened food safety monitoring systems, and declining dietary quality, all of which pose health risks for consumers.



Sustainability and Adaptation

In contrast to other dimensions, sustainability and adaptation showed improvement, with the score rising from 50.2 in 2019 to 54.1 in 2022. This upward trajectory signals a growing global commitment to climate-resilient agricultural practices, enhanced disaster risk management, and the incorporation of environmental considerations into food systems planning.

Mega Trends Influencing Food Security



Demographic Pressures on Food Demand, Nutrition, and Agricultural Sustainability

Global population growth remains a key driver of rising food demand. The world's population is projected to increase from the current 8 billion to 9.8 billion by 2050²³, adding nearly 2 billion people within the next three decades, with Asia's population rising from 4.8 billion to 5.3 billion. This rapid expansion will place immense strain on global agrofood systems to ensure the production of sufficient, affordable, and nutritious food.

To meet the needs of this growing population, global food production must increase by nearly 50% relative to 2012 levels. This requires substantial improvements in agricultural productivity, more efficient food supply chains, and enhanced sustainable resource management.

This growth, coupled with increasing income disparities among populations, will likely result in varied consumption patterns. Populations from lower socioeconomic backgrounds may tend to consume more affordable but highly processed foods with lower nutritional value, potentially exacerbating issues of undernourishment^{24, 25}.

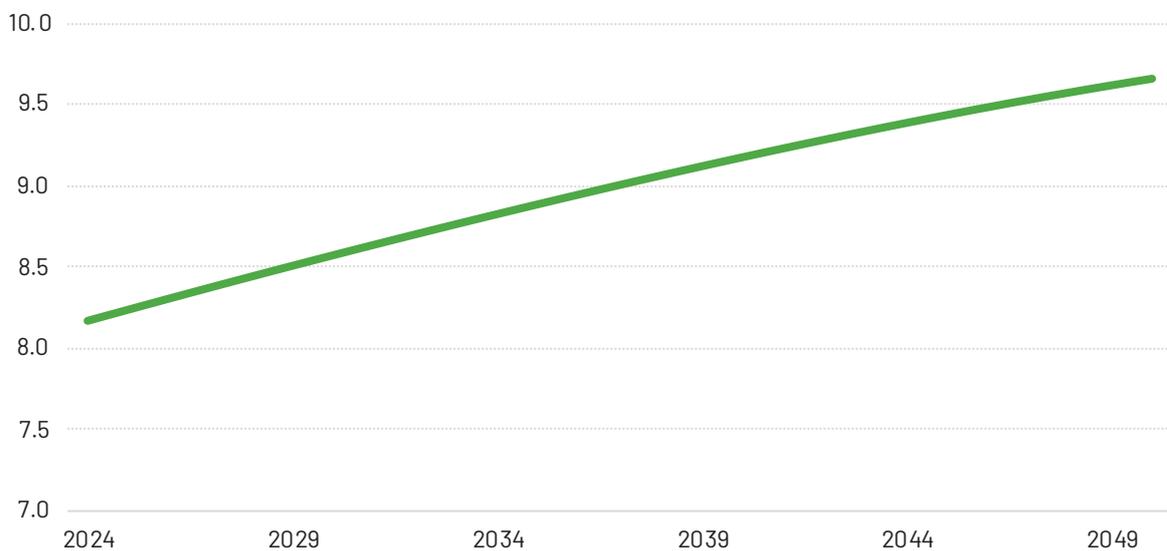


Figure 9: Projected World Population Growth, 2024 – 2050 (persons in billion)²⁶

²³UN. (2024). World population prospects 2024: Summary of result. Department of Economic and Social Affairs, Population Division.

²⁴Miladinov, G. (2023). Impacts of population growth and economic development on food security in low-income and middle-income countries. *Frontiers in Human Dynamics*, 5.

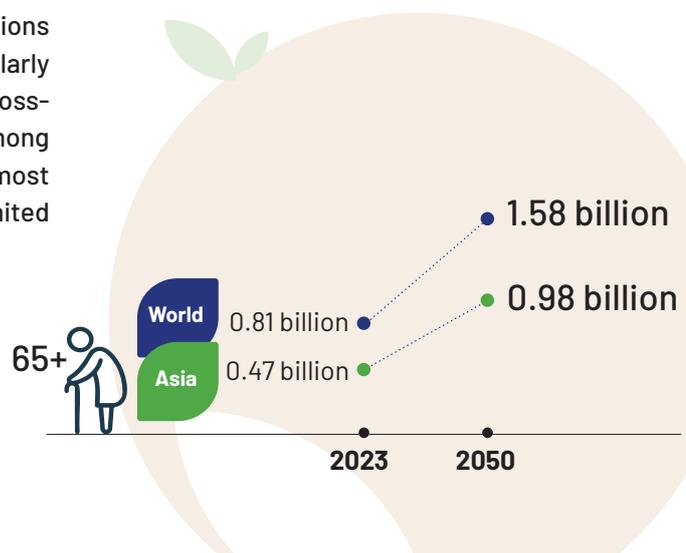
²⁵FAO, IFAD, UNICEF, WFP, & WHO. (2020). The state of food security and nutrition in the world 2020: Transforming food systems for affordable healthy diets.

²⁶UN. (2024). World population prospects 2024: Probabilistic projections. Department of Economic and Social Affairs, Population Division.

Alongside population growth, the global demographic structure is undergoing a significant transformation, with ageing populations becoming a defining trend. By 2050, over 20% of the world's population will be aged 60 and above²⁷, creating unique challenges for food security. Globally, the 65+ age group is expected to nearly double from 0.81 billion in 2023 to 1.58 billion by 2050 while Asia's elderly population is projected to more than double, from 0.47 billion to 0.98 billion.

This surge in the ageing population presents challenges for food security, as older adults often require nutrient-dense diets tailored to age-related health conditions, including chronic diseases and decreased appetite. Additionally, ageing populations face distinct food insecurity concerns, particularly among lower-income groups. A decade-long cross-sectional study found that food insecurity among older adults rose from 5.5% to 12.4%, with the most severe impacts observed among those with limited financial resources.

Furthermore, the ageing population presents significant challenges for the agricultural sector. In many countries, a substantial proportion of farmers are older adults who face numerous obstacles that hinder their productivity. One major issue is shrinking agricultural labour force; as older farmers retire and fewer young people pursue careers in farming, the capacity for food production may diminish. Compounding this challenge is limited access to essential resources, with many older farmers experiencing discrimination when seeking credit, training, and innovative agricultural technologies.



²⁷WHO. (2024, October 01). Ageing and health.

Mega Trends 2

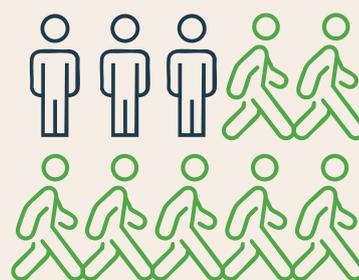
Rapid Urbanisation Affecting Dietary Choices

Urbanisation refers to the migration and concentration of people in urban areas, a process driven by population growth, rural-to-urban migration, and the expansion of city boundaries through the reclassification of rural regions as peri-urban or urban zones²⁸. This demographic shift has profound implications for agricultural practices, food systems, and consumer behaviour. As populations move to urban areas, there is a notable decline in agricultural production for self-consumption, with urban dwellers increasingly reliant on markets to meet their food needs. Urban settings, characterised by high population density and greater income opportunities, reshape dietary preferences and food environments.

Global projections indicate that 68% of the world's population, nearly seven in ten people, will reside in urban areas by 2050²⁹. This translates to over three-quarters of the expected 9.7 billion people living in cities³⁰, indicating the magnitude of urbanisation's impact on food security and consumption trends. With higher wages and evolving lifestyles in urban settings, the opportunity cost of home food preparation rises, prompting consumers to favour convenient, ready-to-eat options. As a result, there is a growing preference for fast food, packaged convenience foods, and meals sold by street vendors, which require less time and effort to prepare.

Urbanisation also influences dietary diversity and consumption patterns. While increased urban incomes often lead to greater consumption of animal products and a broader range of food choices, these diets are typically higher in salt, sugar, and fat, contributing to more energy-dense meals. This shift has significant health implications, as it increases the prevalence of obesity, cardiovascular diseases, and other diet-related conditions. A growing preference for processed and convenience foods over fresh produce is a key concern for public health policy.

Simultaneously, urbanisation brings about structural changes in employment within food systems. As urban populations grow and consumer preferences evolve, the agricultural labour force continues to decline, while job opportunities in food processing, distribution, retail, and food services expand³¹. This shift necessitates the development of policies that balance increasing urban food demand with sustainable agricultural production, ensuring that the nutritional quality of urban diets is not compromised.



Nearly **7** out of **10** people
will reside in urban areas
by 2050



²⁸FAO, IFAD, UNICEF, WFP, & WHO. (2023). The state of food security and nutrition in the world 2023: Urbanization, agrifood systems transformation and healthy diets across the rural-urban continuum.

²⁹FAO, IFAD, UNICEF, WFP, & WHO. (2023). The state of food security and nutrition in the world 2023: Urbanization, agrifood systems transformation and healthy diets across the rural-urban continuum.

³⁰WHO. (2024, October 01). Ageing and health.

³¹Cohen, M. J., & Garrett, J. L. (2010). The food price crisis and urban food (in)security. *Environment & Urbanization*, 22(2), 467-482



Climate Change Pressures on Food Systems

Climate change is a critical megatrend that profoundly affects global food security, with its impact most pronounced in low- and middle-income countries where food systems are already vulnerable. Population growth and urbanisation continue to drive increasing demand for food, yet the agricultural sector faces unprecedented challenges due to climate variability and natural resource constraints. Climate change is both a driver of and driven by food insecurity, creating a complex and cyclical relationship that demands immediate policy intervention.

According to the World Bank, approximately 80% of the global population most at risk of hunger due to climate change resides in Sub-Saharan Africa, South Asia, and Southeast Asia, regions where agriculture-dependent populations are disproportionately poor and vulnerable³². The increasing frequency and severity of climate-related events, such as altered precipitation patterns and extreme weather, contribute to widespread crop failures, soil degradation, and disruptions in food systems. These disruptions not only threaten food availability but also affect accessibility and utilisation, exacerbating existing inequalities.

Climate data reveals a concerning trend in global temperature increases. In 1990, the global mean surface temperature anomaly was 0.45°C above the 20th-century average of 13.9°C³³. By 2023, this anomaly had risen to 1.18°C, an increase of approximately 162% over 33 years. Notably, 2016 and 2020 recorded anomalies of 1.03°C and 1.01°C, respectively, marking two of the hottest years between 1990 and 2023. The overall trend indicates a consistent temperature increase at an average rate of 0.22°C per decade.

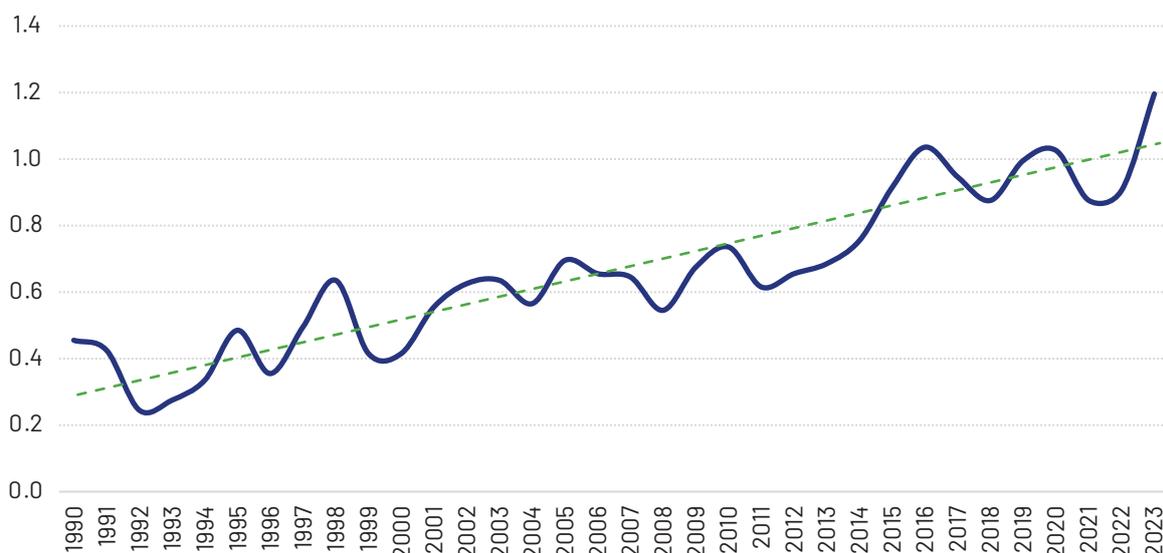


Figure 10: Global Average Temperature Anomaly, 1990 - 2023 (°C)³⁴

³²World Bank Group. (2022, October 17). What you need to know about food security and climate change.

³³NCEI. (2024). Monthly global climate report for annual 2023. NOAA.

³⁴NCEI. (2024). Global Time Series. NOAA

Rising temperatures have a well-documented impact on food security, with significant implications for both the quality and safety of food. Elevated temperatures have been shown to reduce the nutrient content of key food crops, affect critical quality parameters such as sugar and citric acid content, and increase the prevalence of foodborne pathogens and mycotoxins³⁵. These changes pose serious risks to public health and food supply chains, emphasising the urgent need for measures to mitigate global temperature increases.

Beyond temperature changes, changes in precipitation patterns play a pivotal role in agricultural productivity. Variability in rainfall and snow accumulation directly influence soil moisture, a vital element for plant growth and nutrient uptake.

Between 1990 and 2023, global annual average precipitation levels fluctuated significantly. In 1990, the average was 979.06 mm, peaking at 998.76 mm in 1998 and 2016; years marked by intense rainfall. By 2023, precipitation levels had decreased slightly to 977.96 mm, comparable to 1990 levels. Such volatility heightens risks and uncertainties for future crop yields, undermining the stability of global food production.

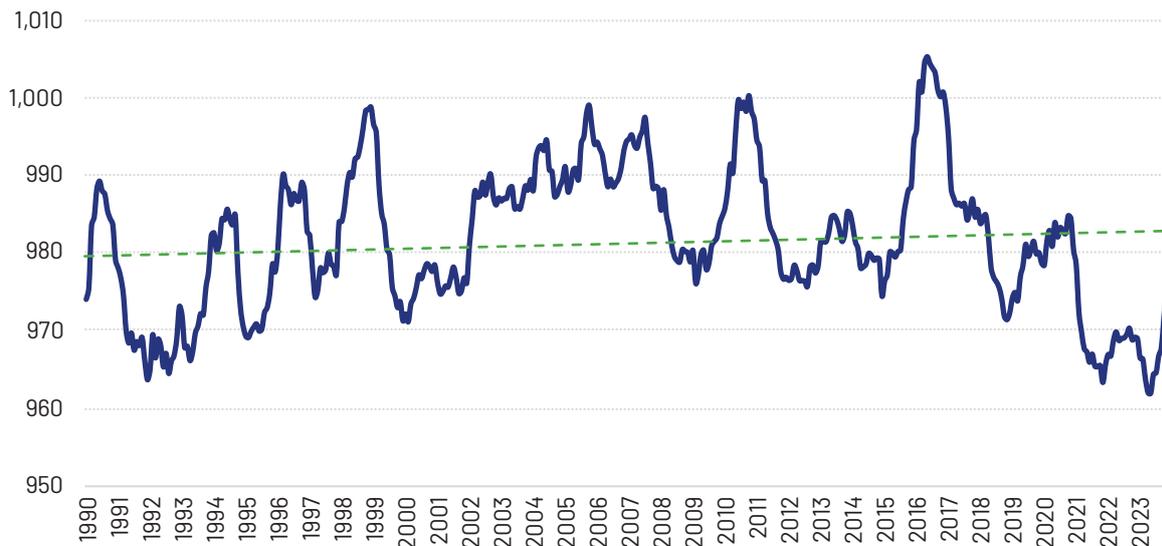


Figure 11: Global Precipitation, 1990 - 2023 (mm)³⁶

³⁵De Pinto et al. (2023). Chapter 7 - Food security under a changing climate: Exploring the integration of resilience in research and practice. In Béné, C., & Devereux, S. (Eds), *Resilience and Food Security in a Food Systems Context* (pp. 207-237).

³⁶NCEI. (2024). Global Time Series. NOAA



Resource Constraints in Meeting Rising Food Demand

As the global population expands and consumption patterns evolve, pressure on essential natural resources, particularly land and water, is intensifying. Agriculture, a resource-intensive sector, relies heavily on arable land and freshwater to meet food production demands. However, increasing land degradation and worsening water scarcity threaten the long-term sustainability of food systems. These challenges are further compounded by climate change, unsustainable agricultural practices, and growing competition for resources.

Environmental degradation, particularly land degradation, poses a significant concern for global food production. Land degradation refers to the deterioration of soil fertility through processes such as erosion, nutrient depletion, and salinisation, which directly impairs agricultural productivity. Globally, approximately 25% of cropland is degraded, with Asia experiencing a disproportionately high share at 30%, while North Africa and the Near East report degradation levels of up to 45%.

Without intervention, the problem is set to worsen. Alarmingly, over 90% of Earth's soil is projected to become degraded by 2050³⁷. The economic repercussions are substantial, with soil erosion in Europe alone affecting 12 million hectares (about 7% of all farmlands), costing farmers an estimated €1.25 billion annually in lost productivity³⁸. On a global scale, soil erosion resulted in approximately US\$8 billion in lost agricultural productivity in 2024, and projections indicate that global GDP losses could reach US\$625 billion by 2070 due to this issue. To address these challenges, the United Nations Convention to Combat Desertification (UNCCD) estimates that restoring one billion hectares of degraded land and enhancing drought resilience will require an investment of US\$2.6 trillion by 2030³⁹.

Freshwater scarcity is also another critical threat to global food security, given that agriculture accounts for over 70% of global freshwater withdrawals⁴⁰.

As demand for food grows, so does the need for irrigation water, placing significant stress on existing water resources. Globally, 2.4 billion people live in water-stressed countries, many of whom are smallholder farmers struggling to meet basic needs for drinking water, sanitation, and food production⁴¹. Climate change further exacerbates this issue by increasing the frequency of droughts and altering precipitation patterns.

Between 1980 and 2015, the demand for “blue water” (fresh groundwater and surface water) increased significantly among major agricultural producers, by 60% in China, 71% in India, and 27% in the United States⁴². Estimates place the global availability of blue water resources between 12,500 km³ and 15,000 km³ annually, but rising consumption is pushing these resources to their limits⁴³.

Without effective management, global water scarcity is projected to worsen. By 2025, 1.8 billion people are expected to live in regions experiencing absolute water scarcity, and up to two-thirds of the global population could face conditions of water stress. If current trends continue, water scarcity may displace 700 million people globally by 2030, with agriculture bearing the brunt of the crisis⁴⁴. Declining water availability threatens agricultural productivity, with potential global yield declines of up to 20%, further undermining food production and increasing food insecurity⁴⁵.

³⁷FAO. (n.d.). Global symposium on soil erosion: Key messages.

³⁸UNEP. (2023, July 06). Why restoring nature is good for farmers, fisheries and food security.

³⁹Joint Research Centre. (2024, February 09). Soil erosion by water could lead to a global loss of up to USD 625 billion by 2070. EU Science Hub, European Commission.

⁴⁰UNESCO. (2024). 2024 UN World water development report: Water for prosperity and peace.

⁴¹Tablet, T., & Chibanga, J. (2024). Water scarcity in agriculture: The greatest threat to global food security. UTIA, The University of Tennessee.

⁴²Deng et al. (2025). Deepening water scarcity in breadbasket nations. *Nature Communications*, 16, 1110.

⁴³Kanaoujiya et al. (2025). Chapter 2 - Agricultural water scarcity: an emerging threat to global water security. In Hassan Etesami & Chen, Y. L. (Eds), *Sustainable Agriculture under Drought Stress* (pp. 15-22).

⁴⁴Geetha Maniam et al. (2022). An assessment of technological development and applications of decentralized water reuse: A critical review and conceptual framework. *WIREs Water*, 9(3).

⁴⁵Biswas et al. (2025). Water scarcity: A global hindrance to sustainable development and agricultural production – A critical review of the impacts and adaptation strategies. *Cambridge Prisms: Water*, 3.

Mega Trends 5

Geopolitical Tensions Disrupting Food Security Stability

In the era of globalisation, geopolitical instability can affect countries beyond the immediate conflict zones through interconnected supply chains, global trade dependencies, and shared commodity markets. Geopolitical instability poses a significant threat to global food security by disrupting international trade flows, increasing commodity price volatility, and exposing food systems to heightened risks. While global food trade is essential for ensuring food availability across nations, it remains vulnerable to geopolitical tensions, armed conflicts, and economic sanctions. These disruptions can severely undermine food supply chains, elevate input costs, and restrict food accessibility, with disproportionate impacts on import-reliant and low-income countries.

In the Russia-Ukraine conflict in 2022, Ukraine, a major global exporter of grains and vegetable oils, experienced a 29% decline in grain production over two years, primarily due to blocked Black Sea ports that halted exports⁴⁶. This disruption led to significant global food price spikes, especially in countries dependent on Ukrainian agricultural imports. Between June 2021 and April 2022, global wheat prices rose by 68%, while maize prices increased by 19%⁴⁷. Major wheat importers, such as Egypt and Turkey, sought alternative cereal grains to offset reduced wheat supplies, highlighting the vulnerability of global supply chains to regional conflicts.

Other commodities affected by the war include sunflower oil, for which Ukraine has been the world's largest producer of sunflower seeds for over a decade⁴⁸. As sunflower cultivation accounts for an average of 62% of Ukraine's total oil crop area, it has suffered significantly due to destruction and pollution caused by projectile explosions, which release toxic substances into the air, water, and soil.



⁴⁶Council of the European Union and the European Council. (2025, January 31). How the Russian invasion of Ukraine has further aggravated the global food crisis.

⁴⁷Arndt et al. (2023). The Ukraine war and rising commodity prices: Implications for developing countries. *Global Food Security*, 36.

⁴⁸Petrenko et al. (2024). War influence on sunflower seed and oil production in Ukraine. *Proceedings of the 23rd International Scientific Conference, Engineering For Rural Development*

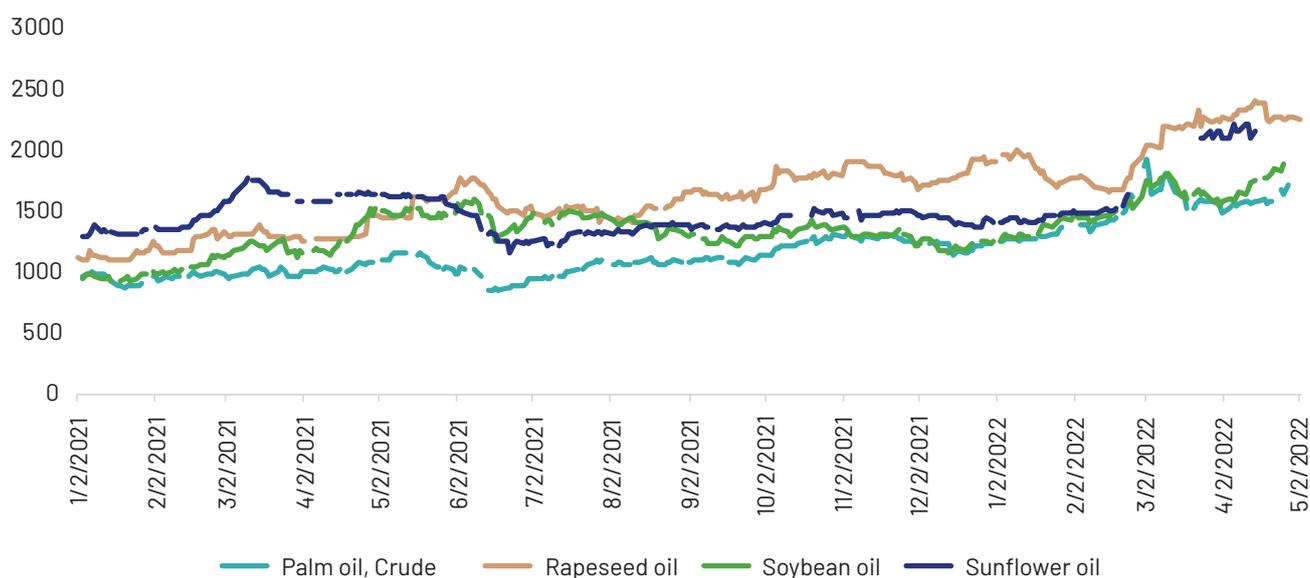


Figure 12: Daily vegetable oil prices in 2021-2022 (USD per tonne)⁴⁹

Geopolitical tensions extend beyond commodity markets, affecting crucial agricultural inputs such as fertilisers and energy. Russia, a key player in global fertiliser supply, accounted for approximately 15% to 20% of global nitrogen and phosphate exports and around 20% of potash exports prior to the conflict⁵⁰. The disruption in fertiliser exports caused by the war exacerbated input shortages, elevating production costs worldwide. Concurrently, grain price volatility contributed to a surge in animal feed costs, adversely impacting the livestock and poultry sectors.

In Malaysia, which imports nearly all its livestock feed, the consequences were immediate. Poultry feed costs, which constitute 72.8% of overall poultry farming expenses, rose sharply, triggering widespread poultry shortages in 2022⁵¹. Retail chicken prices climbed to RM17 per kilogram, compelling the Malaysian government to impose a price ceiling of RM8.90 per kilogram to stabilise the market. Rising input costs, compounded by escalating energy prices, with crude oil prices increasing by 44% (from USD 77 to USD 112 per barrel between December 2021 and July 2022) and natural gas prices surging by 54% (from USD 3.70 to USD 5.70), further strained transportation logistics and contributed to rising food prices across the board⁵².

⁴⁹Glauber et al. (2022, May 03). The impact of the Ukraine crisis on the global vegetable oil market. IFPRI.

⁵⁰Salamat Ali. (2022). The Russia-Ukraine Conflict: Implications for Food Security in the Commonwealth. The Commonwealth

⁵¹Hazlin Hassan. (2024, November 22). Malaysia turns to smart farming to boost food security. The Straits Times.

⁵²MyPF. (2022, August 10). Why have chicken prices increased in Malaysia? Free Malaysia Today



Globalise Food Systems and Dietary Changes Driving the Rise in Public Health

Global food systems have undergone significant transformations over recent decades, driven by globalisation, urbanisation, economic development, and technological advancements. While these changes have improved food availability and accessibility in many regions, they have also contributed to a nutrition transition characterised by dietary shifts towards energy-dense, nutrient-poor foods high in fats, sugars, and salt. This transition has led to rising rates of overweight, obesity, and Non-Communicable Diseases (NCDs), including cardiovascular diseases, diabetes, and certain cancers⁵³. The World Health Organization (WHO) and the FAO have identified unhealthy diets as one of the leading risk factors for global mortality, with poor dietary habits increasingly prevalent in both high- and low-income countries⁵⁴.

The global burden of overweight and obesity has reached alarming levels, with the prevalence doubling since 1980. According to the FAO (2022), as of 2020, 39% of adults globally were overweight, and 13% were obese, affecting over 2 billion people worldwide. Notably, overweight and obesity are no longer confined to high-income countries; low- and middle-income countries are now experiencing rapid increases in these conditions, often coexisting with undernutrition, a phenomenon known as the “double burden of malnutrition”. Dietary shifts toward processed foods, sugar-sweetened beverages, and animal-based products have significantly contributed to these trends.

In 2022, an estimated 2.5 billion adults aged 18 years and older were overweight, including over 890 million living with obesity. This equates to 43% of the global adult population being overweight, an increase from 25% in 1990. The global prevalence of obesity alone reached 16% among adults in 2022, having more than doubled since 1990.

Among children, the trend is equally concerning. In 2022, approximately 37 million children under 5 years old were overweight, reflecting a shift from what was once predominantly a high-income country issue to an increasingly widespread concern in low- and middle-income countries. For children and adolescents aged 5–19 years, over 390 million were overweight in 2022. The prevalence of overweight (including obesity) in this age group rose significantly from 8% in 1990 to 20% in 2022, indicating the urgent need for early intervention and comprehensive prevention strategies⁵⁵.

The growing prevalence of NCDs correlates strongly with these dietary changes. In 2017, an estimated 11 million deaths and 255 million Disability-Adjusted Life Years (DALYs) were attributed to dietary risk factors, making them a greater risk factor for mortality than tobacco use⁵⁶. High consumption of trans fats, added sugars, and sodium substantially increases the risk of heart disease, hypertension, type 2 diabetes, and certain cancers. As urbanisation accelerates and lifestyles become more sedentary, the combined effect of poor diets and physical inactivity further exacerbates the burden of NCDs globally.

 **11 million**
deaths

 **255 million**
Disability-Adjusted Life Years
(DALYs)

⁵³FAO, IFAD, UNICEF, WFP, & WHO. (2022). The state of food security and nutrition in the world 2022: Repurposing food and agricultural policies to make healthy diets more affordable

⁵⁴FAO & WHO. (2019). Sustainable healthy diets - Guiding principles. Rome.

⁵⁵WHO. (2024). Obesity and overweight.

⁵⁶WHO. (2024). Obesity and overweight.

In 2021, poor dietary habits were a significant contributor to global mortality, with 10.6% of all deaths linked to unhealthy diets. Among these, cardiovascular disease was the leading cause, with nearly 30% of cardiovascular-related deaths attributed to poor diet. Notably, high-sodium diets alone accounted for 1.9 million deaths globally, making excessive sodium intake the most impactful dietary risk factor⁵⁷.

The rising rates of overweight, obesity, and NCDs, driven by shifts in global food systems and dietary patterns, pose an urgent challenge to public health and economic stability. These trends are projected to worsen without targeted interventions, such as policy reforms, the creation of healthier food environments, and public education. A comprehensive, multi-sectoral approach is essential to mitigate the health and economic burdens associated with poor diets.



⁵⁷IHME. (2025). Diet.



The Food Loss and Waste Challenge to Food Security

The global food system is a complex network involving various stakeholders and interconnected activities across the stages of production, aggregation, processing, distribution, consumption, and disposal of food products. Food Loss and Waste (FLW) constitute a significant and growing challenge within this system, occurring at every stage of the supply chain and involving multiple actors.

Globally, approximately one out of every four calories produced for human consumption is ultimately lost or wasted along the supply chain. This substantial loss reduces global food availability, worsens food insecurity, and necessitates increased agricultural production to compensate. According to the FAO, an estimated 13.8% of the world's total food production is lost from farm to the point just before retail. Losses at these stages often result from suboptimal harvesting techniques, poor storage facilities, and inefficient transportation systems^{58, 59}.

Meanwhile, food waste, which occurs at the retail and consumer levels, poses an equally urgent issue. The Food Waste Index Report 2024 revealed that in 2022, approximately 1.05 billion tonnes of food were wasted globally across households, food service, and retail sectors. This figure equates to an average of 132 kilograms per capita per year. Notably, the breakdown shows that 60% of food waste originated from households, 28% from food service, and 12% from retail outlets⁶⁰.

Collectively, food loss and waste account for almost one-third of all food produced for human consumption annually. Such inefficiencies are especially concerning given the global rise in food insecurity and malnutrition. Many highly perishable and nutrient-rich foods, such as fresh produce, fish, and dairy products, are among the most wasted, further diminishing the quality and nutritional value of available food supplies.



⁵⁸Ekta Singh et al. (2022). Solid waste management during COVID-19 pandemic: Recovery techniques and responses. *Chemosphere*, 288(1).

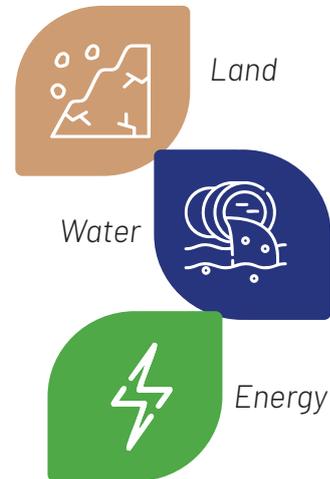
⁵⁹Abhishek Bisht & Sury Pratap Singh. (2024). Postharvest losses and management of horticultural produce: A Review. *Journal of Scientific Research and Reports*, 30(3), 305-320.

⁶⁰UNEP. (2024, March 27). Food waste index report 2024.

On the environmental front, FLW contributes to significant resource wastage, including land, water, and energy. The production of lost and wasted food accounts for approximately 8% to 10% of global greenhouse gas emissions, exacerbating climate change. Additionally, discarded food represents a waste of labour, natural resources, and financial investments, with the FAO estimating the annual economic cost of FLW at over USD \$400 billion.

From a food security perspective, reducing FLW could increase food availability without necessitating additional agricultural expansion, thereby alleviating pressure on ecosystems. Efforts to minimise food loss at the production and post-harvest stages are particularly critical in low- and middle-income countries, where infrastructure deficiencies are prominent. Conversely, high-income countries face challenges primarily at the consumer and retail levels, indicating the importance of consumer education and improved retail practices.

FOOD LOSS WASTE



8-10% 
global greenhouse gas
emissions







**MALAYSIA
FOOD SECURITY
LANDSCAPE**

3.0 MALAYSIA FOOD SECURITY LANDSCAPE

Malaysia's Food Security Performance in a Global Context

Malaysia's food security landscape reflects a combination of relative resilience and emerging vulnerabilities, shaped by global trends, economic fluctuations, climate variability, and domestic structural challenges. While Malaysia performs better than many of its regional counterparts in global food security indicators, rising food costs, urbanisation, and changing consumption patterns have introduced new complexities. Global disruptions, such as the COVID-19 pandemic and geopolitical tensions, have further exposed Malaysia's dependence on food imports and underscored the need for long-term strategies to enhance self-sufficiency and system resilience.

Malaysia ranked 61st out of 130 countries in the 2024 Global Hunger Index with a score of 12.7, indicating a moderate hunger level that has remained consistent over the past two decades. This marks a slight increase from 12.5 in 2022, signalling a marginal worsening in hunger-related indicators. While Malaysia performs better than some regional peers, such as Indonesia (ranked at 77th, score 16.9), it lags behind others, including Thailand (ranked at 52nd, score 10.1).

The Prevalence of Undernourishment (PoU) in Malaysia has shown a notable downward trend over the past decade. Peaking at 3.8% in 2015 after years of fluctuations, the PoU steadily declined to 2.5% by 2020 and has consistently remained below 2.5% since then.

Between 2017 and 2021, Malaysia experienced a steady increase in the cost of maintaining a healthy diet, reflecting broader global food price trends and domestic inflationary pressures. In 2017, the cost of a healthy diet for Malaysians stood at 3.22 PPP dollars per person per day, rising to 3.68 PPP dollars by 2021. This marks a 14.3% increase over the five-year period, driven by rising prices of key food groups such as fruits, vegetables, and animal-source products⁶¹.

Recent data indicate that this upward trend continued into 2022, with the cost of a healthy diet reaching 3.77 PPP dollars per person per day. Despite these rising costs, the proportion of Malaysians unable to afford a healthy diet remained relatively stable over the period. In 2017, 4.0% of the population was unable to meet the cost of a healthy diet, with the proportion consistently trending downward and decreasing marginally to 1.8% in 2022⁶².

In terms of changes in the average prices of goods and services purchased by households, the Consumer Price Index (CPI) for Food and Beverages increased from 115.2 in 2014 to 155.0 in 2024, with cost of food away from home outpacing food at home as inflation for the sector peaked at 6.7% in 2023. This trend reflects increasingly challenging cost-of-living dynamics, with rising food price pressures becoming more pronounced and directly weakening household resilience.

⁶¹FAO, IFAD, UNICEF, WFP, & WHO. (2023). The state of food security and nutrition in the world 2023: Urbanization, agrifood systems transformation and healthy diets across the rural-urban continuum.

⁶²FAO, IFAD, UNICEF, WFP, & WHO. (2024). The state of food security and nutrition in the world 2024: Financing to end hunger, food insecurity and malnutrition in all its forms.

The Global Food Security Index (GFSI) provides a comprehensive evaluation of Malaysia's food security through four key dimensions: affordability, availability, quality and safety, and sustainability and adaptation⁶³. In 2022, Malaysia ranked 41st out of 113 countries, declining slightly from 39th in 2021. This shift indicates the multifaceted challenges affecting Malaysia's food system, from rising food prices to supply chain vulnerabilities and environmental stressors.

Malaysia's affordability dimension saw a marginal decline from 28th in 2021 to 30th in 2022. Despite strong performances in food safety net programmes (score: 100) and poverty reduction (score: 92), rising food costs and external economic pressures have weakened household purchasing power, particularly affecting low- and middle-income households.

The availability dimension registered a more noticeable decline, falling from 51st to 56th. While Malaysia scored highly in food loss prevention (94.4), it performed poorly in the sufficiency of supply indicator (27.2), reflecting challenges in domestic food production and import reliance. These weaknesses raise concerns about the country's vulnerability to external shocks and global supply disruptions.

In contrast, Malaysia's quality and safety dimension improved, moving from 46th in 2021 to 38th in 2022. High scores in food safety (93.6) and micronutrient availability (79.8) demonstrate progress in ensuring food safety standards and addressing nutritional quality. However, challenges persist in dietary diversity, which remains a crucial factor for overall nutritional well-being.

The sustainability and adaptation dimension saw notable progress, with Malaysia improving its ranking by 9 places from 66th to 57th. Efforts in disaster risk management were particularly strong (score: 100), indicating institutional readiness to mitigate climate-related food security risks. Malaysia also performed above average in protecting land and water resources, though the integration of comprehensive sustainability measures in agricultural practices requires further attention.

Quality and safety dimension improved (2022)



93.6

food safety score



79.8

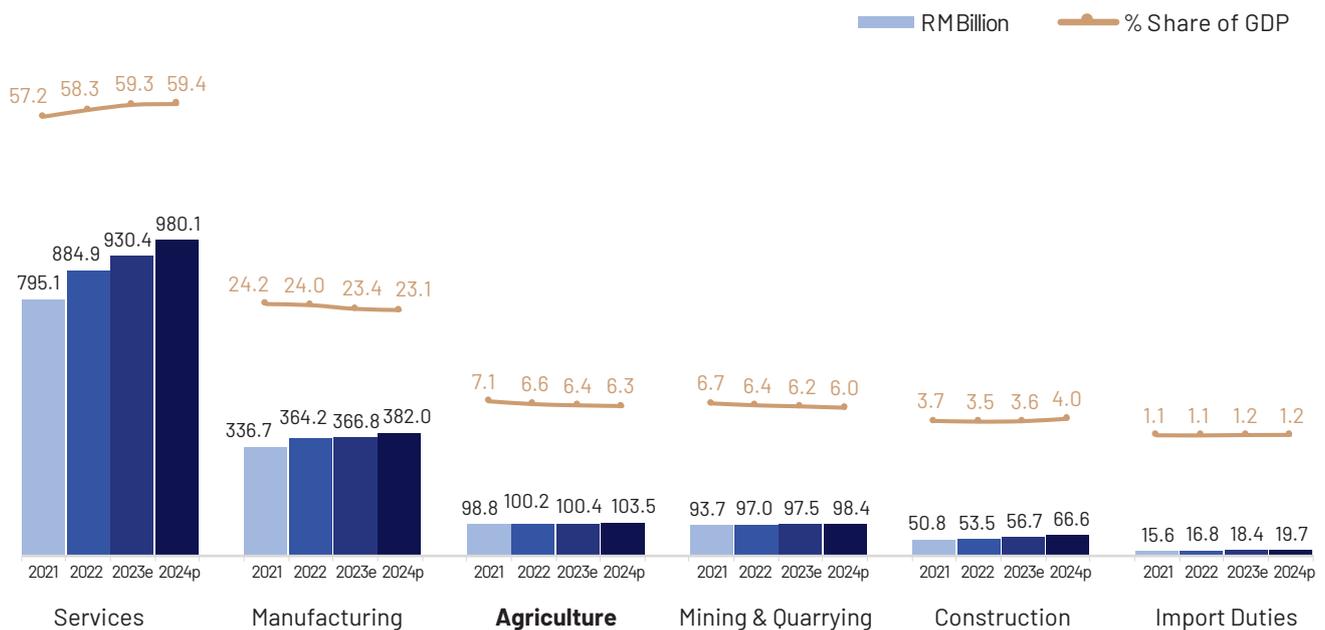
micronutrient availability score

⁶³The GFSI was last published in 2022, after which the Economist Intelligence Unit ceased its publication.

Malaysia Agricultural Landscape

Malaysia’s Agriculture’s GDP Contribution

The agriculture sector demonstrated modest growth between 2021 and 2024, increasing output from RM98.8 billion to an estimated RM103.5 billion. Despite this positive trend, its contribution to Malaysia’s total Gross Domestic Product (GDP) declined slightly from 7.1% to 6.3% over the same period, reflecting a decreasing share in the national economy⁶⁴.



Note: (e) Estimate, (p) Preliminary
Source: DOSM

Figure 13: GDP by Kind of Economic Activity at Constant 2015 Prices (RM billion)

The decline in agriculture’s GDP contribution is primarily attributed to the underperformance of key subsectors. Oil palm, the largest contributor to the agriculture sector, experienced a decline in its GDP share from 2.5% in 2021 to an estimated 2.3% in 2024. This downturn is mainly attributed to reduced Crude Palm Oil (CPO) output in Peninsular Malaysia, driven by delayed fertilisation activities in the previous year, a shortened working period due to multiple festive seasons, and adverse hot weather conditions⁶⁵.

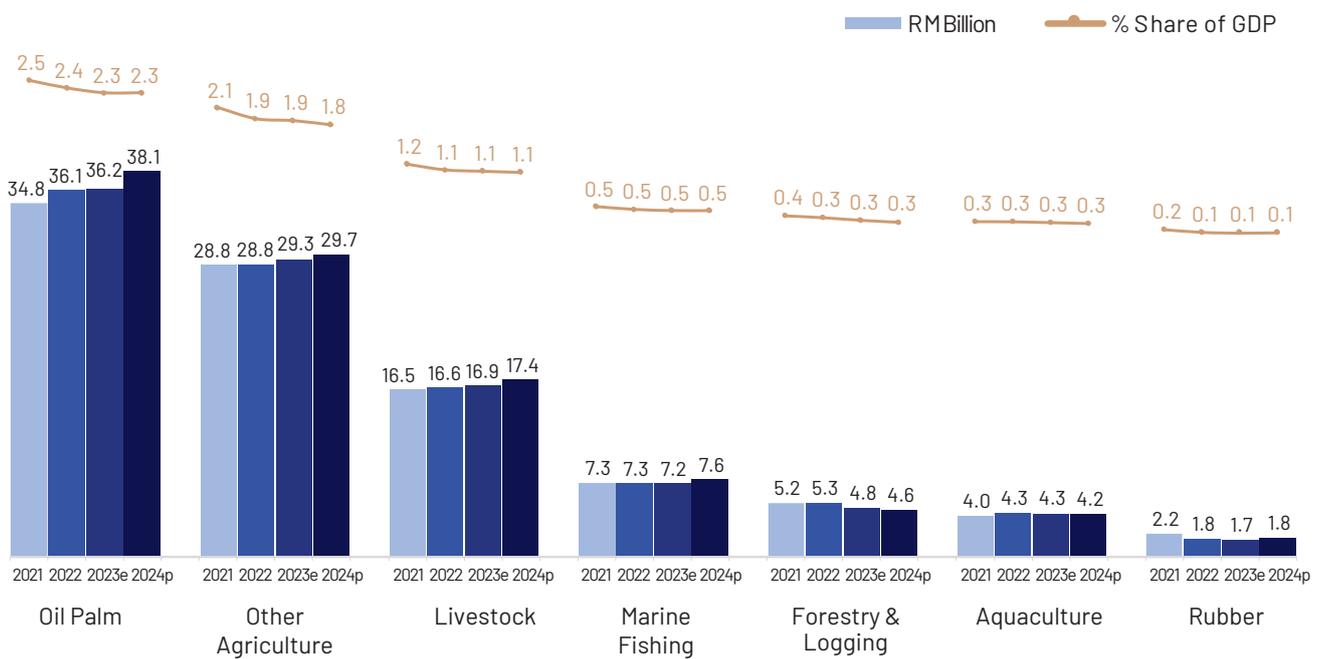
Adverse weather conditions, in particular, exacerbated the decline in other subsectors, underscoring the sector’s heightened vulnerability to external factors. The livestock and other agriculture subsectors experienced marginal declines, stabilising at 1.1% (down from 1.2%) and 1.8% (down from 2.1%), respectively. In contrast, marine fishing and aquaculture sustained steady contributions of 0.5% and 0.3%, demonstrating resilience amidst broader sectoral challenges⁶⁶.

⁶⁴DOSM. (2025). Gross Domestic Product 2021-2024. Ministry of Economy Malaysia.

⁶⁵MOF Malaysia. (2023, October 13). Economic Outlook 2024.

⁶⁶MOF Malaysia. (2023, October 13). Economic Outlook 2024.

Despite facing challenges, the agriculture sector is well-positioned for growth, driven by enhanced performance in the oil palm, other agriculture, and livestock subsectors. In particular, the other agriculture and livestock subsectors are projected to experience positive performance, bolstered by increased production to meet rising domestic demand⁶⁷.



Note: (e) Estimate, (p) Preliminary
Source: DOSM

Figure 14: GDP by Agriculture Sub-Sector at Constant 2015 Prices (RM billion)



⁶⁷MOF Malaysia. (2023, October 13). Economic Outlook 2024.

Value Added of Agrofood Across Economy Sectors

In 2024, the agrofood sector contributed RM186 billion to the national economy, accounting for 11.3% of Malaysia's total GDP⁶⁸. This contribution was underpinned by growth across all key economic segments.

The agriculture sector, comprising crops, livestock, and fisheries, generated RM55.4 billion, marking a 2.3% increase from 2023. The manufacturing sector, primarily focus on F&B processing, contributed RM42.4 billion, registering a 5.2% year-on-year growth. Meanwhile, the services sector, including wholesale, retail trade, and F&B services, recorded RM88.2 billion, marking a 4.9% increase from the preceding year.

These developments highlight the agrofood sector's pivotal role in advancing Malaysia's economic resilience and competitiveness.

	2018	2019	2020	2021	2022	2023e	2024p
Gross Domestic Product at Constant 2015 Prices (2015=100)(RM billion)	1,363.8	1,424.0	1,346.2	1,390.9	1,516.5	1,570.1	1,650.3
Value Added (RM billion)							
Agrofood	154.5	164.8	158.8	161.0	171.8	178.6	186.0
Agriculture Sector							
Food Crops, Livestock and Fisheries	48.4	50.0	51.0	53.1	53.5	54.2	55.4
Manufacturing Sector							
Manufacturing Foods and Beverages Products	34.6	35.7	35.4	36.5	38.6	40.3	42.4
Services Sector							
Wholesale, Retail Trade and Food & Beverages Services	71.5	79.0	72.4	71.5	79.7	84.1	88.2
Share to GDP (%)							
Agrofood	11.3	11.6	11.8	11.6	11.3	11.4	11.3
Agriculture Sector							
Food Crops, Livestock and Fisheries	3.5	3.5	3.8	3.8	3.5	3.4	3.4
Manufacturing Sector							
Manufacturing Foods and Beverages Products	2.5	2.5	2.6	2.6	2.5	2.6	2.6
Services Sector							
Wholesale, Retail Trade and Food & Beverages Services	5.2	5.5	5.4	5.1	5.3	5.4	5.3
Annual Growth Rate (%)							
Agrofood	6.0	6.7	-3.6	1.4	6.7	4.0	4.1

Note: (e) Estimate, (p) Preliminary
Source: DOSM

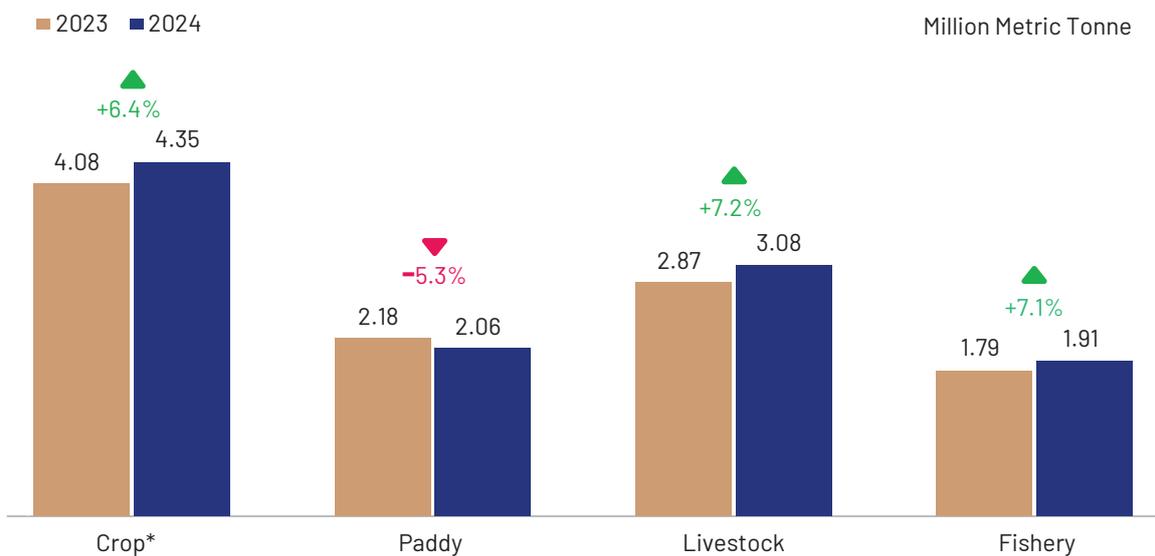
Table 1: GDP and Value Added of Agrofood Across Economy Sectors

⁶⁸DOSM. (2025). Gross Domestic Product 2018-2024. Ministry of Economy Malaysia.

Agriculture Sub-sector

In 2024, Malaysia’s agriculture sector exhibited a mixed performance across its key subsectors. Non-paddy crops demonstrated growth potential, while paddy production faced various challenges. The livestock sector recorded strong expansion, whereas the fisheries sector showed a surge in performance in terms of production and recorded higher market value.

The crop subsector (excluding paddy and flowers) demonstrated sturdy growth momentum, achieving a 6.4% increase in production to 4.35 million metric tonnes (mt), and a 7.6% increase in value to RM22.36 billion. Conversely, the paddy subsector recorded a 5.3% decline in production. Despite the decrease in total production volume, the value of paddy production increased by 5.2%, bringing the total to RM2.66 billion, following the increase in the paddy floor purchase price. The livestock sector recorded encouraging performance, with production rising by 7.2% to 3.08 million mt, while its value increased by 2.6% to RM25.20 billion. For the fishery subsector, production rose by 7.1% with total landings of 1.91 million mt, subsequently recording a value increase of 3.0%, reaching RM16.6 billion⁶⁹.



* Exclude Paddy and Flowers
 Source: Malaysia Agrofood in Figures 2024

Figure 15: Production and Value of Paddy, Crop, Livestock, and Fishery Sector, 2023 and 2024

⁶⁹MAFS Malaysia. (2025, December). Malaysia Agrofood in Figures 2024.

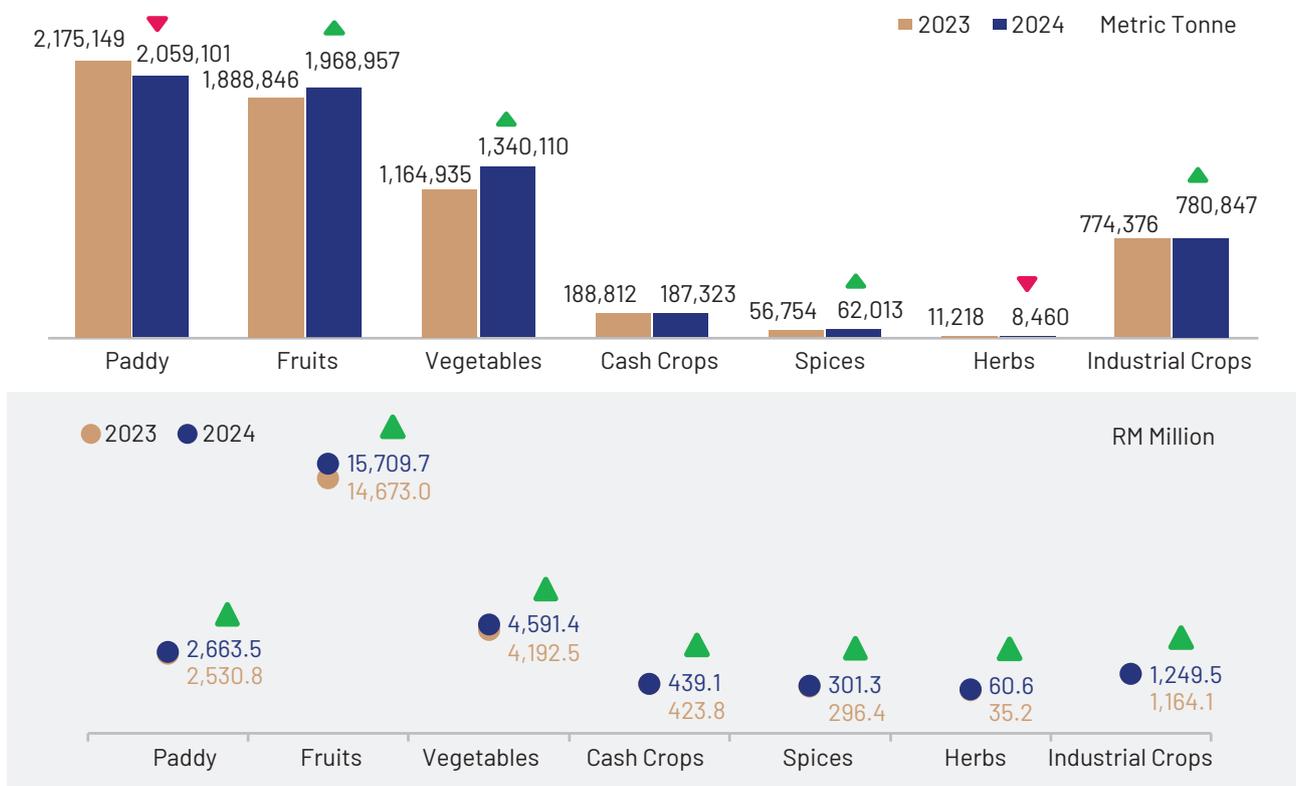


Agriculture Sub-sector: Crops

In 2024, the growth of the crop subsector (excluding paddy) was influenced by a 2.4% decline in productivity, falling from 12.86 mt per hectare to 12.55 mt per hectare. Notably, in terms of value, this subsector continued to record an increase of 7.6%, reaching RM22.36 billion compared to RM20.78 billion in 2023.

Vegetable production recorded the highest growth at 15.0%, reaching 1.34 million mt, while spice production rose by 9.3% to 62,013 mt. Industrial crops showed a moderate increase of 0.8%, with a total of 780,847 mt. Meanwhile, fruit production remained the main contributor, increasing by 4.2% to 1.97 million mt with a production value of RM15.71 billion. Although herb production declined significantly by 24.6% to 8,460 mt, the production value continued to rise from RM35.17 million to RM60.62 million in 2024. Cash crop production declined slightly by 0.8% to 187,323 mt. Overall, the positive performance shown by the vegetables, fruits, and spices subsectors reflects the development of the crop subsector towards market-demand-based production, increased value-added, and adaptation to dietary trends emphasizing health and nutritional balance⁷⁰.

On the other hand, the decline in the paddy subsector was driven by land-use competition, highlighting the ongoing challenge of balancing agricultural expansion with land demands from other sectors. However, paddy productivity recorded an increase of 0.3% to 3.55 mt per hectare compared to 3.54 mt per hectare in 2023. Following the increase in the paddy floor purchase price, the value of paddy production in 2024 also increased by 5.2% to RM2.66 billion compared to RM2.53 billion in 2023⁷¹.



Source: Malaysia Agrofood in Figures 2024

Figure 16: Production and Production Value by Major Crop Commodities, 2023 and 2024

⁷⁰MAFS Malaysia. (2025, December). Malaysia Agrofood in Figures 2024.

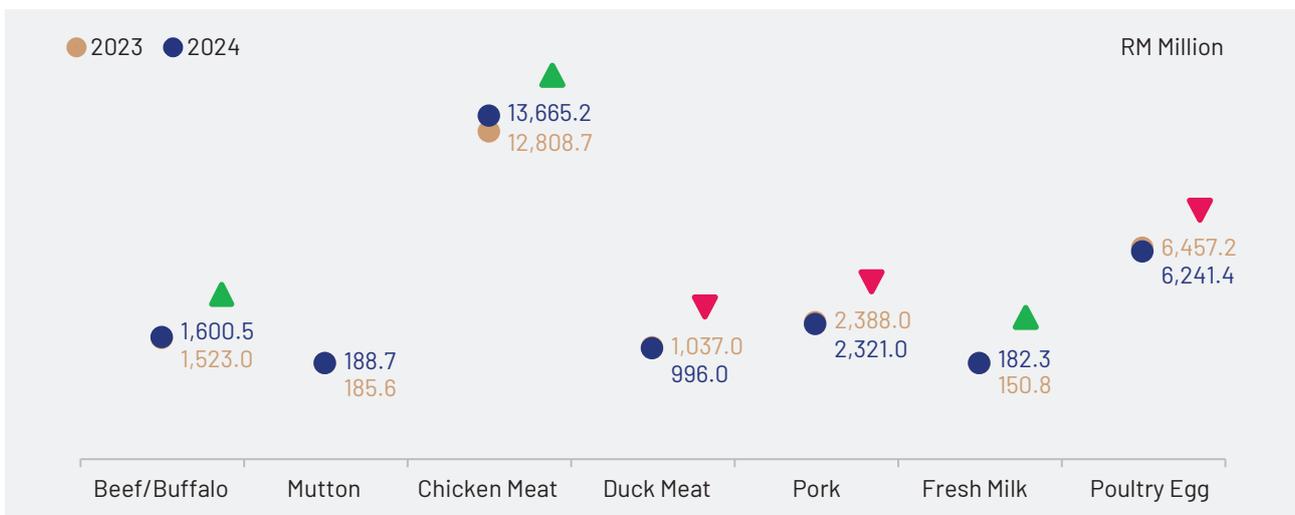
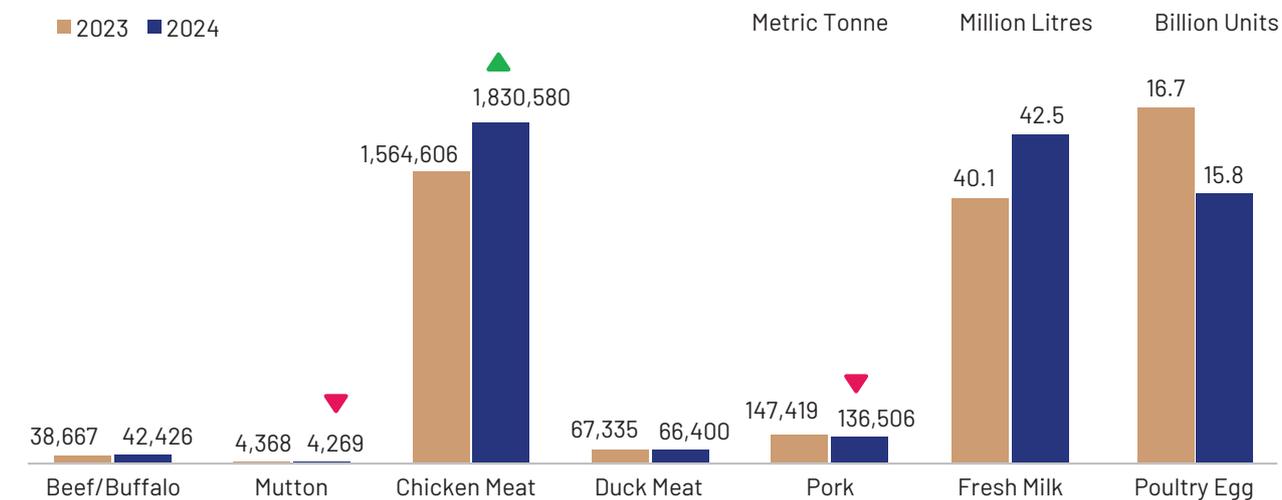
⁷¹MAFS Malaysia. (2025, December). Malaysia Agrofood in Figures 2024.



Agriculture Sub-sector: Livestock

In 2024, three (3) key livestock commodities recorded encouraging production growth compared to the previous year. Chicken meat production recorded the highest increase at 17.0%, reaching 1.83 million mt, compared to 1.56 million mt in 2023. Beef and buffalo meat production increased by 9.7%, totalling production of 42,426 mt. Additionally, fresh milk production rose by 5.9% to 42.5 million litres.

In contrast, four (4) livestock commodities, namely pork, chicken/duck eggs, goat/sheep meat, and duck meat, recorded declines of 7.4%, 5.2%, 2.3%, and 1.4%, respectively. Pork production decreased to 136,506 mt in 2024, compared to 147,419 mt in 2023. Meanwhile, chicken/duck eggs declined from 16.68 billion eggs to 15.81 billion eggs in 2024, while goat/sheep meat also showed a slight decrease from 4,368 mt to 4,269 mt in 2024. Duck meat production contracted slightly from 67,335 mt in 2023 to 66,400 mt in 2024. Overall, chicken meat remained the largest contributor to the livestock subsector’s production, accounting for 59.5% of total production. The second-largest contribution came from chicken and duck eggs, which contributed 31.0% of the subsector’s total production.



Source: Malaysia Agrofood in Figures 2024

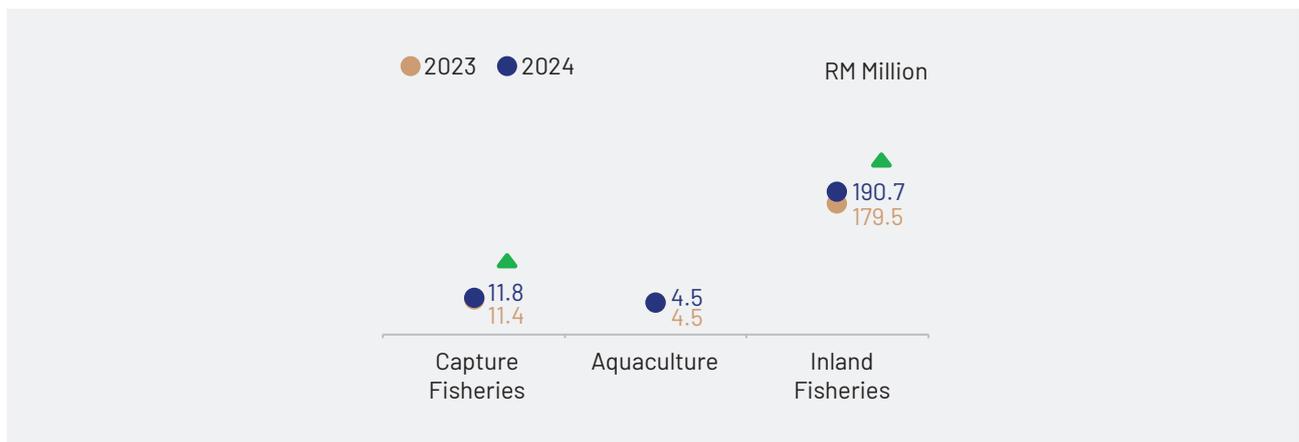
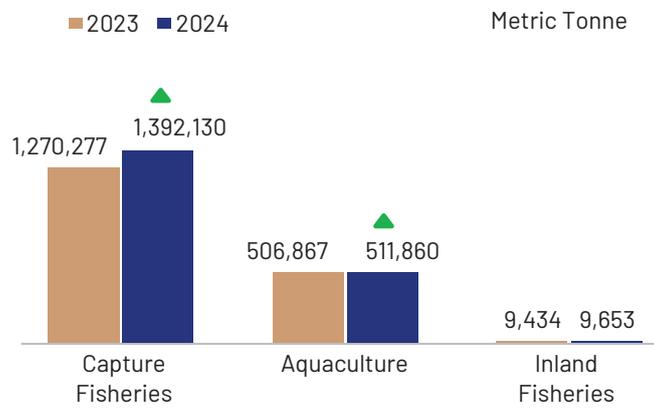
Figure 17: Production and Value of Production of Main Livestock Commodities, 2023 and 2024



Agriculture Sub-sector: Fishery

In 2024, the fisheries sector recorded a production surge of 7.1%, with total landings increasing to 1.91 million mt, compared to 1.79 million mt in 2023. Subsequently, the sector showed a positive increase in terms of value, as production value rose by 3.0%, from RM16.1 billion in 2023 to RM16.6 billion in 2024. This increase reflects growth potential in terms of production and market value.

The capture fisheries sector recorded total landings of 1.39 million mt, showing a slight increase compared to 1.27 million mt in 2023. Aquaculture production also recorded an increase, reaching 511.9 thousand mt, compared to 506.9 thousand mt in the previous year. Additionally, inland fisheries showed positive growth, with production increasing from 9,434 mt to 9,653 mt. In terms of percentage to total fishery production, capture fisheries contributed the largest share at 72.7%, followed by aquaculture (26.7%) and inland fisheries (0.5%)⁷².



Source: Malaysia Agrofood in Figures 2024

Figure 18: Production and Value of Production of Fishery Sector, 2023 and 2024

⁷²MAFS Malaysia. (2025, December). Malaysia Agrofood in Figures 2024.



Malaysia Agricultural Land

Malaysia's agricultural sector utilises approximately 9.7 million hectares of land, accounting for 29.4% of the nation's total land area. The states of Sabah, Sarawak, and Pahang account for the largest share of agricultural land use, while Perlis, Negeri Sembilan, Melaka, and Johor demonstrate the highest proportional contributions (greater than 60%) relative to their available land.

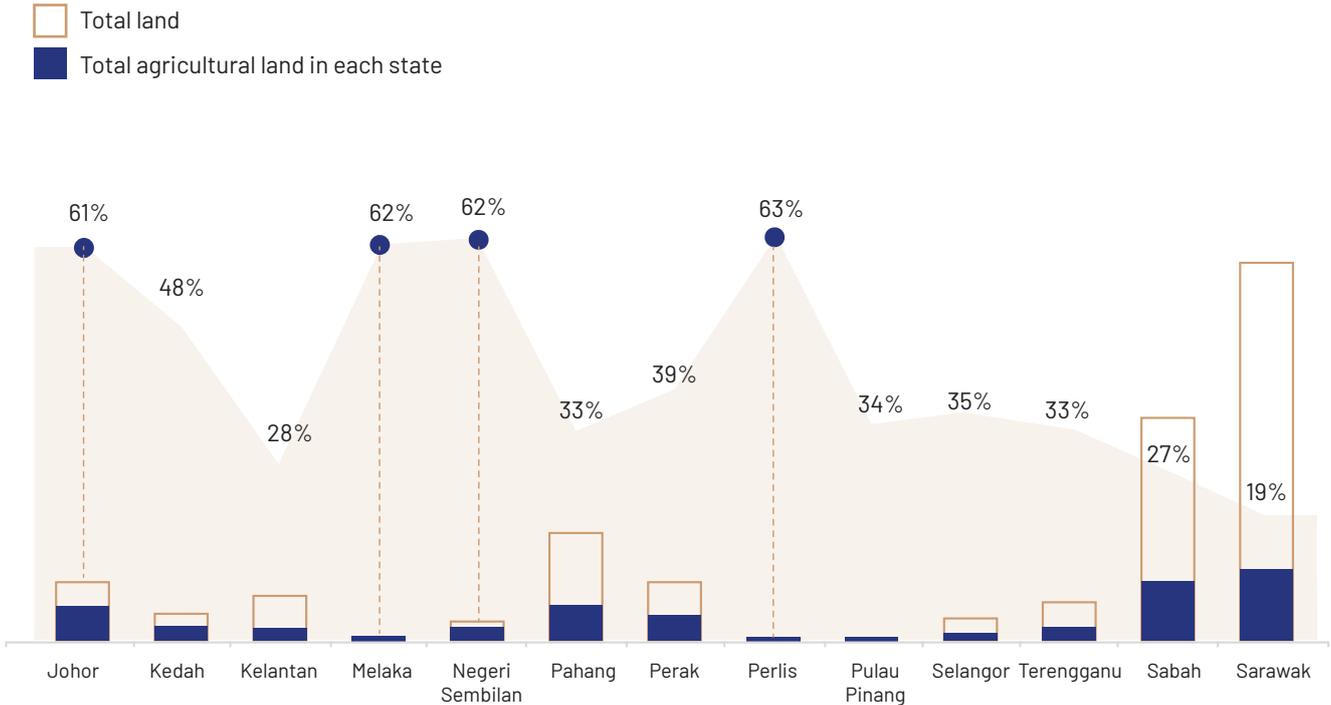


Figure 19: Agriculture Land Use by States, 2023



Top Agriculture Producers and Share of Total Output

Agricultural production performance is influenced by a multitude of factors, including agricultural practices, environmental conditions, climate, regional policies, infrastructure development, and resource availability. These factors collectively affect land utilisation, the types of crops cultivated, and the behaviour of local markets. In response to these factors, each Malaysian state adopts region-specific strategies to maximise agricultural productivity, ensuring the preservation of ecosystems while simultaneously enhancing local livelihoods.

Agricultural and livestock production in Malaysia is regionally specialised, with different states excelling in distinct subsectors. Kedah is the largest contributor to paddy production, accounting for 34% of the national output. Johor dominates fruit production with a 40% share, while Pahang leads in vegetable production, contributing 38%. Pahang also has the largest population of cattle and buffalo, comprising 19% of the national total. Perak is notable for its swine population, representing 33% of the national total. Sarawak accounts for 18% of the national chicken population. In the fisheries sector, Sabah stands out with a 25% share of production, and it also leads in milk production, contributing 19%.

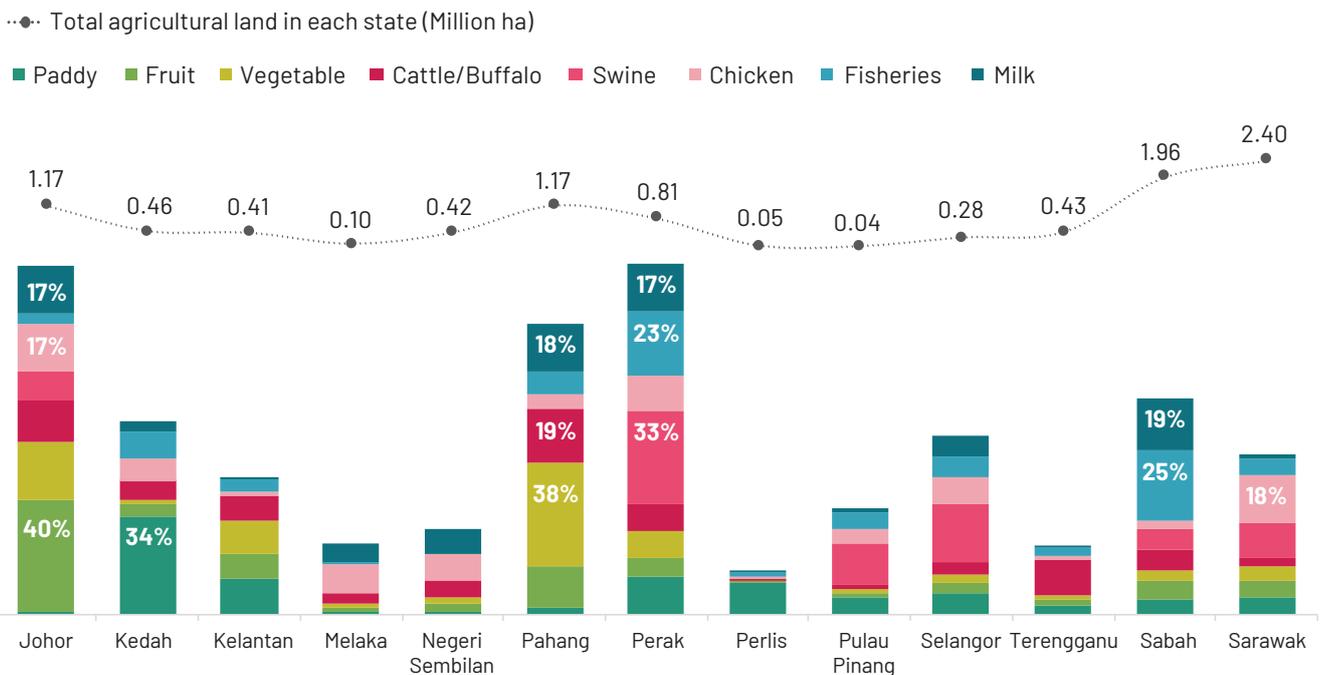


Figure 20: Agriculture Production by States, 2023



Malaysia's Agricultural Workforce

Malaysia's agriculture sector remains predominantly male, with women accounting for only 20% of the workforce across agriculture, forestry, and fisheries⁷³. This highlights concerns about the gender gap in the industry and raises critical questions about women's opportunities to engage in and benefit from the sector. Empowering women is crucial for advancing global food security while aligning with the priorities of the Sustainable Development Goals (SDGs). A study on female rice farmers revealed that women in agriculture face limited participation in decision-making processes and community groups, posing a significant barrier to advancing women's empowerment in the industry⁷⁴.

Men comprise the majority of the workforce across all five key agricultural sub-sectors: livestock, fisheries, fruits, vegetables, and paddy and rice. Among these, the livestock sector exhibits the widest gender disparity, with 30,718 male workers compared to 7,842 female workers, reflecting a nearly 74% difference. This significant imbalance highlights the underrepresentation of women in livestock-related occupations and the challenges they face in entering the field. Conversely, the fisheries sector, while still male-dominated, has a relatively smaller gender gap compared to other sub-sectors. The difference between male and female participation stands at approximately 10%⁷⁵.

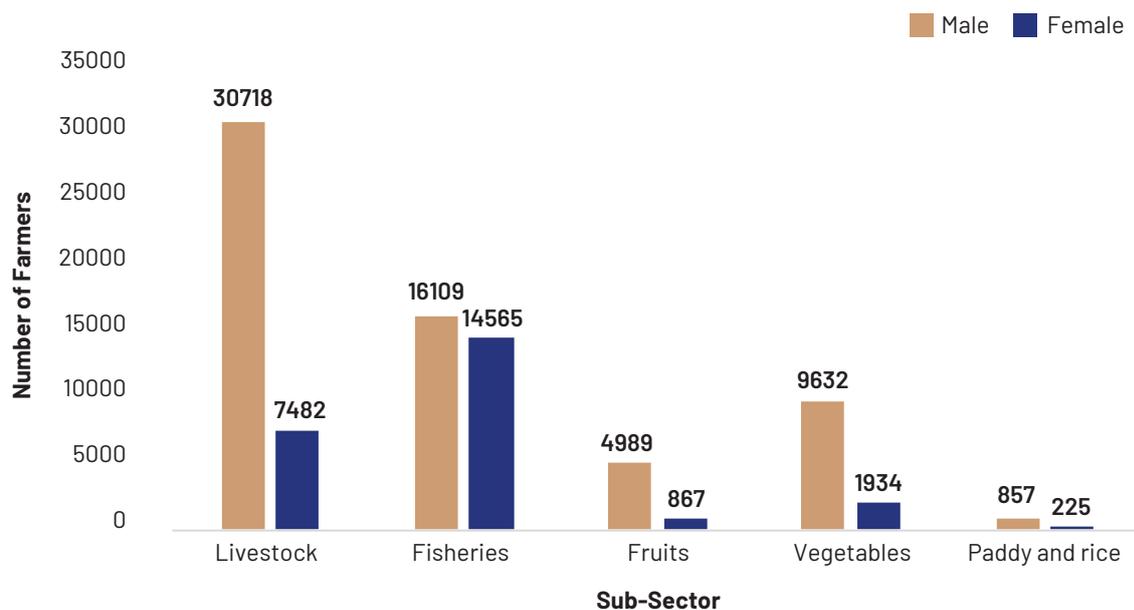


Figure 21: Gender Distribution in Agricultural Sub-Sectors, 2022

⁷³Sarena Che Omar et al. (2022). Understanding the landscape of agrifood smallholders in Malaysia: Climate risks, sustainable standards, and gender gap. KRI.

⁷⁴Amran, F. N. F., & Abdul Fatah, F. (2020). Insights of women's empowerment and decision-making in rice production in Malaysia. Food Research, 4(S5), 53–61.

⁷⁵DOSM. (2024, July 24). Economic Census 2023: All Sectors. Ministry of Economy Malaysia.

Malaysia's Agriculture, Forestry, and Fishing sector has experienced notable shifts in employment distribution across age groups between 2019 and 2024, with a sharp and sustained decline in youth participation. Employment among the youngest cohort (15-19 years) plummeted by 53.7%, from 66.9 thousand in 2019 to just 31 thousand in 2024, while the 20-24 age group declined by 24.8% over the same period. Particularly concerning is the sharp contraction in the 25-29 age group, which fell by 26.1%, from 228.9 thousand in 2019 to 169.1 thousand in 2024.

In contrast, employment among older cohorts has shown relative stability, with certain age groups even registering increases. For instance, the 40-44 age group recorded a substantial rise of 35% from 149 thousand in 2019 to 201.2 thousand in 2024. Likewise, the 45-49 age group grew by 8.7%, and the 55-59 age group is observed with a marginal increase of 2.1%. In the Muda Agricultural Development Authority (MADA) region, the average age of paddy farmers is 60 years old. Additionally, among the 800,000 members of the Farmers' Organisation Authority, only 15% are under 40, while 45% are aged 60 and above⁷⁶. These figures underscore the demographic shift in the sector, with a growing reliance on an ageing labour force to sustain agriculture and fisheries. Without a sufficient influx of younger successors, this trend poses a significant risk to the long-term sustainability and resilience of the industry.

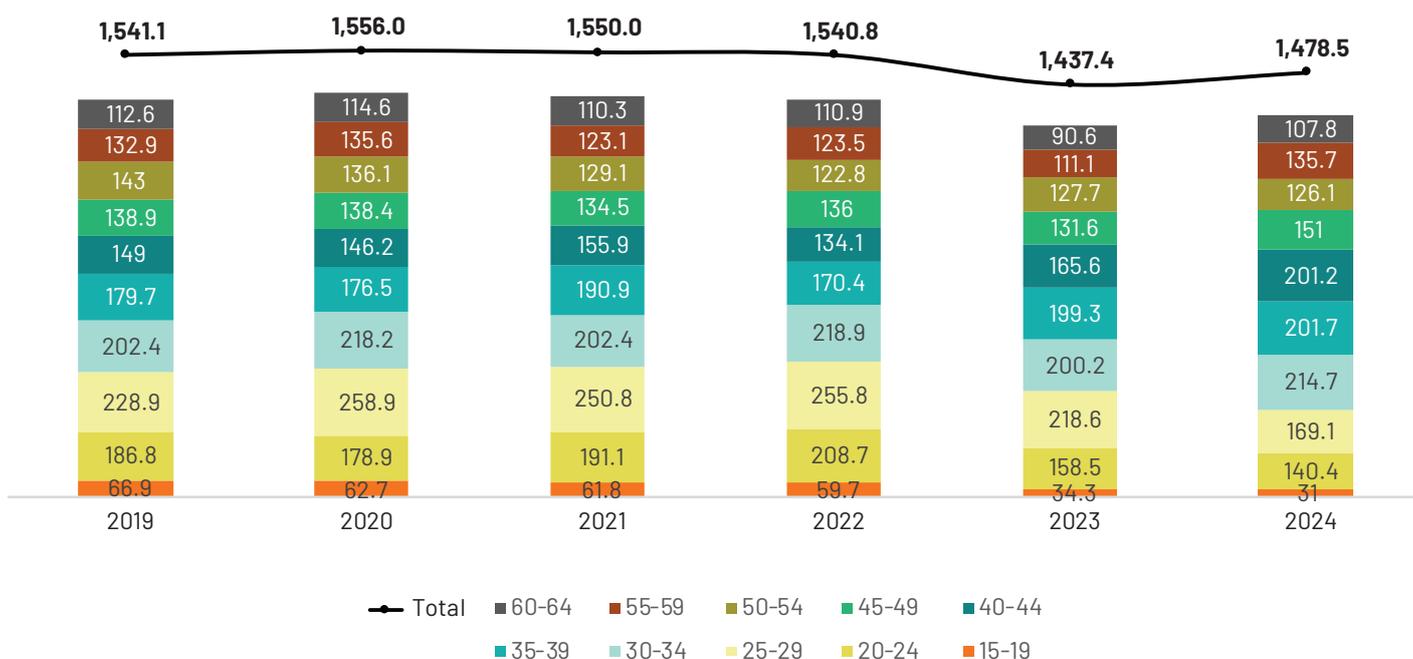


Figure 22: Number of Employed Persons in Agriculture, Forestry, and Fishing Sector by Age Group ('000), 2019-2024⁷⁷

⁷⁶Ahmad Ashraf Ahmad Shaharudin & Mohd Amirul Rafiq Abu Rahim. (2020). Agriculture Exodus? Insights from youth aspirations. KRI.

⁷⁷DOSM. (2025). Labour Force Survey 2019-2024. Ministry of Economy Malaysia.

Labour Productivity in the Agriculture Sector

The agricultural sector has shown a mixed trend over the six-year period from 2019 to 2024. After a modest increase of 1.6% in 2020 (RM26.2, from RM25.8 in 2019), productivity declined by 4.6% in 2021 (RM25), largely reflecting the economic disruptions brought by the COVID-19 pandemic.

The metric remained flat in 2022, indicating stagnation in productivity growth. In 2023, a further decline of 1.2% was observed, pushing the value to its lowest at RM24.7. This downward trend is the result of outdated agricultural practices, which have led to reduced productivity and lower wages, further widening the economic gap between rural and urban areas⁷⁸. However, a slight recovery emerged in 2024, with a 2.0% increase to RM25.2.

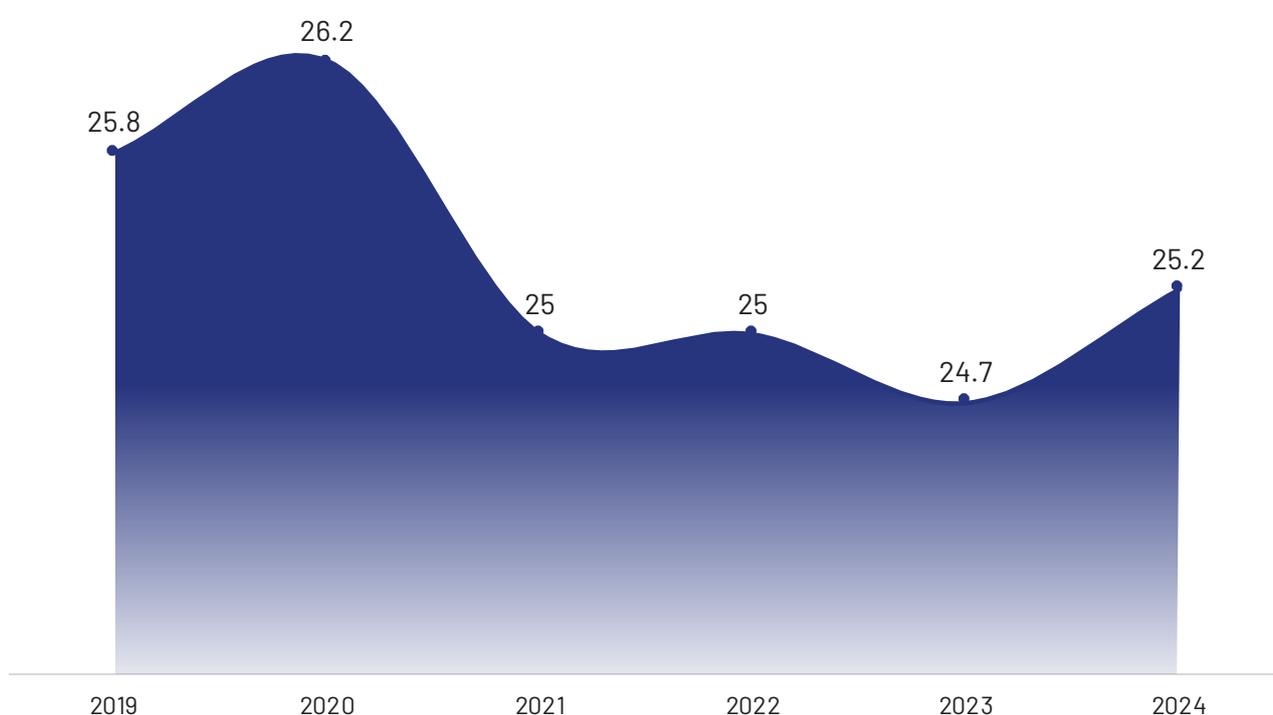


Figure 23: Annual Labour Productivity, Value Added Per Hour Worked in Agriculture (RM), 2019 - 2024⁷⁹

⁷⁸Hidayath Hisham. (2024, October 14). Agriculture industry suffers from modernisation gap. The Malaysian Reserve.

⁷⁹DOSM. (2025, May 22). Labour Productivity, First Quarter 2025. Ministry of Economy Malaysia.

Micro-Level Analysis of Malaysia's Food Security

Consumption Trends among Malaysians

In recent years, Malaysia has seen a considerable shift towards health-conscious eating, with a growing demand for organic, vegetarian, and plant-based options. This trend has been influenced by increased health awareness, especially during the COVID-19 pandemic, alongside ethical and environmental concerns associated with meat consumption and animal agriculture. Consumers are increasingly aware of the environmental benefits of plant-based diets, which require fewer natural resources and place less strain on ecosystems compared to animal-based diets.

The Food and Beverage (F&B) industry in Malaysia is responding to this demand by expanding plant-based offerings, introducing alternative protein products from brands like Beyond Meat, Impossible Foods, and Phuture Daging into supermarkets and restaurant menus. Initially, these products had limited visibility but have gained significant traction in recent years.

A dietary survey highlights this shift where 49% of Malaysian adults have made significant changes to their diets, with 61% increasing their intake of fruits and vegetables, 47% reducing meat consumption, and 41% incorporating more plant-based foods. Furthermore, 56% of Malaysians are now more open to adopting plant-based alternatives. Preferences for plant-based protein sources include soy and soy-based products at 37%, nuts and seeds at 24%, and various beans at 13%⁸⁰.

Despite the growing shift towards health-conscious eating, Per Capita Consumption (PCC) in Malaysia continue to show a strong preference for staple food items traditionally favoured by Malaysians.

Malaysia's rice PCC has steadily declined from 82.9 kg in 1990 to 76.7 kg in 2023. The trend is estimated to continue, with a decline to 76.3 kg per person by 2030. In contrast, PCC for wheat has remained more constant, starting at 33.3 kg in 1990, reaching its peak at 40.4 kg in 1994, and remaining steady over the decades. In 2021, the PCC for wheat was 32.7 kg and is estimated to slightly increase to 32.9 kg by 2030. This includes a change in preferences towards Western alternatives such as tortillas, pizza, pasta, and bread⁸¹.



⁸⁰Chew, A. (2021, April 06). Malaysians feel healthier in the new normal – Herbalife Nutrition Survey. Health Matters.

⁸¹OECD-FAO: The OECD-FAO data is employed to analyse the PCC trends in Malaysia, given its longer timeframe of consumption data dating back to 1990. However, this data is cross-referenced with DOSM data to ensure accuracy and reliability.

Compared to other livestock, poultry consumption trends show the most significant and consistently increasing pattern. Malaysia's poultry PCC has experienced significant growth, nearly tripling from 18.8 kg in 1990 to 50.7 kg in 2023. This upward trend is projected to continue, with consumption expected to reach approximately 53 kg per person by 2029.

Beef PCC in Malaysia has demonstrated steady growth, doubling from 2.6 kg in 1990 to 6.7 kg in 2023. This upward trend is expected to persist, with projections indicating continued increases through 2029. Mutton consumption, although still relatively low compared to other livestock, has shown significant growth, surging from 0.4 kg in 1990 to 1.2 kg in 2023. The PCC for pork peaked at 21 kg in 2010, and the trend fluctuated in the subsequent years. There was a slight decrease from 17.4 kg in 2021 to 17.0 kg in 2023.

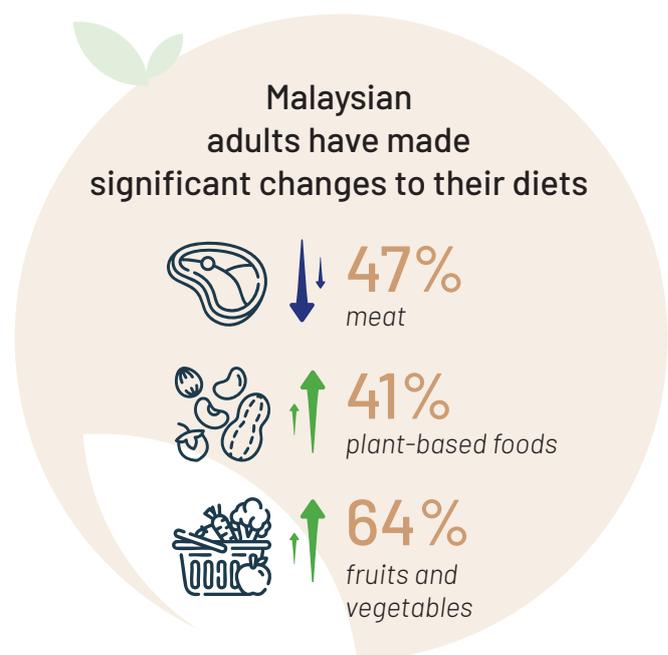
In terms of fruits, Malaysians have a strong preference for coconuts, and this preference has seen a consistent uptrend, rising from 14.9 kg in 2007 to 24.9 kg in 2023. This suggests that coconut, particularly in the form of santan (coconut milk), continues to be a staple ingredient in Malaysian cuisine, consistently utilised in households across the country. Conversely, the consumption of other selected fruits has remained relatively stable over the past 15 years, with durian recording a per capita consumption of 16.6 kg, mango at 1.4 kg, pineapple at 9.8 kg and banana at 10.0 kg in 2023.

The vegetable most consumed by Malaysians is round cabbage, with a consumption rate of 7.5 kg in 2023, marking a substantial increase from 1 kg in 2007. Another significant increase in PCC is observed in tomatoes, which increased significantly from 0.5 kg in 2007 to 4.2 kg in 2023, and mustard greens, which increased from 2.8 kg to 4.7 kg over the same period. In 2023, other vegetables with high PCC include cucumbers at 3.1 kg and chillies at 2.3 kg⁸².

The PCC trends of various fishery products in Malaysia between 2007 and 2023 reveal a shift in seafood preferences. Mackerel consumption fell significantly, decreasing from 7.8 kg per year in 2007 to 4.8 kg per year in 2023. Nonetheless, it remains the most widely consumed fish in Malaysia. Shrimp consumption, in contrast, has almost doubled, increasing from 2.4 kg per year to 4.6 kg per year. The PCC trends for tuna, cuttlefish, and crabs have remained relatively stable over the years, with only minor fluctuations. Tuna consumption declined slightly from 2.2 kg to 2.0 kg per year, while cuttlefish rose moderately from 2.0 kg to 2.2 kg per year. Meanwhile, crab consumption decreased marginally from 0.5 kg to 0.4 kg per year.

In line with the Malaysian Dietary Guidelines 2020, which recommend consuming an adequate amount of milk and dairy products as part of a balanced diet, PCC for these products was recorded at 1.8 kg in 2023. This figure shows little change compared to 1.9 kg in 2007.

As one of the most affordable sources of protein, eggs have exhibited a significant upward trend in consumption where its PCC reached 26.2 kg in 2023, nearly double the 14.3 kg recorded in 2007.



⁸²MAFS Malaysia. (2024, September). Malaysia Agrofood in Figures 2023.

Household Expenditure on Food

In 2022, Malaysians spent an average of RM5,150 per month, with food and beverages ranking as the second-highest household expense. A total of 16.3%, equivalent to approximately RM841, was allocated to food and beverage consumption. Nearly 40% of at-home food spending is dedicated to protein-rich foods such as fish, seafood, and meat.

A substantial portion of household expenditure was allocated to food away from home, accounting for 15.3% of total spending. This category experienced a significant increase, with average monthly expenditure increasing from RM516 in 2016 to RM790 in 2022⁸³.

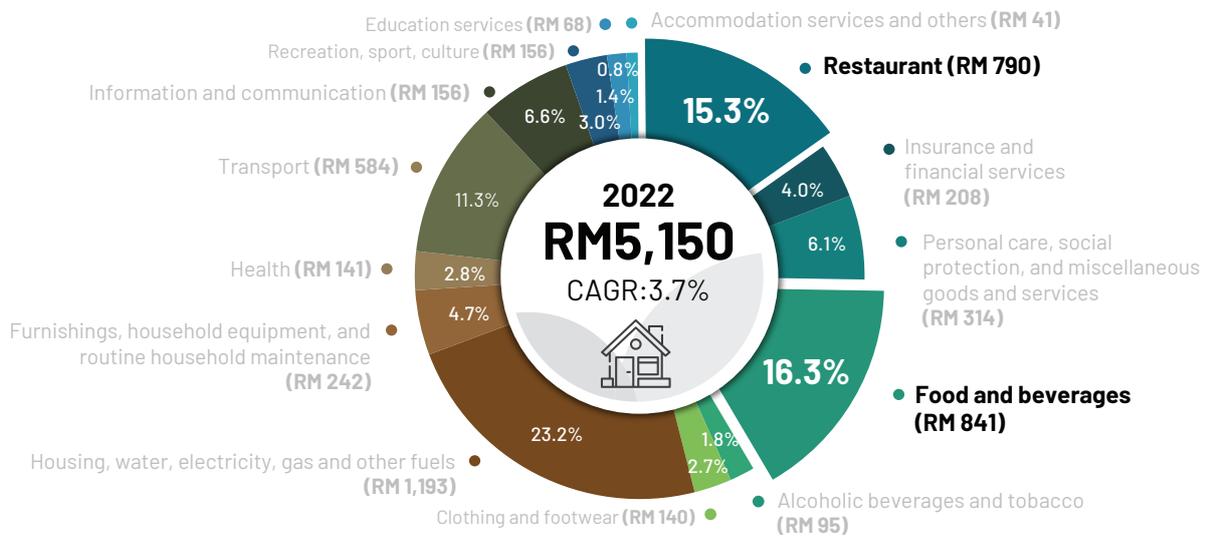


Figure 24: Composition of Mean Monthly Household Consumption Expenditure by Main Group, 2022

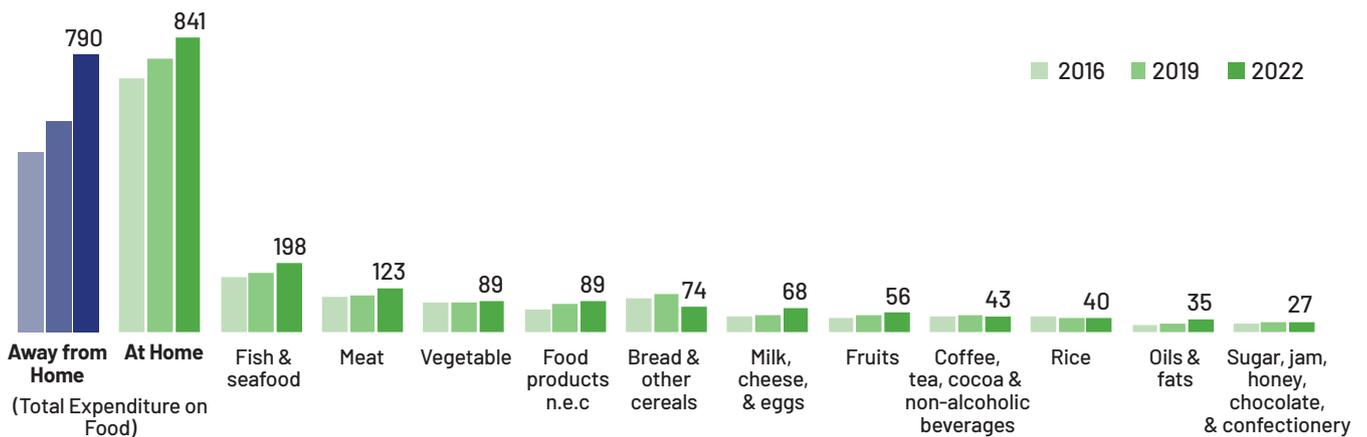


Figure 25: Monthly Expenditure on Food and Beverage Away From Home and Food At Home, 2016-2022 (RM)

⁸³Ministry of Economy Malaysia. (n.d.). Socioeconomic statistics: Household income, poverty and household expenditure.

The urban population in Malaysia generally allocates a larger portion of their expenditure to food and beverages consumed away from home, at 15.8%, compared to 15% for home-prepared meals.

This trend is particularly pronounced in Pulau Pinang, where 20.1% of total expenditure is dedicated to food and beverages consumed away from home, in stark contrast to 13.2% set aside for home-cooked meals. Similarly, in Selangor, 18.4% of spending is directed toward food and beverages consumed away from home, compared to only 11.6% allocated for home-prepared meals.

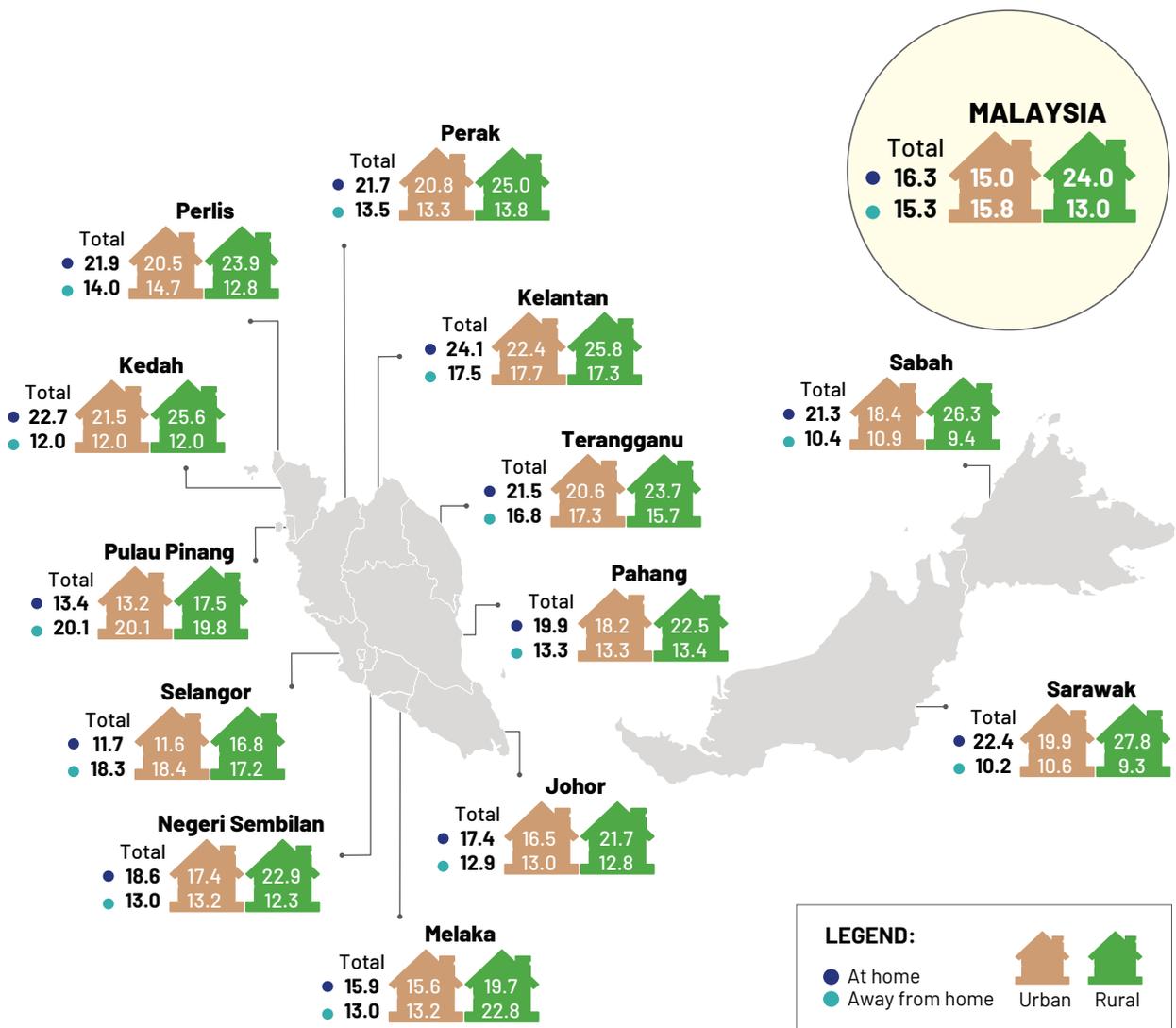


Figure 26: Total Expenditure for Food At Home and Food Away From Home by States (2022)

An analysis of food consumption away from home reveals that 9 out of 13 states in Malaysia (excluding Wilayah Persekutuan) allocate the largest share of their dining-out expenditure to noodle products. This indicates the widespread popularity of noodles as a staple choice among Malaysians.

In contrast, Kedah and Pahang demonstrate higher spending on traditional snacks such as “*kuih-muih*” compared to other food items, reflecting the appeal of local sweet treats. This trend signifies the cultural significance of local delicacies such as *kuih-muih* and tea, which remain integral to Malaysian culinary traditions alongside staples like rice and noodles.

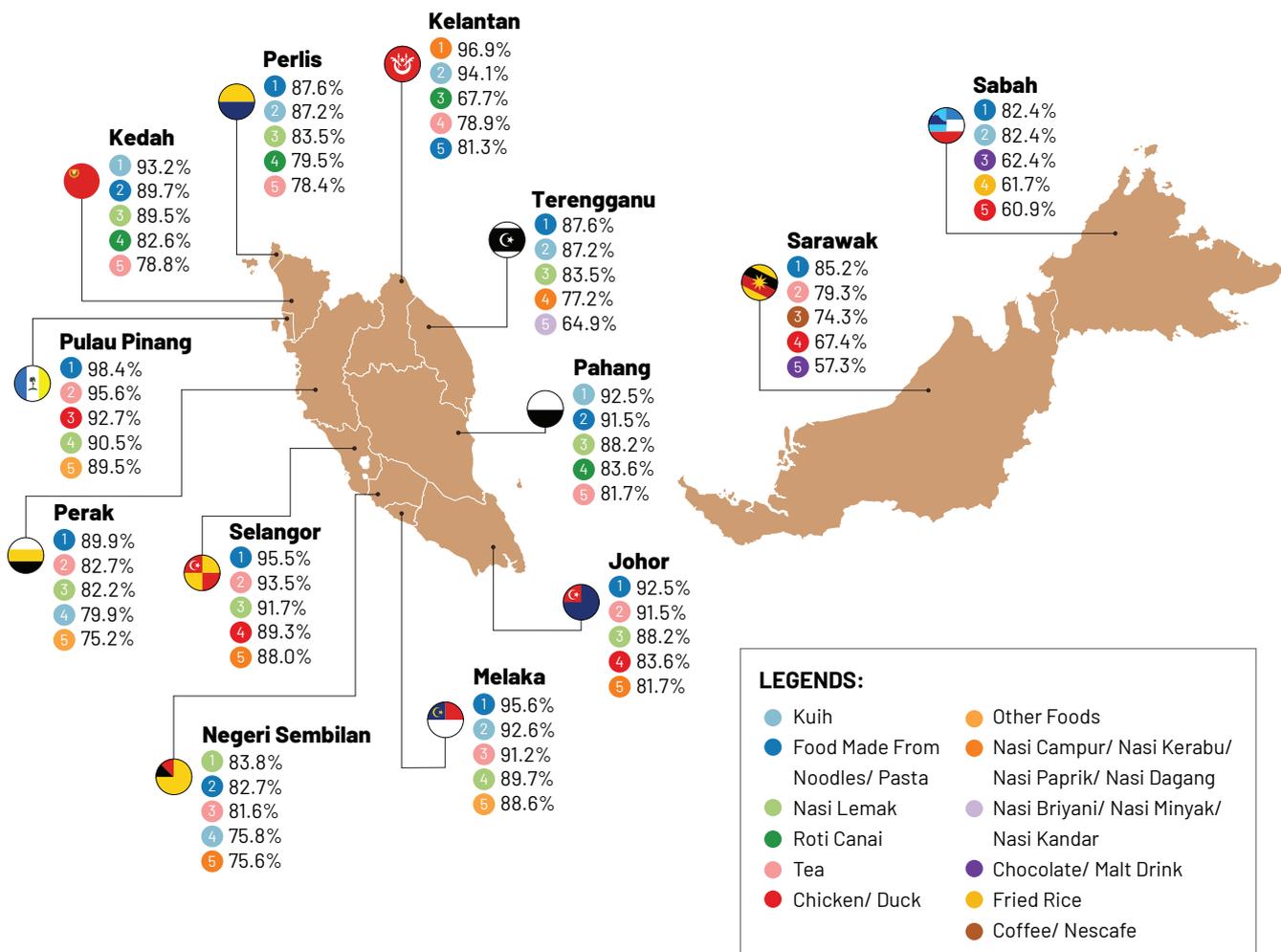


Figure 27: Top 5 Food Items for Food Away from Home

Nutritional Landscape

An analysis of malnutrition levels in Malaysia reveals a discernible pattern, with stunting, wasting, overweight, and obesity identified as the four primary concerns. There is a notable prevalence of undernutrition among children, while overnutrition is more common among adults.

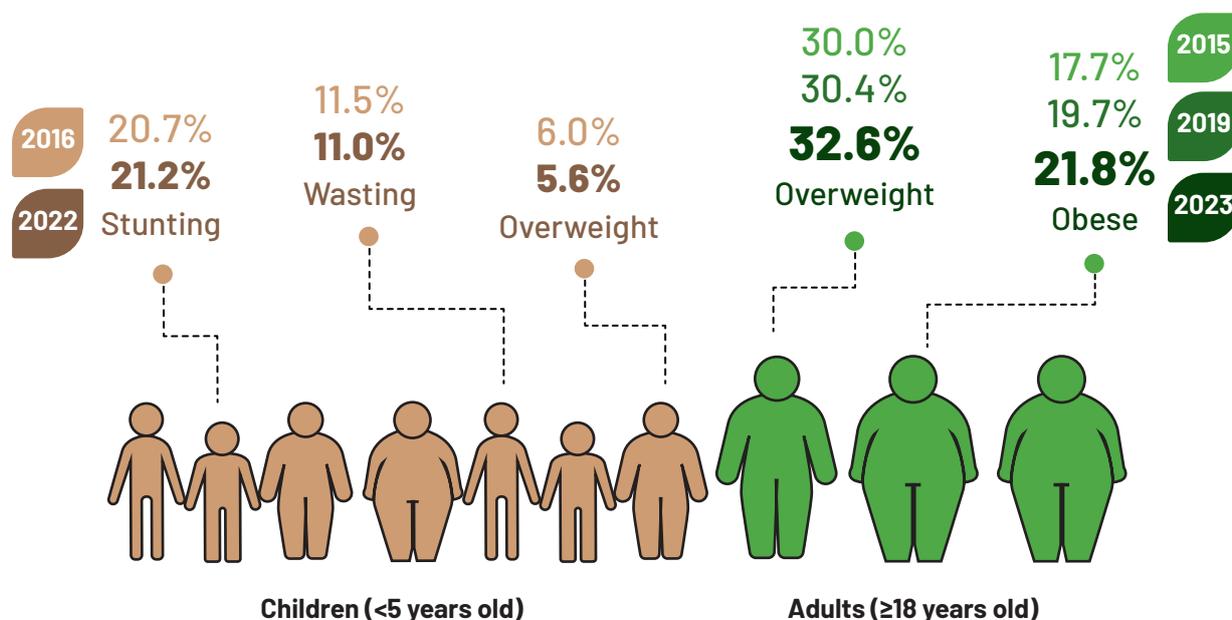


Figure 28: Malnutrition Rates Amongst Malaysians, 2016-2023

In 2022, the states of Pahang, Sabah, and Kedah recorded the highest stunting rates among children under 5, exceeding the national average at 28.2%, 25.3%, and 23.7%, respectively. Significantly, several states demonstrated commendable progress in reducing stunting rates. Kelantan, in particular, stood out for its substantial improvement, moving from the 'very high' to the 'high' range of public significance, with a reduction from 34.0% in 2016 to 23.0% in 2022. Additionally, Perak, Terengganu, Pulau Pinang, Sarawak, and Perlis also showed notable improvements from 2016 to 2022⁸⁴.

Melaka, Perlis, and Terengganu recorded the highest child wasting rates, with percentages of 14.8%, 14.6%, and 13.6%, respectively, surpassing the national average of 11%. Most states exhibited a clear pattern of declining wasting rates, indicating meaningful progress in addressing this nutritional concern. Johor, in particular, registered the most notable decline, shifting from the 'high' to the 'medium' range of public significance, with its prevalence falling from 20.2% in 2016 to 11.4% in 2022.

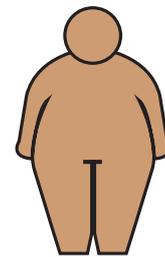
⁸⁴IPH. (2023). Technical Report National Health and Morbidity Survey (NHMS) 2022: Maternal and Child Health. NIH, MOH Malaysia

Similarly, the prevalence of overweight children under the age of five, a positive trend is evident as the national overweight rate remains within the low range of public health concern. With the national average of child overweight at 5.6%, Melaka, Pahang, and Negeri Sembilan exhibit the highest rates of overweight children at 8.0%, 7.4%, and 7.0%, respectively.

In contrast, an evaluation of the prevalence of overweight among adults aged eighteen and above reveals a more alarming trend. This pattern demonstrates rates ranging from high to very high levels of public health significance, indicating a pressing need for proactive measures to address the intensifying issue of overnutrition within the population.

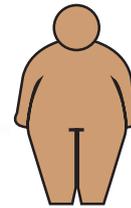
The national average prevalence of overweight among the adult population has shown an upward trend, rising from 30.0% in 2015 to 32.6% in 2023. Terengganu recorded the highest prevalence of overweight adults at 34.2%, followed closely by Pulau Pinang at 34.1%, while Pahang and Selangor both registered 34.0%. The adult obesity rate shows a similarly increasing trend, rising from a national average of 17.7% in 2015 to 21.8% in 2023. Perlis recorded the highest obesity rate among adults at 32.8%, followed by Negeri Sembilan at 28.9% and Johor at 25.2%⁸⁵.

Highest
obesity
rate among
adults



32.8%

Perlis



28.8%

Negeri Sembilan



25.2%

Johor



⁸⁵IPH. (2024). Technical Report National Health and Morbidity Survey (NHMS) 2023: Non-Communicable Diseases and Healthcare Demand. NIH, MOH Malaysia

Malaysia Food Security Trends

Population Growth and Ageing Society

In line with global trends, Malaysia's growing population is expected to place increasing pressure on natural resources to meet rising food demand. With a population of 33.4 million recorded in 2023, the country is undergoing significant demographic changes, and projections indicate a continued upward trajectory, with the population expected to reach 36.9 million by 2030. The top three states projected to experience the highest population growth rates between 2023 and 2030 are Sabah, Selangor, and Johor.

	Annual Population Growth Rate in 2023 ^P (%)	Population in 2023 ^P (million)	Projected Population in 2030 (million)*
Malaysia	2.1	33.4	36.9
Johor	1.8	4.1	4.4
Kedah	1.1	2.2	2.5
Kelantan	1.5	1.9	2.4
Melaka	1.9	1.0	1.1
Negeri Sembilan	1.4	1.2	1.3
Pahang	1.7	1.6	2.0
Perak	1.0	2.5	2.8
Perlis	1.0	0.3	0.3
Pulau Pinang	1.7	1.8	2.0
Sabah	5.1	3.6	4.7
Sarawak	1.4	2.5	3.3
Selangor	2.2	7.2	7.6
Terengganu	1.9	1.2	1.5

^P Preliminary

* Adopted from DOSM. (2016). *Unjuran Penduduk (Semakan Semula) Malaysia 2010-2040*

Table 2: Population by State, Malaysia, 2023^P

Over the past two decades, the country's demographic structure has shifted towards an ageing population, with those aged 65 and over increasing to 7% in 2023. In the same year, eight out of the thirteen states in Malaysia had officially transitioned into ageing societies. Among them, Perak, Kedah, and Sarawak emerged as the regions with the highest proportions of individuals aged 65 years and older, accounting for 9.7%, 8.8%, and 8.3% respectively. Projections provide compelling insights, indicating that Malaysia will reach an estimated ageing population of 3.9 million, or 11% of the overall population, by 2030. Multiple regions across the country, including Pulau Pinang, Melaka, and Perlis, are steadily progressing towards aged society status⁸⁶.

	0-14 years		15-64 years		65 years and over	
	2023 ^P	2030*	2023 ^P	2030*	2023 ^P	2030*
Malaysia	22.6	21.3	70.0	68.0	7.4	10.7
Johor	22.2	20.9	70.8	67.8	7.0	11.3
Kedah	24.4	23.6	66.8	64.9	8.8	11.5
Kelantan	28.8	31.2	64.4	60.7	6.8	8.1
Melaka	22.8	20.3	70.5	66.0	6.7	13.7
Negeri Sembilan	24.2	19.0	68.4	69.5	7.4	11.5
Pahang	24.7	22.2	68.6	67.2	6.7	10.6
Perak	21.8	19.8	68.5	66.6	9.7	13.6
Perlis	19.6	22.1	72.3	66.9	8.1	11.0
Pulau Pinang	19.0	18.0	73.3	67.3	7.7	14.7
Sabah	24.4	20.1	69.6	72.2	6.0	7.7
Sarawak	20.4	21.9	71.3	66.8	8.3	11.3
Selangor	21.2	20.0	71.1	69.9	7.7	10.1
Terengganu	28.1	27.7	66.0	63.3	5.9	9.0

■ Ageing society

^P Preliminary

* Adopted from DOSM. (2016). *Unjuran Penduduk (Semakan Semula) Malaysia 2010-2040*

Table 3: Percentages of Population by Age Group and State, Malaysia, 2023^P and 2030 (%)⁸⁷

As Malaysia transitions towards a higher proportion of elderly residents, the need to address their nutritional needs becomes increasingly evident. An ageing population brings unique dietary requirements, such as nutrient-rich and easily digestible options, alongside a heightened vulnerability to food insecurity. This insecurity often stems from factors such as reduced mobility, fixed incomes, and age-related health conditions.

⁸⁶A nation is categorised as an "ageing society" when the proportion of individuals aged 65 years or older ranges from 7% to 14% of the total population. It is termed an "aged society" if this proportion falls between 15% and 20% and classified as a "super-aged society" if the share surpasses 21% (Scherbov, S., & Sanderson, W., 2019).

⁸⁷DOSM. (2023, July 31). Current Population Estimates Malaysia 2023. Ministry of Economy Malaysia.

Urbanisation

The urbanisation rate in Malaysia is on an upward trajectory, having reached 75.1% in 2020 and is projected to climb to 80% by 2030⁸⁸. Notably, Pulau Pinang, Melaka, and Selangor lead this trend, with each surpassing the national average urbanisation rate at 95.3%, 94.6%, and 93.4%, respectively⁸⁹. This surge in urbanisation can be attributed, in part, to the heightened economic density and infrastructure development witnessed within these regions⁹⁰.

	2000	2005	2010	2015	2016	2017	2018	2019
Malaysia	62.0	66.5	71.0	74.3	74.8	75.2	75.6	76.2
Johor	64.8	68.4	71.8	75.6	77.1	77.7	78.3	78.9
Kedah	39.1	51.4	64.7	68.0	68.6	70.9	71.6	72.3
Kelantan	33.5	37.8	42.3	47.0	47.9	48.7	49.7	50.6
Melaka	67.5	77.3	86.4	91.9	92.7	93.4	94.0	94.6
Negeri Sembilan	54.9	60.4	66.4	72.0	73.0	73.3	73.6	74.4
Pahang	42.0	46.2	50.4	55.1	56.0	56.0	56.9	57.9
Perak	59.0	64.3	69.7	74.4	75.3	75.4	75.5	75.8
Perlis	34.0	42.3	51.1	59.9	61.5	61.7	63.0	64.3
Pulau Pinang	79.7	85.2	90.0	93.9	94.4	94.6	95.0	95.3
Sabah	48.1	51.2	54.3	57.9	58.2	58.8	59.5	60.3
Sarawak	48.1	51.0	53.8	57.1	57.8	57.8	58.5	59.2
Selangor	87.7	89.7	91.3	93.0	93.3	93.3	93.3	93.4
Terengganu	49.4	54.0	59.1	63.4	64.3	65.0	65.7	66.4

Table 4: Urbanisation Rate by State, Malaysia, 2000 to 2019 (%)

⁸⁸Ministry of Economy Malaysia. (2023). Mid-Term Review of the Twelfth Malaysia Plan - Malaysia Beyond 2025: A Sustainable and Progressive Society.

⁸⁹NRES Malaysia. (2022). Fourth Biennial Update Report Under the United Nations Framework Convention on Climate Change.

⁹⁰Ministry of Economy Malaysia. (2023). Mid-Term Review of the Twelfth Malaysia Plan - Malaysia Beyond 2025: A Sustainable and Progressive Society.

Climate Change

An analysis of Malaysia's average annual temperatures reveals differing trends depending on the time frame examined. Between 1991 and 2023, temperatures fluctuated moderately but remained generally stable, ranging from a low of 26.06°C in 1993 to a high of 26.65°C in 2015. These variations typically occurred over short cycles of a few consecutive years, with no significant long-term upward or downward trend. During this 30-year period, Malaysia's climate appeared relatively stable, with temperatures consistently hovering around the mid-26°C range. This stability indicates that, despite short-term fluctuations, no sustained increase in mean temperatures has been observed in recent decades.

However, when extending the analysis over a longer time frame of six decades (1965–2023), a distinct warming trend becomes apparent. As shown in Figure 29, the annual mean temperature increased steadily from 25.43°C in 1965 to 26.77°C in 2023, marking a significant overall rise of approximately 1.34°C. This long-term warming trend aligns with broader global climate change patterns. Notably, the rate of temperature increase was more pronounced from the 1990s onwards but appears to have stabilised in recent years.

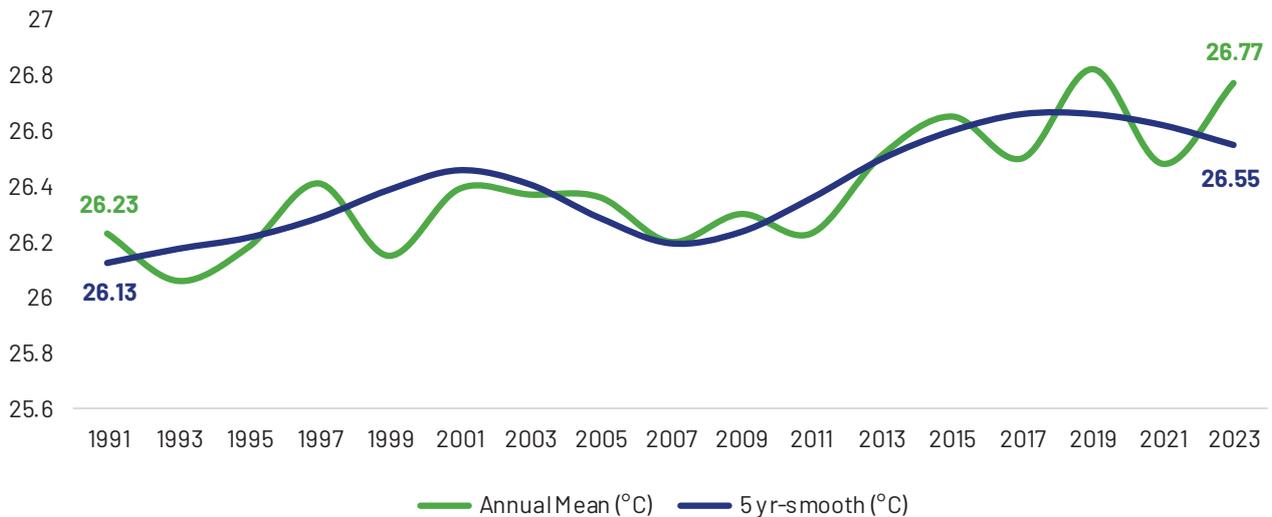


Figure 29: Observed Average Annual Mean Temperature Malaysia 1991–2023 (3 Decade Time Series)⁹¹

⁹¹A 5-year smooth in this context involved averaging observed annual mean temperature over 5-year intervals to reduce short-term fluctuations and highlight longer-term climate trends

Table 5 presents seasonal precipitation data (in millimetres) for Malaysia, comparing the periods 1961–1990 and 1991–2020 across the four seasons: DJF (December–February), MAM (March–May), JJA (June–August), and SON (September–November).

At the national level for 1991–2020, the highest seasonal precipitation occurred during the SON season at 796.28 mm, while the lowest was recorded in DJF at 527.47 mm. Compared to 1961–1990, increases in precipitation were observed in the DJF, MAM, and JJA seasons, with the most significant rise occurring in DJF, where rainfall increased by 51.2 mm from 476.23 mm to 527.47 mm. Conversely, the SON season was the only period to record a decrease, dropping by 17.91 mm from 814.19 mm to 796.28 mm. At the state level, Sarawak consistently experienced the highest seasonal precipitation, peaking at 891.9 mm during the SON season (1991–2020), while Negeri Sembilan recorded the lowest, with 296.04 mm during DJF.

	1961-1990				1991-2020			
Units: mm	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON
Country: Malaysia	476.23	658.74	569.54	814.19	527.47	703.15	598.83	796.28
Highest: Sarawak	652.14	813.38	646.39	897.05	703.84	861.78	678.05	891.90
Lowest: Negeri Sembilan	260.23	552.13	389.38	635.29	296.04	572.82	423.59	626.90

Table 5: Observed Seasonal Precipitation

The 2018 Malaysia Third National Communication (NC3) and the Second Biennial Update Report (BUR2) to the UNFCCC project varying frequencies of dry spells across Malaysia's river basins and coastal regions for the period 2010–2100. Dry spells are measured using Return Periods, which estimate how often drought events of a certain severity may occur.

The analysis indicates that frequent dry spells with 5–10-year Return Periods could occur across much of Malaysia, potentially reducing rainfall by up to 36.3%. More severe but less frequent dry spells, with Return Periods of 20 years or more, are projected to occur once or twice during the century, leading to rainfall reductions of between 44% and 48.4%, particularly affecting several river basins and coastal areas in Peninsular Malaysia. Notably, Sabah and Sarawak are expected to face more frequent dry spells with two to four occurrences, making these states more vulnerable to prolonged drought conditions. Given that water supply systems are often designed based on a 50-year Return Period to ensure reliable yields, these projections highlight the need for adaptive water resource management.

Unhealthy Diet and NCDs

In Malaysia, in alignment with the global trend of globalisation, urbanisation, and economic development, dietary patterns have shifted significantly, with increased consumption of processed and energy-dense foods that are high in fats, sugars, and salt. This nutritional transition has contributed to the rising prevalence of Non-Communicable Diseases (NCDs), reflecting global patterns. Over the past decade, healthcare expenditure in Malaysia has more than doubled, highlighting the growing burden of NCDs on the healthcare system. Total health expenditure surged from RM35.95 billion in 2011 to RM78.95 billion in 2022, representing an alarming increase of 119.7%.

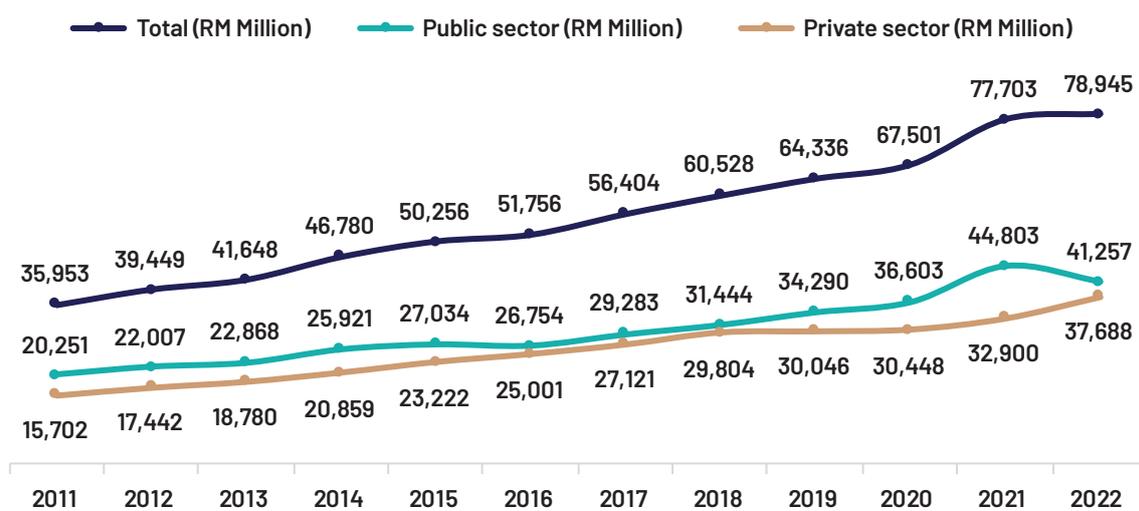


Figure 30: Malaysia's Total Expenditure in Health 2011 – 2022^{92, 93}

A substantial portion of this increase is attributable to unhealthy diets and sedentary lifestyles, both of which are major risk factors for NCDs. Risk factor data indicate that unhealthy dietary habits contributed to approximately 68.9% of productivity losses associated with premature deaths from cardiovascular diseases, equating to an estimated RM1.75 billion in lost productivity.

Malaysia's nutrition landscape is increasingly marked by a growing intake of processed foods, sugary beverages, and convenience meals, driven by hectic urban lifestyles and the rising trend of dining out.

NCD Risk Factor	Cardiovascular disease		Diabetes		Cancer	
	RM	%	RM	%	RM	%
Tobacco Use	935.9M	36.9	11.41M	12.8	222.7M	15.0
Unhealthy Diet	1.75B	68.9	23.74M	26.6	99.3M	6.7
Low Physical Activities	137.M	5.4	1.61M	1.8	6.7M	0.5
Alcohol Use	145.9M	5.8	1.57M	1.8	106.9M	7.2

Table 6: Lost Productivity Due to Deaths of Workers from Selected NCDs Attributable to Specific Risk Factors, Malaysia, 2017⁹⁴

⁹²Ministry of Health. (2022). MNHA Steering Committee Meeting 2022: Malaysia National Health Accounts (MNHA). Planning Division, Ministry of Health

⁹³Ministry of Health Malaysia. (2024, October). Health Facts 2024: Reference Data for Year 2023. Health Informatics Centre Planning Division.

⁹⁴MOH Malaysia. (n.d.). The impact of noncommunicable diseases and their risk factors on Malaysia's gross domestic product.

Policy Response

In Malaysia, food security has often been narrowly understood as the nation's ability to meet its food needs solely through domestic production. This has led to a strong government emphasis on self-sufficiency, sometimes creating the misconception that food security is solely dependent on domestic sources, without considering the role of imports⁹⁵.

Furthermore, historically, Malaysia's agricultural policies have prioritised industrial commodities for their economic returns, overshadowing the agrofood sector and impeding its growth⁹⁶. The shift of resources during industrialisation left internal food production inadequate to satisfy its population's nutritional requirement, leading to the adoption of import substitution as an alternative to fulfil dietary needs⁹⁷.

From the 1950s to the late 1970s, Malaysia's economy was heavily reliant on agriculture, with a focus on industrial crop development under British colonial rule. The First and Second Malayan Plans emphasised plantation agriculture and smallholder subsistence farming, particularly in rubber and oil palm cultivation. During this period, the food sector was not specifically addressed, although efforts were made to strengthen human capital capacity and R&D in agriculture. In the late 1970s and early 1980s, Malaysia shifted towards export-led growth, prioritising commodities like natural rubber and tin. The Second, Third, and Fourth Malaysia Plans further supported oil palm and various other crops, contributing to poverty reduction by making smallholder agriculture more profitable and improving job opportunities.

The 1980s marked a shift towards industrialisation, prompting the introduction of the National Agricultural Policy I (NAP I) in 1984, which aimed to balance agricultural and industrial growth. Despite its focus on cash crops for export, NAP I struggled to bridge the gap between the sectors, leading to limited advancements in the food sector.

In response, the National Agricultural Policy II (NAP II) was introduced in the 1990s to maximise income through efficient resource utilisation and establish a comprehensive food policy strategy. This was followed by NAP III in the late 1990s, which aimed to boost agriculture amid global economic changes.

The 2010s saw the launch of the Economic Transformation Program and the National Agrofood Policy 2011-2020, emphasising food security and reducing reliance on imports. The recent National Agrofood Policy 2021-2030 (NAP 2.0) and initiatives during the COVID-19 pandemic highlight Malaysia's ongoing commitment to a sustainable and resilient agrofood sector, addressing food security through modern technology and comprehensive strategies.

It is understandable that Malaysia initially prioritised industrial policy, given the urgent need to reduce poverty at the time. Similarly, in the 1970s, the global definition of food security focused on food availability and price stability, reflecting the prevailing belief that hunger was mainly due to insufficient global food supplies and unstable prices. However, the concept of food security has evolved. It is now recognised that even with adequate food availability, other factors such as access, utilisation, and stability play crucial roles in addressing hunger and food insecurity.

⁹⁵Tapsir et al. (2019). Food security and sustainability: Malaysia agenda. *Malaysian Applied Biology*, 48(3), 1-9.

⁹⁶Sarena Che Omar. (2022). Deconstructing Malaysia's food import bill: it is not the only measure of food security. KRI.

⁹⁷Faridah Suffian & Firdausi Suffian. (2023). Policy analysis: Food security in Malaysia. *Journal of Administrative Science*, 20, 91-111

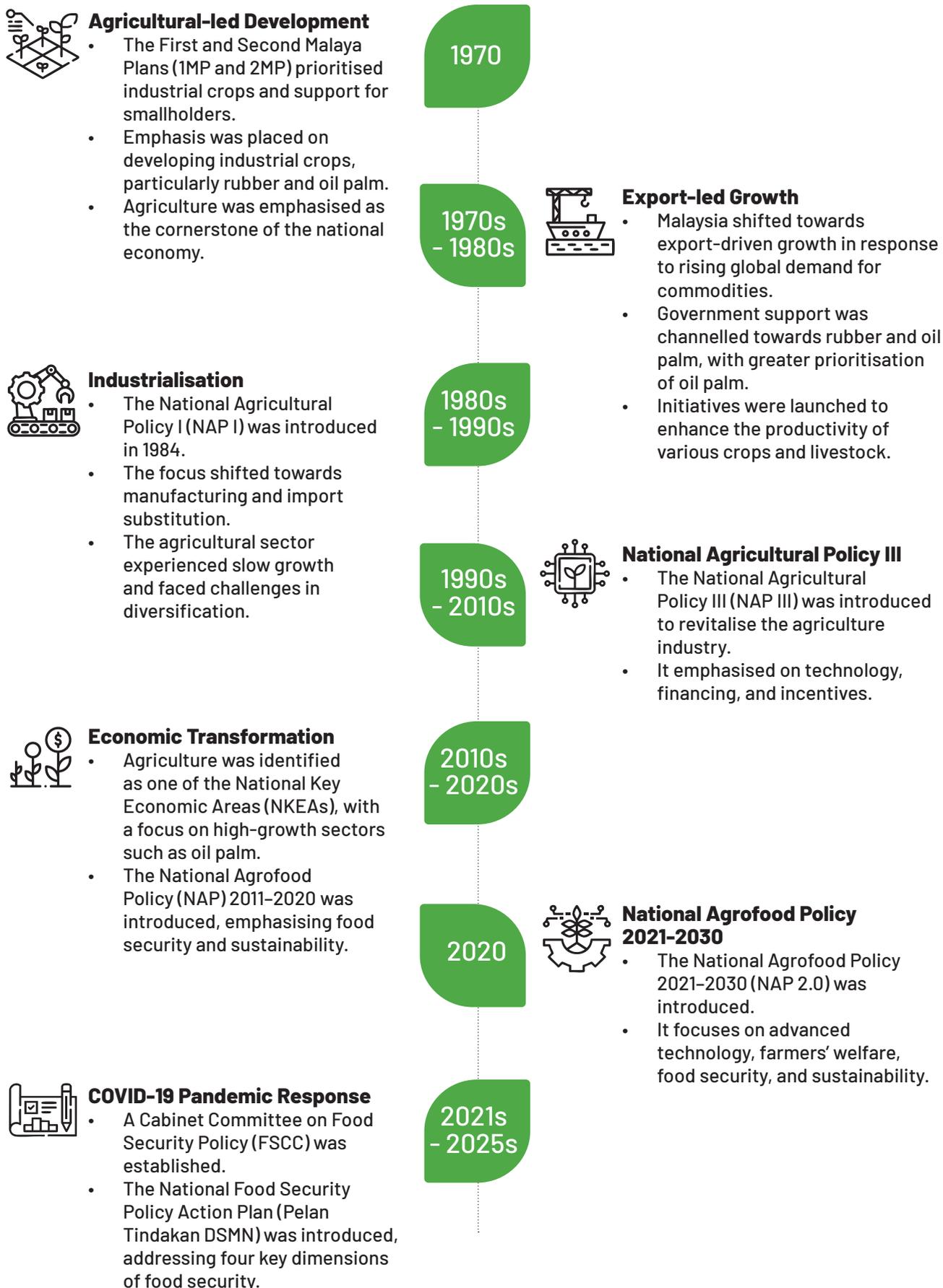


Figure 31: Food Policy in Malaysia

Beyond national food policies, relevant ministerial policies have been examined to evaluate their role in enhancing food security at the national level. Given the broad and multidimensional nature of food security, efforts to strengthen it are distributed across various ministries.

It is evident that the majority of action plans primarily focus on enhancing food security, particularly emphasising food availability. This highlights a concerted effort to ensure that food resources remain accessible within communities. However, while sustainability, accessibility, and utilisation are acknowledged, they may not receive equivalent emphasis compared to availability in these policies. This indicates a gap in prioritisation, particularly in relation to stability and agency within food systems.

Stability and agency, as critical dimensions of sustainable food security, appear to be somewhat overlooked compared to other aspects. This underscores the need for the NFSP 2030 to refocus efforts on strengthening these dimensions in the development of actionable plans. By placing greater emphasis on the stability dimension, the goal would be to build resilience within agrofood systems, safeguard against shocks and disruptions, and enhance protective measures against instability.

Simultaneously, empowering individuals and communities with agency over their food resources is essential to foster sustainable and equitable access. Most importantly, the development of NFSP 2030 necessitates careful consideration of the diverse needs of vulnerable groups. These groups, encompassing nine (9) distinct categories, necessitate tailored interventions to address their specific challenges effectively. The policy scope analysis reveals room for improvement in the policy scope, particularly with regard to single-parent households, a demographic often facing heightened vulnerability. The insufficient attention afforded to this group within policy frameworks underlines the need for inclusivity and responsiveness to the nuanced needs of all societal segments.

The NFSP 2030 overarching objective is to establish a sustainable, resilient, and inclusive agrofood ecosystem. This mission finds a crucial strategic alignment with the *Pelan Transformasi Ekonomi Bumiputera 2035 (PuTERA35)*, which is dedicated to the socioeconomic advancement of the Bumiputera community. By integrating these agendas, the policy powerfully addresses inclusivity, ensuring economic growth in the agrofood sector is equitable. This synergy is operationalized by aligning the policy's implementation with PuTERA35's pillars. Existing mechanisms for entrepreneurial support can be channelled to empower Bumiputera agro-entrepreneurs, frameworks for human capital development can be jointly tailored to build high-tech agricultural skills, and plans for infrastructure modernisation can be strategically guided by a regional focus to uplift targeted communities. This collaborative framework ensures the national drive for food security simultaneously functions as a potent engine for socioeconomic transformation, building a robust and fair food system that embodies the national aspiration of shared prosperity.

By intensifying efforts to support these underprivileged populations, NFSP 2030 can truly embody its vision of fostering comprehensive food security for all.



Policy / Initiative



1.	Dasar Agromakanan Negara 2021-2030 (DAN 2.0)
2.	Dasar Agrikomoditi Negara 2021-2030 (DAKN 2030)
3.	Pelan Tindakan Dasar Sekuriti Makanan Negara 2021-2025 (Pelan Tindakan DSMN)
4.	Dasar Pemakanan Kebangsaan Malaysia (DPKM 2.0)
5.	Dasar Pembangunan Luar Bandar 2021-2030 (DPLB)
6.	Dasar Kebun Komuniti Bandar (DKKB)
7.	Pelan Induk Perancangan Guna Tanah Kawasan Sumber Makanan Negara (KAGUMN)
8.	Dasar Perubahan Iklim Negara
9.	Pelan Tindakan Kebangsaan Spesies Asing Invasif 2021-2025
10.	Pelan Tindakan Biojisim Negara 2023-2030
11.	Dasar Bioteknologi Negara 2.0 2022-2030
12.	Pelan Pembangunan Pendidikan Malaysia 2013-2025 (PPPM)
13.	Pelan Pembangunan Pendidikan Malaysia 2015-2025 (PPPM)(Pendidikan Tinggi)
14.	Arahan No. 20
15.	Dasar Keselamatan Makanan Kebangsaan
16.	Pelan Tindakan Keselamatan Makanan Kebangsaan
17.	Water Sector Transformation 2040: Water-Food-Energy Nexus (WFE)
18.	Dasar Kepelbagaian Biologi Kebangsaan 2016-2025 (DKBK)
19.	Dasar Kepelbagaian Biologi Kebangsaan 2022-2030 (DKBK)



Table 7: List of Ministerial Policies Related to Food Security

State-Level Policies

A state policy review was conducted to analyse state-level policies addressing food security. Findings indicate that all states have incorporated food security aspects to some extent within their *Rancangan Struktur Negeri* or *Pelan Strategik Negeri*.

A state policy review was conducted to analyse state-level efforts in addressing food security. Findings indicate that all states have incorporated elements of food security to some extent within their respective *Rancangan Struktur Negeri* or *Pelan Strategik Negeri*.

The state policy analysis indicates that, similar to ministerial policies, state-level policies strongly address the availability dimension of food security. This includes strategic planning for preserving agricultural land and integrating technology into agricultural activities to enhance productivity and resilience.

Additionally, physical access to food is a key priority in state policies, with urban and rural development initiatives aimed at improving transportation networks, market accessibility, and infrastructure connectivity.

The utilisation dimension has also received some attention, particularly through efforts to enhance clean water supply and expand public healthcare infrastructure, both of which are crucial for maintaining food safety and overall health.

However, a critical gap remains in addressing malnutrition, as state policies lack explicit strategies to tackle undernutrition, diet quality, and nutritional well-being. This oversight highlights the need for a more integrated approach to food security that not only focuses on availability and access but also ensures the nutritional adequacy of food consumption across all population groups.

There are also gaps in addressing the agency dimension across all states, reflecting its relatively recent inclusion among the dimensions for achieving comprehensive food security. Therefore, the NFSP 2030 prioritises empowering vulnerable groups within the agriculture sector. Within stability dimensions, disaster mitigation plans, particularly in flood-prone states, have been incorporated through the integration of flood management into land use planning and development control. Additionally, many states are enhancing compliance with regulations governing agricultural practices in vulnerable highlands, along with efforts to protect forest reserves and steep terrains.

Furthermore, while state policies emphasise sustainable water usage and address water pollution, there is a notable gap in addressing sustainable ocean management and promoting circular economic activities within the agriculture sector. Thus, the NFSP 2030 places greater emphasis on ensuring sustainable fisheries management to secure long-term supplies for future generations.

Policy / Initiative

1. Rancangan Struktur Negeri Johor 2030
2. Rancangan Struktur Negeri Kedah 2035
3. Rancangan Struktur Negeri Melaka 2035
4. Rancangan Struktur Negeri Sembilan 2045
5. Rancangan Struktur Negeri Pahang 2050
6. Rancangan Struktur Negeri Pulau Pinang 2030
7. Draf Rancangan Struktur Negeri Perak 2040
8. Rancangan Struktur Negeri Perlis 2030
9. Rancangan Struktur Negeri Selangor 2035
10. Rancangan Struktur Negeri Terengganu 2050
11. Hala Tuju Sabah Maju Jaya Pelan Pembangunan SMJ 1.0 (2021-2025)
12. Sarawak's Post Covid-19 Development Strategy
13. Pelan Pembangunan Mampan Johor 2030
14. Pelan Pembangunan Kedah 2035
15. Pelan Induk Pembangunan Mampan Negeri Kelantan 2019-2023
16. Pelan Induk Pembangunan Wilayah Kelantan Selatan Sehingga 2030
17. Pelan Strategik Melaka Maju Jaya 2035 (Versi 2)
18. Melaka State Climate Action Plan (MSCAP) 2020-2030
19. Buku Pelan Strategi Seberang Perai 2023-2030
20. Dasar Pembangunan Kanak-Kanak Negeri Selangor Dan Pelan Tindakan 2022-2025
21. Pelan Strategik Veterinar Selangor
22. Pelan Strategik Pembangunan Perlis 2012-2030
23. Pelan Induk Terengganu Sejahtera (PITAS) 2030
24. Pelan Strategik Pertanian Terengganu 2019-2030 (Kajian Semula)

Table 8: List of State Policies Analysed in This Policy

Vulnerable Groups

Aligning with the sustainable food systems framework, which emphasises inclusivity, equity, and empowerment this policy will prioritise vulnerable groups to ensure the full inclusion of all populations. Vulnerable groups often bear the brunt of systemic challenges, including limited access to nutritious food, exclusion from decision-making processes, and heightened exposure to shocks such as climate change, economic instability, and pandemics. Integrating their needs into the food systems is essential for ensuring food security for these groups.



While “vulnerability” and “food insecurity” are sometimes used interchangeably, it is crucial to recognise that food insecurity is a dynamic condition. In contrast, vulnerability signifies the likelihood of falling or remaining below a food security threshold. The distinction lies in the degree of risk, where vulnerable individuals face a higher probability of becoming food insecure. Essentially, food-insecure individuals are those who can no longer meet their minimum food needs and are, by definition, vulnerable.

In the context of food insecurity, vulnerability is defined as a household’s probability to fall, or stay, below the food poverty line within a given period time^{98, 99, 100}.

Vulnerability depends on both people’s exposure to risks and their ability to withstand them. Risks refer to events or trends that introduce a level of instability, potentially negatively affecting people’s well-being. Resilience is determined by how effective risk management strategies—such as prevention, mitigation, and coping—are in keeping individuals above a minimum welfare threshold.

Vulnerability can be understood in two main components: the external side, which refers to the structural elements that determine sensitivity and risk of exposure to stressors, such as poverty, lack of access to resources, and exposure to shocks and stresses that can increase a household’s risk of food insecurity. Meanwhile, the internal side concerns the ability of households to respond and cope with these stressors. This includes actions such as accessing coping mechanisms, leveraging support networks, and applying knowledge to manage risks effectively.



⁹⁸Capaldo et al. (2010). A model of vulnerability to food insecurity. FAO, Agricultural Development Economics Division (ESA).

⁹⁹Løvendal et al. (2004). Understanding vulnerability to food insecurity: Lessons from vulnerable livelihood profiling. Agricultural and Development Economics Division, FAO.

¹⁰⁰Løvendal, C. R., & Knowles, M. (2005). Tomorrow’s hunger: A framework for analysing vulnerability to food insecurity. Agricultural and Development Economics Division, FAO.

Vulnerability can manifest in various forms, including structural vulnerability, vulnerability to shocks, and nutritional vulnerability. These categories may arise from a range of risk factors, encompassing both external influences, such as economic and political conditions, and internal factors, such as intra-household dynamics and social beliefs.

*...importance
of a balanced
and diverse
diet*



1. Structural Vulnerability

Structural vulnerability refers to the situation where gradually evolving conditions make people more susceptible to high levels of risk and stress and weaken their ability to deal with them effectively. Chronic food insecurity, which refers to the long-term inability of a household or an individual to meet their minimum daily food needs, is typically the outcome of persistent structural vulnerability. Although food-secure individuals may also face similar risks and stresses, they possess sufficient capacity to cope.

2. Vulnerability to Shocks

Every individual in a population is vulnerable to unexpected disturbances, which may trigger various risks. These shocks such as natural disasters, economic crises, or social unrest, can affect people differently depending on their circumstances. People who experience unforeseeable shocks, may face transitory food insecurity, temporary and short-term in nature, resulting from sudden events. The degree of pre-existing structural vulnerability and individuals' capacity to adapt and respond are crucial factors that determine the magnitude and impact of such episodes.

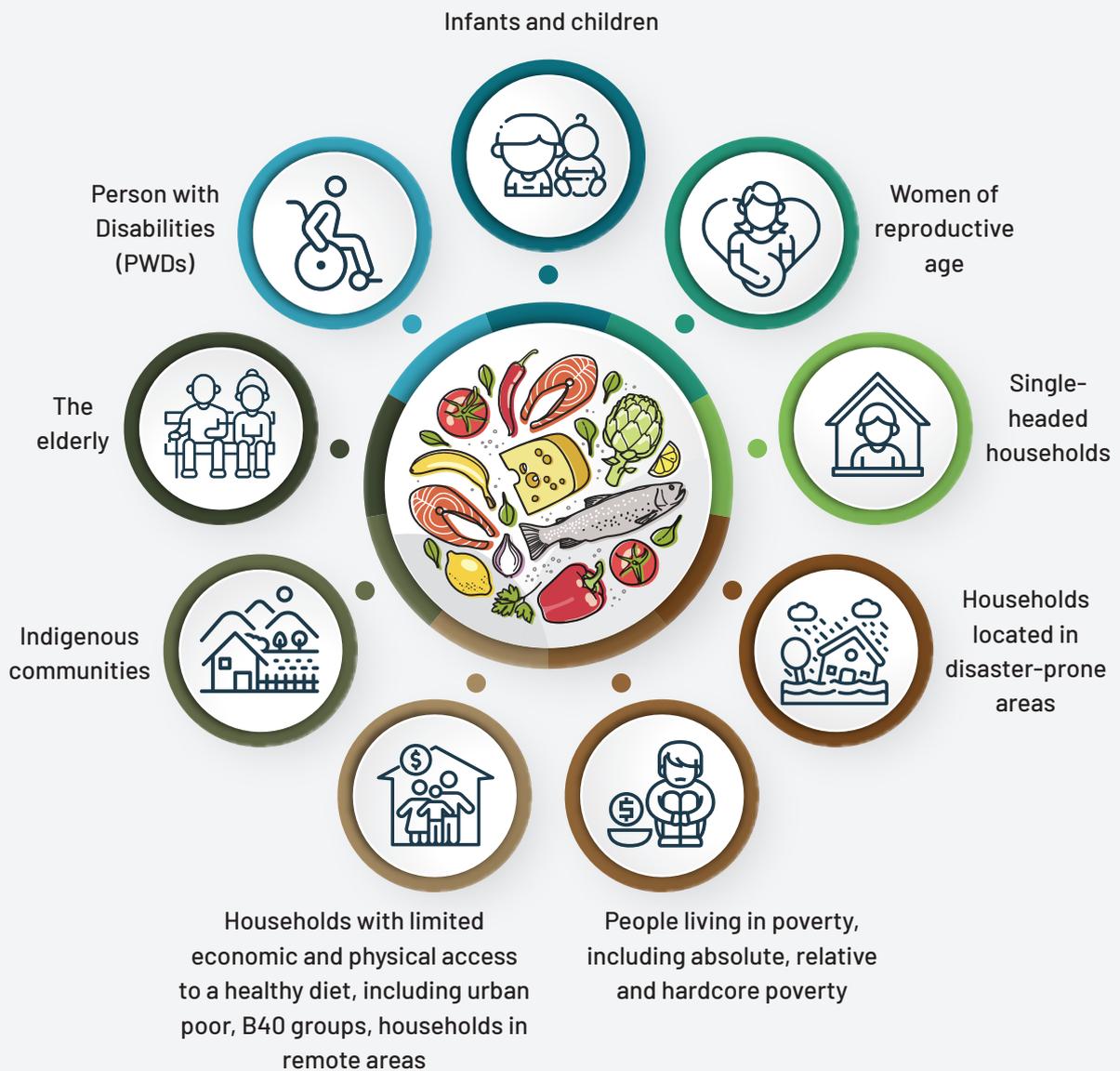
3. Nutritional Vulnerability

Nutritional vulnerability refers to the heightened risk of experiencing nutritional deficiencies or imbalances due to factors such as poverty, inadequate dietary diversity, limited access to health care, and low-quality food. These deficiencies, particularly in micronutrients like iron, vitamin A, and zinc, are strongly linked to compromised immunity, greater susceptibility to infections, and poor health outcomes.

Individuals facing chronic food insecurity are especially vulnerable, as the elevated cost of nutrient-dense foods limits their access to balanced diets. Even those meeting their caloric needs may suffer from nutritional imbalances, which can exacerbate health issues and impair recovery from illnesses. Vulnerable groups include young children, pregnant and lactating women, the elderly, Person With Disability (PWDs), and individuals with chronic diseases or immune-related conditions.

Marginalised populations, including Indigenous communities and those affected by displacement or poverty, face compounded risks due to limited resources and reduced access to culturally appropriate, nutrient-rich foods. Addressing nutritional vulnerability requires improving access to affordable, diverse diets and strengthening healthcare systems to prevent and manage malnutrition effectively.

In the Malaysian context,
the NFSP 2030 will also focus on vulnerable group,
particularly those at risk of food insecurity and malnutrition



Future of Food

Alternative protein sources are becoming increasingly viable for both human consumption and animal feed in land-based and aquatic farming. Advances in plant-based, cell-cultured, mycoprotein, and precision fermentation technologies are rapidly transforming the market, offering products that closely replicate the taste, texture, and aroma of conventional animal-based meat and dairy products.

Among these, plant-based meat alternatives have seen significant consumer adoption, with global sales exceeding USD 5 billion in 2021. Market projections indicate continued expansion, with sales expected to reach nearly USD 15 billion by 2027 and potentially USD 85 billion by 2030¹⁰¹. The increasing demand for plant-based foods reflects a shift in dietary preferences driven by both health and environmental considerations.

Major industry players, including Nestlé, anticipate substantial growth in the plant-based food sector. Beyond the health benefits, plant-based diets contribute to broader sustainability goals by reducing reliance on resource-intensive livestock farming¹⁰². This shift supports environmental conservation efforts while addressing ethical concerns related to animal welfare. The growing market for alternative proteins highlights a global movement towards more sustainable, ethical, and innovative food solutions, positioning plant-based and alternative protein sources as key drivers of the future food industry.

The Malaysian Food and Beverage (F&B) sector is a rapidly expanding industry and a key contributor to the nation's economy. Projections indicate that the industry will grow by 8% in 2023¹⁰³. As consumer preferences evolve, the market is experiencing a significant shift towards healthier diets and sustainable food products, in line with the global trends.

Insights from the Tetra Pak Index 2023 reveal that 75% of Malaysian consumers prioritise health when selecting food and beverages, reflecting growing awareness of nutrition's role in overall well-being.

Additionally, 62% of consumers actively seek products labelled as "healthy" or "nutritious", highlighting a shift away from traditional dietary patterns toward a more health-conscious approach.

Beyond health considerations, sustainability is increasingly influencing purchasing decisions. According to the same index, 72% of Malaysian consumers are willing to pay more for environmentally friendly products, demonstrating greater awareness of the ecological impact of food production and packaging. Furthermore, 63% prefer brands that demonstrate a clear commitment to sustainability¹⁰⁴.

In response to these shifting preferences, Malaysia's F&B industry is undergoing a transformation, with brands focusing on healthier and more sustainable options. From plant-based meat substitutes and dairy alternatives to innovative packaging solutions, companies are adapting to meet evolving consumer demands. The rise of Plant-Based Animal Product Alternatives (PB-APAs) presents a highly viable approach to reducing animal product consumption, as these alternatives align with consumer priorities of taste, price, and convenience¹⁰⁵.



*plant-based
meat*

¹⁰¹Thornton et al. (2023). Alternative sources of protein for food and feed. *Current Opinion in Environmental Sustainability*, 62.

¹⁰²Eswaran, V. (2018). Vegetarianism is good for the economy too. *World Economic Forum*.

¹⁰³Shaping the future of Malaysia's food and beverage landscape. (2024, January 01). *The Sun*.

¹⁰⁴Gilchrist, L. (2023, October 25). The future of health and nutrition – Tetra Pak Index 2023. *Ipsos*.

¹⁰⁵Bryant, C. J. (2022). Plant-based animal product alternatives are healthier and more environmentally sustainable than animal products. *Future Foods*, 6.

Alternative Food

Cultured meat, also known as cultivated meat, is produced using biotechnology by cultivating animal tissue cells in a controlled laboratory environment rather than through conventional livestock farming¹⁰⁶. This emerging technology addresses multiple concerns associated with traditional meat production, including ethical, environmental, religious, public health, and economic factors. As global food demands rise, cellular agriculture presents an innovative solution to reduce reliance on conventional farming, lower resource consumption, and enhance food security.

Recognising the potential of biotechnology, Malaysia's Ministry of Science, Technology, and Innovation (MOSTI) has positioned it as a key pillar in addressing national food security challenges. The Malaysian Bioeconomy Development Corporation, an agency under MOSTI, actively supports local companies in developing biotechnology-driven solutions to mitigate food supply shortages, rising production costs, and price fluctuations. While biotechnology alone may not resolve all challenges, its applications in molecular breeding, tissue culture, and sustainable agriculture hold great promise for transforming the country's food production landscape.

Additionally, advancements in cellular agriculture are paving the way for lab-grown meat production, with Malaysia actively exploring this sector. The recent launch of a cultivated meat conference marks a significant milestone in the country's efforts toward future-proofing its food systems¹⁰⁷.

Forecasts indicate that lab-grown meat could become mainstream by 2040, and Malaysia aims to capitalise on this shift by planning its first cultivated meat production facility. However, for this initiative to succeed, strong collaboration between the public and private sectors is essential. Effective policy implementation, coupled with comprehensive consumer education and engagement programmes, will be pivotal in shaping public acceptance and fostering a resilient, biotechnology-driven food system in Malaysia.

The exploration of insect-based nutrition is gaining global attention as a sustainable alternative to traditional protein sources. The FAO has identified edible insects as a promising solution to food security challenges¹⁰⁸, offering a rich source of protein, essential amino acids, vitamin B12, iron, zinc, fiber, and omega-3 and omega-6 fatty acids. In addition to their nutritional value, edible insects present environmental benefits, including lower greenhouse gas emissions, reduced agricultural land use, and improved feed conversion efficiency compared to conventional livestock.



*Cultivated
meat*

¹⁰⁶Arujanan, M. (2023, March 28). Cultivated meat for M'sian consumers in 2025. The Petri Dish

¹⁰⁷The first Malaysia Cultivated Meat Conference was held in 15th and 16th March 2023, at Kuala Lumpur Convention Centre. Organised by Cell Agritech Sdn. Bhd, the conference aimed to gather all the government agencies relevant to cellular agriculture and biotech industries, food manufacturers, investors, regulatory bodies, higher institutions, researchers, players along the supply chains of cellular agriculture and future food frontliners who are interested on the growth market in this aspect.

¹⁰⁸FHA-Food & Beverage. (2023, October 06). Exploring Insects as A Sustainable Food Source.

Despite their small size, insects provide high-density nutrition with superior feed efficiency. For example, crickets require only 2kg of feed to gain 1kg of weight, significantly outperforming traditional livestock in terms of resource efficiency while generating lower emissions. Mealworms, another widely studied edible insect, contain higher levels of unsaturated omega-3 fatty acids than pork and beef. Additionally, insect farming contributes to waste valorisation by converting food waste, agricultural residues, and organic byproducts into nutrient-rich insect-based products, further enhancing sustainability.

In Malaysia, the acceptance of edible insects as food varies across regions and cultures. Entomophagy (the practice of consuming insects) has historical significance in certain indigenous communities, particularly in Sabah, where a diverse range of edible insect species has been traditionally consumed. These include honeybee brood, grasshoppers, and sago grubs, which are commonly incorporated into local dishes such as stir-fries, soups, and snacks. However, despite this cultural precedent, mainstream acceptance of insect-based foods remains low due to sociocultural barriers and consumer perceptions¹⁰⁹.

The FAO has identified consumer acceptance as one of the primary challenges for scaling the insect protein industry¹¹⁰. Many consumers remain hesitant due to neophobia (fear of trying unfamiliar foods) and the perception of insects as pests rather than viable food sources. To address this, experts recommend incorporating insect-based ingredients into familiar food products, such as protein bars, pasta, and tortilla chips, rather than selling whole insects directly.

The insect protein industry faces regulatory hurdles, as international standards on food safety, production quality, and commercial viability are still developing. Research gaps remain in areas such as shelf stability

and risk assessments of insect-based products for human and animal consumption. Moreover, while global insect production is expanding, it remains relatively niche compared to traditional food and feed sources. The FAO suggests that scaling up production is essential to establish insect protein as a viable and competitive alternative in the global market.

Malaysia is also at the forefront of insect-based animal feed innovation. The Black Soldier Fly (BSF) is emerging as a sustainable alternative to conventional animal feed, reducing the environmental impact of livestock farming while offering high nutritional value. This approach aligns with Malaysia's commitment to sustainable food systems, supporting both human and animal nutrition while mitigating resource constraints.

One of Malaysia's leading insect meal manufacturers, Entofood, has successfully penetrated the European pet food market, marking a significant milestone in the expansion of insect-based protein. The company specialises in converting organic waste into high-quality insect protein, reflecting a sustainability-driven approach to alternative proteins¹¹¹. The European Union's approval of Entofood's products underscores the growing global acceptance of insect-based proteins, particularly in pet nutrition and animal feed applications.



Edible insects

¹⁰⁹Chun et al. (2002). Edible insects and Entomophagy in Sabah, Malaysia. *Malayan Nature Journal*, 56(2), 131-144.

¹¹⁰FAO. (2021). Looking at edible insects from a food safety perspective: Challenges and opportunities for the sector.

¹¹¹Buelva, A. (2023, May 22). Malaysian insect meal maker breaks into EU pet market. *Pet Food Industry*.

Alternative Healthy Food Source

Malaysia is experiencing rising rates of NCDs, including obesity, diabetes, and cardiovascular diseases, largely due to the increased consumption of processed and high-calorie foods. As dietary patterns shift toward convenience-driven consumption, the overreliance on refined grains and diets high in fats and sugars has exacerbated health concerns nationwide. In response, the Malaysian Dietary Guidelines (MDG) 2020 indicates the need for healthier dietary practices, advocating for increased intake of whole grains, plant-based proteins, and fiber-rich foods. Expanding the national food supply to include diverse, nutrient-dense alternatives can address both health and food security challenges, while promoting a more sustainable agricultural system.

Millet and sorghum are emerging as viable alternatives to conventional grains such as rice and wheat. These drought-resistant crops provide essential micronutrients, fiber, and slow-digesting carbohydrates, making them particularly beneficial for individuals managing diabetes and metabolic disorders. Unlike refined grains, which contribute to blood sugar spikes, millet and sorghum offer a gradual energy release, reducing the risk of insulin resistance. Given their climate resilience, these grains also hold significant potential for enhancing Malaysia's food security by reducing dependence on imported staples and mitigating risks associated with climate-induced crop failures.

Oat is another whole grain with strong potential for integration into Malaysia's food system. Rich in beta-glucan fiber, oats play a key role in reducing cholesterol, supporting heart health, and improving digestive function. Research has linked regular oat consumption to lower risks of cardiovascular diseases and improved weight management, aligning with public health objectives to curb lifestyle-related illnesses. The development of Malaysia's first oat mill in Pulau Pinang signals a growing interest in diversifying the grain sector, presenting an opportunity to increase domestic production and reduce reliance on imports.

Legumes and pulses serve as nutrient-dense plant-based proteins, providing a cost-effective and sustainable alternative to animal protein. These protein-rich foods are also excellent sources of dietary fiber, iron, and essential amino acids, which are vital for balanced nutrition. Incorporating legumes and pulses into daily diets aligns with the MDG's emphasis on increasing dietary fibre intake and reducing dependence on red meat.

As Malaysia works toward enhancing food self-sufficiency, expanding the production and consumption of legumes can help bridge nutritional gaps while alleviating environmental pressures associated with livestock farming.

The increasing focus on climate-resilient and resource-efficient crops reflects Malaysia's need to safeguard food security amid climate change and environmental degradation. The production of traditional staples such as rice and wheat is becoming increasingly volatile due to extreme weather patterns, water scarcity, and declining soil fertility. In contrast, alternative grains such as millet, sorghum, and oats require fewer inputs, less irrigation, and can thrive on marginal lands, making them practical solutions for ensuring long-term agricultural sustainability. Similarly, legumes contribute to soil health by fixing nitrogen, thereby reducing the need for synthetic fertilisers.

Beyond health and sustainability, the integration of these alternative food sources presents significant economic opportunities. The growing global demand for functional foods and plant-based nutrition positions Malaysia to expand its role in the alternative food market. Investments in research, processing infrastructure, and commercialisation efforts can help unlock the full potential of these underutilised crops, creating new revenue streams for farmers, food producers, and the agro-industrial sectors.



Fiber-rich foods

Conclusion

The future of food in Malaysia must be rooted in both practical readiness and long-term sustainability and ensuring that food security strategies align with climate resilience, consumer acceptance, and economic viability. While cultured meat and insect-based proteins have been widely discussed as emerging global food solutions, their feasibility in Malaysia remains limited at this stage due to technological constraints, regulatory challenges, and sociocultural perceptions. Given the high costs of production, evolving regulatory frameworks, and public hesitancy toward lab-grown and insect-based food products, these options remain premature for large-scale adoption within NFSP 2030.

Instead, Malaysia's immediate focus should be on alternative food sources that are both climate-ready and consumer-ready. Millet, sorghum, oats, legumes, pulses and soy-based products present viable solutions that align with Malaysia's climatic conditions, nutritional needs, and agricultural capabilities. These food sources offer a sustainable alternative to conventional staples like rice and wheat, which are increasingly vulnerable to climate change and resource constraints. Unlike high-tech solutions such as cultivated meat, these climate-resilient crops require minimal adaptation to be integrated into Malaysia's food system and can immediately contribute to food security and dietary diversification.

The MDG emphasises on whole grains, plant-based proteins, and fiber-rich foods, indicating consumer readiness for a shift toward healthier and more sustainable diets. Given the growing awareness of nutrition and increasing demand for functional foods, promoting millet, sorghum, and oats as

alternatives to refined grains aligns with both public health objectives and food security goals. Similarly, legumes, pulses, and soy-based products are already part of Malaysia's traditional food culture, making their expansion into mainstream consumption more achievable compared to novel protein sources like insects or lab-grown meat.

From an economic and agricultural perspective, prioritising climate-ready crops strengthens domestic food production and reduces reliance on imports. Expanding the cultivation and processing of millet, sorghum, and legumes can diversify Malaysia's agricultural sector, creating new income streams for farmers while ensuring food affordability and accessibility.



CASE
STUDYIndonesia's Adoption of Sorghum
as an Alternative Staple Food

Indonesia is reintroducing the farming of sorghum, a popular staple food in the old days, as it seeks to expand its staple food sources beyond rice and wheat. The rice-eating country is aiming to have 30,000 hectares of sorghum plantations by end of 2023, and 40,000 hectares by 2024, from less than 10,000 hectare today¹¹².



Sorghum is a gluten-free and nutrient-rich crop that can replace rice in times of need. It is drought-resistant and grows where the soil cannot produce vegetables.

- Indonesia Expat¹¹³

Indonesia, like other countries in Southeast Asia, has historically relied heavily on rice as its staple food that deeply embedded in the cultural and culinary traditions of its people. However, with the changing climate patterns affecting agricultural productivity and concerns over the sustainability of rice cultivation, the Indonesian government has recognised the need to explore alternative staple crops to ensure food security for its vast population. The country's heavy dependence on rice leaves it vulnerable to various risks, including climate change-induced droughts, floods, and pest infestations.

¹¹²Siregar, K. (2023, January 12). 'It will be just like rice': Why Indonesia turns to sorghum as alternative staple food. CNA.

¹¹³Susetyo, G. (2017, April 26). Maria Loretha: Championing Sorghum, Flores' Crop of Hope. Indonesia Expat.

Key Factors Driving the Adoption of Sorghum in Indonesia

Sorghum, a drought-tolerant grain native to Africa, has gained attention globally for its adaptability to diverse agro-climatic conditions and its nutritional value. Rich in carbohydrates, protein, and micronutrients, sorghum offers a viable option for enhancing food security in regions prone to erratic weather patterns. By diversifying crop options, Indonesia aims to mitigate the risks associated with climate change-induced agricultural disruptions.

Sorghum is a nutrient-dense grain, rich in essential vitamins, minerals, and dietary fiber, making it a valuable tool in combating malnutrition and improving public health, especially in rural areas with limited food diversity. Economically, Indonesia has demonstrated that sorghum cultivation provides smallholder farmers with a resilient, income-generating crop, even under challenging climatic conditions. Expanding its production can diversify agriculture, strengthen rural livelihoods, and support poverty alleviation efforts. While the Indonesian government is actively promoting sorghum cultivation, challenges such as consumer preferences, adaptation of agricultural practices, and sustainability of cropping systems remain key considerations in advancing the sector.

Firstly, introducing sorghum as a staple food requires overcoming cultural preferences and deeply ingrained dietary habits centred around rice consumption. Therefore, educating consumers about the nutritional benefits and culinary versatility of sorghum is essential for fostering its acceptance and adoption. The popular story of Maria Loretha, better known as “Mama Sorghum”, highlights her persistence in promoting sorghum cultivation and challenging mindsets shaped by decades of government policies favouring the expansion of mass rice production. She also confronted cultural perceptions that associated the consumption of “inferior crops”, typically grown as animal fodder or backup staples during rice shortages in the dry season, as “poverty-stricken”.

It is undeniable that adapting agricultural practices and infrastructure to accommodate sorghum cultivation poses logistical challenges. Training programmes and extension services are needed to support farmers in adopting suitable agronomic techniques and optimising yields. Additionally, establishing a market for sorghum products requires collaboration between government agencies, private sector stakeholders, and civil society organisations. Investment in value chain development, processing facilities, and marketing initiatives is also crucial to creating demand and ensuring the sustainability of sorghum production.

Indonesia’s embrace of sorghum as an alternative staple food sets a model for other countries grappling with food security challenges exacerbated by climate change. By diversifying food sources and promoting resilient crops like sorghum, nations can build more resilient food systems capable of withstanding environmental shocks and safeguarding the well-being of their populations. Continued research, policy support, and stakeholder engagement are essential for scaling up sorghum adoption and realising its full potential in addressing global food security concerns.

Indonesia's Adoption of Sorghum as an Alternative Staple Food



KEY TAKEAWAYS

The case study on Indonesia's successful adoption of sorghum as an alternative staple food serves as a compelling example for Malaysia, particularly for states like Kedah and Perlis, to explore sorghum cultivation. This venture holds immense potential for enhancing food security and attracting investment while simultaneously diversifying crops and improving farmers' income.

On the other hand, sorghum is not only suitable as a dietary option but is also regarded as a highly promising raw material for animal and pet feed¹¹⁴. In Malaysia, people consume less sorghum as it is culturally less preferred as a staple food. However, according to an industry player in the *Kampung Ayam Saga* from Sarawak, sorghum has been cultivated as a raw material for producing feeds for *Ayam Saga*.

Additionally, cultivating sorghum presents an opportunity to produce raw materials for animal feed, as demonstrated by poultry farmers in Sarawak. This initiative can reduce dependence on imported feed ingredients, strengthen local farming capabilities, and promote self-sufficiency in animal feed production.



¹¹⁴Mohd et al. (2022, November 07). Sorghum as a new source of animal feed in Malaysia. FFTC-AP Platform.

Key Food Items

Unhealthy dietary habits, compounded by sedentary lifestyles, continue to fuel the rise in diet-related Non-Communicable Diseases (NCDs). In response to this public health challenge, the Ministry of Health (MOH) has introduced dietary guidelines aimed at promoting balanced and nutritious eating patterns.

MALAYSIAN FOOD PYRAMID 2020

Guide to your **DAILY** Food Intake

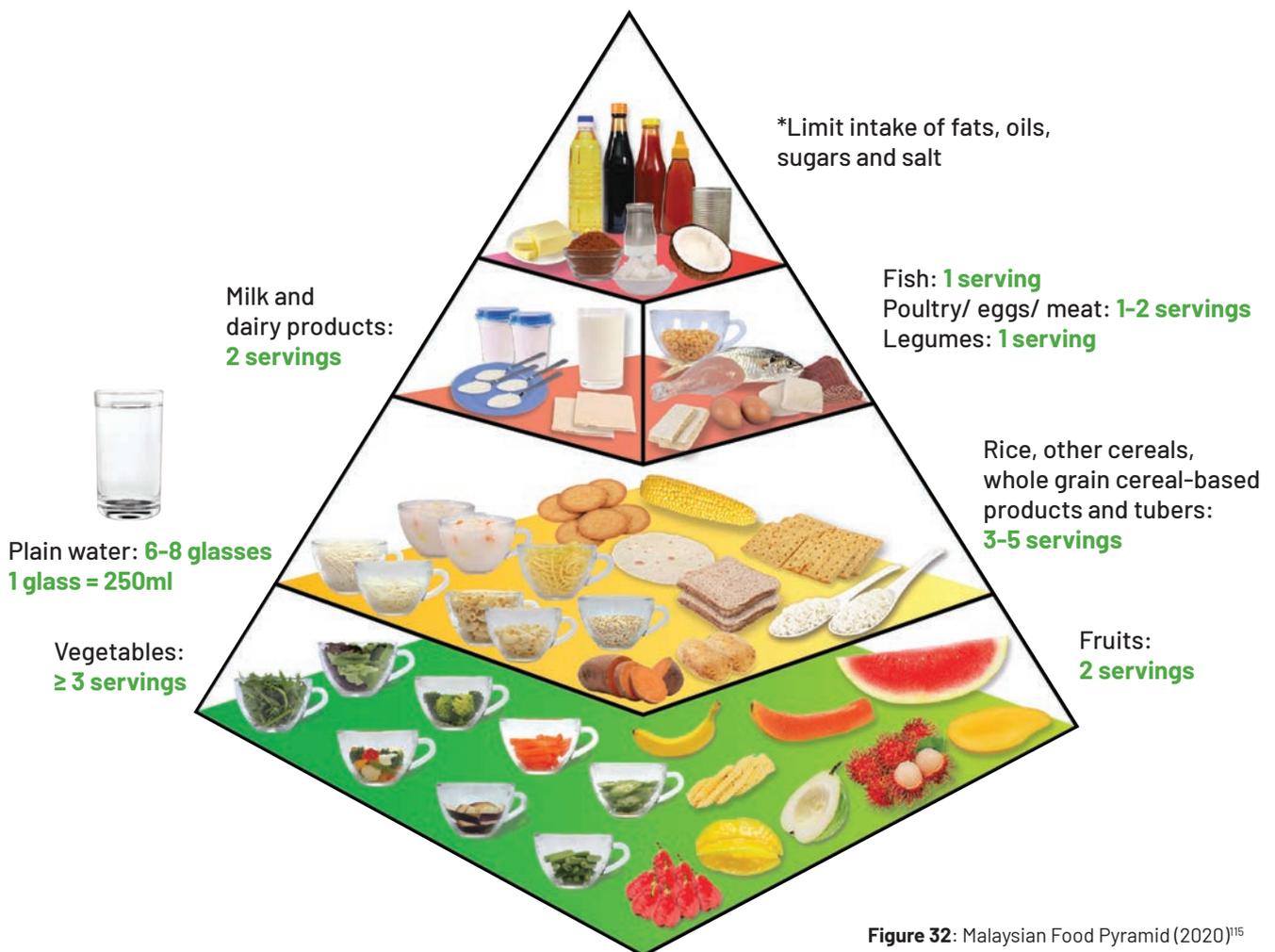


Figure 32: Malaysian Food Pyramid (2020)¹⁵

A well-rounded diet should incorporate a variety of choices from the five primary food groups:

1. Vegetables
2. Fruits
3. Rice, other cereals, whole grains, and tubers
4. Fish, poultry, eggs, meat, and legumes
5. Milk and dairy products

¹⁵MOH Malaysia. (2020). Malaysia Dietary Guidelines 2020.

Based on Malaysian consumption trends and alignment with the MDGs, eight (8) key food items have been prioritised in NFSP 2030. However, this does not exclude alternative crops such as legumes, sorghum, and millet, which are also supported under this policy. These alternative crops are promoted for their climate resilience and their alignment with the MDGs. The eight prioritised food items are:



1. Rice



2. Fisheries



3. Poultry



4. Eggs



5. Meat



6. Fruit



7. Vegetables



8. Milk

An in-depth analysis was conducted for each of the eight prioritised food sectors to identify key supply chain constraints. A common set of challenges emerged across these sectors, leading to the development of targeted initiatives aimed at addressing these overarching issues, rather than benefiting only individual sectors.

However, the paddy sector was treated separately, given its critical role in the Malaysian diet and its designation as a key strategic sector. Due to its national significance, a dedicated strategy has been developed specifically for the paddy sector to ensure long-term sustainability and resilience.





**THE
CHALLENGES**

4.0 KEY CHALLENGES IN MALAYSIA AGROFOOD SYSTEMS

The NFSP 2030 takes a holistic approach to address Malaysia's agrofood system challenges. While the policy emphasises eight (8) key sectoral issues (including rice, meats, poultry, fisheries, vegetables, fruits, eggs, and milk) and the development of healthy and alternative food production, its framework is grounded in the Sustainable Food Systems Model.



Beyond production and supply chain concerns, the NFSP 2030 recognises the critical need to address malnutrition and its long-term implications. Issues such as stunting, obesity, and nutrient deficiencies not only impact individual well-being but also pose broader societal and economic risks, including lower productivity and higher healthcare expenditures. To combat these challenges, the NFSP 2030 places significant emphasis on fostering a healthy food environment by promoting dietary diversity, alternative food sources, and access to nutritious food options for all Malaysians.

A sustainable food system is defined as a system that ensures food security and nutrition for all in a manner that preserves the economic, social, and environmental foundations without compromising them for future generations. It encompasses every aspect of the food value chain, from production and processing to distribution and consumption, while aiming to minimise environmental degradation, promote social equity, and maintain economic viability.

Agriculture GHG Emissions

Malaysia contributes 0.8% to global Greenhouse Gas (GHG) emissions and has committed to achieving net-zero emissions by 2050. According to Malaysia's 2019 GHG inventory, as outlined in the National Energy Transition Roadmap (NETR), the energy sector is the largest emitter, accounting for 78% of total emissions, followed by Industrial Processes and Product Use (IPPU) at 10%, waste at 9%, and agriculture at 3%.

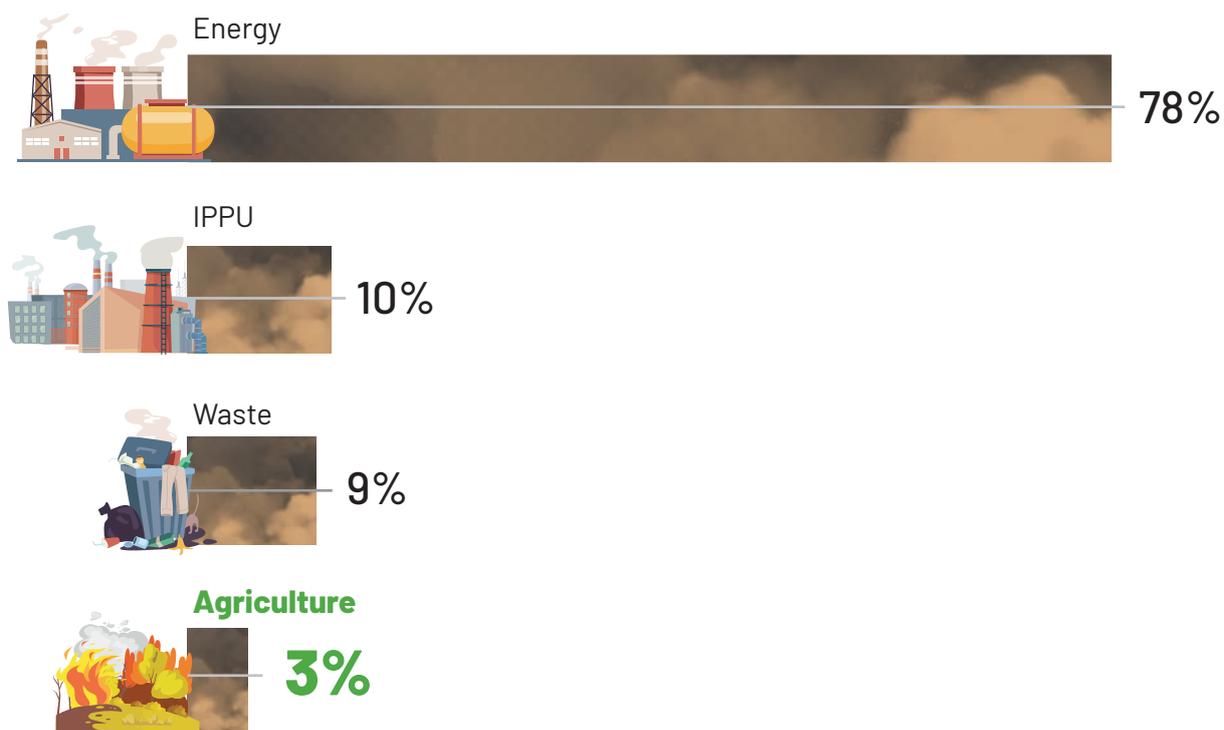


Figure 33: Malaysia's 2019 GHG Inventory

Within the agriculture sector, emissions totalled 9,921.71 Gg CO₂ equivalent in 2019, comprising carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O). The primary sources of emissions in agriculture include livestock, biomass burning, liming, urea application, and both direct and indirect N₂O emissions from managed soils and rice cultivation.

The largest contributor to agricultural emissions was direct N₂O emissions from managed soils, accounting for 3,736.73 Gg CO₂ eq. (37.66%), followed by rice cultivation at 2,268.98 Gg CO₂ eq. (22.87%), enteric fermentation at 1,224.46 Gg CO₂ eq. (12.34%), and indirect N₂O emissions from managed soils at

1,053.28 Gg CO₂ eq. (10.62%). Other contributors include manure management (660.10 Gg CO₂ eq., 6.65%), indirect N₂O emissions from manure management (541.90 Gg CO₂ eq., 5.46%), and urea application (389.89 Gg CO₂ eq., 3.93%). Emissions from liming (21.67 Gg CO₂ eq.) and biomass burning (24.70 Gg CO₂ eq.) were minimal, each contributing less than 1% of the total.

Compared to the baseline year of 2005, agricultural GHG emissions in 2019 were 3.34% lower, driven primarily by reductions in the non-dairy cattle and buffalo populations and decreased fertiliser usage¹¹⁶.

¹¹⁶NRES Malaysia. (2022). Fourth Biennial Update Report Under the United Nations Framework Convention on Climate Change.

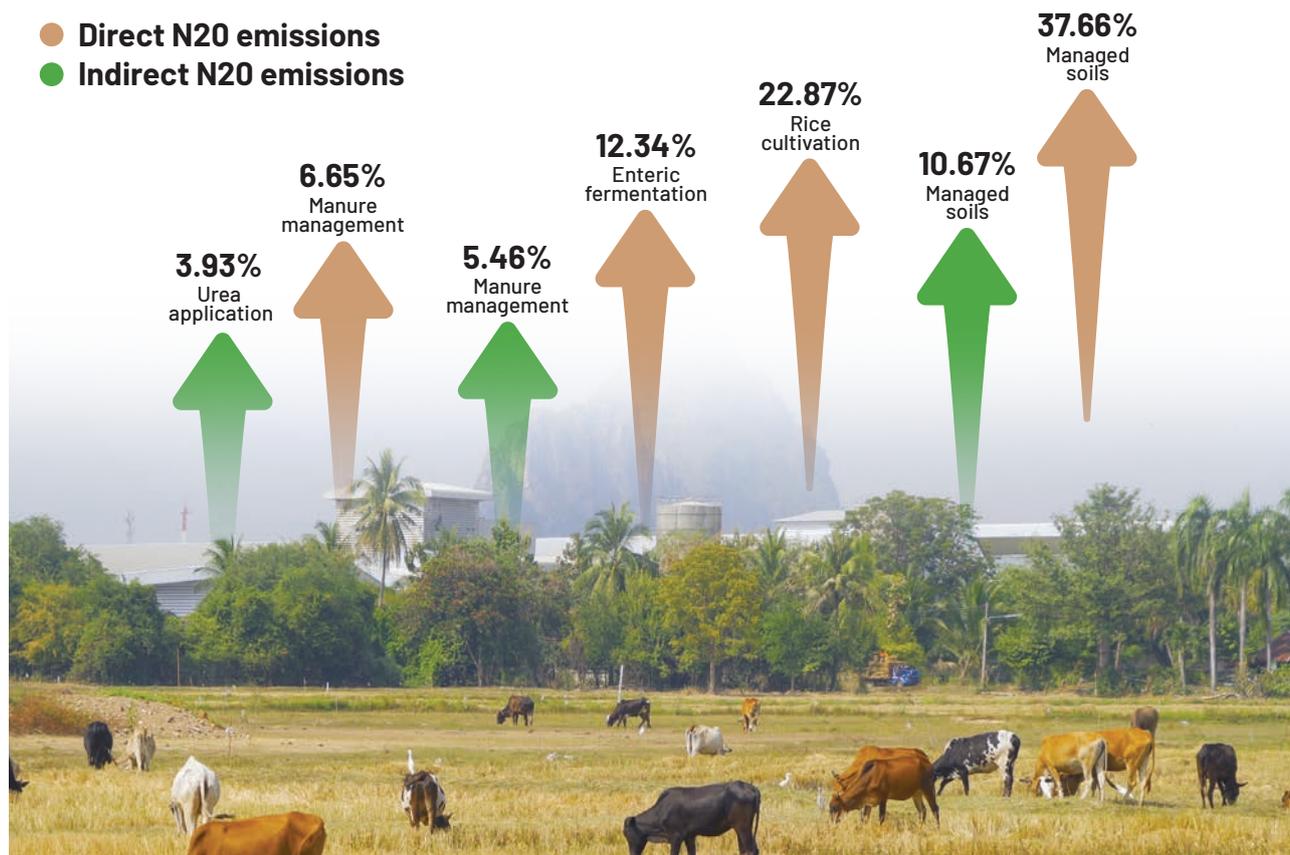


Figure 34: Contributors to Malaysia's Agricultural Emissions

Sustainable Practice in Agriculture

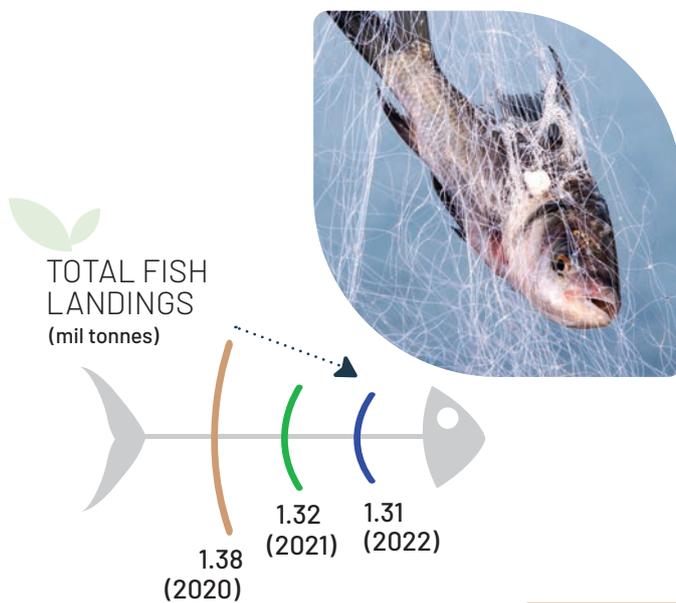
Sustainable practices in agriculture are vital for addressing the growing global demand for food while ensuring the conservation of natural resources, the protection of ecosystems, and equitable socioeconomic benefits for communities. Agriculture serves as the backbone of global agrofood systems, but if not managed sustainably, the practices can lead to significant environmental degradation, social inequities, and economic instability.

Unsustainable agricultural practices have profound and far-reaching impacts on the environment, society, and economy. Environmentally, intensive farming often leads to soil erosion, fertility loss, and desertification, while over-irrigation and inefficient water management deplete freshwater reserves, jeopardising future agricultural needs. These practices also contribute significantly to climate change, with greenhouse gas emissions arising from methane in livestock, nitrous oxide from fertilisers, and carbon dioxide from deforestation and land-use changes. Furthermore, monocropping and habitat destruction for agricultural expansion reduce biodiversity, weakening ecosystem resilience and the natural regulation of pests and diseases.

Socially and economically, unsustainable practices disproportionately affect marginalised communities, particularly smallholders, who often lack access to essential resources, technology, and markets, trapping them in cycles of poverty. Economic instability is exacerbated as these practices foster reliance on single crops, leaving farming systems highly vulnerable to market shocks and climate variability. Together, these issues highlight the urgent need for transitioning to sustainable agricultural practices to ensure long-term ecological, social, and economic resilience.

Unsustainable Practice in Marine Capture Fisheries

The capture fisheries industry in Malaysia is currently facing increasingly severe challenges due to overfishing, illegal activities, and destructive fishing practices. These factors have directly contributed to the depletion of critical fish stocks, which in turn undermines the country's ecological and economic stability. The overexploitation of marine resources, particularly driven by Illegal, Unreported, and Unregulated (IUU) fishing has led to a sharp decline in fish populations and disrupted the balance of marine ecosystems.



For example, in Kedah, marine life populations have plummeted by 45%, compelling fishermen to resort to capturing juvenile and breeding fish due to the scarcity of mature species. In addition, data reported by the Department of Fisheries (DOF) paints a concerning picture with regard to the sustainability of fish stock in Malaysia. In 2022, fish landings totalled only 1.31 million tonnes, compared to 1.32 million tonnes in 2021 and 1.38 million tonnes in 2020, across Malaysia¹⁷⁷.



Illegal fishing practices, including the use of destructive tools such as bubu naga, have further aggravated the situation. These devices indiscriminately capture various marine species, including juveniles and breeding fish, disrupting biodiversity and undermining long-term sustainability. The accessibility of such equipment through online platforms complicates enforcement efforts and perpetuates unsustainable practices.

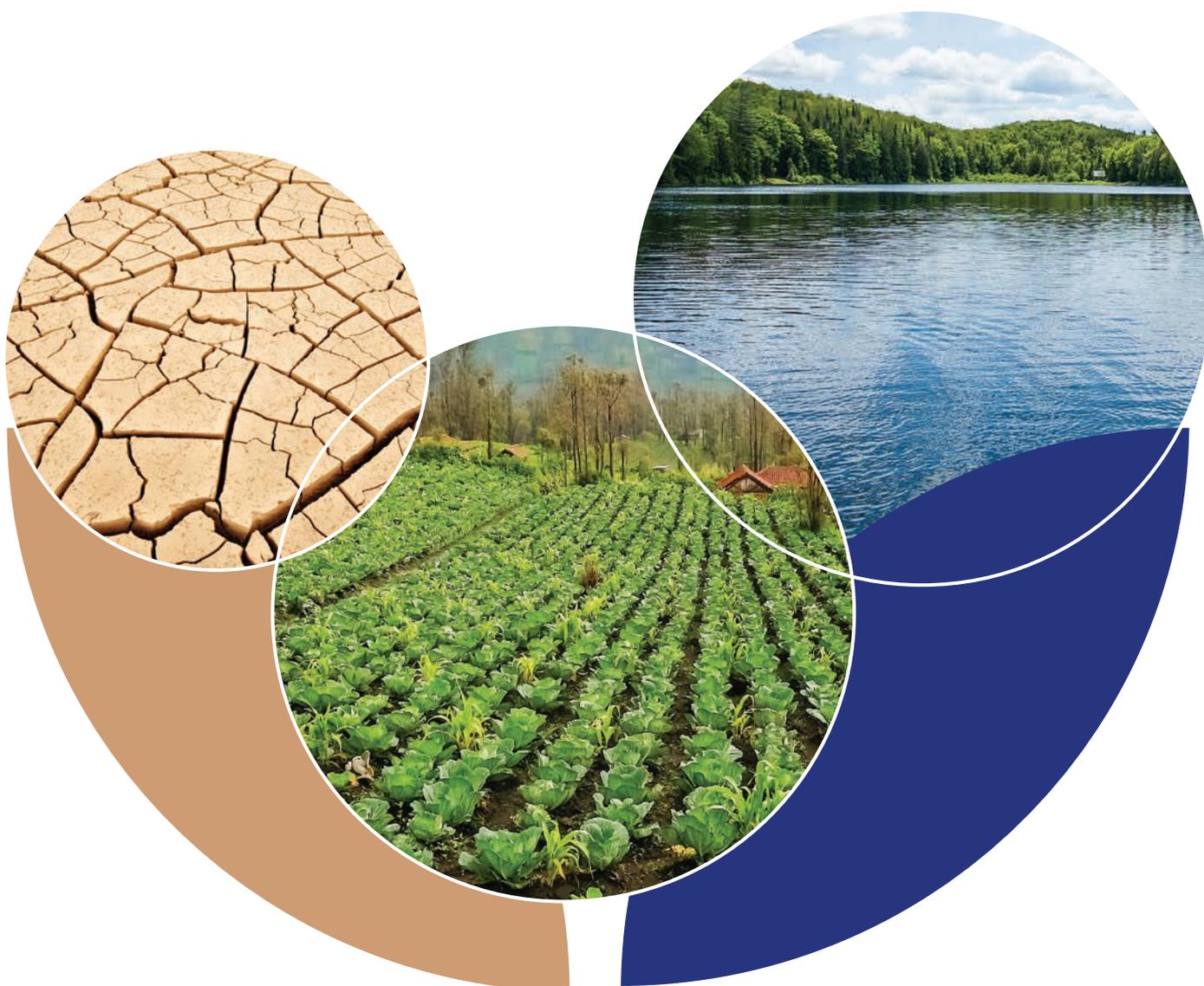
Additionally, encroachment into restricted fishing zones, particularly Zone A, by vessels from Zones B and C, has led to the overexploitation of coastal resources, reducing fish availability and causing conflicts within the fishing community.

¹⁷⁷Fish catch is fast declining. (2023, November 3). The Star.

Food Systems Resilience

Food systems resilience refers to the capacity of a food system to withstand and recover from adverse shocks and stressors while maintaining its essential functions, particularly in ensuring sufficient, appropriate, and accessible food for all. This resilience is critical in addressing the increasing vulnerabilities posed by climate change, economic fluctuations, and socio-political instability.

Food systems resilience is a critical component of achieving the stability dimension of food security. External shocks, such as climate events, economic disruptions, or pandemics, are often beyond human control, making preparedness and mitigation essential to minimising their impacts.



Impact of Climate Change on Malaysia's Agrofood Systems

Climate change poses a **significant threat to Malaysia's agriculture**, particularly impacting rice production, a staple food for the population. Extreme weather events, rising temperatures, and water scarcity are among the key challenges undermining agricultural productivity and sustainability in the country.

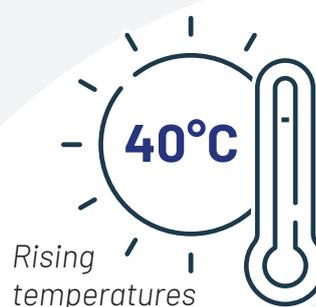
Malaysia has faced severe flooding events that have caused substantial agricultural losses. For instance, the 2014 floods in Kedah resulted in approximately RM299 million in damages to crops and infrastructure. More recently, the 2021 floods in Selangor led to an estimated RM6.1 billion in overall losses, with the agricultural sector experiencing significant setbacks (RM90.6 million)¹¹⁸. Such extreme weather events disrupt farming operations, damage critical infrastructure, and heighten food insecurity by reducing the availability and accessibility of essential resources.

Rising temperatures during dry seasons have further strained Malaysia's agricultural systems. Temperatures reaching up to 40°C have created unfavourable conditions for rice cultivation, significantly reducing water availability for irrigation. Research indicates that rising temperatures in Malaysia, particularly during dry seasons when they can reach up to 40°C, pose a severe threat to rice cultivation. Elevated heat levels disrupt the optimal growing conditions required for rice, adversely affecting critical stages such as flowering and grain filling.

This leads to reduced crop quality and yield. Projections suggest that if these trends continue, rice yields could decline by as much as 31% over the next decade¹¹⁹. Such reductions could increase reliance on imports, exposing the country to global market volatility and higher costs, while also threatening the livelihoods of smallholder farmers.



In addition to these challenges, climate change intensifies soil degradation and water scarcity. Higher temperatures and unpredictable rainfall patterns contribute to soil erosion and the loss of fertility, undermining agricultural productivity. Water scarcity, driven by inconsistent rainfall and heightened evaporation rates, compounds the difficulties faced by rice farmers and other agricultural stakeholders.



¹¹⁸Bedi, R. S. (2022, January 28). Malaysia massive floods result in RM6.1 billion losses, Selangor worst hit. CNA.

¹¹⁹Negin et al. (2015). Impact of climate change on food security in Malaysia: Economic and policy adjustments for rice industry. Journal of Integrative Environmental Sciences, 13(1), 19-35.

Trade Dependency and Food Security

For countries with limited agricultural capacity or those vulnerable to supply chain disruptions, trade serves as a critical mechanism to ensure access to essential food supplies and maintain dietary stability. However, as globalisation advances, the complexity of agrofood systems continues to grow, presenting both opportunities and challenges.

In Malaysia, reliance on trade is particularly pronounced, with the country heavily dependent on a limited number of partners for key food imports. Over 80% of certain critical goods, including rice and frozen meat, are sourced from the top three trading partners. While this trade activity helps bridge domestic production gaps, it also exposes Malaysia to significant risks, including supply shortages and price volatility during external shocks such as trade disruptions, geopolitical tensions or climate-induced challenges. Diversifying import sources and strengthening regional trade partnerships are essential steps to mitigate these vulnerabilities and build resilience within the agrofood systems.

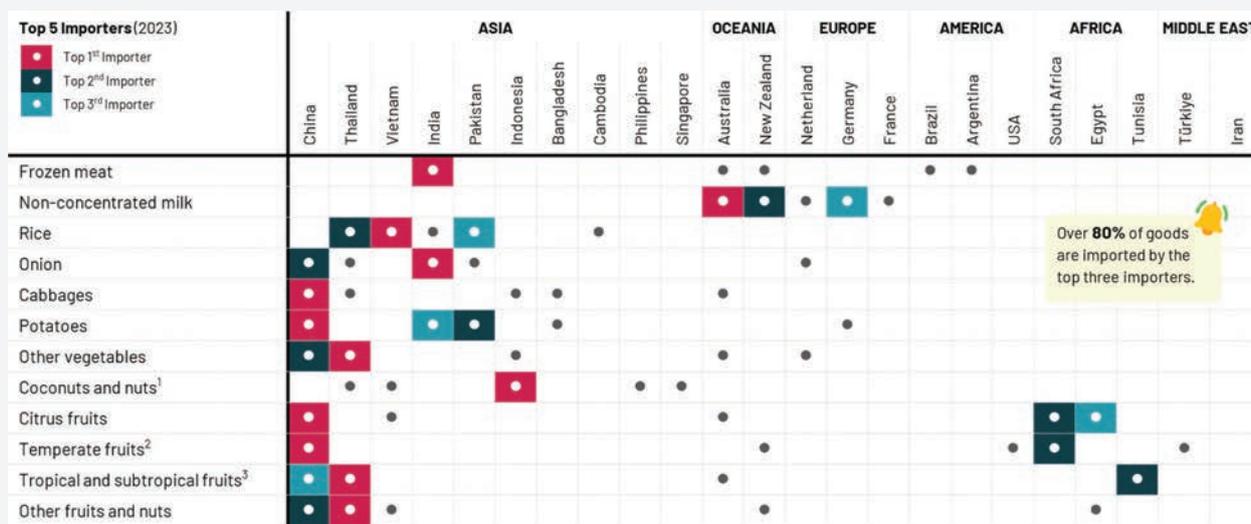


Figure 35: Malaysia's Top Importers for Various Food Items 2023

Source: UN Comtrade Database. (n.d.). Trade data.
 1. Nuts, Brazil nuts, Cashew nuts | 2. Apples, Pears, Quinces |
 3. Dates, Figs, Pineapples, Avocados, Guavas, Mangoes, Mangosteens

Figure 35 illustrates Malaysia's reliance on key international suppliers for various food items in 2023. The data reveals that several essential food products are heavily dependent on a limited number of countries. For example, frozen meat shows significant dependency, with India supplying over 80% of Malaysia's imports, highlighting significant vulnerability to disruptions in Indian exports. Similarly, rice, a staple food, is primarily sourced from Thailand, Vietnam, and Pakistan, which collectively contribute over 80% of the national supply. Imports of onions and potatoes are also heavily concentrated, with India being the dominant supplier, indicating potential risks should there be trade restrictions or production shortfalls in the region.

Trade Policies Role in Ensuring Food Security

Free Trade Agreements (FTAs) and regional trade arrangements play a pivotal role in enhancing access to diverse food items, addressing nutritional gaps, and promoting resilience. Malaysia has signed and implemented 16 FTAs, including notable agreements such as the Regional Comprehensive Economic Partnership (RCEP) and the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP), both implemented in 2022. These agreements collectively accounted for 67.3% of Malaysia's total trade in 2022, valued at RM1.92 trillion, with a trade surplus of RM221.94 billion. Beyond expanding market access, these FTAs foster transparency and long-term economic collaboration and support value-added industries.

Cooperation clauses within Malaysia's FTAs offer a strategic opportunity to enhance food security by fostering collaboration with trade partners in areas beyond market access. These clauses often include provisions for technology transfer, capacity building, joint research, and the development of sustainable agricultural practices. Additionally, partnerships forged through these clauses can facilitate the diversification of import sources, reducing over-reliance on a limited number of countries and mitigating risks associated with external shocks.

However, while trade liberalisation has improved food availability and affordability, it has also influenced dietary patterns, particularly in developing countries. Increased access to global markets has led to a rise in the consumption of energy-dense, ultra-processed foods with lower nutritional value. This duality underscores the urgent need for balanced trade policies that not only promote economic growth but also safeguard public health and nutrition¹²⁰.

Non-Tariff Measures (NTMs), including Sanitary and Phytosanitary (SPS) standards and Technical Barriers to Trade (TBT), play a dual role in shaping agrofood systems. These measures are critical for ensuring food safety and quality by addressing contaminants, additives, and labelling (SPS) and broader

issues such as nutritional labelling and product grading (TBT). Nevertheless, these regulatory frameworks can also increase trade costs, potentially affecting the affordability and diversity of diets. This highlights the importance of carefully designed policies that balance regulatory compliance with accessibility.

To navigate these complexities, trade and food security strategies must emphasise coherence between economic and health objectives. Leveraging FTAs and food systems diplomacy can minimise barriers, promote resilience, and achieve sustainable, inclusive, and nutritious outcomes across diverse socioeconomic contexts.

Recognising the limitations of prioritising economic interests alone, food systems diplomacy provides a comprehensive framework to balance the economic, health, social, and environmental dimensions of agrofood systems governance. This approach advocates policies that promote sustainable diets, equitable trade practices, and ecological resilience while addressing challenges such as climate change and resource degradation.

¹²⁰FAO. (2024). The State of Agricultural Commodity Markets 2024 – Trade and nutrition: Policy coherence for healthy diets.

Food Systems Diplomacy

Food scholars are advocating for Food Systems Diplomacy (FSD), a new approach to global food systems governance that prioritises considerations beyond economic interests. The FSD serves as a narrative and evaluative framework that incorporates multi-sectoral negotiations aimed at shaping the functionality of the global food system. It is the process through which nations, intergovernmental organisations, and non-state actors, including transnational companies, engage in negotiations to make decisions that influence food systems for a range of political, economic, or social objectives¹²¹.

The comparative assessment of Malaysia's Free Trade Agreements (FTAs) highlights significant gaps in alignment with the principles of FSD. While FTAs have enhanced market access and trade collaboration, they do not adequately address key food system challenges, including the promotion of sustainable agricultural practices, reduction of food waste, and mitigation of environmental impacts.

Furthermore, Malaysia's FTAs do not explicitly include measures to prioritise nutrition and public health. Addressing malnutrition and promoting access to nutrient-rich, locally produced foods requires policies that incentivise their production and ensure their affordability, particularly for vulnerable populations.

The absence of provisions for culturally appropriate foods further underscores the need to incorporate measures that preserve culinary heritage and food diversity. Additionally, the assessments indicate that Malaysia's FTAs could be strengthened to better promote equality within food systems by placing greater emphasis on gender equity, improving resource access for smallholders, and providing more robust support for marginalised communities. Incorporating these elements into its FTAs would enable Malaysia to enhance food security, public health, and sustainability, while fostering global collaboration and resilience.



¹²¹Pahwa, D. (2020). Defining Food Systems Diplomacy [Master's thesis, University of Washington]. ResearchWorks Archive.

The food systems diplomacy framework that considered the key dimensions of food systems is shown in Table 9:

Food Systems Domain	Food Systems Diplomacy Goals, with Key Dimensions
 <p>Population Health, including diet quality, nutritional status, and human health (including NCDs and occupational health)</p>	<p>Goal 1: Ensure there is enough food (quantity)</p> <p>Goal 2: Prioritise safe, nutritious food (quality)</p> <p>Goal 3: Ensure that all people can access and utilise these foods in ways that leads to improved nutritional status and health (distribution)</p> <p>Goal 4: Promote policies and infrastructure that support nutritious diets for future generations (quality, resilience)</p> <p>Goal 5: Consider occupational health (e.g., the health of farmworkers, restaurant workers and other labourers)(distribution, resilience)</p>
 <p>Social, including social equity (for example, safe and fair working conditions for labourers), cultural practices, and the religious and cultural appropriateness of food</p>	<p>Goal 6: Prioritise social equity outcomes for vulnerable groups, including women, farm workers, and other labourers, resource constrained households, and communities susceptible to climate change or agricultural/environmental exposures (distribution, resilience)</p> <p>Goal 7: Promote the production of and access to culturally appropriate foods (quantity, quality)</p> <p>Goal 8: Uphold dignity and minimise harm to cultural practices related to food (quality, resilience)</p>
 <p>Environmental, including relationships between agrofood systems and changes (such as climate change) and externalities associated with food production, processing, distribution, and waste</p>	<p>Goal 9: Promote diets with low environmental impact (quantity)</p> <p>Goal 10: Protect and restore the environment and its natural resources, including soil, water, air, forests, wildlife, and energy (quantity, quality)</p> <p>Goal 11: Mitigate and reverse climate change (quantity, quality, resilience)</p> <p>Goal 12: Build ecological resilience to disruptions that may impact agrofood systems (resilience)</p>
 <p>Economic, including affordability of food for consumers, and the economic viability of food production and other agrofood systems livelihoods</p>	<p>Goal 13: Leverage the global movement of foods in ways that build wealth for all nations (quantity, quality, distribution)</p> <p>Goal 14: Identify areas where agrofood systems change can contribute to long term economic growth (quality, resilience)</p> <p>Goal 15: Foster economic resilience, especially for developing economies (distribution, resilience)</p>

Table 9: Food Systems Domain and Food Systems Diplomacy Goals with Key Dimensions

Food Supply Chain, Consumer Behaviour and Food Environment

The structure and functionality of agrofood systems revolve around three interconnected components:

Food supply chains



Food environments



Consumer behaviour



These elements collectively shape the availability, accessibility, affordability, and quality of food, influencing dietary patterns and nutritional outcomes of populations.

Therefore, the NFSP 2030 examines the challenges within agrofood systems through the lens of these three core components.

Component 1



Agricultural Inputs

Food Supply Chain

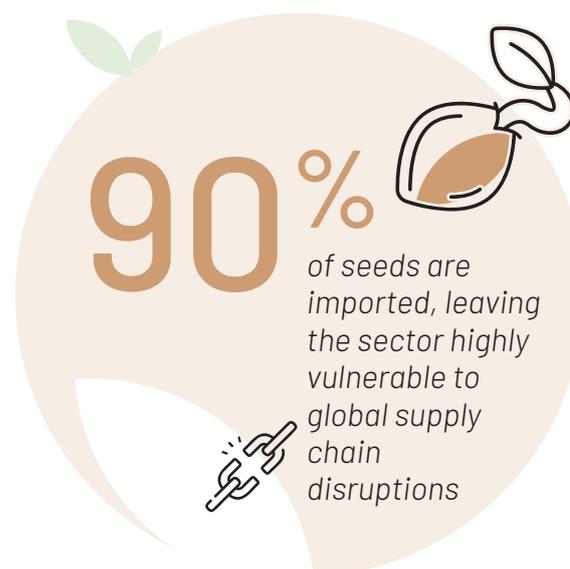
1. Seeds

The challenges surrounding seeds in Malaysia's agrofood system are multifaceted and impact productivity, sustainability, and resilience across sectors. One of the primary issues lies in the inconsistent quality and reliability of paddy seed supply, which significantly hinders agricultural productivity. Farmers frequently encounter poor germination rates even with certified seeds, leading to reduced yields and increased costs due to the need for replanting. Delays and shortages in seed distribution during critical planting seasons force farmers to rely on unregulated suppliers, increasing the risk of substandard quality. These challenges highlight the urgent need for a more reliable and efficient seed supply chain to support the country's agricultural goals.

In addition to supply reliability, the lack of access to a diverse range of high-quality seed varieties further intensifies challenges in the agrofood system. While advancements have been made in developing pest-resistant and high-yielding paddy seed varieties, farmers still report limited availability of options adapted to regional and environmental conditions. The issue is particularly acute in the vegetables and fruit sectors, where over 90% of seeds are imported, exposing the sectors to significant risks from global supply chain disruptions. Another critical issue is the pricing and affordability of certified seeds, which pose significant financial challenges for farmers, particularly smallholders. For crops like paddy, the elevated cost of key varieties, such as MR297, hinders farmers from maintaining cost-efficient operations. Moreover, within paddy sector, the regulatory and market systems governing seed production and distribution add another layer of complexity. The current framework is fragmented and restrictive, limiting farmers' ability to produce and sell their own seeds.

Further compounding the issue is the insufficient investment in Research and Development (R&D) for seed innovation. This deficiency hampers the development of innovative, climate-resilient, and pest-resistant seed varieties. Public-private partnerships in seed R&D and commercialisation remain underutilised, slowing progress in hybrid seed development and limiting the sector's ability to adapt to environmental changes and future challenges.

Finally, farmer awareness and adoption of locally produced seeds continues to pose a significant challenge. Many farmers prefer imported seeds due to perceived superior quality and performance, highlighting the need for targeted campaigns to promote the benefits of domestic seed varieties. Increasing farmer confidence in locally developed seeds through awareness programmes and demonstrations can reduce dependency on imports while supporting the growth of the domestic seed industry.



2. Fertilisers and Pesticides

Malaysia's agrofood system faces critical challenges related to the availability, affordability, and environmental impact of fertilisers and pesticide use. The sector is heavily reliant on imports, with the majority of chemical fertilisers and pesticides sourced from global markets. This dependency exposes the agrofood system to disruptions in supply chains, price volatility, and fluctuations in foreign exchange rates, which increase production costs for farmers and reduce profitability, particularly for smallholders.

Moreover, the excessive use and mismanagement of chemical fertilisers and pesticides have led to severe environmental degradation, including soil nutrient imbalances, water pollution, and harm to biodiversity. These practices also pose health risks to farmers and consumers due to improper application and residual

chemical contamination. Despite growing awareness of these issues, the adoption of sustainable alternatives, such as organic fertilisers and Integrated Pest Management (IPM), remains limited due to higher associated costs and limited access to innovative technologies.

Compounding these challenges is the fragmented regulatory and support framework for fertilisers and pesticides, which undermines effective oversight and the promotion of best practices across Malaysia's agrofood system. Responsibility for regulating fertilisers and pesticides is divided among multiple agencies, leading to overlapping mandates, inconsistent regulatory enforcement, and gaps in monitoring.

3. Feedstuff

Malaysia's agrofood sector heavily dependent on imported feedstuff, such as maize and soybeans, for livestock and aquaculture, making the industry highly vulnerable to external market shocks and price volatility. Despite local production initiatives, such as cultivating Napier grass and using Palm Kernel Cake (PKC), these alternatives remain underutilised.

The domestic feed industry, comprising 44 mills, primarily focuses on poultry feed¹²², with minimal production for aquaculture and ruminants, intensifying the sector's dependence on imports. Efforts to retain locally produced feedstuff like PKC are further undermined by export-driven priorities, reducing its availability for local farmers.

4. Scarcity of Land

Malaysia's agricultural expansion is increasingly constrained by the scarcity of arable land, primarily driven by accelerating urbanisation, industrialisation, and the conversion of agricultural areas into higher-value commercial developments. This trend is further exacerbated by the fact that, as of 2024, more than 103,000 hectares of agricultural land remain idle¹²³, with substantial concentrations in states such as Selangor and Pahang. Underlying factors include fragmented land ownership, unresolved inheritance issues, and low-productivity land holdings, all of which continue to hinder efficient land utilisation.

Addressing these constraints requires the implementation of strategic land-use planning

and the integration of coherent policy measures to facilitate the reclamation and optimisation of idle agricultural land. Equally vital is the enhancement of soil fertility to ensure that reclaimed land can support high-yield, nutrient-dense crop production. The adoption of sustainable soil management practices, such as the application of organic amendments, crop rotation, cover cropping, and site-specific fertiliser regimes, can significantly improve soil structure and microbial activity, thereby increasing the bioavailability of essential nutrients to crops. This not only contributes to higher crop productivity and nutritional quality but also supports long-term soil health, reinforcing the resilience and sustainability of Malaysia's agricultural sector.

¹²²MPC. (2020). Potential application of circular economy concept in livestock production.

¹²³Lai et al. (2024, March 20). Over 103,000ha of abandoned agricultural lands in Malaysia, says Joseph Kurup. The Star.

5. Water

Water management is a critical challenge in Malaysia's agrofood sector, compounded by climate change, inefficient infrastructure, and fragmented regulations. Although Malaysia benefits from abundant rainfall, the agriculture sector faces escalating water scarcity due to increasing competition for water resources, pollution, and climate-related disruptions like droughts and floods.

Malaysia's agrofood sector faces significant challenges related to water management, impacting productivity and resilience. Outdated irrigation systems, particularly in critical granary areas like the Muda Agricultural Development Authority (MADA)

region, lead to inefficiencies and water wastage. Funding shortfalls, such as the RM230 million annual maintenance gap in MADA, exacerbate these issues, resulting in inconsistent water supply for paddy farming.

Climate change compounds these challenges, with frequent droughts, rising temperatures, and erratic rainfall patterns directly affecting crop yields. Additionally, sustainable practices like rainwater harvesting and recycled water systems remain underutilised, despite the country's high annual rainfall.

6. Breed and Broodstock

Cattle breeds commonly used in Malaysia are Kedah-Kelantan (KK), Yellow Cattle KK, Nelore, Brahman crosses, and others. Imported cattle breeds, particularly those from temperate regions, experience heat stress and struggle to achieve optimal growth and weight under local conditions. To enhance performance, various exotic breeds (e.g., Brahman, Charolais) have been imported for both purebred use and crossbreeding purposes since the 1970. Additionally, the lack of access to improved, climate-adapted breeds limits opportunities for smallholders to enhance efficiency and profitability. Breeding programmes for livestock, remain underdeveloped, with few nucleus and multiplier farms available to supply high-quality stock to smallholders.

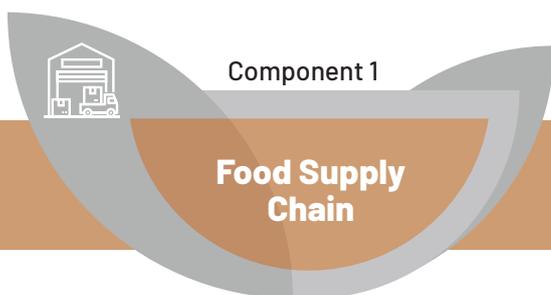
Moreover, Malaysia's livestock sector faces critical challenges due to the smuggling of live animals across borders. This illicit activity undermines biosecurity and introduces significant risks to both livestock health and food safety. For instance, the Malaysian Quarantine and Inspection Services (MAQIS) reported that 90% of smuggled cattle in 2021 were infected with Foot-and-Mouth Disease (FMD)¹²⁴. Such smuggling activities not only jeopardise the health of domestic livestock populations but also disrupt supply chains, leading to economic losses for farmers and increased market instability.

In the aquaculture sector, the availability of high-quality broodstock is a persistent challenge. Farmers face difficulties accessing disease-resistant, fast-growing, and high-yield broodstock, such as genetically improved tilapia and shrimp varieties. The limited supply of quality broodstock increases vulnerability to diseases and reduces the sector's ability to scale production effectively. Additionally, the high costs associated with importing broodstock further burden small and medium-scale aquaculture operators. Existing hatcheries often lack the capacity or technical expertise to produce sufficient quantities of high-performing broodstock domestically.

*Rising
temperatures,
and erratic rainfall
patterns*



¹²⁴Sharifah Mahsinah Abdullah. (2021). 90 per cent of smuggled cattle infected with FMD – Maqis. New Straits Times.



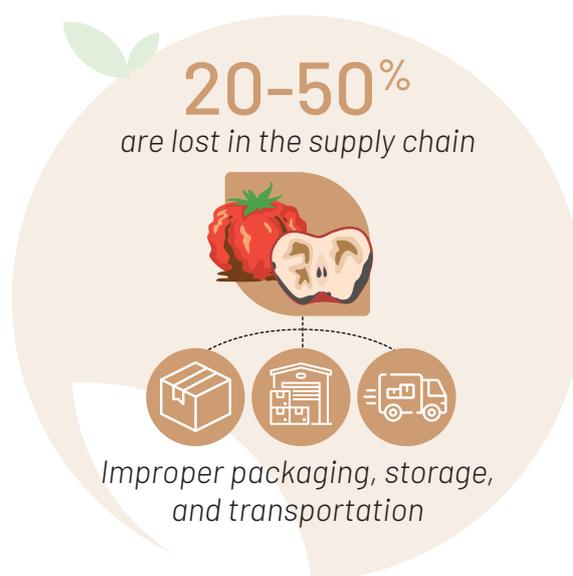
Food Loss

Food loss, defined as the reduction in edible food mass during production, post-harvest, and processing stages before it reaches consumers, is a critical challenge in Malaysia's food supply chain. Poor post-harvest handling techniques and inadequate storage infrastructure contribute significantly to losses, particularly in perishable commodities such as fruits and vegetables. Research indicates that up to 20% to 50% of fruits and vegetables are lost in the supply chain due to improper packaging, storage, and transport conditions.

Contributing factors include a lack of adequate knowledge of good handling practices (36.7%), inefficient handling systems (50.3%), inadequate infrastructure (51.9%), and insufficient funding (38.8%)¹²⁵. These challenges are further compounded by the lack of a cohesive cold chain infrastructure and inadequate transportation mechanisms, which lead to spoilage during transit, particularly for temperature-sensitive commodities such as dairy, fish, and high-value crops. Additionally, overproduction and inefficient market distribution frequently result in surplus perishable produce being discarded, exacerbating food loss and inefficiency within agricultural supply chains.

Underlying these issues are systemic deficiencies in Malaysia's food supply chain infrastructure, affecting every stage from farm to market. The shortage of adequate cold storage facilities, particularly in rural areas, severely limits the preservation of perishable goods. While cold storage facilities are available in some areas, only 14% of stakeholders utilise them, citing barriers such as high costs, limited capacity, remote locations, and poor management. These limitations ripple through the supply chain, contributing to spoilage during transit and reducing the availability of fresh, high-quality produce.

Transportation and logistical networks are equally underdeveloped. Poorly maintained roads and insufficient logistical hubs hinder the timely and efficient movement of goods, driving up operational costs, delaying delivery times, and increasing spoilage rates. Wet markets, which are pivotal for food accessibility in Malaysia, also suffer from obsolete infrastructure and a lack of proper waste management systems, cold storage, and efficient handling processes. These shortcomings compromise food safety and reduce the quality of products reaching consumers.



Challenges also extend to collection and packing centres, which are often poorly equipped for sorting, packaging, and pre-treatment of produce. As a result, an estimated 27% of fruits and vegetables are sent directly to wholesalers without any post-harvest handling, thereby increasing the risk of losses. Similarly, the absence of modern processing facilities limits value addition in the agrofood sector, diminishing its competitiveness and reducing income opportunities for smallholders and producers.

¹²⁵Azizah Osman et al. (2009). Post-harvest handling practices on selected local fruits and vegetables at different levels of the distribution chain. *Journal of Agribusiness Marketing*, 2, 39-52.

Component 1

Adoption of Technology
among SmallholdersFood Supply
Chain

Malaysia's food supply chain is increasingly under pressure to meet the demands of a growing population and to ensure food security by 2030. Technology has the potential to revolutionise agricultural practices, improve productivity, and reduce inefficiencies. However, the limited adoption of modern technology remains a critical challenge, particularly among smallholders and rural producers.



The adoption of advanced technologies, such as precision agriculture, the Internet of Things (IoT), and digital supply chain tools, is hindered by several factors. High upfront costs and limited financial support prevent smallholders' access to these agricultural innovations. A lack of awareness and technical capacity among farmers, coupled with resistance to change among traditional producers, continues to impede the adoption of modern agricultural technologies. Furthermore, inadequate digital infrastructure in rural areas impedes the deployment of smart farming systems. These challenges are compounded by fragmented policy initiatives and underfunded R&D^{126, 127}, which fail to deliver locally tailored, affordable solutions.



¹²⁶Nik Syafiah Anis Nik Sharifulden. (2024, December 04). The forgotten importance of R&D for agriculture and food security. KRI.

¹²⁷ASTI, IFPRI, APAARI) & MARDI. (2020, April). ASTI Country Brief: Malaysia.



Component 2

Consumer Behaviour

Food Waste

Malaysian households generate approximately 79 kg of food waste per person annually, slightly surpassing the global average of 74 kg per person per year, as reported by the UNEP Food Waste Index Report 2021. Globally, household food waste accounts for 61% of total food waste, followed by the food service sector (26%) and retail (13%)¹²⁸.

This translates into millions of tonnes of food being wasted annually at the consumer level. The primary drivers include excessive purchasing, poor meal planning, and improper storage practices. Urban households, in particular, contribute more to food waste due to higher disposable incomes and a lack of awareness of sustainable consumption practices.

This waste represents a direct financial loss for families and an indirect loss of resources such as water, energy, and labour used in food production. Additionally, food waste disposed of in landfills emits methane, a potent greenhouse gas, further contributing to climate change. Despite the scale of household waste, public awareness and education efforts remain inadequate to encourage behavioural change towards more sustainable consumption.

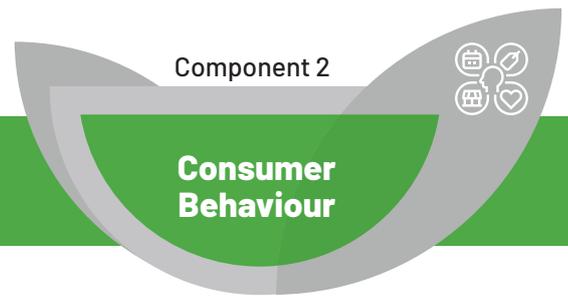
The Hospitality, Restaurant, and Catering sector (HoReCa) is another major contributor to food waste in Malaysia. Practices such as buffet-style food service, over-preparation, and improper inventory management lead to significant waste across the sector. A considerable proportion of food prepared in these establishments is discarded due to leftover portions, spoilage, or failure to meet consumer preferences.



While comprehensive national-level data on HoReCa waste is limited, global trends suggest this sector can account for 15%-20% of overall food waste, underscoring its critical role in the waste landscape. The economic losses from HoReCa waste extend beyond direct costs, impacting the broader food supply chain through unsold inventory and wasted resources. Furthermore, the sector's reliance on large-scale food preparation magnifies environmental consequences, including increased waste disposal and higher carbon emissions.



¹²⁸UNEP. (2021, March 01). Food waste index report 2021.



Malnutrition

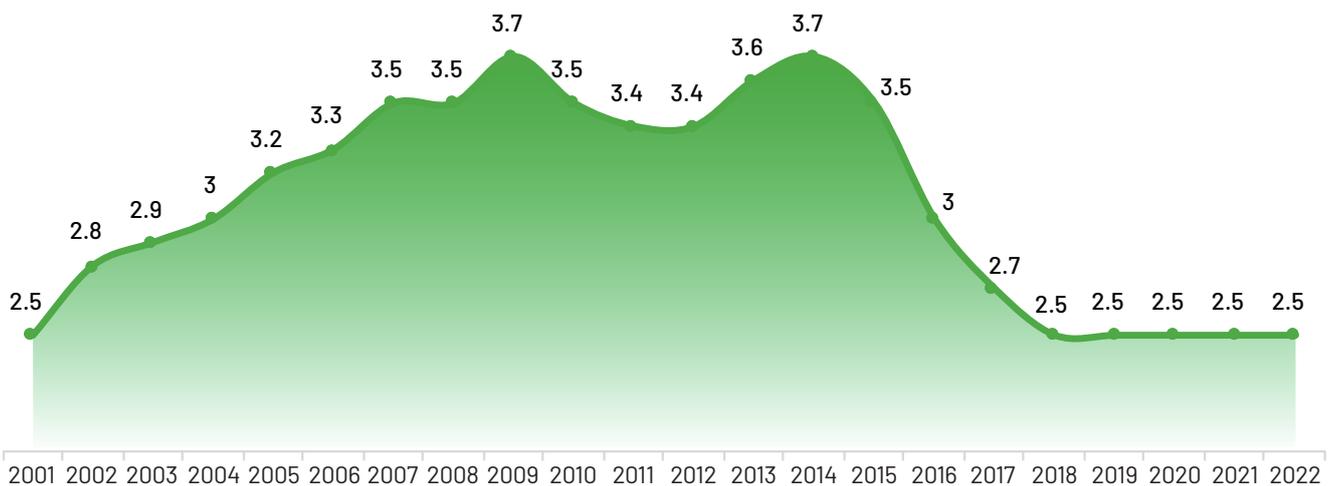
Consumer Behaviour

Malaysia faces significant challenges in addressing poor dietary habits, which contribute to malnutrition across different segments of the population. The dual burden of malnutrition (i.e., undernutrition and obesity) poses a public health crisis, driven by changing consumer behaviours, food preferences, and socioeconomic conditions.

The Prevalence of Undernourishment (PoU) is a globally recognised index used to measure the proportion of a population whose dietary energy consumption falls below the minimum requirement needed to maintain a healthy and active life. It serves as a key indicator under SDG 2: Zero Hunger, specifically linked to Target 2.1, which aims to end hunger and ensure access to safe, nutritious, and sufficient food for all people by 2030.

According to the Food and Agriculture Organization (FAO), countries are categorised based on PoU severity: low (under 5%), moderate (5%-14.9%), high (15%-24.9%), and very high (25% or above).

In Malaysia, the PoU has shown a distinct trend over recent decades. Data indicates that the undernourishment rate steadily increased until it peaked at 6.1% in 2015, highlighting challenges in food access and dietary energy sufficiency during that period. However, since 2015, the prevalence has shown consistent improvement, declining to 2.7% by 2021. This marks a significant stabilisation after two decades of fluctuation, showcasing progress in addressing food security and improving access to nutritious diets.



Source: World Bank

Figure 36: Percentage of Prevalence of Undernourishment (PoU) from total population in Malaysia

However, an analysis of malnutrition levels in Malaysia reveals a discernible pattern, whereby, among the four primary concerns (i.e., stunting, wasting, overweight, and obesity), there is a notable prevalence of undernutrition among children¹²⁹, while a higher occurrence of overnutrition is observed among adults¹³⁰.

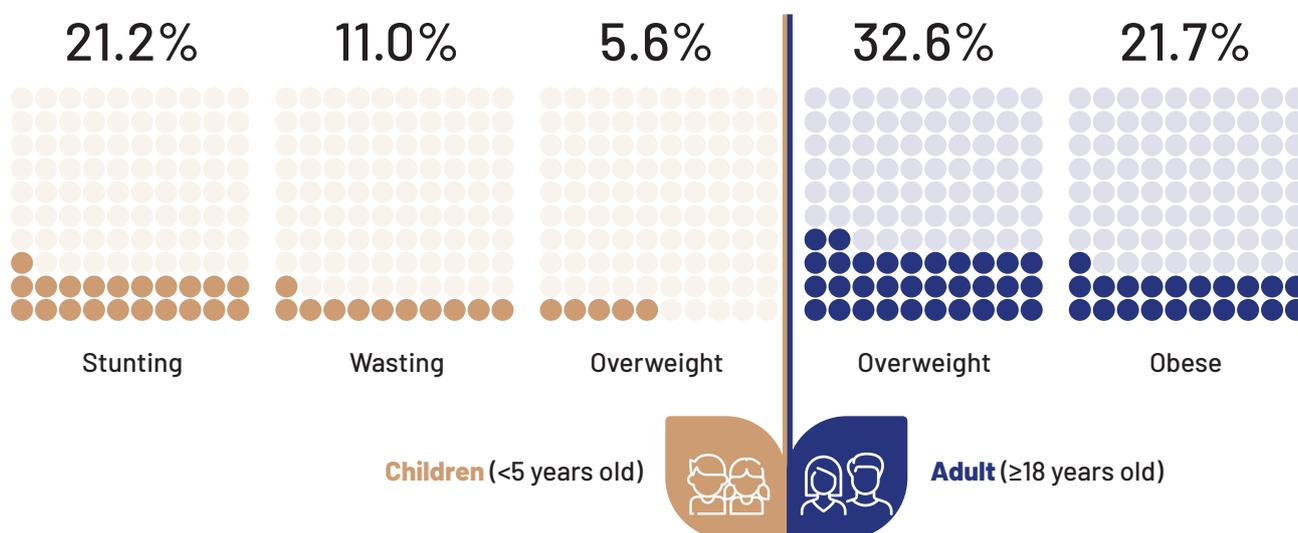


Figure 37: Malaysia's Current Malnutrition Level Among Children and Adults

Malnutrition in Malaysia is driven by a combination of economic barriers, poor dietary behaviours, and limited awareness of nutritional health. Elevated food prices, particularly for nutrient-dense items such as fruits, vegetables, and protein-rich foods, render these essential components of a balanced diet inaccessible to low-income households. Economic inequality exacerbates the issue, with marginalised communities, particularly in rural areas, experiencing limited dietary diversity due to financial constraints.

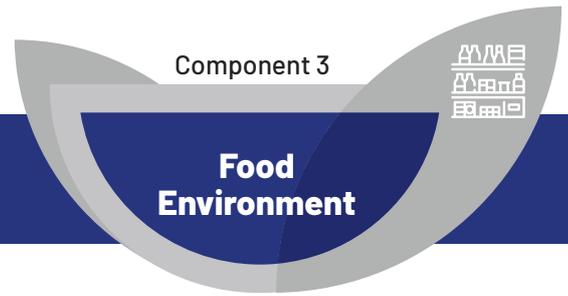
Poor dietary habits further compound the problem. A reliance on carbohydrate-rich foods and the widespread consumption of processed, nutrient-poor items contribute to nutritional inadequacy.

Cultural preferences for calorie-dense and fried foods, along with limited awareness of the benefits of balanced diets, result in both undernutrition and rising rates of overnutrition in Malaysia.

Additionally, limited awareness of nutritional needs and health-related practices among the population perpetuates malnutrition. Without adequate education on healthy eating and the importance of nutrient diversity, many individuals continue to make food choices that do not meet their nutritional requirements.

¹²⁹IPH. (2023). Technical Report National Health and Morbidity Survey (NHMS) 2022: Maternal and Child Health. NIH, MOH Malaysia

¹³⁰IPH. (2024). National Health and Morbidity Survey (NHMS) 2023: NCDs – Non-Communicable Diseases and Healthcare Demand. NIH, MOH Malaysia.



Affordability of Nutritious Food and Healthy Diet

Globally, it is estimated that more than 3 billion people were unable to afford a healthy diet in 2017. This includes approximately 1.9 billion people in Asia and 965 million in Africa. The cost of a healthy diet presents a significant economic barrier for many, particularly those living in poverty. At more than USD 1.90 per day, the cost of a healthy diet exceeds the international poverty line, rendering it unaffordable for the poor. Furthermore, a healthy diet is 60% costlier than a nutrient-adequate diet and nearly five

times more expensive than an energy-sufficient diet, highlighting the financial barriers to accessing diverse and nutrient-rich foods essential for a balanced and healthy lifestyle¹³¹.

In 2022, Malaysians spent an average of 16.3% of their total household expenditure on food and beverages, reflecting the central role of food in household budgets nationwide¹³².

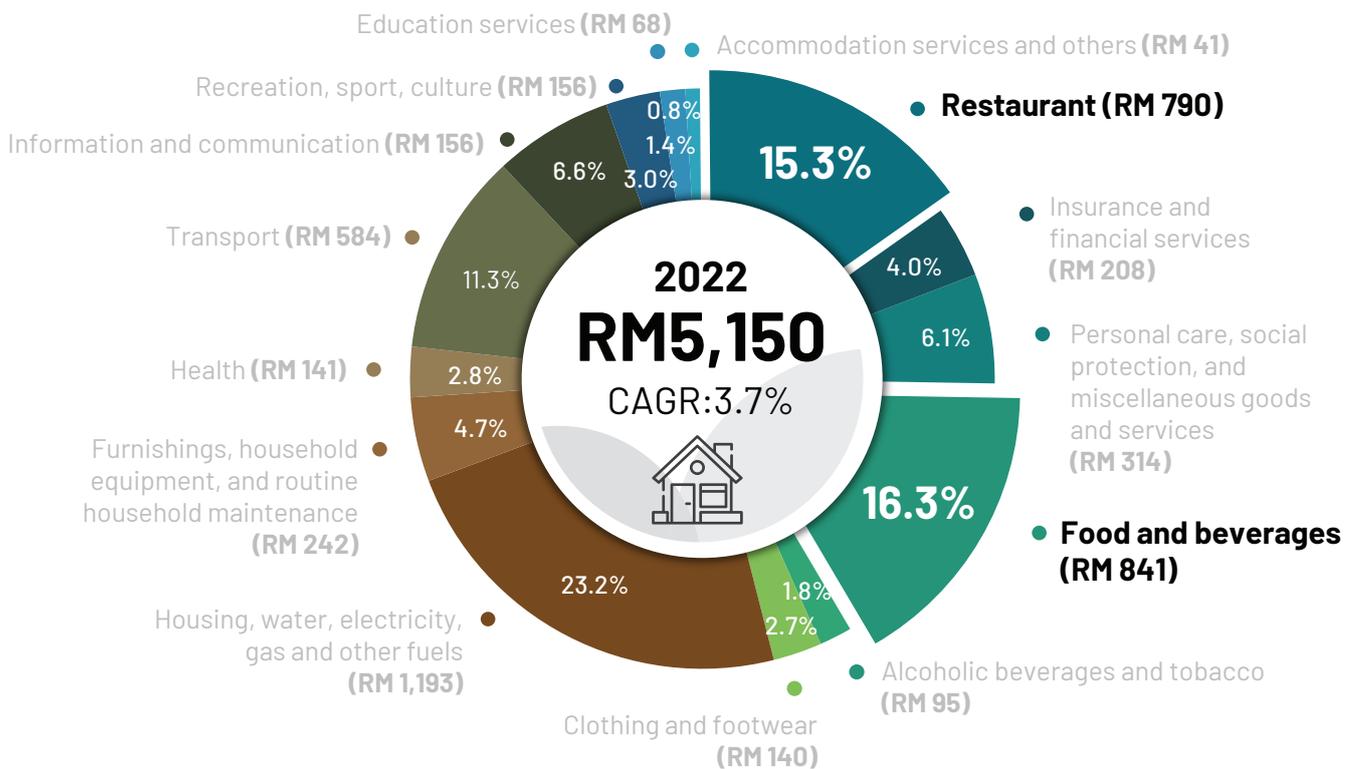


Figure 38: Composition of Mean Monthly Household Consumption Expenditure by Main Group, 2022

¹³¹FAO, IFAD, UNICEF, WFP, & WHO. (2020). The state of food security and nutrition in the world 2020: Transforming food systems for affordable healthy diets.

¹³²Ministry of Economy Malaysia. (n.d.). Socioeconomic statistics: Household income, poverty and household expenditure.

In Malaysia, the trend of consuming food away from home has grown significantly, influencing dietary patterns and contributing to malnutrition. This shift, driven by urbanisation, busy lifestyles, and the convenience of dining outside the home, has led to unbalanced diets that are high in calories and low in essential nutrients.

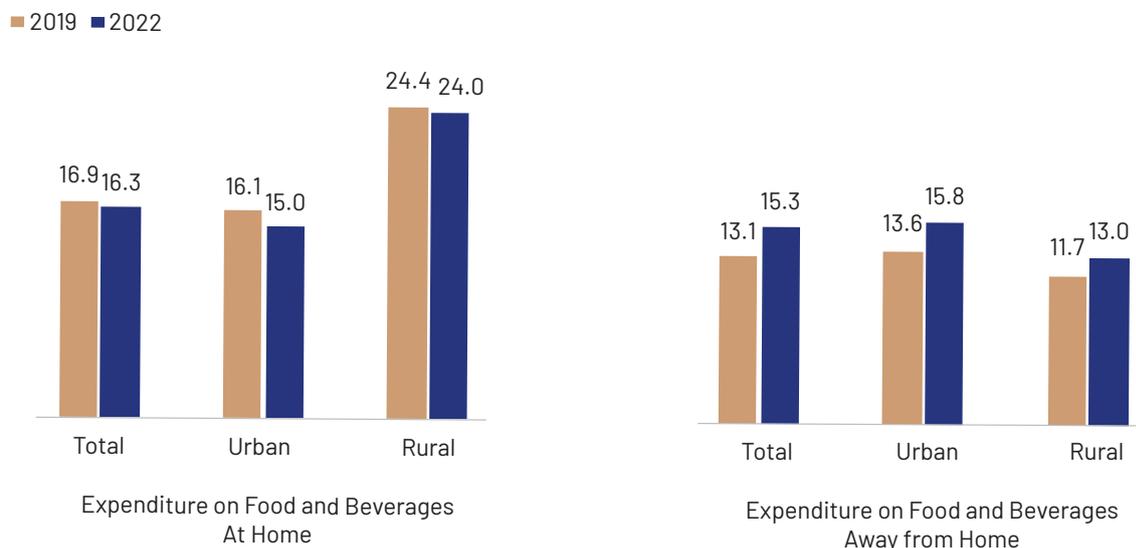


Figure 39: Percentage of Monthly Household Consumption Expenditure on Food at Home and Food Away from Home, 2019 and 2022¹³³

However, income levels and regional disparities significantly influence household food expenditure trends. In areas with stagnant or declining income growth, such as Kelantan and Kedah, households allocate a higher proportion of their income to food, with percentages reaching 24.1% and 22.7%, respectively. These figures highlight the financial constraints faced by lower-income regions, where limited disposable income forces households to prioritise food over other essential expenditures.

Despite only marginal increases in median household disposable income between 2019 and 2022, urban households typically enjoy a higher per capita income compared to rural areas, further emphasising these disparities. The Household Expenditure Survey 2022 reveals a consistent preference for fish and seafood, which account for 23.5% of total food expenditure, followed by meat at 14.6%. This spending pattern suggests that fish and seafood are perceived as more affordable and accessible protein sources compared to other options.

¹³³Ministry of Economy Malaysia. (n.d.). Socioeconomic statistics: Household income, poverty and household expenditure.

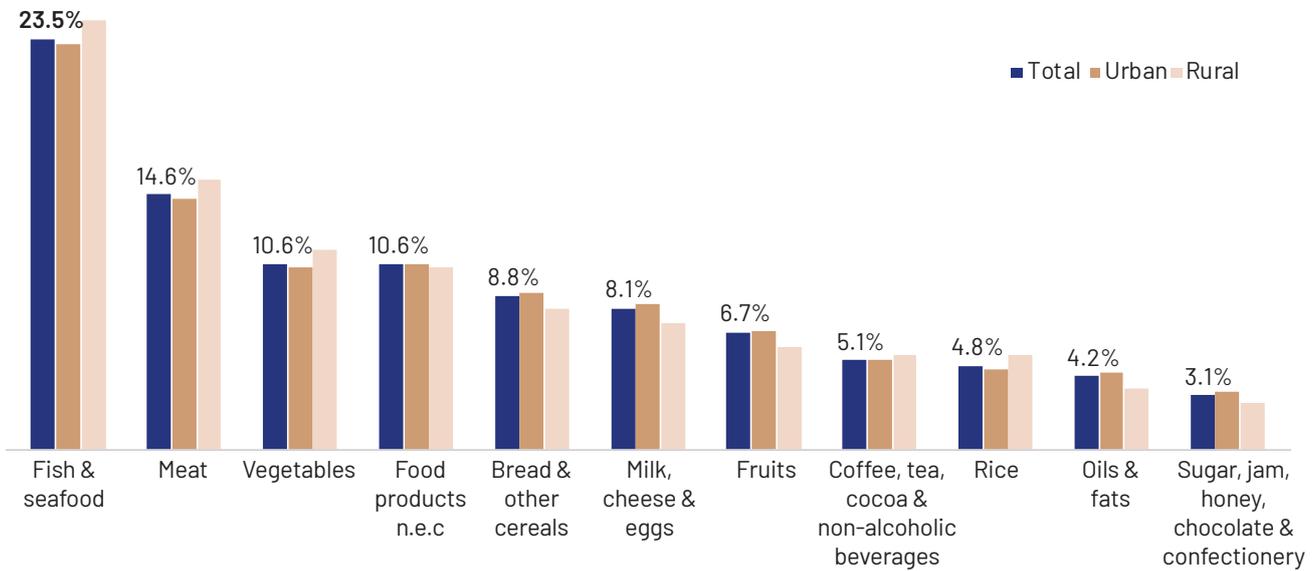


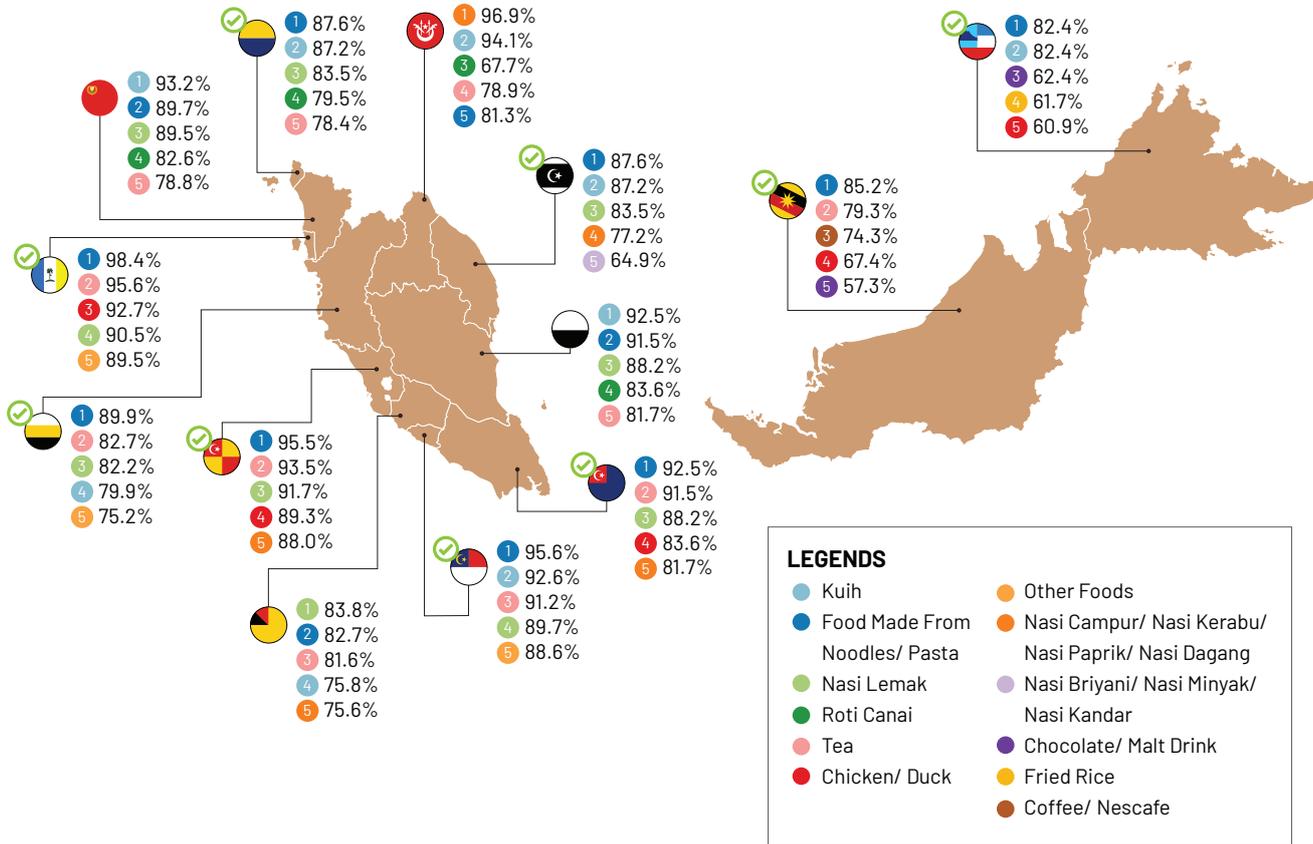
Figure 40: Composition of Monthly Household Consumption Expenditure by Strata, Malaysia, 2022¹³⁴

These trends underscore the need for targeted interventions to address regional disparities in food affordability and promote equitable access to nutritious diets across the country. Investments in local supply chains, infrastructure, and income support policies can play a vital role in alleviating these challenges. By reducing barriers to affordable and nutritious diets, Malaysia can ensure that all regions benefit equitably from the country's agrofood systems.



¹³⁴Ministry of Economy Malaysia. (n.d.). Socioeconomic statistics: Household income, poverty and household expenditure.

Across Malaysia, the most common items consumed when eating away from home include food made from noodles/pasta, tea, nasi lemak, and fried foods. These are often high in carbohydrates, fats, and sugars, but lack essential micronutrients and sufficient dietary diversity to support a balanced diet. Nine (9) out of the thirteen (13) states spend the most on noodle-based meals when eating out.



Source: DOSM

Figure 41: Top 5 Items by Highest Percentage of Expenditure on Food Away from Home, 2022

The food environment refers to the interface where individuals interact with the food system to make decisions about acquiring, preparing, and consuming food. It encompasses the physical, economic, and socio-cultural factors that influence food availability, affordability, accessibility, quality, and acceptability.

A well-functioning food environment supports the availability and affordability of diverse, safe, and nutritious foods, enabling individuals to make informed dietary choices that align with their health and cultural needs. Conversely, a poorly structured food environment can drive malnutrition, food insecurity, and unhealthy consumption patterns by limiting access to nutritious options or encouraging the widespread availability of unhealthy, calorie-dense foods.

Definition of Nutritious Foods and Healthy Diet

Nutritious foods are defined as safe foods that provide essential nutrients such as vitamins and minerals (micronutrients), fibre, and other components of a healthy diet. These nutrients support growth, health, and overall well-being, while protecting against malnutrition. In the context of public health, the focus on nutritious foods lies in promoting adequate intake of essential nutrients. Parallel efforts aim to reduce the consumption of saturated fats, free sugars, and salt or sodium. This includes initiatives such as eliminating industrially produced trans fats and promoting the use of iodised salt.



Fats:

Healthy diets should contain **less than 30% of total energy intake from fats**. This means that the calories obtained from fats should be less than 30% of total calories consumed in a day. It is important to note that not all fats are created equal. The recommendation emphasises shifting away from saturated fats (typically found in animal products) to unsaturated fats (found in sources like olive oil, nuts, and fatty fish). Industrial trans fats, which are often found in processed and fried foods, should be eliminated from the diet.



Free sugars:

The recommendation is to consume **less than 10% of total energy intake from free sugars**. Ideally, the intake should be even lower, preferably less than 5%. Free sugars refer to sugars added to food and drinks by manufacturers, cooks, or consumers, as well as sugars naturally present in honey, syrups, fruit juices, and fruit concentrates. Reducing the consumption of free sugars can help prevent conditions like tooth decay and obesity.

Healthy Diet

Dietary recommendations set forth by the World Health Organization (WHO) for achieving healthy diets:



Fruits and vegetables:

A healthy diet should include the consumption of **at least 400 grams (g) of fruits and vegetables per day**. Fruits and vegetables are rich in essential vitamins, minerals, fibre, and antioxidants. Including a variety of fruits and vegetables in one's diet contributes to overall health and helps prevent chronic diseases.



Salt:

The recommendation is **not to consume more than 5 grams (g) of salt per day**. Additionally, it mentions that salt should be iodised. Iodised salt is salt that has been enhanced with iodine, an essential nutrient for thyroid function. Limiting salt intake helps reduce the risk of high blood pressure and related to health problems.

Food Safety

Food safety is a critical concern in Malaysia, encompassing the prevention, detection, and management of food contamination and hazards that can occur throughout the supply chain, from production to consumption. This issue has far-reaching implications, impacting public health, economic stability, and consumer confidence. Food safety challenges arise from a range of factors, including microbial hazards, chemical contamination, improper food handling, and the emergence of zoonotic diseases, all of which require a coordinated approach to mitigate risks effectively.

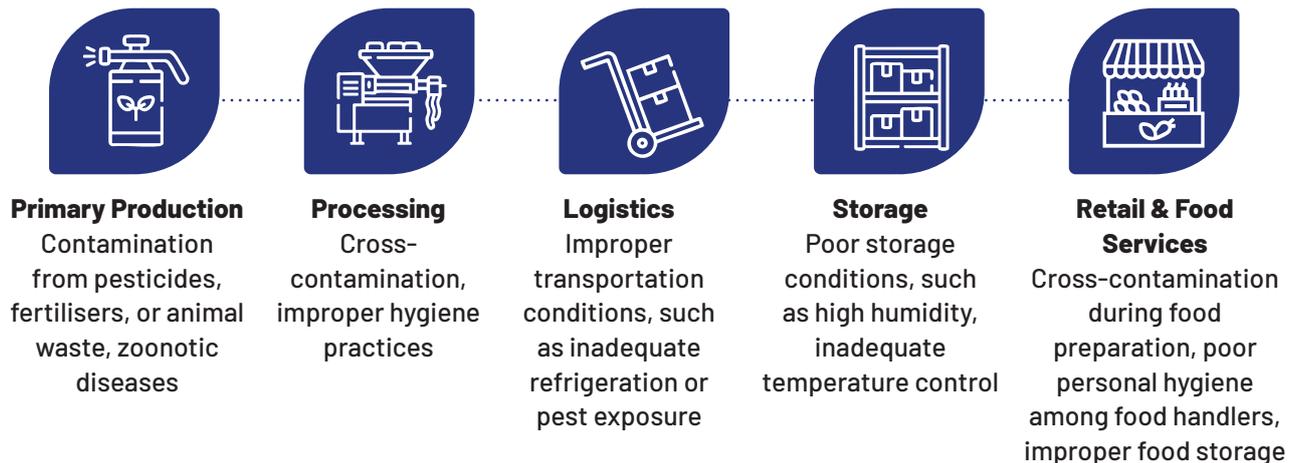


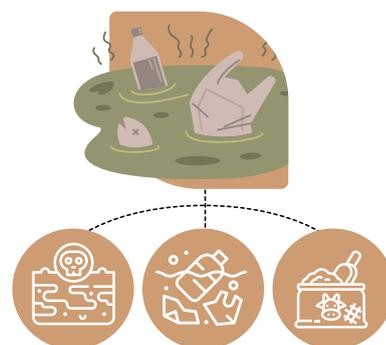
Figure 42: Food Safety Issues Across the Supply Chain

At the production stage, contamination often arises from environmental factors such as polluted soil, water, or animal feed¹³⁵. For example, the use of untreated water for irrigation increases the risk of microbial contamination in fresh produce. A notable case of zoonotic disease at the production level was the Nipah virus outbreak in 1998, which originated in pig farms and caused over one hundred (100) human fatalities. This incident not only highlighted the risks of zoonotic diseases but also led to significant economic losses in Malaysia's swine industry.

During processing and distribution, poor sanitation, inadequate temperature control, and cross-contamination contribute to the spread of foodborne pathogens. For instance, improper storage during transportation can result in the rapid growth of microorganisms in perishable goods. Additionally, failures to adhere to hygiene protocols in food processing facilities exacerbate contamination risks.

At the consumer level, improper food handling and preparation practices are common causes of foodborne illnesses. Practices such as undercooking meat, failing to wash fresh produce, or cross-contamination in the kitchen increase these risks. Limited public awareness regarding safe food handling practices exacerbates the issue, highlighting the importance of education and outreach as critical components of food safety management.

ENVIRONMENTAL CONTAMINATION



polluted soil, water, or animal feed

¹³⁵FAO & WHO. (2019). Hazards associated with animal feed.





**THE
POLICY**

NATIONAL FOOD SECURITY POLICY 2030: 5.0 TOWARDS TRANSFORMATIVE AGROFOOD SYSTEMS

The FAO has been advocating for the transformation of agrofood systems from an exclusive focus on quantity to one that addresses multiple dimensions of quality¹⁴¹. In this context, “quality” encompasses several aspects, including the sustainability of production systems, the resilience of food production and distribution networks, as well as the integration of health and nutritional considerations at all stages (i.e., from production to consumption)^{142, 143}.

Until recently, global and national food security policies primarily focused on increasing food production to address availability concerns. Despite some policy initiatives continuing to prioritise food production over other goals, it is widely agreed that simply boosting production is no longer sufficient to address all dimensions of food security¹⁴⁴.

This policy envisions transforming Malaysia’s current agrofood systems, which are shaped by structural inefficiencies, unsustainable practices, and socioeconomic disparities, into systems that are inclusive, efficient, resilient, and sustainable.

The transformation emphasises the need to address structural inefficiencies in the production and distribution of food, minimise environmental harm through sustainable and climate-resilient farming practices, and ensure equitable access to nutritious and culturally appropriate food for all populations.

VISION

Transforming Malaysia Agrofood Systems to Become Efficient, Resilient, Sustainable, and Inclusive by 2030



POLICY STATEMENT

Transform Malaysia’s agrofood systems to deliver sufficient, safe, and nutritious food, prioritise the well-being, and health of the citizens, while ensuring a sustainable environment for future generations



¹⁴¹HLPE. (2020). Food security and nutrition: Building a global narrative towards 2030 [HLPE Report 15]. A report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security, Rome.

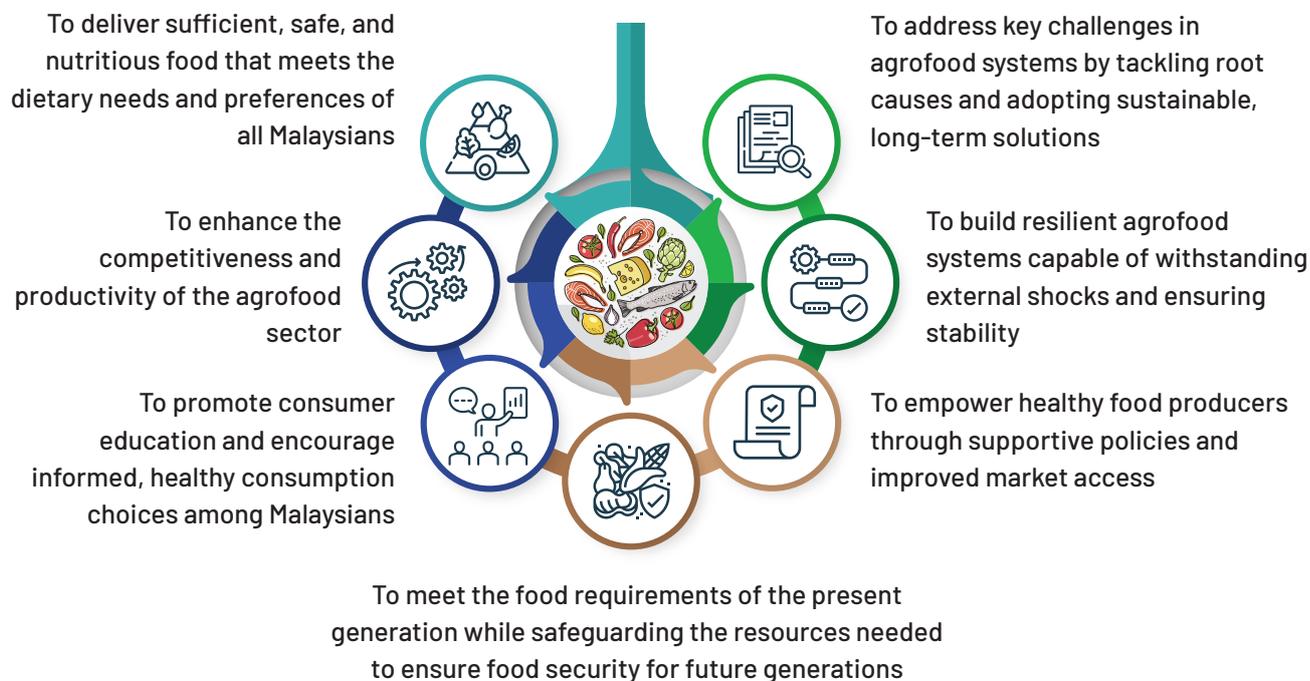
¹⁴²HLPE. (2012). Food security and climate change [HLPE Report 3]. A report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security, Rome.

¹⁴³HLPE. (2017). Nutrition and food systems [HLPE Report 12]. A report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security, Rome.

¹⁴⁴FAO, IFAD, UNICEF, WFP, & WHO. (2022). The state of food security and nutrition in the world 2022: Repurposing food and agricultural policies to make healthy diets more affordable

OBJECTIVES

To achieve this vision, the framework is guided by seven (7) main objectives:



MISSION-BASED STRATEGY

The NFSP 2030 adopts a mission-based strategy in response to the complex and interconnected challenges facing modern agrofood systems. Food security is no longer a standalone issue confined to agriculture, as it is deeply interwoven with environmental sustainability, socioeconomic equity, health outcomes, and global market dynamics. Recognising these interdependencies, a mission-based strategy enables the NFSP 2030 to address food security through a holistic and cross-sectoral approach.

Malaysia's agrofood systems are under mounting pressure from climate change, resource depletion, population growth, and economic inequality. These challenges are further exacerbated by external shocks, including extreme weather events and global trade disruptions. In light of these complex and interrelated pressures, traditional, sector-specific solutions often prove inadequate in delivering effective and sustainable responses.

Additionally, achieving food security requires extensive collaboration across ministries, agencies, and stakeholders, thereby positioning a mission-oriented approach as the most logical and effective way forward.

A mission-oriented strategy is inherently flexible and adaptive, enabling the NFSP 2030 to align its goals with Malaysia's broader sustainability objectives and global commitments. This approach prioritises systemic change and transformative solutions, focusing on key dimensions of equity, resilience, and sustainability to ensure food security for current and future generations. Through this strategy, the NFSP 2030 aims to build resilient agrofood systems that are not only productive but also equitable, sustainable, and capable of withstanding external shocks.

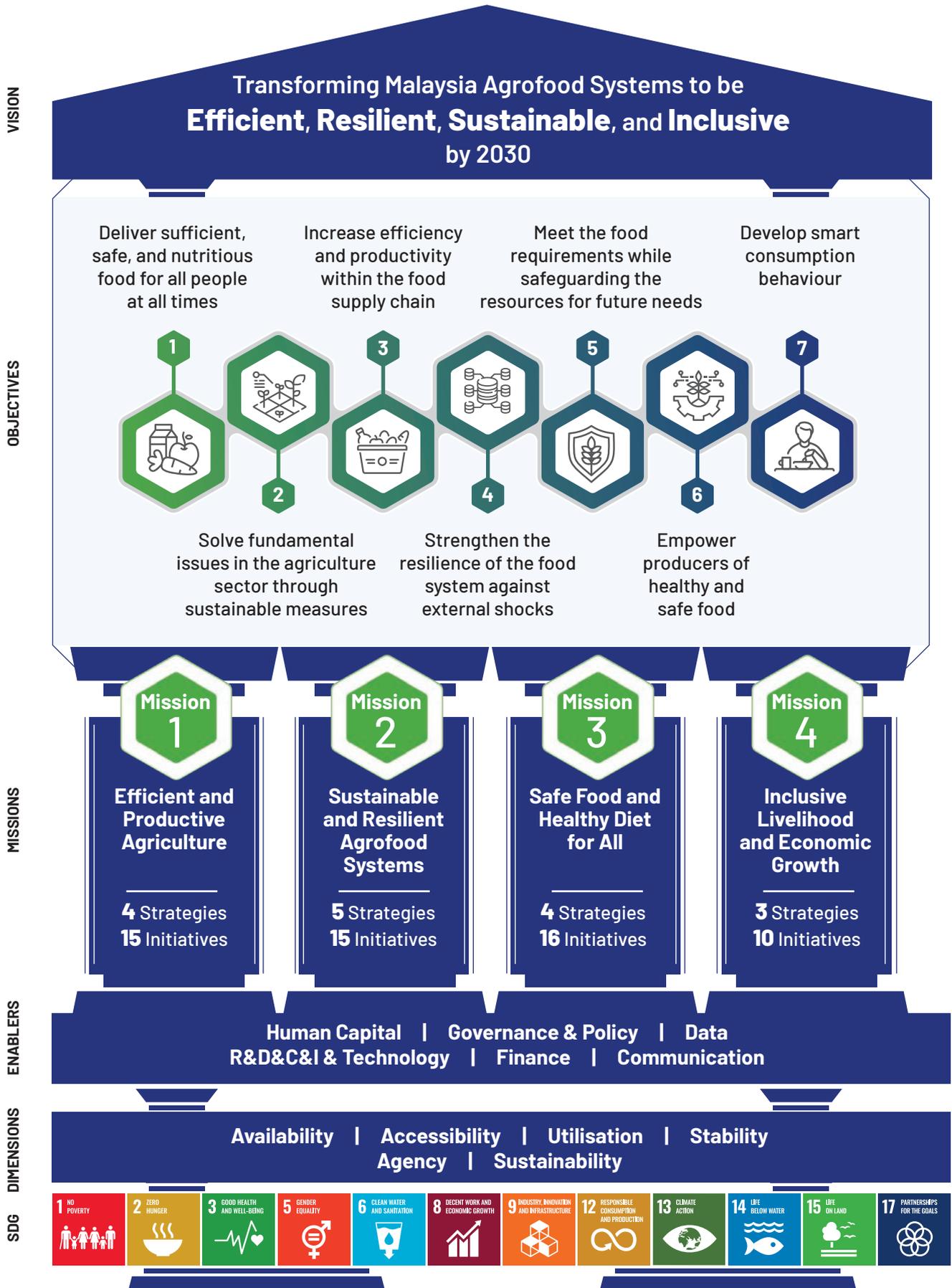


Figure 43: National Food Security Policy 2030

NATIONAL FOOD SECURITY POLICY 2030: TO (Efficient • Resilient •)

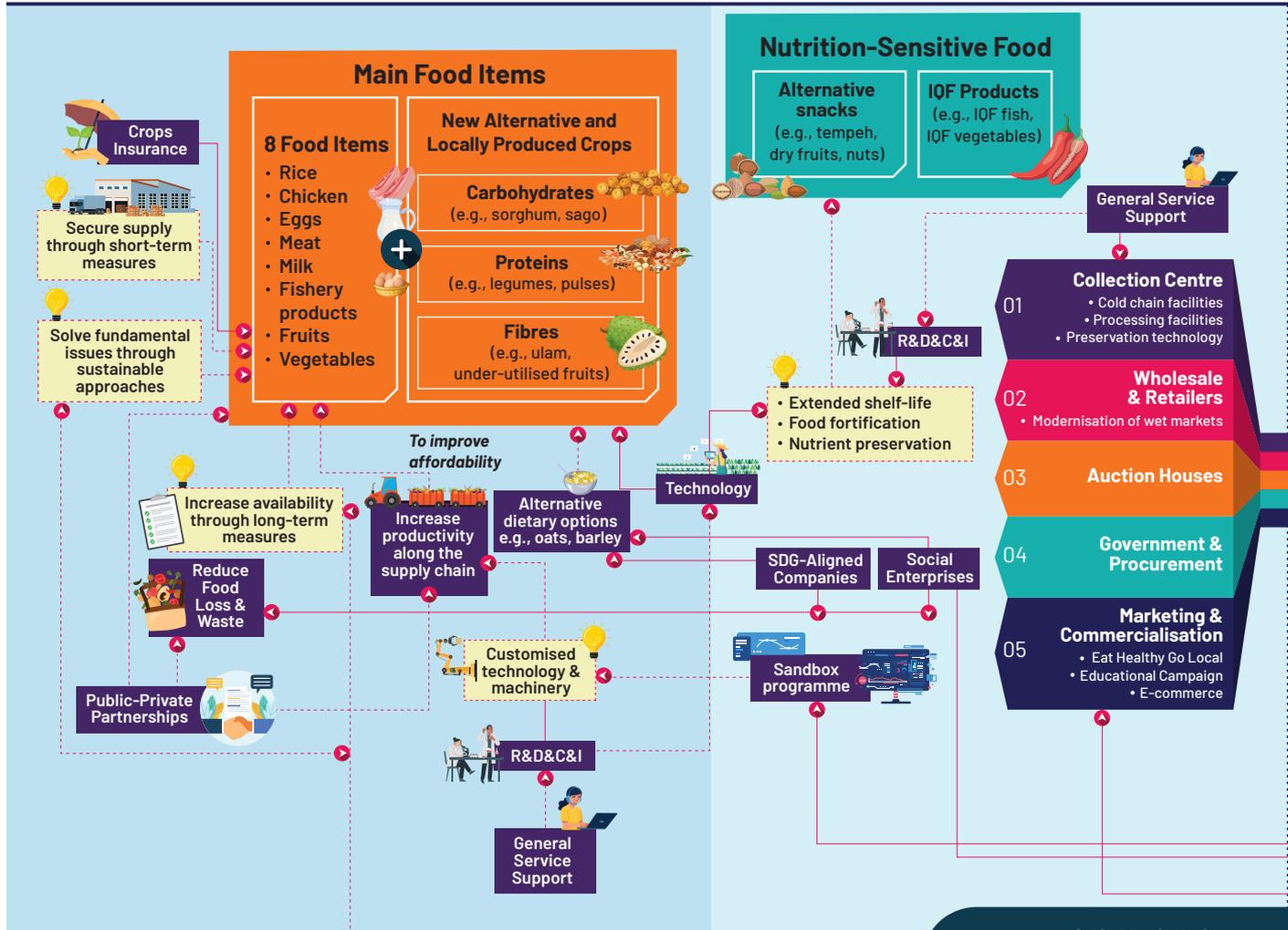
FOOD SECURITY ACT
GOVERNANCE - National Food Security Council

PRODUCERS

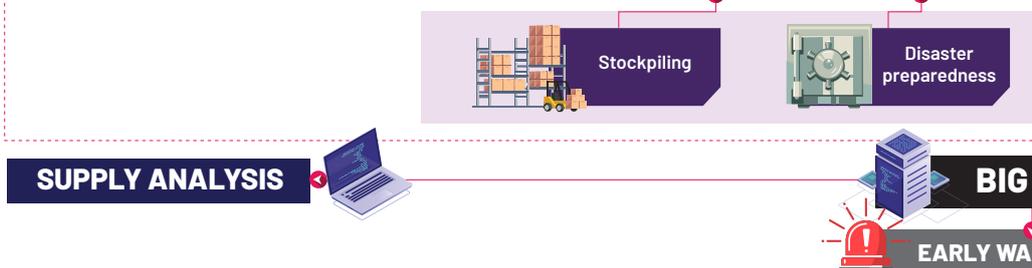
PROCESSORS

SUPPLY

Transitioning from



FOOD SYSTEM

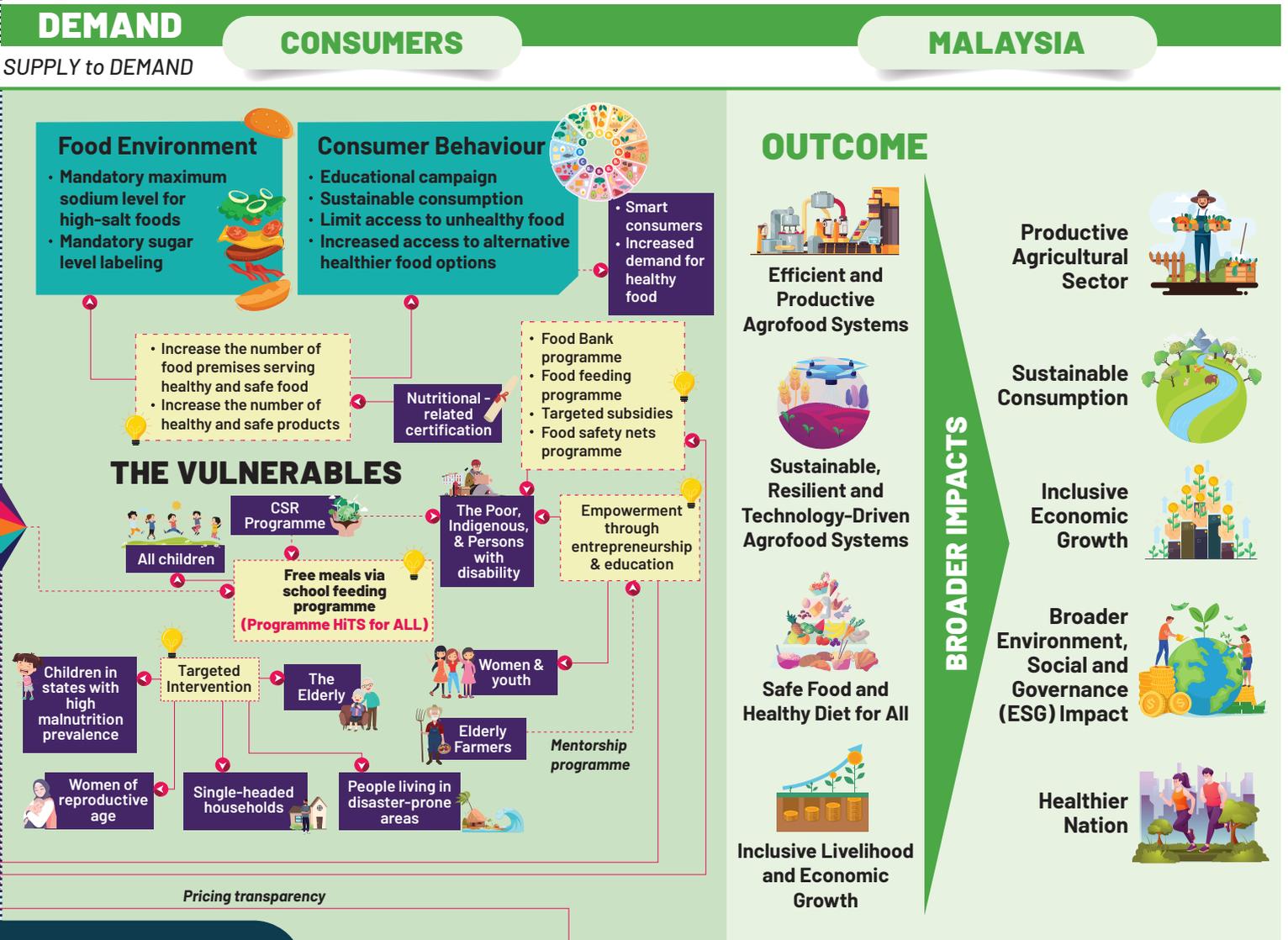


AVAILABILITY • ACCESSIBILITY • UTILISATION

1 NO POVERTY	2 ZERO HUNGER	3 GOOD HEALTH AND WELL-BEING	5 GENDER EQUALITY	6 CLEAN WATER AND SANITATION	8 DECENT WORK AND ECONOMIC GROWTH
---------------------	----------------------	-------------------------------------	--------------------------	-------------------------------------	--

DRIVERS TOWARDS TRANSFORMATIVE AGROFOOD SYSTEMS

(Sustainable • Inclusive)



RESILIENCE



DATA DEMAND ANALYSIS

TRAINING SYSTEM

STABILITY • AGENCY • SUSTAINABILITY



Figure 44: Proposed interventions throughout the value chain in National Food Security Policy 2030

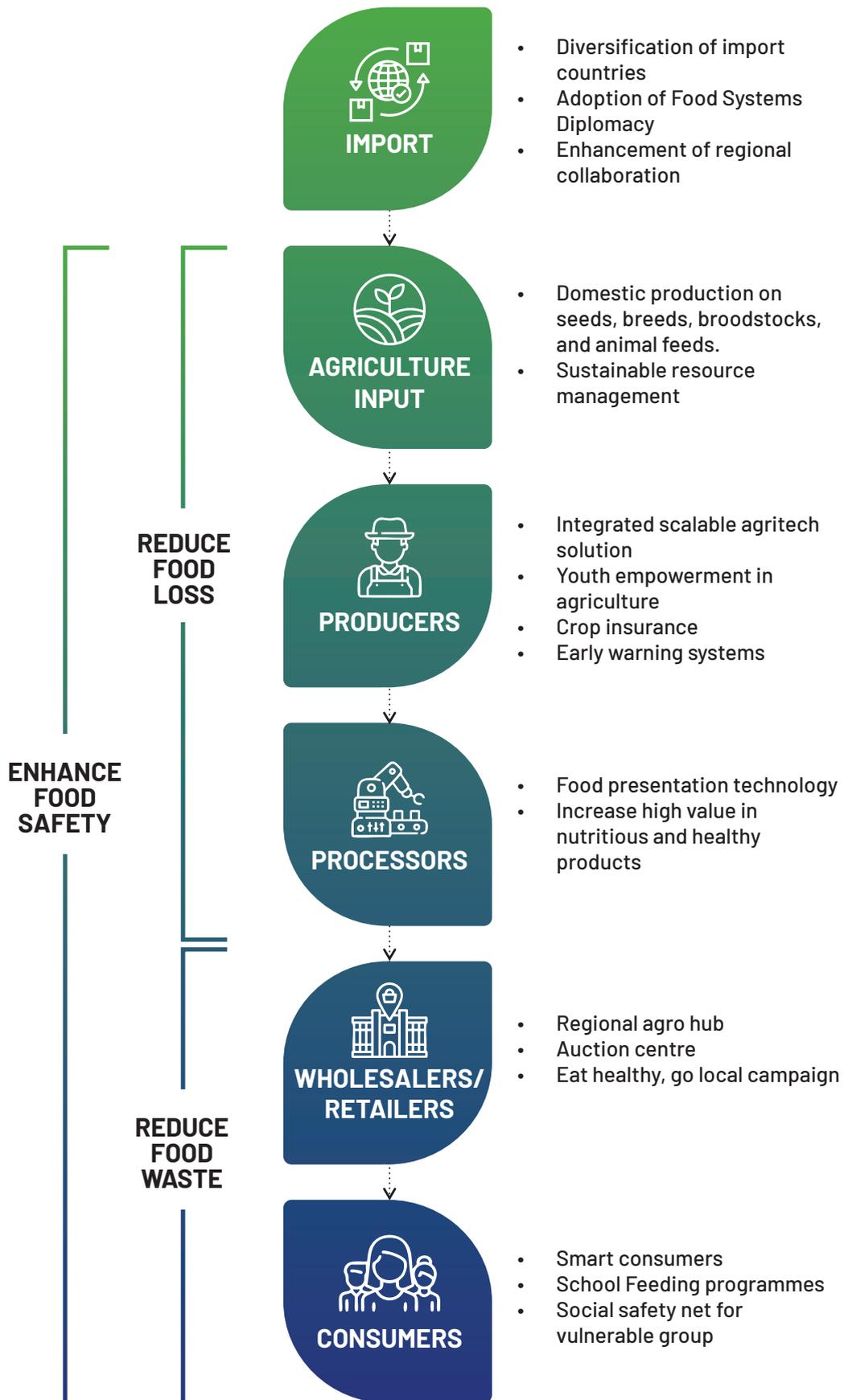


Figure 45: Key Intervention in Agrofood Systems

GOALS AND TARGETS



Transformative Agrofood Systems

The NFSP 2030 envisions a comprehensive transformation of Malaysia's agrofood systems to ensure they are efficient, resilient, sustainable and inclusive. In response to global challenges such as climate change, supply chain disruptions, and evolving consumer demands, the policy provides a strategic framework aimed at strengthening national food security while advancing economic growth, environmental sustainability, and social equity.



Increase the Efficiency of Agrofood Sector

The NFSP 2030 aims to establish a streamlined, well-coordinated agrofood value chain that minimises inefficiencies, reduces resource waste, and increases productivity across all stages of production, processing, and distribution. Integrating modern technologies such as real-time monitoring systems, precision agriculture, and digital tools for farmers and processors ensures optimal resource utilisation and higher yields. Efficient value chains also reduce post-harvest losses and improve market transparency, enhancing Malaysia's competitiveness in both domestic and global markets. These efforts enable the agrofood sector to meet rising food demands while ensuring affordability and access for all consumers.



Strengthening the Resilience of Malaysia's Agrofood System

Through the implementation of the NFSP 2030, the nation envisions an agrofood system capable of withstanding external shocks while ensuring a reliable and continuous food supply. This vision is supported by strategies that address vulnerabilities at multiple levels. Diversifying import sources reduces dependency on a narrow range of trade partners, mitigating risks from geopolitical conflicts or supply chain disruptions. Promoting climate-smart agriculture equips farmers with adaptive practices that enhance productivity while preserving natural resources, ensuring sustainability even in the face of shifting environmental conditions.

In addition, the establishment of robust risk management frameworks, including comprehensive agricultural insurance policies, offers a safety net for farmers and processors against uncertainties such as crop failure, livestock loss, or extreme weather events. This framework not only stabilises income levels but also incentivises investments in innovative and sustainable practices. Enhanced real-time data systems and strengthened governance mechanisms further reinforce resilience by enabling stakeholders to monitor risks, anticipate disruptions, and respond proactively to challenges.

A resilient agrofood system not only secures the food supply but also enhances the sector's capacity to adapt and remain competitive amid global uncertainties. Through these comprehensive measures, Malaysia aims to build an adaptive and robust agrofood ecosystem that ensures food security while supporting economic growth and sustainability in an increasingly unpredictable global environment.



Sustainable Agrofood Systems

The NFSP 2030 envisions an agrofood system in which sustainability is embedded at every stage of the value chain, transforming Malaysia's agrofood systems into a global benchmark for eco-conscious agricultural practices.

The policy prioritises optimising resource efficiency through circular economy principles, reducing resource depletion by promoting waste recovery and reuse. Innovative farming methods such as precision agriculture, low-carbon practices, and rainwater harvesting are strategically adopted to minimise the environmental footprint of production, ensuring that food systems thrive within ecological boundaries.

To preserve biodiversity and ecosystem health, the NFSP 2030 emphasises the implementation of marine closures and crop diversification, creating resilient agrofood ecosystems that can withstand climate-related risks. These efforts safeguard critical habitats, maintain ecosystem services, and support sustainable livelihoods, reflecting Malaysia's commitment to protecting its rich natural heritage for future generations.

The NFSP 2030 also tackles food loss and waste, which represents one of the most pressing inefficiencies within agrofood systems. Enhanced storage systems, streamlined logistics, and consumer education campaigns aim to reduce waste across the supply chain, fostering a culture of conservation and accountability among stakeholders.



Ensuring Inclusivity in Malaysia's Agrofood Transformation

The NFSP 2030 envisions a transformed agrofood system where inclusivity is a defining principle, ensuring that all stakeholders, regardless of socioeconomic status, geographic location, or demographic background, have equitable opportunities to both contribute to and benefit from a thriving agrofood sector. The policy prioritises empowering vulnerable groups, including smallholders, women, and Indigenous Peoples and Local Communities (IPLCs), by providing targeted support programmes, capacity-building initiatives, and fair resource distribution.

Through initiatives such as cooperative development, expanded access to financing, and tailored capacity-building programmes, marginalised communities will gain the tools and opportunities to actively participate in the agrofood economy. Efforts to enhance financial literacy and develop inclusive financial products ensure that these groups are not left behind in the modernisation of Malaysia's agrofood systems.

Inclusivity also extends to ensuring equitable access to nutritious and affordable food for all Malaysians, particularly underserved populations such as children, low-income households, and rural communities. Through the integration of social safety nets, targeted food programmes, and public awareness campaigns, the NFSP 2030 proactively addresses disparities in nutritional outcomes while reinforcing food security for all Malaysians.

In a fully inclusive agrofood systems, previously marginalised groups become active contributors to economic growth and sustainability. Smallholders gain fair access to markets, women and Indigenous Peoples are empowered as entrepreneurs and leaders, and underserved communities experience improved food security and economic resilience. This holistic approach not only strengthens the socioeconomic fabric of Malaysia's agrofood systems but also ensures alignment with the nation's broader goals of equity, sustainability, and societal well-being.

The NFSP 2030 is designed to transform Malaysia's agrofood systems, delivering significant benefits across three key stakeholder groups: producers, processors, and consumers.



Producers

The NFSP 2030 is designed to empower Malaysia's agrofood producers by fostering self-reliance, enhancing productivity, and ensuring economic resilience. Producers are anticipated to benefit from improved water resource management, the enhanced adoption of modern farming practices, and the implementation of innovative technologies that will optimise agricultural outputs while preserving environmental resources.

The policy places significant emphasis on digital transformation and sustainable farming methods, thereby enabling producers to adapt to climate variability and market demands. These efforts are anticipated to elevate incomes, expand job opportunities in key sectors, including aquaculture and farming, and create a more resilient agricultural base. By addressing systemic challenges such as fragmented supply chains and limited access to financing, the NFSP 2030 ensures that producers can thrive in an increasingly competitive agrofood landscape.



Processors

The NFSP 2030 aims to modernise and diversify agrofood value chains, fostering a competitive and efficient processing industry while driving economic activities, particularly in the healthy food sector. Key impacts include improved market transparency and accessibility through structured platforms like auction houses, which promote fair pricing and open new market opportunities. Encouraging the development of niche and specialty products enables processors to tap into high-value markets, catering to diverse consumer preferences while supporting the growth of SMEs in the sector.

The policy emphasises the modernisation and streamlining of supply chains, thereby allowing processors to reduce inefficiencies, optimise operations, and scale their activities. Strengthened collaboration among stakeholders in the processing industry ensures the sector's capacity to meet increased demand while maintaining rigorous food safety and quality standards.



Consumers

The NFSP 2030 prioritises the establishment of an environment in which access to safe, nutritious, and affordable food is the standard, while concurrently limiting the availability of unhealthy products. Through targeted initiatives, including mandatory labelling systems and public awareness campaigns, the policy promotes healthier dietary choices. These measures empower consumers with the knowledge necessary to make informed decisions while encouraging the market to produce safer and more nutritious food options.

The policy also addresses affordability and accessibility by expanding food security programmes, such as the Food Bank Malaysia initiative, and enhancing the availability of essential goods in underserved areas. By promoting equitable access to nutritious foods and reducing the prevalence of unhealthy options, the NFSP 2030 aims to improve the nutritional well-being of all Malaysians, particularly vulnerable groups, including children, the elderly, and low-income households. Furthermore, these efforts contribute to broader public health objectives by mitigating the increase in NCDs associated with poor dietary habits.

In releasing this vision,
the National Food Security Policy 2030 (NFSP 2030)
adopted **Four high-level Missions** and **Six Enablers**
to achieve national food security by 2030



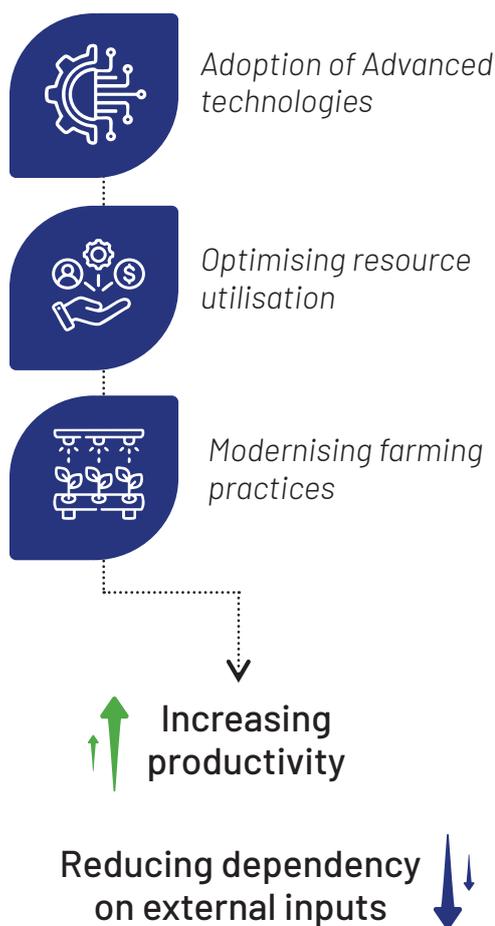
Mission 1

EFFICIENT AND PRODUCTIVE AGRICULTURE

The rapid growth of the global population is driving an escalating demand for food, placing significant strain on nations' capacities to meet evolving consumption needs. This rising demand is occurring alongside the increasing globalisation of food systems, which has led to a more complex, interconnected landscape for food production, distribution, and consumption. As markets become more integrated, nations are facing heightened pressure to secure a reliable and sustainable food supply, not only in terms of volume but also in response to shifting consumer preferences and dietary trends. The challenge of balancing this dynamic demand with the capacity for local production is becoming a critical issue for governments and the agricultural sector as a whole.

This challenge is further exacerbated by the growing scarcity of key resources essential for agricultural production. Nations are increasingly dependent on critical inputs such as seeds, feed, fertilisers, and pesticides, which are becoming increasingly limited in availability. Driven by environmental factors, climate change, and geopolitical shifts, this constraint directly impacts the ability to sustain current agricultural outputs. Moreover, nations that are heavily reliant on external suppliers for these inputs face heightened vulnerability to supply chain disruptions. This dependency threatens food security and creates an urgent need for local solutions that can mitigate the risks associated with these external pressures.

In response to these challenges, enhancing productivity within local agricultural sectors emerges as a strategic priority for securing food security and sustaining economic stability. This can only be achieved through a concerted focus on driving productivity across the entire agricultural value chain. By adopting advanced technologies, optimising resource utilisation, and modernising farming practices, nations can substantially increase productivity while reducing dependency on external inputs. Innovation within the sector is a strategic imperative to enhance local production capabilities, secure food security, and position agricultural markets for competitive advantage in the global economy.



Mission 1: Efficient and Productive Agriculture aims to enhance agricultural systems through a strategic, multi-faceted approach. It focuses on strengthening local production capabilities and securing access to critical input supplies, including advancing the domestic seed industry, diversifying local animal feed sources, optimising land use, and promoting the sustained growth and advancement of the animal breeding industry. The mission also prioritises production diversification, reducing dependence on monoculture, and encouraging dietary diversity, achieved by improving market access and competitiveness through the establishment of regional agro hubs, agricultural auction houses, and the development of niche markets for locally produced specialty products. These efforts are supported by targeted investment strategies and outcome-based programmes for sustainable growth.

Additionally, the mission seeks to ensure equitable access to technology, accelerating its adoption through integrated agritech ecosystems, financial support, and capacity building. Importantly, special emphasis is placed on strengthening resilience and boosting yields in the paddy sector, ensuring stable rice production as a vital staple food, which is achieved through enhanced support systems, improved seed distribution networks, advanced water management solutions, and infrastructure upgrades.



Strategy 1

Mission
1Boost Agriculture Input Production
and Reinforce Security

Historically, prioritising cost efficiency through import-driven supply chains has been a dominant strategy across various sectors, including agriculture. However, escalating geopolitical instability and systemic global disruptions have exposed critical vulnerabilities, necessitating a strategic shift toward greater national self-reliance. This transformation hinges on bolstering domestic competitiveness, particularly through the accelerated expansion of the agricultural input market.

Establishing a resilient and self-sustaining agricultural ecosystem, capable of navigating the complexities of global disruptions, necessitates strategic investment in a comprehensive Research, Development, Commercialisation, and Innovation (R&D&C&I) pipeline. Addressing supply chain vulnerabilities requires a dual-pronged strategic approach tailored to current and emerging challenges. This involves strengthening domestic production capacity for high-quality agricultural inputs while simultaneously advancing local sourcing strategies to reduce reliance on volatile international supply chains.

Strategy 1.1: Boost Agriculture Input Production and Reinforce Security aims to strengthen local production capabilities and enhance input security, establishing a robust foundation for advancing agricultural productivity. This strategy focuses on reducing dependency on imported agricultural supplies by advancing innovation within the domestic input industries. It prioritises the development of locally adapted, climate-resilient seed varieties tailored to specific environmental conditions and evolving sectoral demands. Similarly, strengthening the animal feed industry remains a strategic priority, with efforts centred on diversifying the sourcing and utilisation of locally produced feed to enhance overall input security.

This approach is underpinned by the optimised management of adaptable and productive land-use ecosystems, along with the strategic maximisation of resource utilisation to strengthen efficiency, sustainability, and resilience in agricultural practices. This is reinforced by results-driven agricultural development programmes and targeted investment strategies, which focus on continuous improvement and fostering innovation across all sectors of the industry.

In essence, these coordinated measures are expected to reinforce national agricultural self-sufficiency, reduce exposure to supply chain risks, and drive measurable gains in productivity and operational efficiency. Anchored by a focus on innovation and strategic resource management, they position Malaysia's agricultural sector to play a more central role in sustaining economic stability and food security, while enhancing its resilience and competitiveness in a shifting global landscape.



Strategy 2

Enhance Market Access and Competitiveness

Mission 1

The current agricultural landscape is characterised by a heavy reliance on monoculture, a practice largely driven by market demand. While maximising productivity within these systems is necessary to meet immediate supply needs, overdependence on a limited range of crops presents significant sustainability challenges. Climate change, soil degradation, pest outbreaks, and fluctuating commodity prices further exacerbate the vulnerabilities of monoculture, making it increasingly clear that a long-term shift towards diversification is imperative. A more resilient agricultural sector must incorporate a broader variety of crops to enhance ecological balance, improve food security, and mitigate economic risks associated with market volatility.

Achieving this transition requires a strategic push towards dietary diversity, underpinned by increased access to a wider range of nutritious and sustainable food options. Beyond supply-side interventions, consumer behaviour must also be influenced through sustained promotional efforts that instil the value of diversified consumption. By aligning production with evolving consumption patterns, the agricultural sector can build a more balanced and sustainable food ecosystem.

Strategy 1.2: Enhance Market Access and Competitiveness focuses on expanding the reach of diversified agricultural products by streamlining supply chains, improving distribution networks, and fostering market-driven approaches. This can be achieved by transforming wholesale markets into regional, multi-functional agrohubs, serving as integrated centres for trade, logistics, and innovation. Additionally, the establishment of agricultural auction houses will transform market dynamics by enhancing price transparency and improving income opportunities for farmers. These initiatives, combined with targeted efforts to modernise agrofood systems, will enable a transition from traditional supply-driven models to more responsive, demand-driven frameworks.

Significantly, crop diversification must be supported by a strategic focus on cultivating market niches for locally produced specialty products, leveraging unique regional characteristics and consumer preferences. By positioning high-value crops and traditional varieties within premium markets, local farmers can tap into new revenue streams while promoting biodiversity. This approach not only strengthens the resilience of the agricultural sector but also aligns with broader national objectives of food security, sustainability, and economic growth. Through an integrated strategy that enhances both supply and demand mechanisms, the shift towards diversified agriculture can be accelerated, ensuring long-term viability in an evolving global food landscape.



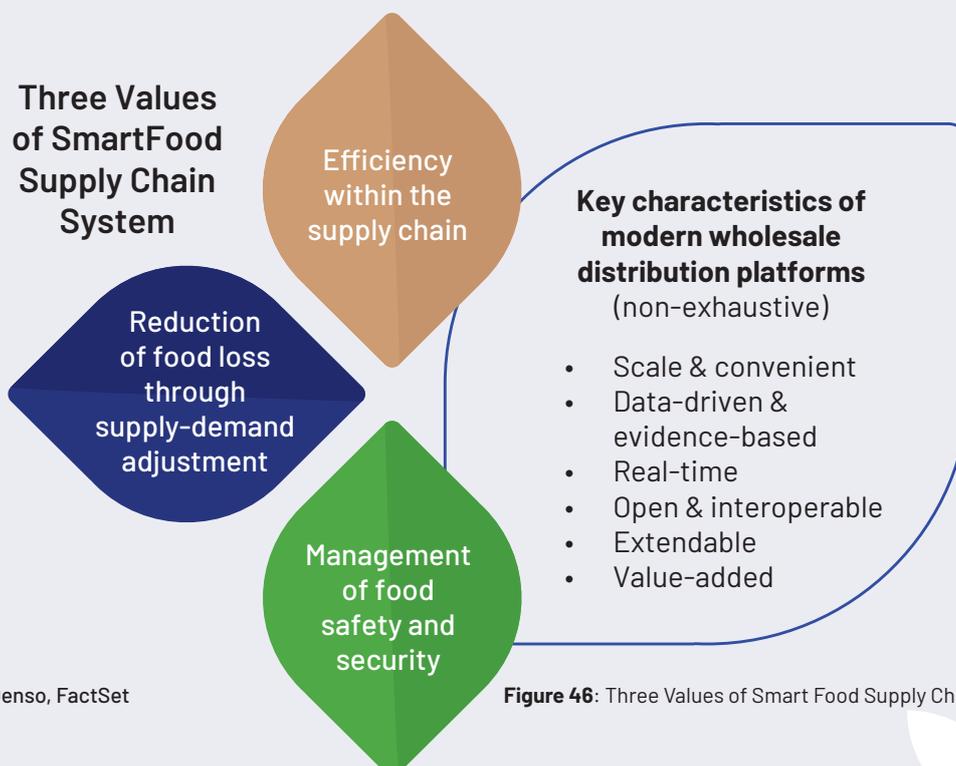
**CASE
STUDY**
Denso Concept of Modern Agriculture Wholesale Market

The food supply chain, a complex and multifaceted system encompassing producers, processors, distributors, and retailers, plays a pivotal role in ensuring food security and accessibility. However, its inherent complexity and fragmentation continue to present substantial challenges in maintaining transparency and accountability across the value chain.

The involvement of a wide range of stakeholders further compounds this complexity, creating significant challenges in consistently tracking and verifying information across the chain. Consequently, tracing the precise origin of products becomes increasingly difficult, exposing consumers to the risk of inaccurate or misleading label claims. Furthermore, the industry's reliance on outdated analogue methods such as paper, phone, and fax exacerbates the problem by hindering efficiency, transparency, and traceability. These

processes are not only susceptible to errors and inefficiencies but also contribute to operational strain, particularly in segments of the supply chain where labour shortages, extended working hours, and physically demanding conditions are prevalent.

To effectively address these challenges, a comprehensive strategy is essential. The strategy should prioritise flexible work arrangements to enhance agility, invest in automation to boost efficiency, and advance digital transformation to maintain competitiveness. A key component of this approach is the implementation of a smart food supply chain system, a transformative solution that can redefine the industry by optimising operations, increasing efficiency, and delivering a more streamlined and transparent supply chain¹⁴⁵.



Source: Denso, FactSet

Figure 46: Three Values of Smart Food Supply Chain System

¹⁴⁵Denso. (2024, April 5). Go for sustainable food supply chain.

Three Values of Smart Food Supply Chain System

Denso Concept of Modern Agriculture Wholesale Market



Efficiency within the Supply Chain

By leveraging IoT devices and advanced analytics, businesses can gain comprehensive end-to-end visibility across the entire food supply chain. This enhanced transparency not only streamlines operations and supports decision-making but also strengthens supply chain resilience, leading to optimised efficiency and notable cost reductions. Moreover, the integration of technology complements the workforce by enabling more strategic allocation of manpower to value-added tasks, reducing the strain on labour-intensive processes.

The automation of essential processes, such as sorting, packing and inventory management, reduces human error, streamlines processing times, and enhances order fulfilment efficiency, while advanced logistics solutions, including intelligent route planning and real-time tracking, optimise goods movement, ensuring timely, cost-effective deliveries that minimise delays and waste. This allows employees to focus on higher-level activities that require critical thinking and problem-solving, thereby enhancing both productivity and job satisfaction.

Furthermore, the integration of predictive maintenance (e.g., IoT sensors and data analytics) enhances equipment reliability by maximising uptime and minimising unplanned downtime. This proactive approach to maintenance helps prevent unexpected breakdowns, ensuring operational continuity and further boosting efficiency across the supply chain. Collectively, these measures contribute to a more agile and responsive supply chain, reduced operating costs, and improved customer satisfaction. These outcomes are essential for sustaining a competitive advantage in the rapidly evolving agricultural wholesale market.



Reduction of Food Loss through Supply-Demand Adjustment

Advanced algorithms empower businesses to forecast demand with greater precision, enabling them to align production and inventory levels with consumer needs. This precision helps minimise overproduction, effectively reducing food waste while ensuring supply meets demand. In addition, dynamic pricing strategies, informed by real-time market data, optimise the sale of nearly expired products by offering targeted incentives to consumers. This approach not only reduces waste but also enhances revenue potential by capitalising on products that would otherwise go unsold.

Moreover, the integration of real-time tracking and predictive analytics significantly improves inventory management, allowing businesses to monitor stock levels and shelf life more efficiently. This proactive approach prevents spoilage, ensures optimal product turnover, and minimises waste, ultimately enhancing operational efficiency. By leveraging these strategies, businesses can streamline operations, drive profitability, and achieve sustainability in a competitive market.



Management of Food Safety and Security

Full traceability of food products from farm to fork allows businesses to quickly identify and recall contaminated items, thereby safeguarding consumer health and maintaining brand integrity. IoT devices and sensors offer continuous monitoring of key factors such as temperature, humidity, and other critical parameters that impact food safety, with alerts promptly triggered for any deviations to mitigate the risk of foodborne illnesses and ensure the security and reliability of the supply chain.

Blockchain technology further enhances the system by providing a secure, tamper-proof record of all food transactions. This not only reduces the risk of fraud but also guarantees the authenticity of products, offering consumers greater confidence in the food they purchase.

Key Attributes Underpinning Modern Agriculture Wholesale

Denso Concept of Modern Agriculture Wholesale Market

A modern wholesale operation, supported by advanced technology, is characterised by several critical factors that drive its success in a highly competitive market. Foremost among these is scalability, which enables seamless growth and expansion while supporting efficient operations. Building on this foundation, data-driven decision-making supported by real-time analytics enhances forecasting accuracy and inventory precision, enabling businesses to respond proactively to evolving market conditions. This enables business continuity and sustaining competitiveness in a rapidly evolving environment.

Transparency and scalability are integral to reinforcing the operation's capacity to thrive by bolstering trust, accountability, and adaptability. Transparency offers customers, partners, and regulatory bodies clear and consistent visibility into processes, reinforcing confidence and positioning the business as a dependable and accountable entity. This approach supports long-term stakeholder relationships, ensures compliance with regulatory requirements, and mitigates risks that could disrupt operations or compromise the company's reputation.

In parallel, scalability enhances the business's ability to stay ahead of market changes by enabling seamless integration of emerging technologies, tools, systems, and value-added services. This ensures the operation remains agile, continuously evolving to meet changing market demands and technological advancements, providing a critical edge in a competitive environment.

Collectively, these capabilities provide a strong foundation for sustained growth in the modern agricultural wholesale sector, enabling businesses to navigate challenges effectively whilst capitalising on new opportunities, driving innovation and enhancing overall market value¹⁴⁶.



¹⁴⁶Etheber, T. (2021, August 25). Rethinking the Wholesale Distribution Workflow (Part 1). FactSet Insight.

CASE
STUDY

Rungis International Market

Rungis International Market exemplifies a sophisticated smart food supply chain system, positioning itself as a pivotal hub in the global agricultural wholesale sector and serving as a critical link in efficiently meeting both domestic and international demand. Spanning over 230 hectares, it is the largest wholesale market in the world, managing the annual trade of approximately 2.9 million tonnes of food products and accounting for an estimated 40% of France's total fruit and vegetable supply.

Rungis International Market is distinguished by its cutting-edge logistical infrastructure, strategically located just 7 kilometres from Paris at the intersection of key motorways, including the A6 and A86. This prime location ensures efficient and uninterrupted transportation of goods, facilitating the daily movement of over 25,000 vehicles, including approximately 3,000 heavy goods vehicles (HGVs).

The market spans over 600 hectares of expansive storage facilities, complemented by essential services such as a hospital, police station, and various retail outlets, all of which support the seamless operations of more than 1,200 trading companies each day¹⁴⁷. Notably, a key driver of Rungis' logistical efficiency is its strategic emphasis on digital transformation and innovation in supply chain management.

Management of Food Safety and Security

At the heart of this operation are robust traceability and food safety measures, ensuring that the extensive range of fresh produce and food products consistently meets the highest industry standards. By leveraging an advanced Product Information Management (PIM) system, Rungis consolidates data from multiple sellers, enabling precise tracking of products from source to end consumer. This system incorporates detailed product information, including origin, handling procedures, and quality certifications, while ensuring full compliance with safety regulations.

Beyond digital traceability, Rungis adheres to stringent food safety protocols in line with European Union regulations, including rigorous inspections of all products entering the market to ensure they meet health standards. SEMMARIS, the market's management company, collaborates closely with health authorities to conduct regular audits and inspections, maintaining high standards of hygiene throughout operations.

Additionally, Rungis promotes best practices among vendors through training and awareness programmes focused on safe handling and storage, mitigating foodborne risks and enhancing the overall quality of food in the marketplace.

¹⁴⁷Dubbeling et al., (2016, December). The role of private sector in city region food systems. RUA Foundation.

Reduction of Food Loss through Supply-Demand Adjustment, and Enhanced Supply Chain Efficiency

Rungis International Market

Driven by the need for greater efficiency and integration, Rungis partnered with Califrais to develop a cutting-edge e-commerce platform, supported by a robust infrastructure that enables seamless, consolidated ordering across multiple suppliers. Advanced machine learning algorithms embedded in the platform optimise logistics operations, ensuring timely delivery while maintaining cost competitiveness. Building on this digital foundation, Rungis integrates transportation solutions from strategic partners such as the STEF Group and customer engagement support from Webhelp to further strengthen its service delivery. This end-to-end ecosystem enhances operational performance and enhances overall customer satisfaction. Beyond improving supply chain transparency and traceability, these technological innovations address key concerns surrounding food safety and quality, while also streamlining order management^{148, 149}.

Moreover, Rungis is proactively advancing its sustainability objectives within its logistics operations. The market has implemented a comprehensive waste management strategy aimed at minimising food waste and maximising recovery and recycling efforts. This includes partnerships with organisations such as SUEZ to enhance waste sorting and recovery capabilities, with the goal of doubling the proportion of sorted waste by 2025. As a key component of this broader sustainability initiative, Rungis is also implementing the mandatory collection and segregation of organic waste, in full compliance with the requirements set out under the AGECE law¹⁵⁰. These efforts reflect the market's ongoing commitment to environmental responsibility and regulatory alignment.

In addition, Rungis has established a platform for donating unsold produce, effectively redistributing surplus food to those in need and reducing food waste. In 2022, wholesalers donated 1,571 tonnes of food to 44 charitable associations, underscoring their commitment to tackling food waste and supporting vulnerable communities. SEMMARIS also contributed over €16,100 in free toll cards to eligible organisations, further amplifying these efforts. The impact of these initiatives was substantial, facilitating the

redistribution of approximately 3,107,000 meals across the Île-de-France region through food parcels, prepared meals, and solidarity grocery networks, further cementing Rungis' role in community support¹⁵¹.

Significantly, Rungis' sustainability strategy extends beyond food waste management to encompass broader environmental objectives aimed at reducing its carbon footprint. A critical component of this strategy is the adoption of fully electric collection vehicles for on-site logistics, which are expected to significantly reduce annual CO₂ emissions. Furthermore, the market has achieved a significant milestone, with 100% of its waste now valorised. This includes 63% converted into energy, while the remainder is either recycled or composted. By implementing these sustainable practices, Rungis not only reduces the environmental impact of food waste but also reinforces its position as a leader in promoting a circular economy within the agricultural sector¹⁵².

¹⁴⁸Platform.sh. (2022, December 19). Califrais digitizes Rungis Market via Platform.sh.

¹⁴⁹Beniot, M. C. (2021, December 17). Logistics & intelligent transport: Califrais raises €1.5 million from the STEF group. ActuaI.A.

¹⁵⁰Suez. (2024, March 15). The Rungis International Market has awarded SUEZ a €31 million contract to expand its food and non-food waste sorting and recovery capability.

¹⁵¹WUWM. (2023, September 29). European Wholesale Markets Leading the Way in Food Donation Initiatives.

¹⁵²MUFFP. (2024). Wholesale markets: Public spaces for interconnected food policies.

CASE
STUDY

Taipei's Auction Centre for Fruits and Vegetables

The Taipei Agricultural Products Marketing Corporation (TAPMC)¹⁵³, also known as the Taipei Agricultural Wholesale Market or the Taipei Fruit and Vegetable Market, is the region's largest wholesale platform for agricultural products.

Operating through an auction system, the market is a joint initiative by the Government, various farmers' associations and transport companies. It handles approximately 1,600 metric tonnes of vegetables and 700 metric tonnes of fruit daily. Beyond its role as a central

trading hub for fresh produce, the market also serves as a platform for distributing a wide range of agricultural specialty products from across the region. These include certified safe and premium-quality items such as black tea, specialty noodles, and fragrant lotus flowers, which cater to both domestic and international demand. Central to these operations is the TAPMC¹⁵⁴ who plays a critical role in ensuring supply chain efficiency and nationwide market connectivity.



The Agricultural Products Market Transaction Act underpins auction activities by regulating market management, auction procedures, and quality standards for agricultural products. It also governs key aspects such as market transactions, pricing mechanisms, operational protocols, and dispute resolution. Through these provisions, the Act ensures the efficient functioning of wholesale markets by fostering transparency and fairness in transaction.



To address food safety concerns, the market operates an on-site laboratory that conducts **daily residue** testing on fruits and vegetables. Approximately 250 random samples are analysed each day, with any produce failing to meet safety standards immediately confiscated and barred from auction. In addition, the Farmer's Association carries out preliminary **food safety checks**. These stringent inspection measures are further reinforced by mandatory requirements for product manufacturers to submit certifications from authorised testing agencies, along with basic registration documents, before their products are allowed for sale in the market.

The market opens before dawn each day, and within two to three hours, all produce is distributed via auction to retailers across Greater Taipei, who then supply it to consumers. The scope of distribution has been expanded to include satellite cities and towns in Taoyuan and Yilan, **servicing a total of approximately five million consumers**.

¹⁵³Ku, C. H. (2016, June 16). Professional Farmer Shop: Providing a Variety of Safe Taiwan – produced Foods. Taipei Travel.

¹⁵⁴Chung, J. (2022, October 18). Agricultural firm promoting new collapsible crates. Taipei Times.

Taipei's Auction Centre for Fruits and Vegetables



Complementing these facilities, the Professional Farmer's Association, located adjacent to the market, **conducts preliminary food safety inspections**. Product manufacturers are required to **provide certification from recognised testing agencies**, along with basic registration documents, before their products are allowed to be sold in the market.



Figure 47: Taipei's Auction Centre



Figure 48: Auction Centre with Various Advanced Machinery

The auction centre is **equipped with various advanced machinery**, including electric forklifts and trailers, which significantly enhance the operational efficiency. These machines, combined with the use of collapsible crates, streamline the transport of goods to their designated areas. Each item is meticulously stored according to its tag number, ensuring an organised system that minimises labour requirements and reduces potential errors in handling.



The Agricultural Products Market Transaction Act regulates market transactions, pricing rules, quality standards, market operations, and dispute resolution. This legislation ensures that fair and transparent practices are upheld in the buying and selling of agricultural products.



Strategy 3

Advance Scalable Mechanisation and Digitalisation Efforts

Mission 1

Leveraging technology to drive agricultural productivity is a proven strategy, offering a dual advantage of resource efficiency and profit maximisation. Advanced mechanisation, precision farming, and data-driven solutions have consistently demonstrated their ability to enhance yields, reduce input waste, and improve overall sustainability. However, widespread adoption remains a challenge, particularly for smallholders who dominate the agricultural sector. The high implementation costs, coupled with limited access to financing and technical expertise, often impede their ability to integrate modern technologies into their operations. Addressing these barriers requires a strategic framework that enables gradual adoption, financial accessibility, and skill development to ensure that technological advancements benefit all stakeholders.

Establishing an agritech ecosystem optimised for both end-users (farmers and technology adopters) and providers (technology developers) is key in this effort, ensuring that technological advancements are both accessible and locally relevant. This includes promoting flexible, modular implementation models that combine aquaculture with hydroponics, enhanced by renewable energy, nanotechnology, and IoT sensors, allowing smallholders to adopt technology incrementally, based on their financial capacity and operational scale. Equally critical is achieving technological sovereignty by strengthening domestic innovation capabilities, reducing dependency on external technologies, and fostering the development of locally adapted solutions. Ensuring that the supply of technology aligns with local requirements, by offering solutions tailored to diverse agricultural practices such as integrated fish-vegetable cultivation systems with advanced nanomaterials for efficiency, environmental conditions, and user capabilities, is crucial for long-term sustainability.

Strategy 1.3: Advance Scalable Mechanisation and Digitalisation Efforts aims to achieve this by fostering sector-wide innovation through a holistic approach that not only enhances access but also nurtures a self-sustaining ecosystem in which homegrown technological solutions are developed, tested, and refined to meet real-world agricultural needs.



Strategy 4

Mission
1Bolster Productivity Within
the Paddy Sector

In Malaysia, rice consumption stands at approximately 80 kg per person annually, contributing to 26% of daily calorie intake. Despite its strategic importance, the paddy sector continues to grapple with systemic inefficiencies, low productivity, and a persistent reliance on subsidies to remain economically viable. These issues are further exacerbated by the overuse of chemical inputs, such as pesticides, driven by frequent pest attacks that not only increase production costs but also pose significant environmental risks.

Given the fundamental role of paddy cultivation in national food security and rural livelihoods, a dedicated strategy is essential to address these persistent challenges. Pricing remains a major concern, as controlled prices for rice and inputs often fail to reflect actual production costs, discouraging investment in innovation and modernisation. At the same time, farmers grapple with rising input costs, restricted access to high-quality seeds, and inefficient water management systems, all of which limit productivity gains.

Compounding these structural inefficiencies are growing climate-related threats, including flooding and drought, which further jeopardise Malaysia's rice production capabilities. Without targeted interventions to enhance resilience, efficiency, and sustainability in the sector, achieving the national rice self-sufficiency target of 80% by 2030 remains increasingly challenging¹⁵⁵.

Strategy 1.4: Bolster Productivity Within the Paddy Sector aims to address the critical challenges facing Malaysia's paddy industry, a sector that remains vital to national food security as rice continues to be the staple food for the majority of the population. Ensuring long-term stability in rice production requires a multifaceted approach that enhances productivity, builds resilience against climate risks, and strengthens the economic viability of paddy farming. Central to this effort is the development and deployment of high-yield, climate-resilient rice varieties, designed to mitigate the adverse effects of extreme weather events and water scarcity.



¹⁵⁵MAFS Malaysia. (2024, August 13). National Agrofood Policy (NAP 2.0).

Beyond productivity enhancements, structural reforms are necessary to support farmers and improve overall sector efficiency. A key component of this strategy involves transitioning from the current subsidy model to a voucher-based system, offering farmers greater flexibility in selecting inputs while fostering competition among suppliers. This shift aims to enhance the quality and availability of essential agricultural inputs, including advanced soil conditioning solutions leveraging nanotechnology, driving sector-wide improvements. This is especially critical for paddy seed production, where establishing a robust distribution network is essential to ensure timely access to high-quality seeds and to mitigate risks associated with supply chain disruptions. Simultaneously, addressing water-related challenges through modernised irrigation systems and improved water resource management is crucial to optimising efficiency and reducing vulnerabilities associated with erratic weather patterns.

In response to rising demand, expanding and optimising granary areas remains a strategic priority, supported by targeted investments in modern infrastructure and resources to drive higher production capacity across key agricultural regions. This also includes improving storage capacity, optimising land use, and enhancing supply chain efficiency, creating a more resilient and responsive rice production system. Collectively, these measures contribute to transforming Malaysia's paddy sector into a more resilient, self-sufficient, and environmentally sustainable industry. This, in turn, strategically positions the country for long-term food security and enhanced agricultural competitiveness.



CASE
STUDYSMART Sawah Berskala Besar Asnaf (SMART SBBA)
by Lembaga Zakat Negeri Kedah (LZNK)

Smart SBBA by the Kedah State Zakat Board (Lembaga Zakat Negeri Kedah) was selected as a case study for its dual impact in addressing food insecurity. While primarily aimed at lifting residents out of poverty through targeted food assistance, the initiative has also contributed to increased rice production at scale, aligning with broader national food security goals. Their success serves as compelling evidence that contributions to food security can extend beyond the remit of agencies or ministries, highlighting the impact that external organisations can make in addressing food security.

Reviving Abandoned Paddy Fields While Lifting Asnaf Communities Out of Poverty

Due to the inheritance-based land distribution system, rice paddy plots have progressively decreased in size across generations. This issue is further compounded by the fact that the total land area has remained unchanged, while the number of family members has increased.

Consequently, some farmers continue to work on plots that have become too small to be economically viable. As a result, a significant number of paddy farmers in Kedah are now living below the poverty line¹⁵⁶.



LZNK has **established a food bank in all 578 mosques** across Kedah, providing 30 food packages to each mosque per month. This food bank is intended for Asnaf facing temporary food shortages, rather than as recurring monthly assistance. The initiative involves distributing a total of 2,080,800 kilogrammes of rice annually, at a cost of RM5,410,080.00. The current scope of the food bank has expanded to include 590 mosques, with each mosque now receiving an increased allocation of 30 to 40 packages per month. Significant savings could be achieved by LZNK if it produced the rice in-house through the Asnaf, redistributed it to Asnaf groups in need, and established a sustainable economic cycle.

Since assuming the role of Chief Executive Officer at LZNK in 2017, Dato' Sheikh Zakaria Othman has consistently pursued a strategy to integrate small, fragmented rice fields under multiple ownerships into a single, large-scale rice estate managed using practical, professional, and scientific methods.

This vision has been communicated to MAFS, aligning with its initiative, Large-Scale SMART Paddy, which shares the objective of consolidating small paddy plots into efficient, professionally managed estates. As a result, MAFS has appointed LZNK as the lead agency, in collaboration with MADA, designating LZNK's rice fields in Padang Lumat, Yan District, as a pilot project for this initiative.

¹⁵⁶Jamaludin Mat Rashid. (2023, November 06). Aspirasi LZNK Basmi Kemiskinan Melalui SMART SBB. Agrimag.

Implementation Method

SMART Sawah Berskala Besar Asnaf by LZNK

LZNK implements this initiative through three key approaches:

1. LZNK-Owned Land

LZNK owns approximately 200 hectares of land, distributed across various districts in Kedah. To manage the SMART SBB ASNAF LZNK project, LZNK has appointed 77 participants from the Asnaf group. These participants receive working capital from LZNK to initiate paddy cultivation, facilitated through interest-free personal loans (Qardhul Hasan) provided by Bank Islam. The capital is recovered by LZNK through deductions from the participants' yield.

2. Privately Owned Land

Asnaf landowners with two hectares or more will receive assistance from LZNK in the form of working capital, administered through participants appointed by LZNK. The recovery of the working capital will be made through deductions from the harvested yield.

3. Private Landowners Leasing to LZNK

Private landowners have the option to lease their land to LZNK, with the organisation overseeing all agricultural activities in the paddy fields by appointing participants from the Asnaf group. Landowners will receive rental or lease payments, while LZNK recovers the working capital through deductions from the harvested yield.

Additionally, LZNK has adopted a concept in which Asnaf members actively participate in farm work, while LZNK manages the entire supply chain comprehensively. The organisation assumes responsibility throughout the supply chain, ensuring a seamless provision of inputs, supplying the necessary machinery, managing paddy sales to selected millers, coordinating the paddy planting schedule, and carrying out upgrades to the irrigation system. This holistic approach enables farmers to focus solely on paddy production.





KEY CHALLENGES

**SMART Sawah Berskala Besar
Asnaf by LZNK**

1. Land Revitalisation

Given that much of the land has remained unused for an extended period, extensive revitalisation efforts are required. Before land acquisition, LZNK collaborates with the Department of Agriculture (DOA) to assess key factors such as pH levels and historical land use, with a specific focus on suitability for paddy cultivation. To support the comprehensive study and analysis, LZNK also works with Universiti Utara Malaysia (UUM).

2. Price and Quality of Seeds, Fertilisers, and Pesticides

A significant challenge arises in procuring seeds, primarily due to high demand. This forces farmers to resort to market-priced seeds, with subsidised seeds priced at RM35, while actual market prices range from RM45 to RM70, depending on the variety.

Similarly, the rising annual costs of fertilisers and pesticides continue to pose a significant challenge for farmers. Compounding this issue is the growing need for higher input volumes over time, which increasingly exceeds the coverage offered under existing subsidy schemes.

At the same time, stakeholders have expressed concerns that the existing business model of seed suppliers tends to prioritise distribution targets over quality assurance. This has raised issues around seed performance, particularly regarding germination rates and yield reliability.

3. Dominance in Machinery Services and Rice Millers

The use of machinery, particularly for ploughing and harvesting, is often dominated by a few key providers, leading to controlled pricing for rentals and services. This concentration contributes to elevated operational costs for farmers.

Beyond the challenges associated with machinery access and costs, farmers also encounter persistent inefficiencies in the post-harvest stage, particularly in the transportation and sale of their produce. Paddy farmers typically rely on independent lorry drivers to transport and sell their harvest to millers. The reported weight is determined at the mill and communicated solely by the drivers, with no standardised verification at the point of collection. This lack of oversight, coupled with the exclusive control of weight data, raises concerns about the transparency and fairness of the weighing process.

Currently, millers exert control over the paddy standard rejection cut at 20%, regardless of the paddy's quality, leading to significant losses for the farmers. Moreover, the commissions received by lorry drivers from brokers limit the farmers' choices in selecting millers.

These compounded issues, coupled with the fragmentation of rice paddy plots through inheritance, have rendered the paddy industry unprofitable, further exacerbating the cycle of poverty among paddy farmers in Kedah.

SMART Sawah Berskala Besar Asnaf by LZNK

4. Farming Is Highly Dependent on Water and Weather Systems

LZNK recognises the crucial importance of water availability and weather conditions in paddy farming activities. Therefore, any delays in water supply are deemed unacceptable, and scheduling must remain flexible in response to weather conditions.

5. Farmers' Financial Literacy Level

Many farmers obtain loans for paddy farming activities without a clear understanding of Return On Investment (ROI). When the yield falls short of covering the debt, they are forced to begin the next season, thereby accumulating further debt. Consequently, this situation puts their land ownership rights at risk of seizure by debt collectors.

Proactive Measures from LZNK

LZNK assumes responsibility throughout the supply chain allowing participants to concentrate on paddy production. To fulfil these responsibilities and address challenges, LZNK has taken the following proactive measures:

1. LZNK ensures the suitability of land conditions and infrastructure readiness before taking over or renting the land. This involves collaboration with various stakeholders, including the DOA and academic institutions.
2. LZNK engages in extensive collaborations with agencies such as NAFAS and MARDI to ensure the smooth and efficient delivery of fertilisers and seeds.
3. The procurement process for pesticides is optimised, with an emphasis on identifying the most cost-effective suppliers. Leveraging bulk buying helps to minimise costs.
4. LZNK owns its fleet of machinery for paddy cultivation, including ploughing and harvesting tractors, as well as lorries. Through proactive initiatives, LZNK has successfully secured corporate social responsibility contributions, including tractor donations from financial institutions such as Bank Pembangunan Malaysia Berhad, as well as the acquisition of three small paddy machines worth RM411,000 through a collaboration with Pemodelan Nasional Berhad. Collaborations also extend to drone operation courses, skills enhancement, and opportunity creation through partnerships with training centres and Bank Islam Malaysia Berhad. Owning their own machinery has allowed LZNK to cut down on the expenses associated with renting equipment to participants while ensuring efficient scheduling.
5. LZNK strategically select mills for the sale of the yield and has successfully negotiated with millers to reduce the paddy rejection rate from 20% to 9%.



**SMART Sawah
Berskala Besar Asnaf by LZNK**

NO	TYPE OF MACHINE	MARKET COST (RM)	COST IMPOSED BY LZNK (RM)	TOTAL SAVINGS (RM)
1	Harvesting Machine	110.00/relung	66.00/relung	44.00
2	Ploughing Machine	120.00	40.00	80.00
3	Drone	20.00/relung	10.00/relung	10.00
Total Saving for 1 Relung:				134.00

Table 10: Total Cost Reductions for Machinery Provided to Participants

In less than five years since the project was initiated, the cultivated paddy land has expanded to **163.62 hectares**, boasting an average yield of **5.03 tonnes per hectare**. Participants have also realised a monthly income averaging **RM2,416.16**¹⁵⁷.



KEY TAKEAWAYS

1. LZNK assumes responsibility across the supply chain, which includes ensuring a consistent and timely provision of inputs, using in-house machinery to reduce costs for farmers, and negotiating fair prices with millers. This approach has effectively reduced the expenses associated with rice cultivation and increased farmers' income.
2. LZNK carefully selects participants for its programmes, considering not only Asnaf status but also the individuals' capacity for engaging in paddy farming. This involves a thorough selection process, including home visits and interviews.
3. The success is further attributed to LZNK personnel actively engaging on the ground, exercising effective control over pesticide application, ensuring consistency, and timeliness, and preventing overuse. The field supervisors, with extensive personal experience in farming, play a crucial role in overseeing various aspects of farm management for LZNK. Their presence ensures participants properly maintain the farm and achieve high rice yields.
4. The success of LZNK is also credited to strong collaboration with key stakeholders, agencies, and academia, each playing a role in enhancing efficiency and reducing costs along the supply chain. Despite the complexities of broker relationships, Zakat actively engages in these partnerships, facilitating fair deals and safeguarding farmers' rights.



¹⁵⁷Lembaga Zakat Negeri Kedah. (n.d.). Info smart sawah berskala besar asnaf LZNK musim 1/23.

SUSTAINABLE AND RESILIENT AGROFOOD SYSTEMS

Mission 2

The steady growth of the global population, combined with the increasing complexity of globalised food systems, continues to place significant pressure on efforts to meet evolving consumer demands. A resilient and adaptive agricultural sector is increasingly critical, as external disruptions such as climate change, geopolitical uncertainties, and supply chain vulnerabilities continue to pose significant risks to food security. Ensuring a stable and sufficient food supply requires not only increased production but also the strategic integration of sustainability principles to safeguard long-term viability and competitiveness.

Mission 1 is designed to drive productivity growth through a structured yet pragmatic approach to sustainability. The primary objective is to enhance output through efficiency-driven innovations, technological advancements, and optimised resource utilisation. Emphasis is also placed on strengthening self-reliance to ensure that the agricultural sector remains resilient and competitive in the face of disruptions.

Mission 2 takes a deeper and more integrated approach to sustainability, embedding it as a core pillar rather than a secondary consideration. This approach extends beyond operational resilience to encompass environmental stewardship, resource efficiency, and long-term ecosystem health. A key component of this approach focuses on enhancing the sustainability of input production through strengthened local capabilities and expanded market access.

Concurrently, it promotes regenerative and circular agricultural models such as precision resource management and soil restoration techniques. This include practices that collectively improve soil health, increase carbon sequestration, and mitigate environmental degradation. The sustainable management of marine resources is also a priority, with conservation policies, regulatory enforcement, and advanced monitoring systems playing a crucial role in preserving biodiversity and preventing overexploitation.



Furthermore, Mission 2 seeks to address systemic vulnerabilities through proactive risk management strategies designed to strengthen the resilience of food systems against external shocks and long-term stresses. This includes the integration of advanced agricultural early warning systems, leveraging data analytics and predictive modelling to enable timely interventions, prevent food shortages, and minimise losses.

Efforts to strengthen the resilience and sustainability of food supply chains are further bolstered by a holistic waste management strategy, with a targeted focus on minimising food loss and waste throughout the value chain.

This includes the deployment of advanced shelf-life extension technologies, such as controlled atmosphere storage, innovative packaging solutions, and precision cold chain management, alongside enhancements in logistics and storage infrastructure to ensure seamless handling, transportation, and distribution. Additionally, the mission places emphasis on strengthening redistribution networks, enabling surplus food to be efficiently redirected to communities in need, thereby reducing waste while improving food accessibility. This integrated approach not only fortifies food security but also mitigates environmental impact, ensuring that productivity gains are not achieved at the expense of future agricultural potential.



Strategy 1

Drive Sustainability in Local Input Production

Mission 2

Expanding agricultural production necessitates a proportional increase in input usage, particularly fertiliser and pesticide inputs. However, conventional practices that rely on chemically intensive methods and uncontrolled application have led to long-term challenges, including soil degradation, reduced efficiency, and heightened environmental risks. The increasing frequency of climate-related pressures, such as rising temperatures, further amplifies input dependency, escalating both costs and sustainability concerns.

Strategy 2.1: Drive Sustainability in Local Input Production tackles these challenges by spearheading a strategic transition toward precision-based, resource-efficient solutions that enhance productivity while reducing environmental impact. This approach prioritises the adoption of environmentally responsible agricultural practices, including targeted fertilisation, site-specific nutrient management, and integrated pest control strategies, to maximise efficiency and minimise reliance on chemical-intensive inputs.

Furthermore, the strategy focuses on catalysing the growth of high-potential sectors that face significant expansion challenges, particularly livestock and aquaculture. For instance, advancements in breeding technology have facilitated the development of high-quality, disease-resistant breeds with enhanced adaptability to local environmental conditions. However, despite these advancements, the local market continues to face significant challenges due to intense competition from international suppliers that leverage aggressive pricing strategies, economies of scale, and well-established distribution networks.

As a strategic approach to maintaining competitiveness, advancing self-sufficiency, and promoting environmental sustainability, the initiative prioritises sustained efforts to strengthen the viability of locally bred hybrid livestock breeds.

By integrating resource-efficient breeding programmes, precision feed optimisation, and eco-friendly disease management strategies, the approach minimises the sector's ecological footprint while enhancing productivity. Expanding access to advanced reproductive technologies (e.g., genetic selection, embryo transfer, artificial insemination) alongside the adoption of precision farming practices significantly enhances genetic potential, improves feed conversion efficiency, and elevates overall herd and stock performance. These efforts collectively strengthen industry resilience, ensuring long-term sustainability and competitiveness in both domestic and global markets.

Critically, diversifying international supply chains remains a key strategic priority, in recognition of the fact that certain breeds are not optimally suited to local conditions due to environmental and resource constraints. Ensuring long-term sustainability requires a balanced approach that strengthens domestic breeding capabilities while strategically engaging with international partners to complement local production. This includes leveraging global expertise through contract farming, bilateral trade agreements, and technology transfers to secure access to high-quality breeding stock and advanced genetic resources.

CASE STUDY

FarmByte, Revolutionising Malaysia's Agrofood Sector With A Digital Aggregator Platform

FarmByte, a company under Johor Corporation, is transforming Malaysia's agrofood sector through digital solutions that empower farmers, strengthen food security, and reduce food waste. Farmers face challenges such as market volatility, limited access to buyers, and supply chain inefficiencies that contribute to food loss.

FarmByte bridges these gaps through data-driven technology, optimising farm productivity, expanding market access, and ensuring that more food reaches consumers rather than going to waste. This approach strengthens Malaysia's agrofood ecosystem while fostering a more sustainable and profitable future for farmers.



From the left: Agrobank Strategic Partnership, FarmByte Archisen Joint Venture, FarmByte Digital Products



KEY TAKEAWAYS

Harnessing Data and Technology to Address Market Trends



Farmers often face challenges such as price volatility, shifting consumer preferences, and evolving supply chain dynamics. Limited market connectivity frequently compels them to sell their produce at lower prices. A data-driven platform enables farmers to make informed decisions by providing real-time insights into market trends, demand fluctuations, and pricing patterns. With greater visibility, they are able to align production more closely with actual market needs, thereby reducing instances of oversupply and minimising food waste.

Expanding Market Access, Strengthening Industry Collaboration, and Enhancing Food Security



Traditional supply chains often involve multiple stakeholders, with systemic inefficiencies that can erode farmers' earnings. The integration of data-driven platforms mitigates these issues by enhancing transparency, streamlining farmer-to-buyer linkages, and promoting more equitable and efficient transactions.

Furthermore, digital marketplaces also expand opportunities for farmers to reach new customers and strengthen their market position while fostering collaboration across the agrofood ecosystem. Improved market alignment and supply chain efficiency help prevent overproduction and post-harvest losses. Real-time demand data ensures food is distributed more effectively, reducing waste and enhancing national food security. Additionally, insights into resource use and crop health promote sustainable farming practices.

Enabling a Future-Ready Agrofood Sector with Digital-First and Whole-of-Nation Approach



As Malaysia's agrofood sector continues to evolve, the integration of digital innovation is critical to driving long-term sustainability and growth. FarmByte's initiatives demonstrate the transformative potential of technology in modernising conventional farming, enhancing profitability, operational efficiency, and environmental stewardship.

Through strategic partnerships and cross-sector collaboration, the industry can achieve progressive advancements that benefit farmers and reinforce national food security. These efforts, underpinned by data-driven insights, market-responsive decision-making, and a strong emphasis on sustainability, are paving the way for a more resilient and competitive agrofood ecosystem.

Strategy 2

Mission 2

Foster a Regenerative and Circular Agricultural Model

Traditional agricultural models, which rely on excessive resource use, chemical inputs, and inefficient production cycles, continue to threaten soil health, water resources, and biodiversity. As such, transforming agricultural practices towards more sustainable, regenerative, and climate-resilient approaches is essential to prioritise resource efficiency, ecosystem restoration, and long-term sustainability. Addressing these challenges necessitates a strategic departure from conventional practices, replacing them with innovative solutions, including nature-based solution that prioritise regenerative land use, closed-loop resource management, biological control of pests, and climate-smart agricultural techniques.

Strategy 2.2: Foster Regenerative and Circular Agricultural Model serves as a comprehensive framework to accelerate this transition by embedding sustainable models such as circular economy principles and regenerative agricultural practices into mainstream food production systems. This includes optimising resource efficiency, reducing environmental externalities, and strengthening the resilience of agricultural ecosystems against climate change and market disruptions.

A key priority under this strategy is to promote the large-scale adoption of Integrated Farming Systems (IFS) across areas such as crop cultivation, livestock rearing, and aquaculture. This integrated approach provides a holistic model of agriculture that maximises land use efficiency, enhances resource recycling, promotes ecological balance, and improves farm productivity while reducing dependence on external inputs.

To complement the integrated approach, strengthening circular agricultural practices further reinforces sustainability by transforming agricultural waste into valuable resources for renewable energy production. Rather than allowing organic by-products, such as crop residues, manure, and processing waste, to contribute to environmental degradation, these materials can be repurposed into biofuels, biogas, and organic fertilisers, reducing waste while enhancing energy security and soil health.

The integration of waste-to-energy solutions within the broader agricultural framework presents an opportunity to enhance energy security and support carbon reduction efforts, in addition to maximising the use of available resources.

Furthermore, Strategy 2.2 places a priority on the efficient and sustainable management of water resources. This includes the implementation of precision irrigation systems, advanced rainwater harvesting techniques, and wastewater recycling initiatives. Additionally, the strategy emphasises the protection and restoration of watersheds, wetlands, and natural water bodies, recognising their essential role in sustaining ecosystem services and ensuring the long-term viability of agricultural activities.

By integrating sustainability as a core operational principle, from input utilisation through to waste repurposing, this strategy not only safeguards and revitalises natural ecosystems but also enhances food security, fosters economic resilience, and reinforces the global competitiveness of the agricultural sector.

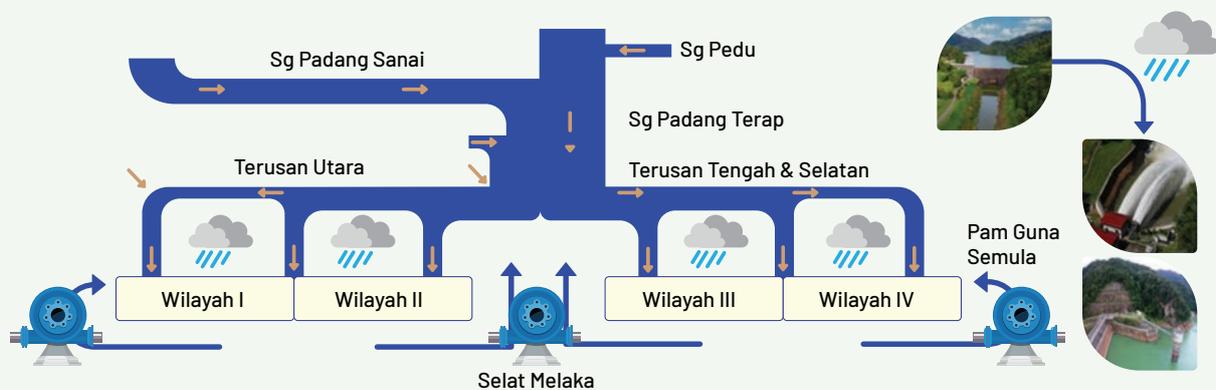
CASE STUDY

Sustainable Water Management Through Rainwater Harvesting (RWH)

Schematic of the Irrigation Water Reuse System in Malaysia's Granary Areas

The Irrigation Water Reuse System (Skematik Sistem Guna Semula Air Pengairan), implemented by MADA and KADA, represents a pioneering initiative in Malaysia focused on sustainable water management through Rainwater Harvesting (RWH). This innovative system is designed to efficiently capture and store rainwater, optimising its use specifically for agricultural irrigation.

By harnessing rainwater, the system not only conserves potable water but also reduces reliance on traditional water sources during dry spells, ensuring that farmers have access to a reliable and consistent water supply even during periods of low rainfall.



Source: Pelan Induk Perancangan Guna Tanah Kawasan Sumber Makanan Negara (KAGUMN), 2021

Figure 49: Irrigation water recycling facility at IADA Kerian, Perak

Technologies Involved

**Rainwater Harvesting Structures:**

These structures are engineered to capture and store rainwater for agricultural irrigation, thereby reducing reliance on conventional water sources.

**Pumping Systems:**

Efficient pumps are employed to distribute harvested rainwater to fields, ensuring adequate moisture for crops during dry periods.

**Drainage Water Recycling:**

The system incorporates methods for recycling drainage water, enabling the reuse of surplus water that would otherwise be wasted. This contributes to a sustainable water supply for irrigation.

**Irrigation Management Systems:**

Advanced irrigation management techniques, including drip irrigation and sprinkler systems, optimise water use and minimise waste, ensuring that crops receive precise and adequate hydration.

CASE STUDY

Rainwater Harvesting (RWH) Increasing Water Efficiency in Pali, India

In the arid region of Pali in Rajasthan, farmers have demonstrated remarkable ingenuity by adopting rainwater harvesting (RWH) techniques to address the challenges of water scarcity. Through these efforts, farmers have successfully cultivated staple crops such as sorghum, pearl millet, maize, and pulses. This approach enables enhancement of efficient water use while strengthening agricultural productivity, thereby contributing to economic resilience and promoting sustainable development in the face of challenging climatic conditions.

This forward-thinking initiative, supported by the ICAR-Central Arid Zone Research Institute (CAZRI), serves as a noteworthy example of efforts to enhance food security and improve livelihoods in a region with limited water resources¹⁵⁸.

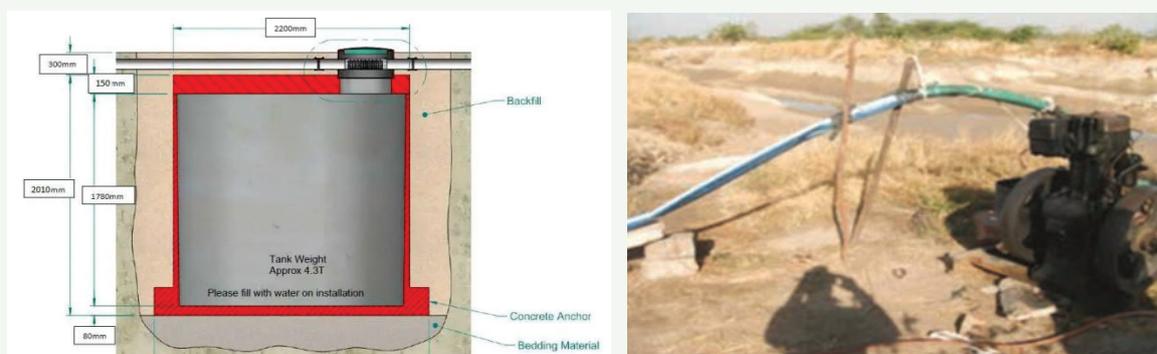


Figure 50: Concrete structure measuring 40m x 40m x 3.5m (left) and channels to divert water for irrigation (right)

Technologies Involved



Deepened Natural Depression:

The existing depression in the low-lying area was excavated and expanded using heavy-duty machinery, allowing for improved water collection.



Pond:

The area was transformed into a large pond with a capacity of 1,000 cubic metres, capable of collecting runoff from approximately 40 to 65 hectares.



Concrete Rainwater Storage Structure:

A reinforced concrete structure measuring 40 m x 40 m x 3.5 m was constructed to store harvested rainwater.



Channels and Circular Catchments:

Channels and circular catchments were constructed to divert water efficiently to specific locations for harvesting.

¹⁵⁸Singh et al. (2019). Rain Water Harvesting for Food and Livelihood Security: A case study from Pali, India. *Open Agriculture*, 4(1), 767-777.



SUCCESS STORY

Rainwater Harvesting (RWH) Technologies

A notable case from the region involves a farmer whose annual income from rain-fed agriculture was previously limited to INR 20,000 due to the seasonal variability of rainfall. Following the adoption of RWH technologies, the farmer's income increased significantly to INR 615,000, attributed to improved soil and water conditions that enhanced crop productivity. This outcome underscores the effectiveness of RWH technologies in improving agricultural performance and strengthening rural livelihoods.

Beyond improving traditional crop yields, the integration of RWH technologies facilitated the diversification of agricultural activities, including the establishment of ber (jujube) orchards, which contributed to increased income. Leveraging the benefits of the improved irrigation system, an additional 760 ber trees were planted, resulting in a total yield of approximately 40 tonnes of fruit. This outcome further underscores the effectiveness of RWH in enhancing farm productivity and illustrates the broader potential of innovative agricultural practices to strengthen livelihoods and support sustainable agricultural development in water-constrained environments¹⁵⁹.



KEY TAKEAWAYS

Improved Water Efficiency



The RWH systems enabled farmers to increase the availability of water for irrigation by approximately 30–50%, significantly reducing reliance on groundwater.

Higher Yields



The adoption of RWH practices led to improved crop yields, attributable to enhanced water management.

Diversification of Income



Improved water availability through harvested rainwater also enabled farmers to diversify their agricultural activities by cultivating a wider range of crops.

¹⁵⁹Singh et al. (2019). Rainwater Harvesting for Food and Livelihood Security: A case study from Pali, India. *Open Agriculture*, 4(1), 767–777.

Strategy 3

Mission 2

Accelerate Sustainable Marine Resource Management

As an essential source of protein, fish plays a pivotal role in safeguarding Malaysia's food security. However, the growing demand for seafood is placing considerable strain on marine fisheries, highlighting the urgent need for a strategic shift towards a more resilient and sustainable production model. This pressure has led to the depletion of fish stocks, which in turn disrupts supply chains, increases dependence on imports, heightens market volatility, and threatens the livelihoods of communities reliant on the fisheries sector.

Under Mission 1, the focus is on achieving significant productivity improvements in the aquaculture sector to reduce dependence on wild-caught fisheries and strengthen the stability and reliability of the national seafood supply. At the same time, efforts in the marine fisheries sector aim to expand commercial fishing operations into deeper and more distant waters, thereby increasing the yield of premium catch while mitigating overexploitation in critical regeneration zones that are essential for the protection of juvenile fish populations.

Strategy 2.3: Accelerate Sustainable Marine Resource Management builds on this effort by strengthening regulatory frameworks and enhancing enforcement mechanisms to uphold high standards of fisheries management. A key pillar of this strategy is the implementation of seasonal marine closures, reinforced by advanced surveillance technologies such as satellite tracking, real-time data analytics, and automated enforcement systems. These closures serve as a crucial mechanism for replenishing fish stocks in designated areas, ensuring ecological balance while sustaining the long-term viability of the fisheries sector.

In addition to stock regeneration efforts, the strategy prioritises marine conservation and habitat restoration through targeted initiatives such as the establishment of artificial reefs, large-scale seagrass and mangrove rehabilitation programmes, and the strict enforcement of no-fishing zones in ecologically sensitive areas. These measures not only restore biodiversity and enhance marine productivity, but also serve as critical carbon sequestration mechanisms, contributing to broader climate goals. Efforts also encompass the integration of community-based conservation models and the introduction of incentive

mechanisms to encourage stakeholder participation, thereby fostering local stewardship of marine resources and ensuring the long-term sustainability of conservation initiatives.

Equally important is the need to strengthen inter-agency coordination to regulate and eliminate the sale of prohibited fishing gear, particularly within online marketplaces where illegal equipment is widely accessible. The proliferation of unregulated fishing tools has exacerbated destructive practices, undermined national conservation efforts, and threatened marine biodiversity. A more robust enforcement framework, bolstered by data sharing agreements, advanced digital monitoring solutions, and strategic collaboration with e-commerce platforms, is essential for curbing illicit trade. This comprehensive approach not only strengthens regulatory oversight but also accelerates the advancement of responsible fisheries governance, deters illegal activities effectively, and reinforces sustainable fishing practices across the sector.

CASE STUDY

Thailand Rotational Closure in the Gulf of Thailand

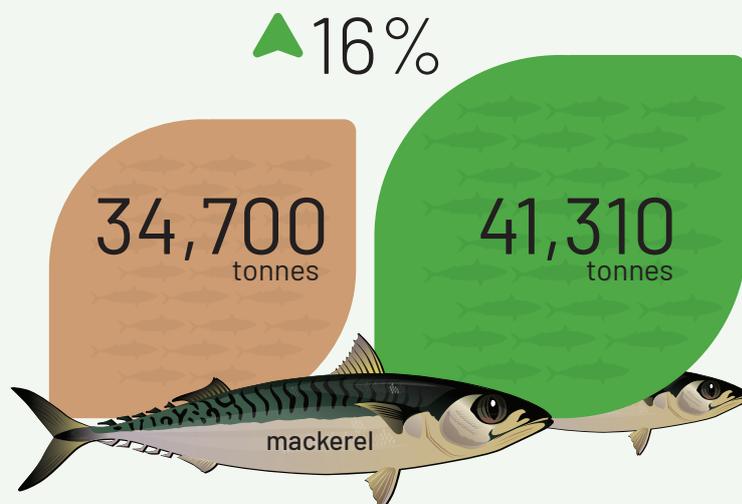


The Department of Fisheries in Thailand conducts an **annual rotational closure of fishing areas** in the Gulf of Thailand, which lasts until September. The seasonal fishing ban commences along the Khao Ta Mong Lai coast in Prachuap Khiri Khan and extends to the Don Sak district in Surat Thani, remaining in effect until 15 May each year. Subsequently, from 16 May to 14 June, the ban shifts to the area between Khao Ta Mong Lai and Hua Hin in Prachuap Khiri Khan province.

This is followed by a ban from 15 June to 15 August, covering the western sea areas of Prachuap Khiri Khan, Phetchaburi, Samut Songkhram, and Samut Sakhon. Finally, from 1 August to 30 September, the ban is extended to the upper Gulf region, encompassing the provinces of Samut Sakhon, Bangkok, Samut Prakan, Chachoengsao, and Chon Buri. In 2023, a survey conducted by the Department of Fisheries showed that mackerel catches in the Gulf **reached 41,310 tonnes**, valued at 3.3 billion baht, **indicating a 16% increase** from the previous year (2022) as a result of the rotational closure initiative. Additionally, the survey revealed a significant proportion of mature fish in the catch, highlighting the effectiveness of the Gulf closure in preserving and enhancing marine life.



Figure 51: Thailand Rotational Closure in the Gulf of Thailand



Strategy 4

Mission 2

Enhance Resilience to Vulnerability, Shocks and Stresses

Strategy 2.1, 2.2 and 2.3 focus extensively on ensuring the sustainability of Malaysia's agrofood system, addressing aspects such as resource efficiency, environmental impact, and long-term viability. In contrast, **Strategy 2.4: Enhance Resilience to Vulnerability, Shocks and Stresses** is dedicated to bolstering the resilience of the agrofood system, ensuring it can withstand and recover from various vulnerabilities, shocks, and stresses. This This include efforts such as strengthening Food Systems Diplomacy (FSD) and global partnerships, reinforcing international alliances to address food security challenges, and expanding the deployment of Early Warning Systems (EWS) for agricultural applications.

Bilateral and multilateral collaborations play a critical role in strengthening Malaysia's food security framework by facilitating access to a broader and more reliable network of food import sources. This strategic diversification enhances the resilience of national food supply chains in the face of global market disruptions, geopolitical tensions, and climate-related challenges. A case in point is Singapore's food diversification model, which has successfully reduced the country's reliance on any single supplier by broadening its network of sourcing countries. This strategy advocates adopting a similar approach by leveraging Malaysia's extensive Free Trade Agreements (FTAs), which include cooperation clauses that foster collaboration and knowledge-sharing among partner nations. These provisions support joint agricultural initiatives, technology transfers, and capacity-building efforts, enabling Malaysia to strengthen its agrofood sector's resilience against global uncertainties.

Beyond trade diversification, enhancing agrofood resilience can be achieved by integrating best practices from leading agricultural economies. India's success in implementing technology-driven agricultural solutions, such as precision farming, optimised fertiliser application, and financial inclusion for smallholder farmers, offers valuable insights that can be adapted to suit different agricultural contexts.

Strategy 2.4 seeks to capitalise on these opportunities by deepening regional cooperation and strengthening strategic collaborations to accelerate the transfer of knowledge, innovation, and capacity-building across the agrofood value chain.

Complementing trade-based strategies, strengthening internal risk management through the integration of advanced technologies for early detection and response is also a key emphasis of Strategy 2.4. A key component of this approach is the deployment of EWS for agricultural applications, which serve as a proactive defence mechanism against disruptions in the agrofood sector. These systems leverage real-time data and predictive analytics to monitor climate variability, detect emerging threats, and anticipate supply chain disruptions, enabling timely and informed decision-making. Additionally, a well-structured EWS not only safeguards food production but also reinforces national food security by minimising the economic and social impacts of agricultural disruptions. As Malaysia navigates an increasingly volatile global landscape, a data-driven, technology-enabled risk management framework is essential for ensuring long-term agrofood sustainability and resilience.

CASE
STUDY**Capitalising on the Transferable Experiences and Expertise Gained Through India's Agricultural Transformation**

India's agricultural sector offers valuable lessons for advancing food self-sufficiency, particularly in the development of the paddy and rice subsector. Strategic investments in research and development, especially in high-yielding, fertiliser-responsive, and short-cycle varieties of genetically modified crops such as rice and wheat, enabled India to achieve substantial production gains by the late 1970s.

India's experience demonstrates that meaningful progress in the agricultural sector can be achieved without extensive institutional structures or substantial budgetary allocations. Instead, progress is supported by an enabling environment that encourages agritech development through targeted incentives and coordinated support across the food value chain. When accompanied by accessible financing mechanisms and adequate infrastructure, this approach has delivered

tangible outcomes and may offer a useful reference for adaptation in other contexts.

Strategic engagement with successful partner countries can also be optimised through the utilisation of existing cooperation provisions under FTAs. Leveraging these frameworks enables the acceleration of economic and technological collaboration, thereby advancing national progress towards greater food security¹⁶⁰.



KEY TAKEAWAYS

Moving Beyond the Four Conventional Variables: Land, Water, Labour, and Energy Resources


India's technological transformation is centred on five key advancements. These include the development of engineered high-yield crops, the optimisation of fertiliser application, the implementation of precise pest management, the adoption of precision farming coupled with mechanisation, as well as the introduction of innovative water practices such as drip irrigation and intercropping.

Expanding Agricultural Credit and Insurance Through Private Banks


Increased participation by private banks broadens access to affordable agricultural credit and insurance for farmers, encouraging competition, reducing borrowing costs, and reducing reliance on high-cost informal lenders.

Agri-tech Disruption at All Levels of the Food Supply Chain


Driven by a digital-friendly policy framework and substantial government investments in digital infrastructure and rural internet, India experienced a surge to over 1,000 agritech firms between 2013 and 2020, attracting a substantial investment of US\$1.6 billion. The prioritisation of highly scalable agritech solutions over capital-intensive technologies proved pivotal in enabling both small and large farms to contribute to the growth of India's food sector.

¹⁶⁰Asif Raihan et al., (2024). An exploration of the latest developments, obstacles, and potential future pathways for climate-smart agriculture. *Climate Smart Agriculture*, 1(2).

Regional cooperation plays a pivotal role in strengthening food security by facilitating collaborative efforts to address common challenges across the region. Through mutual support and resource sharing, neighbouring countries are better positioned to coordinate efforts and enhance collective food system resilience and long-term sustainability.

Participation in platforms such as the Association of Southeast Asian Nations (ASEAN) and Asia-Pacific Economic Cooperation (APEC) provides Malaysia with opportunities to leverage regional solutions and collective action. For example, both the ASEAN Integrated Food Security (AIFS) Framework and APEC's Aotearoa Plan of Action advocate for sustainable agricultural practices, resilient supply chains, and improved food availability. These initiatives place particular emphasis on technology transfer, knowledge sharing, resource optimisation, and coordinated crisis responses.

A key priority is the development of advanced early warning systems in agricultural management, leveraging real-time data and predictive analytics to monitor risks such as extreme weather, pest outbreaks, and market disruptions.

Active participation in these platforms enables Malaysia to strengthen food security by adopting sustainable practices, integrating resource-sharing mechanisms, and coordinating responses to supply chain disruptions, while contributing to regional agrofood resilience and sustainability.



ASEAN & APEC COLLABORATIVE EFFORTS



Promote sustainable agricultural practices



Strengthen supply chain resilience



Enhance food availability



Facilitate technology transfer



Encourage knowledge sharing



Optimise resource utilisation



Coordinate responses to crises



Strategy 5

Structural Approach to Address Food Loss and Waste Crisis

Mission 2

Food loss and waste represent significant challenges, with high volumes of perishable goods discarded annually due to inadequate infrastructure, inefficient handling, and market failures. Addressing this issue is critical for enhancing food availability, reducing environmental impact, and improving resource efficiency in support of Malaysia's food security goals. **Strategy 2.5: Structural Approach to Address Food Loss and Waste Crisis** aims to combat Malaysia's food loss and waste crisis by adopting a systemic approach to reduce inefficiencies across the agrofood system.

Food loss and waste have become critical challenges within Malaysia's agrofood system, contributing to inefficiencies across production, distribution, and consumption. This issue not only exacerbates food insecurity but also strains the nation's environmental resources and increases greenhouse gas emissions. In Malaysia, food waste constitutes over 60% of total landfill waste, with a significant portion comprising still-edible food.

Key drivers of these inefficiencies include rapid urbanisation, which has increased the consumption of perishable foods but is hindered by inadequate infrastructure and logistics that lead to spoilage. In rural and remote areas, challenges are intensified by the lack of cold storage facilities, inefficient transportation networks, and weak post-harvest management systems. These structural gaps are further aggravated by limited awareness and accountability across the supply chain, as many stakeholders lack the tools and incentives necessary to monitor and minimise waste. Moreover, the absence of comprehensive regulatory frameworks has enabled unsustainable practices to continue unchecked.

Strategy 2.5 acknowledges the critical need to address losses of perishable goods through the adoption of modern technologies. As such, it prioritises investments in advanced cold storage systems, efficient logistics, and improved post-

harvest technologies to preserve food quality and minimise spoilage. These measures not only extend the shelf life of perishable products but also enhance supply chain efficiency.

In addition to reducing waste, fostering collaboration across sectors is essential to creating a more resilient and efficient agrofood system. Social Enterprises (SE) play a pivotal role in this effort, serving as catalysts for innovative, community-based solutions to food waste. Programmes such as WarmingUp, which transforms organic waste into valuable inputs through insect farming, highlight the potential of SE to promote responsible consumption and environmental sustainability. Empowering SE that are committed to this initiative generates a ripple effect throughout communities, effectively reducing food waste while advancing sustainable practices.

Building on the success of the MySaveFood initiative, which focuses on recovering surplus food at the retail level, this strategy aims to expand its reach by extending food redistribution efforts to underserved communities. Enhancing this programme through strengthened governance and monitoring frameworks will accelerate efforts to reduce food waste, ensuring larger quantities are effectively salvaged and redirected to those in need.



SUCCESS STORY

WORMING UP - Growing Communities Through Growing Food

12 RESPONSIBLE CONSUMPTION AND PRODUCTION



13 CLIMATE ACTION



Established in 2015 and headquartered in Kuching, Sarawak, WormingUp is an accredited social enterprise that focuses on **environmental conservation**. Their approach specifically utilising **Black Soldier Flies (BSF)**, to involves insect farming, responsibly manage organic waste and prevent it from ending up in landfills. Comprised of a diverse team of young individuals under 30 years old from various ethnic backgrounds, WormingUp is united by a shared passion for preserving organic resources and mitigating environmental degradation.

WormingUp effectively addresses **SDGs 12 and 13**, focusing on responsible consumption and production, and climate action respectively, through education programmes on waste management. **Collaborating with partners like Hilton, they provide training to hotel staff, educate over 400 hawkers and 2000 students on waste management awareness.** These efforts are aligned with their belief that transforming communities and systems to reduce, separate, and upcycle food waste requires collaborative partnerships among key players, including state and community partnerships and various organisations.



Sustainable Waste Management



Educational Workshops



Smart Agriculture

Additionally, a robust regulatory framework is essential for enforcing accountability across the supply chain. The Malaysian Association of Hotels (MAH) has highlighted that buffet-style establishments, particularly during high-demand periods, contribute significantly to food waste within the hospitality sector. The consequences of this wastage are dire, with an estimated **3,000 metric tonnes of untouched, edible food discarded daily, an amount sufficient to provide three substantial meals to approximately half a million people.** Exploring the potential introduction of phased regulatory measures (e.g., penalties for excessive food waste) may serve to encourage businesses to adopt more sustainable practices while allowing for meaningful stakeholder engagement and a gradual transition.



3,000 metric tonnes

discarded daily



Structural Approach to Tackle Food Loss and Waste

SDG 12.3 commits to reducing global food loss and waste by half per capita at the retail and consumer levels by 2030. The Food Loss Index (FLI), developed by the FAO, monitors progress towards achieving SDG Target 12.3 by tracking losses along the post-harvest supply chain—excluding retail. Meanwhile, the United Nations Environment Programme (UNEP) oversees the Food Waste Index, which monitors waste at retail, food service, and household levels.

Adopting Food Loss Index and Food Waste Index in national monitoring and evaluation frameworks is essential for generating reliable data, identifying critical points of loss and waste, and informing evidence-based interventions. Additionally, alignment with internationally recognised metrics not only enhances transparency and accountability but also enables Malaysia to benchmark progress against global targets, strengthen policy coherence, and prioritise resource allocation to the most critical points of intervention.



Custodians of SDG 12.3 Indicators: FAO & UNEP



Figure 52: Custodian of Food Loss and Food Waste Index [Adopted from UNEP (2024)]¹⁶¹

¹⁶¹UNEP. (2024, March 27). Food waste index report 2024.

The FLI focuses on measuring the proportion of food removed from the supply chain, rather than measuring the actual amount of food loss in tonnes. FAO defines food loss in the context of the FLI as the quantity of crops, livestock, and fish that are edible for humans but are entirely excluded from the supply chain after being harvested, slaughtered, or caught. This include food typically discarded, incinerated, or otherwise disposed of without being redirected for alternative uses such as animal feed or industrial applications. This definition of food loss includes everything up to but excluding the retail level. It accounts for losses of both the edible and inedible parts of the commodity during storage, transportation, and processing, including those related to imported products¹⁶².

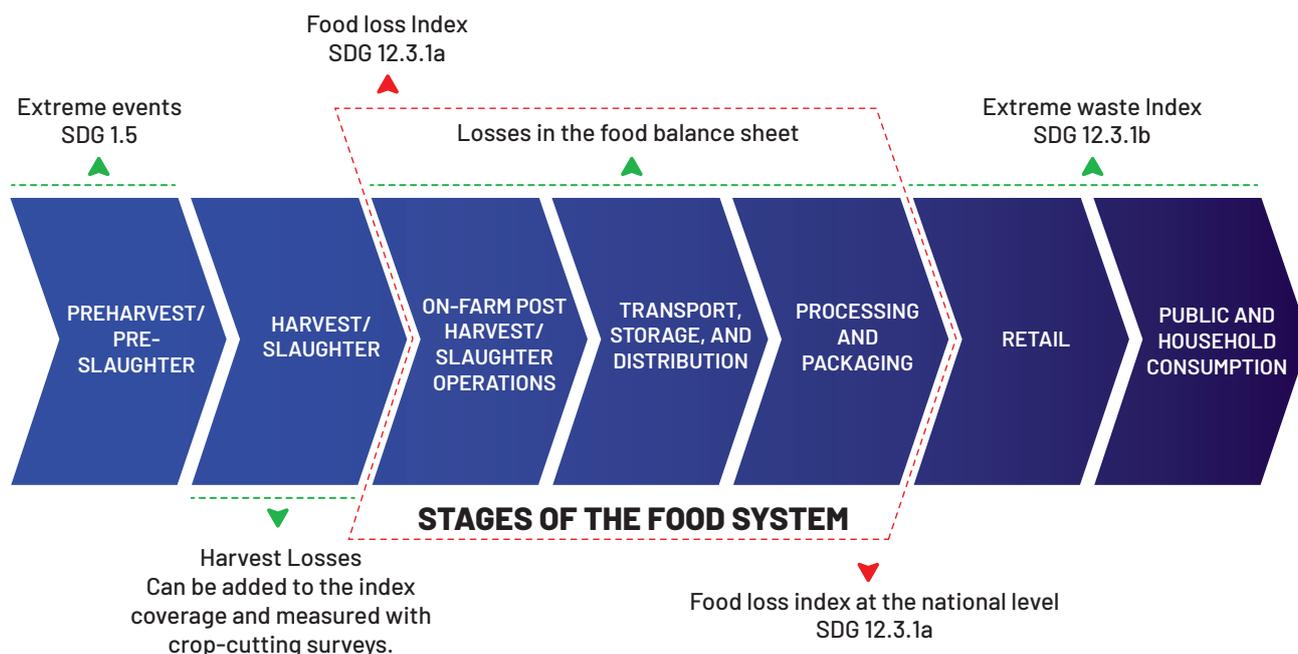


Figure 53: Scope of Food Loss Index [Adopted from FAO (2019)]¹⁶³

The global food system is intricately linked to stakeholders and activities across the production, aggregation, processing, distribution, consumption, and disposal of food products. Given this complexity, collaborative efforts and systemic changes across agrofood systems are crucial for tackling food loss and waste.

The UNEP advocates for evidence-based solutions through Public-Private Partnerships (PPPs) to systematically combat food loss and waste. A PPP, also referred to as a 'voluntary agreement', involves collaboration to achieve a common goal. In the context of addressing food loss and waste, this entails a jointly agreed-upon and self-determined commitment to take action on food waste generated at various stages of the agrofood system¹⁶⁴.

PPPs serve a vital function in addressing fragmentation within the agrofood system by formally uniting diverse stakeholders through structured signatory frameworks. The stakeholders identified by UNEP to drive this effort include the private sector, public institutions, and third-party actors such as non-governmental organisations, research institutes, and trade associations. As more entities join as signatories, however, PPPs must continue to evolve to remain effective.

¹⁶²FAO. (2019). The state of food and agriculture 2019: Moving forward on food loss and waste reduction.

¹⁶³UNEP. (2024, March 27). Food waste index report 2024.

¹⁶⁴REFRESH & WRAP Global. (2021). Building partnerships, driving change: A voluntary approach to cutting food waste.

CASE
STUDY

GRASP 2030 (Gotong Royong Atasi Susut & Limbah Pangan di Tahun 2030)



The GRASP 2030 (Gotong Royong Atasi Susut & Limbah Pangan di Tahun 2030) initiative represents a Voluntary Agreement (VA) aimed at fostering collaboration among all stakeholders across the food system chain in Indonesia. Its primary objective is to catalyse concerted efforts across businesses and supporting actors to enhance the sustainability of food production and consumption practices.

The GRASP 2030 initiative seeks to generate tangible environmental, social, and economic benefits for participating organisations and for Indonesia as a whole by fostering systemic change across the food value chain. This objective is closely aligned with the global commitment to achieving SDG Target 12.3, which focuses on reducing food loss and waste, as well as SDG 2, which aims to end hunger and ensure food security.



Reduction of food loss and waste **by half** by the year 2030



KEY TAKEAWAYS

**Collaborative
Multi-Stakeholder
Engagement**


Establishment of a collaborative framework and a progress-focused programme, with significant participation from both the private sector and the hospitality industry. Notable signatories include East West Seed Indonesia, Multi Bintang, Nutrifood, Fairmont Jakarta, and Grand Hyatt Jakarta. Additionally, NGOs and social enterprises such as Food Bank Bandung, Foodbank of Indonesia, and Food Sustainesia have also pledged their commitment to the initiative.

**Structured,
Results-driven
Methodology**


GRASP 2030 adopts the Target-Measure-Act approach to enhance resource efficiency, utilising robust monitoring and evaluation mechanisms to effectively achieve its goals.

**Established
Programme
Governance**


A Steering Group has been established to uphold strong governance, ensuring the programme remains focused on its targeted areas.



Mission 3

SAFE FOOD AND HEALTHY DIET FOR ALL



Mission 3 aims to transform Malaysia's agrofood systems by pursuing the dual objectives of improving dietary quality and ensuring food safety, thereby securing the availability of safe and nutritious food for all. This entails promoting healthier dietary habits while addressing broader public health challenges. Furthermore, it involves aligning Malaysia's food safety and nutrition policies with global best practices to strengthen the food environment and shape consumer behaviour, while integrating sustainable practices into the agrofood system.

The mission acknowledges the pressing challenges posed by changing consumption patterns, the nutrition transition, and the coexistence of malnutrition and diet-related NCDs within Malaysian society. Rapid urbanisation, globalisation, and rising income levels have significantly increased the accessibility and consumption of highly processed, calorie-dense foods that lack nutritional value. This dietary shift has been a major contributing factor to the growing prevalence of obesity and related NCDs. Simultaneously, significant segments of the population, including women of reproductive age and school-aged children, continue to experience micronutrient deficiencies and undernutrition.

Additionally, the mission acknowledges the importance of creating a supportive food environment where safe, nutritious, and affordable options become the default choice for all. It seeks to balance accessibility with education, ensuring consumers are empowered to make healthier dietary decisions without overlooking cultural and economic considerations.

Simultaneously, it places significant emphasis on embedding nutrition-sensitive strategies into the fabric of public policy and community-driven initiatives to create a more health-conscious and equitable food system. These approaches aim to address the root causes of malnutrition and poor dietary habits by integrating nutritional considerations into wider food system policies and practices.

Key examples include implementing standardised school feeding programmes that provide balanced and nutritious meals, ensuring children, particularly in underserved areas, receive the dietary support they need for healthy growth and development. This initiative is expected to not only improve nutritional outcomes but also foster a broader socioeconomic impact.

Targeted interventions are another critical component, focusing on nutritionally vulnerable groups such as low-income families, women of reproductive age, and children under five. These interventions include fortified food distributions, subsidies for nutrient-rich foods, and tailored community nutrition programmes to address specific deficiencies and dietary needs.

To encourage the private sector's participation in promoting nutritional and safety standards, the mission envisions incentivising businesses to innovate and offer healthier food products. This includes tax benefits, recognition programmes, or support for adopting practices that align with national health objectives, such as reducing sugar, salt, and trans fats in processed foods.

In parallel, the mission seeks to foster consumer-driven demand for healthier foods by enhancing public awareness and education. Comprehensive labelling regulations, such as front-of-pack labelling, will help consumers make informed choices, while widespread campaigns will promote sustainable and healthy eating habits. These efforts aim to shift consumer behaviour toward more nutrient-rich, locally sourced, and sustainable food options.

In essence,, Mission 3 aims to address the multifaceted challenges of malnutrition, food safety, and health, ensuring that every Malaysian has access to safe food and a healthy diet.

Strategy 1

Improve Accessibility To Nutritionally Rich Foods

Mission 3

Strategy 3.1: Improve Accessibility to Nutritionally Rich Foods underscores the importance of ensuring equitable access to safe and nutritious food as a foundation for promoting a healthy population in Malaysia. This strategy focuses on addressing the nutritional needs of all Malaysians, with special attention to vulnerable groups such as children, women of reproductive age, and low-income communities.

Key initiatives in this strategy include strengthening agrofood systems to deliver safe, nutritious, and culturally appropriate foods. A notable example is the implementation of a standardised and free school feeding programme, which provides balanced meals to schoolchildren and contributes to improved educational outcomes and overall health. Drawing on international models like Japan's Kyushoku programme, the initiative fosters collaboration among ministries, communities, and parents to enhance access to safe and nutritious food while instilling nutritional education.

Additionally, a fundamental pillar of this strategy involves building upon and intensifying ongoing efforts to encourage more businesses to obtain nutritional and food safety certifications. This initiative reinforces the critical importance of ensuring that safe and healthy food options are both available and accessible to all Malaysians. Supporting businesses in achieving these standards not only bolsters consumer confidence but also cultivates a market environment where nutritious food choices are abundant and accessible to all.

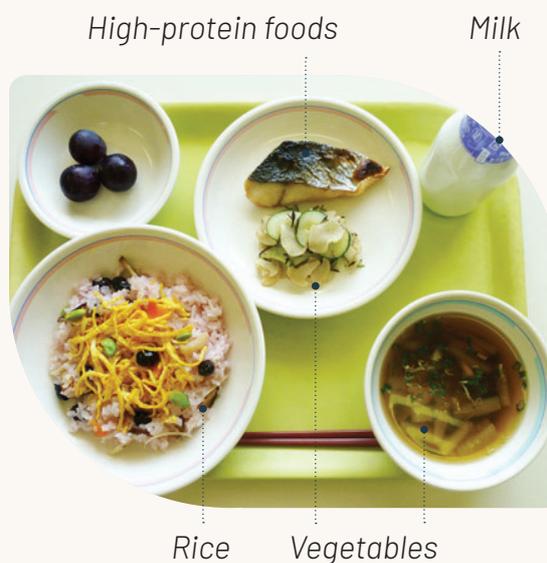
Simultaneously, this strategy recognises the persistent issue of micronutrient deficiencies among vulnerable populations and emphasises the fortification of commonly consumed staple foods with essential vitamins and minerals. Key interventions include providing fortified supplements and tailored nutrition programmes for high-risk populations.

To address regional disparities, the strategy promotes collaboration with local governments, non-governmental organisations, and private sector stakeholders. These collaborations aim to implement innovative food distribution models and community-level nutrition education programmes, improving access and awareness in underserved areas. Collectively, these efforts aim to bridge nutritional gaps and create a healthier, more equitable food system.

CASE
STUDYJapan Kyushoku School
Lunch Programme

Post-World War II, Japan faced food shortages and nutritional deficiencies. Therefore, there was a strong need for a nutrition policy particularly catering to vulnerable groups such as low-income children. As such, the creation of the Kyushoku School Lunch Programme was developed alongside the “School Lunch Act” (Gakko Kyushoku Ho). The Kyushoku School Lunch Programme was officially implemented in Japan as a government-initiated system aimed at providing nutritious and balanced meals to students during their school day. The common meals included rice, vegetables, high-protein foods and milk. First introduced in the late 1940s, the programme has since evolved and expanded over the decades, with ongoing adjustments to menu planning, nutritional standards, and administrative procedures to meet changing dietary needs and educational priorities¹⁶⁵.

Under the purview of the Ministry of Education, Culture, Sports, Science, and Technology (MEXT), Kyushoku is administered in collaboration from local governments and school boards. Operational during the standard academic year, the initiative extends its reach to primary schools and occasionally pre-schools, guaranteeing students daily meals from Monday through Friday during lunch hours. Individual schools or localities typically have government-assigned nutritionists stationed on-site who collaborate with educators. Participation in the programme is compulsory for all schools, with government authorities and local health departments closely overseeing menu formulation, food preparation, and adherence to regulations¹⁶⁶.



Implementing Kyushoku required the Japanese government to establish guidelines and regulations regarding nutritional standards, menu planning, and meal preparation for Kyushoku. This was initially achieved by enacting several laws and regulations to ensure effectiveness and compliance. One key law relevant to this programme is the “School Lunch Act” (Gakkō Kyūshoku Hō), which outlines the legal framework for providing school lunches in Japan. This law establishes the obligation for schools to provide nutritious meals to students and sets standards for menu planning, nutritional content, and food safety. Additionally, the Ministry of Education, Culture, Sports, Science, and Technology (MEXT) issues guidelines and regulations pertaining to the Kyushoku programme, detailing specific requirements for meal preparation, nutritional standards, and monitoring procedures. These laws and regulations provide the necessary structure and oversight to ensure that the Kyushoku programme meets its objectives of promoting children’s health and well-being through nutritious school meals¹⁶⁷.

¹⁶⁵MEXT Japan. (n.d.). Japanese school lunches and shokuiku.

¹⁶⁶JNTO. (2022, January 24). Lunch in Japanese schools.

¹⁶⁷Yamamoto, M. (2023, June 23). Kyushoku - School Lunch in Japan. How to Japan.

Japan Kyushoku School Lunch Programme

Every school is mandated to participate in the Kyushoku programme. School administrators work closely with local government authorities to ensure compliance, while also collaborating with on-site nutritionists and dietitians to plan menus that meet government-mandated nutritional requirements. Meals are prepared in school kitchens either by the students themselves or outsourced to certified food providers. Government authorities and local health departments monitor the programme to ensure compliance with nutritional standards, food safety regulations, and overall effectiveness. Inspections and audits may be conducted periodically to assess the quality of meals and adherence to guidelines. Finally, parents, teachers, and community members may be involved in advocating for the programme, providing feedback, and volunteering to support meal preparation and distribution¹⁶⁸.

The Kyushoku programme delivers several notable benefits, foremost among them its positive impact on the overall health of children in Japan. By providing balanced and nutritious meals, Kyushoku effectively combats malnutrition and ensures that children receive essential nutrients crucial for their growth and development. Exposure to a diverse array of foods and adherence to regular mealtimes foster healthy eating habits among children, promising long-term advantages for their health and well-being. Furthermore, the programme plays a vital role in addressing disparities in access to nutritious food by guaranteeing that all students, regardless of socioeconomic background, have equitable access to wholesome meals at school¹⁶⁹.

Another notable positive outcome is the programme's contribution to improved academic performance. Research shows a clear link between proper nutrition, enhanced cognitive function, and academic success. By providing students with access to nutritious meals throughout the school day, Kyushoku supports their ability to concentrate and learn effectively, thereby bolstering their academic achievements¹⁷⁰.

In addition to these benefits, the Kyushoku programme is complemented by "food education" (Shokuiku) practices. This entails engaging students in the food preparation process and imparting knowledge about nutrition and culinary practices. By actively involving students in food-related activities, such as meal preparation and appreciation, Shokuiku fosters a greater appreciation for food among students and helps reduce food waste, fostering a culture of mindful consumption¹⁷¹.

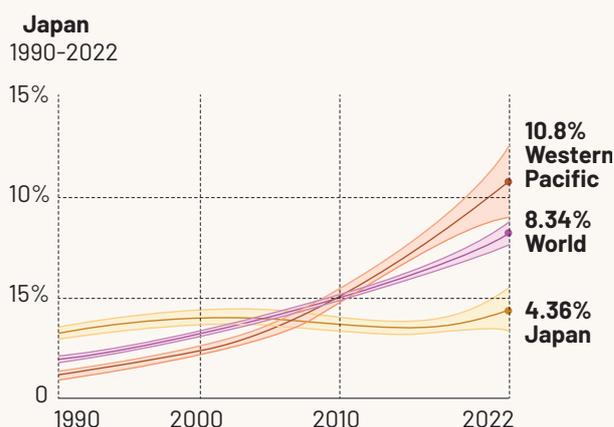


Figure 54: Prevalence of obesity among children and adolescents aged 5 to 19 years in Japan

¹⁶⁸School Food Matters. (2023, October 16). What lessons can we learn from Japan's acclaimed school food programme?

¹⁶⁹Oda, Y. (n.d.). All about Kyushoku and Shoku-Iku food education. Education in Japan Community Blog.

¹⁷⁰Oda, Y. (n.d.). All about Kyushoku and Shoku-Iku food education. Education in Japan Community Blog.

¹⁷¹Paku, K. H. (2022, January 21). Nutrition and food education in Japan. Just One Cookbook.

Malaysia – Nutritional Landscape of school feeding programmes

In Malaysia, the primary school feeding initiative is the Rancangan Makanan Tambahan (RMT) programme, overseen by the Ministry of Education¹⁷². It aims to provide free meals to primary school students from low-income households, ensuring they receive adequate nutrition to support their growth and development. Governed by a guidebook issued by the Ministry, the RMT programme supplements food provided at home, while also serving as a platform for nutrition education and fostering cooperation between schools and the broader community. The collaboration between ministries and school-level stakeholders, coordinated by the Student Assistance Committee, enables effective planning, implementation, and monitoring of the programme.

Eligible schools, including government and government-aided institutions, are required to meet specific criteria, such as enrolling students from households with incomes below the poverty line or those with special needs. The programme operates

throughout the school year, except during the fasting month for Muslim students. The meals are provided before the start of school sessions for both morning and afternoon sessions. Funding is provided by the Ministry of Education, with allocated budgets varying by region.

Food supply arrangements range from utilising existing canteen operators to appointing suppliers from the Parent-Teacher Association or school staff families, with any deviations subject to approval by the Ministry's Finance Division. A menu comprising diverse options ensures students receive balanced meals, including local favourites like nasi lemak, mi goreng, and roti canai, listed in the Food Supply Agreement¹⁷³.



Each beneficiary receives a daily meal during school days, with a maximum of 190 days per year. Since 2022, the program has included a daily supply of milk for students, which was previously provided twice a week.

Building on these nutrition-focused efforts, the RMT initiative incorporates two complementary programmes that not only support children's dietary needs but also reinforce the critical importance of food safety throughout the school feeding system¹⁷³. This programmes are in compliance with the Food Act 1983 and Food Regulations 1985, particularly through regular inspections conducted under the School Milk Programme (Program Susu Sekolah)¹⁷⁴.

(1983)
Program
Susu Sekolah



(2020)
Program
Sarapan Pagi



¹⁷²Khalidi, J. R., & Tan, G. Z. (2020, February 07). Understanding School Feeding in Malaysia. KRI.

¹⁷³Khalidi, J. R., & Tan, G. Z. (2020, February 07). Understanding School Feeding in Malaysia. KRI.

¹⁷⁴Khalidi, J. R., & Tan, G. Z. (2020, February 07). Understanding School Feeding in Malaysia. KRI.

Another noteworthy school feeding initiative is the Program Hidangan Berkhasiat di Sekolah (HiTS). This programme operates as a school breakfast initiative, primarily funded through private contributions, often sourced from parental enrolment fees. The programme places a strong emphasis on kitchen hygiene and food safety practices, ensured through regular inspections conducted by nutritionists and food technology officers. With a diverse selection of at least 60 meal options rotating daily, HiTS aims to provide students with a variety of balanced and nutritious meals. This approach not only caters to different dietary preferences and cultural tastes but also ensures affordability, making healthy food accessible at minimal cost. Collaboration between teachers and nutritionists facilitates the organisation and monitoring of student participation. While non-enrolled students still have the option to purchase food, they are subject to higher prices. HiTS operates on a voluntary basis, underscoring its community-driven approach¹⁷⁵.

The feeding programmes have demonstrated notable efficacy in enhancing students' health and academic performance¹⁷⁶. Nevertheless, there are still several opportunities for Malaysia to strengthen its school feeding initiatives. To optimise Malaysia's school feeding programmes, several strategic enhancements could be introduced.

Firstly, to elevate the nutritional quality of meals provided through the RMT, close collaboration with local farmers, processors, and industries is essential. By sourcing fresh, locally grown produce and sustainable protein sources, the programme can offer a diverse range of fruits, vegetables, whole grains, and proteins, carefully designed with input from nutritionists and dieticians. This approach not only meets the dietary requirements of growing children but also fosters their overall health and well-being. Through partnerships with local agricultural stakeholders, the programme simultaneously bolsters the local economy, reduce its carbon footprint by shortening supply chains, and delivers nutritious meals crafted from high-quality, locally sourced ingredients.

In addition, raising awareness about food safety certifications such as MyGAP, Makanan Selamat Tanggungjawab Industri (MeSTI), Good Manufacturing Practices (GMP), and Hazard Analysis and Critical Control Points (HACCP) plays a pivotal role in strengthening the programme's integrity. By promoting understanding and recognition of these standards among suppliers, school communities, and parents, the initiative fosters greater consumer confidence in the quality and safety of the meals provided.

This heightened awareness not only reinforces public trust but also encourages more suppliers to adopt certified practices, thereby elevating the overall standard of food handling, preparation, and delivery within the programme. Ultimately, integrating food safety education into the broader framework of the RMT supports a culture of accountability, transparency, and continuous improvement across the entire value chain.

Secondly, broadening the programme's impact necessitates extending coverage to encompass a broader demographic range beyond underprivileged students, spanning primary schools nationwide. While continuing to prioritise expansion in areas marked by poverty and food insecurity, the inclusion of students from diverse socioeconomic backgrounds ensures equitable access to essential nutritional support. This comprehensive approach recognises the universal significance of nutrition and strives to meet the varying needs of students across socioeconomic strata.

Lastly, community engagement and empowerment are vital components for programme success. By fostering greater community involvement in planning, implementation, and evaluation, initiatives such as school gardens or cooking clubs can actively engage parents, local farmers, and other stakeholders in promoting healthy eating habits and nutrition education. Empowering students to make informed food choices and take charge of their health outcomes through participatory activities and peer-led initiatives fosters a culture of wellness within the school community, thereby ensuring sustainable benefits for all stakeholders involved.

¹⁷⁵Khalidi, J. R., & Tan, G. Z. (2020, February 07). Understanding School Feeding in Malaysia. KRI.

¹⁷⁶Healthy meals in schools programme yields positive results, says Zahid. (2024, November 26). The Star.

Comparative Analysis of School Lunch in Malaysia and Japan

The disparities between Malaysia and Japan in their school lunch systems can be comprehensively examined through their policy and regulation frameworks, implementation and monitoring mechanisms, and cultural considerations.

In terms of policy and regulation, Japan has established a comprehensive School Lunch Act, providing a solid legal foundation for the Kyushoku Programme. This legislation ensures standardised nutrition and food safety standards across all schools, fostering consistency and adherence to guidelines. Conversely, Malaysia lacks a specific School Lunch Act, resulting in variations in menu planning and nutritional compliance among schools¹⁷⁷. Additionally, Japan's adoption of a nationwide unified programme offers structured guidelines and actions, facilitating clarity of objectives and enabling progress tracking, in contrast to Malaysia's diverse range of programmes.

In terms of implementation and monitoring, Japan maintains a well-structured system overseen by government authorities to ensure adherence to nutritional standards and menu planning guidelines. In comparison, while Malaysia's school feeding programmes are guided by directives from the Ministry of Education, enforcement and monitoring mechanisms may vary in consistency, which can lead to differences in the quality of meals provided across schools.

Cultural and social considerations are pivotal in shaping the effectiveness and acceptance of school feeding programmes. In Malaysia, efforts are made to incorporate cultural preferences and dietary practices to some extent. However, there is room for improvement in catering to the diverse cultural backgrounds of students. Malaysia's rich cultural diversity presents an opportunity to diversify menu offerings and incorporate traditional dishes that resonate with students from various ethnicities.

Japan's Kyushoku Programme serves as a relevant example, providing nutritious meals while incorporating elements of local culinary traditions. The inclusion of culturally familiar dishes supports meal acceptance among students and integrates aspects of food culture into the school environment.

Japan

Established a comprehensive School Lunch Act



Reflects Japanese culinary traditions and local food culture



Strictly regulates and monitors the lunch programme



Malaysia

Lacks a dedicated School Lunch Act

Needs improvement in catering to the diverse cultural backgrounds of students

Lack of stringency

¹⁷⁷MEXT Japan. (n.d.). Japanese school lunches and shokuiku.

Implementation of Kyushoku Programme in Malaysia

If Malaysia were to adopt Japan's Kyushoku School Lunch Programme, careful consideration must be given to the social, cultural, and economic dimensions of implementation. A key aspect of Japan's success lies in its robust community engagement, involving local communities, parents, and stakeholders to understand cultural preferences and dietary habits. This ensures that school menus are culturally sensitive and acceptable to all.

In Japan, collaboration with stakeholders played a pivotal role in achieving positive outcomes for child health, nutrition, and the agricultural sector. The government supported and empowered farmers, resulting in reduced costs for parents participating in the school lunch programme. Such collaboration fosters synergy within the food sector while promoting nutrition¹⁷⁸. Malaysia's government would need to likewise engage with food producers, suppliers, and NGOs to source local ingredients, support small-scale farmers, and advocate for sustainable food practices.

Critically, integrating nutrition education into the school curriculum is a key enabler of programme effectiveness. In Japan, student involvement in activities such as vegetable cultivation and meal preparation has proven effective in fostering food appreciation and minimising waste. Adopting similar experiential learning approaches in Malaysia could enhance students' awareness of healthy eating practices and support long-term dietary behavioural change.

In terms of regulatory framework, introducing a School Lunch Act or similar legislation in Malaysia would provide the necessary structure to standardise school meal programmes. It ensures consistency in nutritional standards, food safety protocols, and menu planning across educational institutions. Stakeholders including policymakers, public health advocates,

educators, and community leaders should be actively engaged to advance this effort through strategic advocacy, public engagement, and coordinated collaboration with relevant government agencies.

In conclusion, while Malaysia can draw valuable insights from Japan's Kyushoku Programme, it must tailor its implementation to the unique social, cultural, and economic context. By addressing these factors and potential challenges, Malaysia can strive to ensure that all students have access to nutritious and culturally appropriate meals at school, ultimately promoting their health and well-being.



Engage with food producers, suppliers, and NGOs to source local ingredients



Empower students with knowledge of healthy eating habits and the importance of a balanced diet



Provide a legal framework for standardised school meal programmes

¹⁷⁸School Food Matters. (2023, October 16). What lessons can we learn from Japan's acclaimed school food programme?.

CASE
STUDY**Enhancing Children's Nutrition and Wellbeing at SJK(C) Yong Peng 2**

SJK(C) Yong Peng 2 is one of the few schools that have implemented the HiTS programme, a structured breakfast and lunch programme to improve children's nutrition and wellbeing. This initiative is a collaborative effort involving teachers, nutritionists, the Parent-Teacher Association (PIBG), and the district health office. The programme's primary focus is on providing balanced meals during the school period and ensuring that students receive nutritious food in a monitored and organised manner. The programme was launched to address malnutrition and ensure all students, regardless of their socioeconomic status, have access to healthy meals. By improving students' overall health, the initiative aims to enhance concentration and academic performance while also supporting their physical and cognitive development. Additionally, the programme strives to foster healthy eating habits and a sense of responsibility among students¹⁷⁹.

The programme begins with a "soft-landing" phase during the first three months, designed to ease students into the new environment. This gradual introduction ensures students feel comfortable and accepted, helping them adapt to the new routine and become more receptive to the provided meals. The programme takes place in the school canteen, where the canteen operator is tasked with preparing and packing the food to ensure it meets the nutritional standards set by the district health office. To further ensure meals are nutritious, photos of the food are sent to the district health office nutritionists and the PIBG for verification and shared on social media for transparency and accountability¹⁸⁰.

The programme has yielded significant positive impacts on children's nutrition and wellbeing at SJK(C) Yong Peng 2. It ensures that all students receive at least one balanced meal during school hours, contributing to their overall health and reducing the incidence of malnutrition. The programme also fosters discipline and responsibility among students, as they are involved in cleaning and maintaining their eating areas¹⁸¹.

Additionally, the soft landing approach is accompanied by a monitoring phase to facilitate data collection, allowing for continuous refinement of the programme to better align with students' needs and preferences. Findings suggest that the programme has contributed to improved student concentration and academic performance, while promoting healthier eating habits. The involvement of various stakeholders, including teachers, nutritionists, and parents, creates a supportive community focused on the children's health and education. The HiTS programme at SJK(C) Yong Peng 2 exemplifies a successful intervention that addresses nutritional deficiencies and enhances the overall wellbeing and academic potential of students through a comprehensive and collaborative approach¹⁸².



¹⁷⁹Khalidi, J. R., & Tan, G. Z. (2020, February 07). Understanding School Feeding in Malaysia. KRI.

¹⁸⁰MOH Malaysia. (2023). Garis panduan: Pelaksanaan program hidangan berkhasiat di sekolah (HiTS).

¹⁸¹Khalidi, J. R., & Tan, G. Z. (2020, February 07). Understanding School Feeding in Malaysia. KRI.

¹⁸²Khalidi, J. R., & Tan, G. Z. (2020, February 07). Understanding School Feeding in Malaysia. KRI.

Strategy 2

Stimulate Consumer-driven Demand for Safe and Healthy Foods

Mission 3

Strategy 3.2: Stimulate Consumer-driven Demand for Safe and Healthy Foods focuses on empowering consumers to make informed dietary choices by encouraging demand for safe and nutritious food. This strategy recognises that shifting consumer preferences toward healthier, locally sourced food options plays a vital role in addressing the rising prevalence of NCDs and promoting sustainable consumption practices. It also emphasises the central role of consumers in shaping food environments and influencing market demand for healthier and safer food choices.

The strategy focus on shifting consumer preferences toward healthier and more sustainable choices. Promoting the consumption of locally sourced and nutritious foods fosters a deeper appreciation for Malaysia's agricultural diversity, strengthens food security, and supports local producers. Measures such as nutritional labelling systems, including the introduction a mandatory sugar rating for prepackaged beverages, provide consumers with transparent information. This regulatory approach empowers consumers to make informed decisions, while simultaneously encouraging businesses to reformulate products with lower sugar content, promoting healthier offerings in the market.

Public education campaigns complement these efforts by creating widespread awareness of the benefits of sustainable diets and empowering consumers to adopt better eating habit. Equipping consumers with the tools to understand nutritional information fosters long-term behavioural change, driving demand for safe, nutritious, and locally produced foods.

Public education campaigns & awareness



Strategy 3.2 represents a holistic approach to reshaping Malaysia's food environment by aligning consumer preferences with public health and sustainability goals. Through a combination of regulatory measures, education, and support for local production, this strategy seeks to build a dynamic ecosystem where healthy, sustainable, and locally produced food becomes the norm.

CASE STUDY

Singapore Nutri-Grade labelling for Beverages



In response to rising rates of NCDs linked to unhealthy dietary habits, Singapore implemented Nutri-Grade labelling for beverages. This initiative aims to empower consumers by providing clear and transparent information about the nutritional content of their drink choices. Through collaboration between government agencies and beverage manufacturers, clear guidelines were established, requiring Nutri-Grade labels to be prominently displayed on product packaging. Public awareness campaigns supplemented the initiative, educating consumers on interpreting Nutri-Grade labels and the importance of healthier beverage choices¹⁸³.

Since the introduction of Nutri-Grade labelling and advertising restrictions, total sugar intake decreased from 60g in 2018 to 56g in 2022. In 2022, 67% of residents adhered to the recommended maximum sugar intake of no more than 10% of total daily energy consumption (equivalent to 10 teaspoons of sugar), compared to 61% in 2019¹⁸⁴.

Furthermore, the labelling requirement has incentivised manufacturers to reformulate their products, leading to a wider range of healthier beverage options in the market. Singapore’s experience underscores the effectiveness of proactive regulatory measures in promoting public health, offering valuable insights for other countries facing similar health challenges. Through Nutri-Grade labelling, Singapore has successfully empowered consumers, transformed the beverage industry, and reduced the burden of NCDs on society¹⁸⁵.

Grade	Horizontal Variants	Vertical Variants	Nutrient Threshold
A			<ul style="list-style-type: none"> ≤1g/100ml sugar ≤0.7g/100ml saturated fat No non-sugar substitutes
B			<ul style="list-style-type: none"> >5-10g/100ml sugar >0.7-1.2g/100ml saturated fat
C			<ul style="list-style-type: none"> >5-10g/100ml sugar >1.2-2.8g/100ml saturated fat
D			<ul style="list-style-type: none"> >10g/100ml sugar >2.8g/100ml saturated fat



Nutri-Grade labelling example

Nutri-Grade grading example

Figure 55: Singapore’s Nutri-Grade labelling

¹⁸³HPB Singapore. (2023). Measures for nutri-grade beverages. Ministry of Health Singapore.

¹⁸⁴Health Hub. (n.d.). Nutri-grade-mark.

¹⁸⁵Health Hub. (n.d.). Nutri-grade-mark.

Strategy 3

Foster an Enabling Environment for Safe and Nutritious Food

Mission 3

Strategy 3.3: Foster an Enabling Environment for Safe and Nutritious Food focuses on creating a supportive framework that not only discourages the production and distribution of unhealthy food but also fosters conditions that enable producers of safe and nutritious food to thrive. This strategy aims to align food production practices with public health objectives, ensuring that agrofood systems prioritise health, safety, and sustainability, while also promoting economic opportunities for responsible producers.

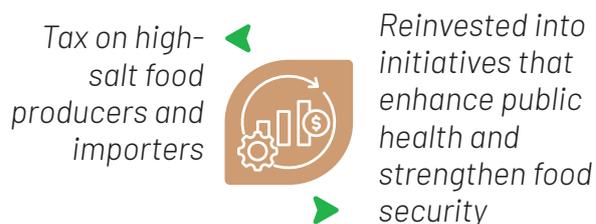
To achieve this, the strategy introduces comprehensive regulatory measures that set rigorous standards for food safety and nutritional quality. These measures include enhanced monitoring and enforcement mechanisms to ensure compliance, creating a food landscape where the production of unhealthy or substandard products is actively discouraged. Concurrently, incentives and support are provided to producers who meet higher safety and nutritional standards, fostering a more competitive, responsible, and quality-driven food production landscape.

The strategy also emphasises empowering and championing food companies that align with the SDGs. Recognising and supporting businesses that prioritise sustainability, food safety and nutrition, the initiative encourages the industry-wide adoption of best practices. This creates a ripple effect, driving improvements across the food production and distribution value chain.

Additionally, promoting good farming practices is a critical component of this strategy. Advocating for stringent food safety standards ensures consumers have access to high-quality, safe food, while also incentivising producers to adopt methods that safeguard public health. These measures help build consumer trust and align Malaysia's agrofood systems with international benchmarks.

Efforts such as Kafeteria Sihat, the Healthier Dining Programme, the Healthier Choice Logo and others (including food safety recognition) can encourage and assist consumers to make more informed and healthier food choices. Hence, the strategy focuses on supporting local SMEs to produce alternative dietary food options. This not only addresses the issue of nutritional deficiencies but also diversifies the market, making it more inclusive and resilient. Additionally, empowers SMEs with financial incentives, training, and access to technology ensures that they can effectively meet consumer demands for healthier food choices.

The overarching goal of Strategy 3.3 is to establish an agrofood system where safe and nutritious food production is actively supported, and unhealthy food practices are systematically discouraged. This strategy aims to reshape Malaysia's food environment by creating policies and frameworks that enable the growth of businesses aligned with public health priorities while reducing the prevalence of unhealthy food options. This balanced approach ensures a forward-looking agrofood system that aligns public health goals with economic growth and environmental stewardship.



Mission 3

Strategy 4 Enhance Monitoring System and Evaluation for Food Safety and Nutrition

Strategy 4

Strategy 3.4: Enhance Monitoring System and Evaluation for Food Safety and Nutrition acknowledges the pivotal role of food safety in ensuring public health and maintaining trust across the food supply chain. Food safety is not a singular effort but a comprehensive responsibility encompassing the production, processing, distribution, and consumption stages. A robust food safety system is vital to prevent contamination, minimise risks, and ensure that food meets nutritional and safety standards.

Malaysia faces persistent challenges in food safety, such as inconsistencies in monitoring systems, lack of standardisation, and limited public awareness. These issues, compounded by the globalisation of agrofood systems and increasing consumer demand for diverse food products, necessitate stronger governance frameworks. Additionally, Malaysia's commitment to international standards, such as the Codex Alimentarius, calls for an integrated approach to align local practices with global benchmarks.

The strategy promotes mandatory myGAP certification across essential food sectors, including crops, livestock, and fisheries. This initiative ensures that producers meet stringent safety and sustainability criteria, enhancing the credibility and quality of the agrofood systems. However, the rapid adoption of urban farming highlights the need for myGAP certification criteria to evolve in tandem with the changing agricultural landscape. Expanding its criteria to include urban farming practices ensures the certification remains relevant, supporting sustainable and innovative production methods while maintaining food safety and quality standards.

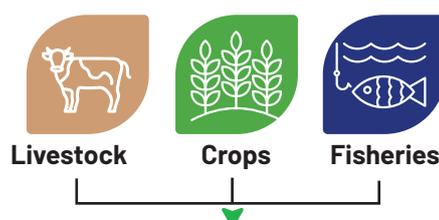
Enhanced public education and awareness campaigns are also a critical pillar of this strategy. These initiatives aim to empower consumers with knowledge about food safety, enabling them to make informed choices and reduce risks associated with unsafe consumption practices. Raising awareness about certifications like myGAP fosters consumer confidence and stimulates demand for safer, certified food products.

To strengthen the governance of food safety, the strategy prioritises improved enforcement mechanisms and harmonised standards. Addressing inconsistencies in monitoring and evaluation frameworks ensures compliance across the supply chain, reducing risks of contamination and foodborne illnesses. Establishing unified safety protocols that align with international best practices also facilitates trade opportunities and strengthens Malaysia's position within the global agrofood market.

Promotes mandatory

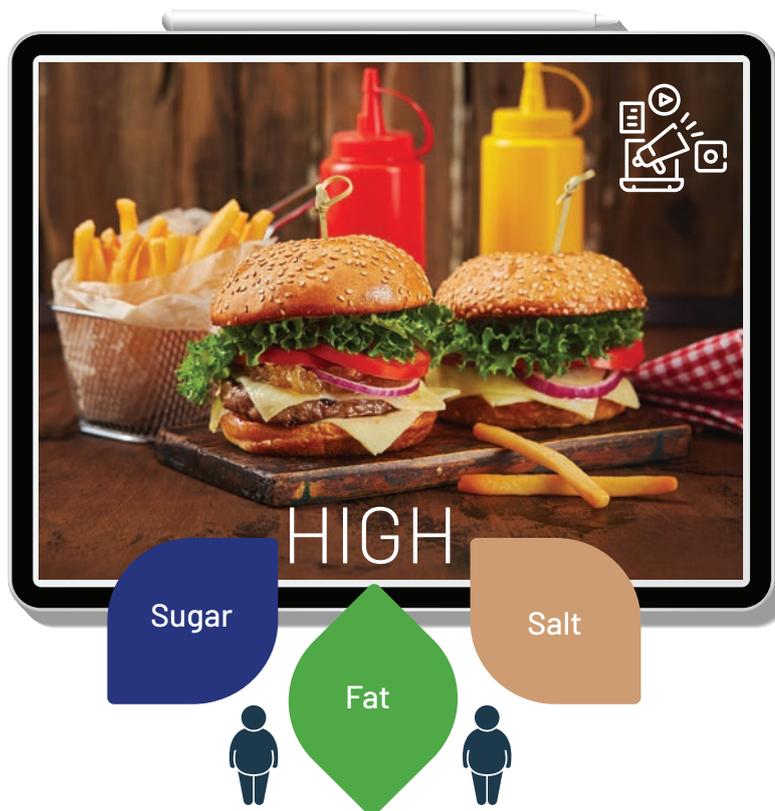


Certification



*To ensure producers meet
stringent safety and
sustainability standards*

The aggressive marketing of unhealthy food products, especially to vulnerable populations, particularly children, has significantly shaped dietary preferences and consumption patterns. Research highlights that children exposed to advertisements for high-sugar, high-fat, and high-salt foods are more likely to develop preferences for such products, leading to poor nutritional outcomes and an increased risk of obesity and other NCDs¹⁸⁶. This environment exacerbates health disparities, as marketing efforts often exploit communities with limited access to healthy alternatives.



Marketing restrictions aim to counter these challenges by creating a food environment that limits the visibility and appeal of unhealthy products, especially to children. This regulation not only reduces exposure to misleading advertisements but also incentivises manufacturers to reformulate their products, aligning them with public health goals. The broader impact extends beyond individual dietary choices to fostering a culture of health-consciousness, where healthier options are normalised and prioritised, contributing to improved national nutrition outcomes.

Through these comprehensive efforts, the strategy contributes to transforming Malaysia's agrofood systems into a model of safety, innovation, and resilience, driving public health outcomes and long-term sustainability.



Marketing
restrictions
on unhealthy food



¹⁸⁶Norman et al. (2016). The impact of marketing and advertising on food behaviours: Evaluating interventions to address childhood obesity. *Current Nutrition Reports*, 5, 139-149.

Mission 4

INCLUSIVE LIVELIHOOD AND ECONOMIC GROWTH

Mission 4 focuses on fostering inclusive livelihood opportunities and driving equitable economic growth within Malaysia's agrofood systems. At its core, this mission aims to uplift vulnerable and marginalised communities, such as Indigenous Peoples and Local Communities (IPLCs), women entrepreneurs, and low-income farmers, by integrating them into high-value agriculture, fisheries, and livestock value chains. Inclusivity in agrofood systems is vital to ensuring that all population segments, regardless of socioeconomic background, can actively participate in and benefit from economic growth. It promotes equitable access to resources, markets, and opportunities, helping bridge income disparities and enhance societal well-being.

A robust social safety net is central to this mission, particularly in safeguarding vulnerable groups during economic shocks or disruptions. Social safety nets provide a foundational layer of support that ensures food security, minimises income losses, and maintains access to essential goods and services for the most at-risk populations. The mission's approach balances short-term assistance with long-term empowerment, aiming to create self-reliant communities equipped with the tools and opportunities needed for sustainable livelihoods.

This mission supports vulnerable groups through targeted initiatives such as community farming projects, skill development programmes, and the expansion of cooperative-based enterprises. Simultaneously, it empowers these communities by enabling entrepreneurship, increasing access to markets, and fostering resilience against socioeconomic and environmental challenges. Empowerment is achieved by providing the necessary tools, knowledge, and support systems to enable individuals and communities to thrive independently, contributing meaningfully to the agrofood economy.

This mission is aligned with existing efforts led by LPP, including the IPR Intan and Ehsan Tani Programs, complemented by entrepreneurship schemes with matching grants. These initiatives exemplify LPP's commitment to uplifting communities through on-the-ground implementation, a component that is fundamental to achieving the country's socioeconomic objectives.

Mission 4 integrates economic growth strategies with inclusivity and sustainability principles. It seeks to address disparities in income and resource access while promoting the development of rural and marginalised areas. Through this mission, it aims to transform Malaysia's agrofood system into a model of inclusive and equitable growth that benefits all Malaysians.

INITIATIVES



Community farming



Skills development



Cooperative-based expansion



Entrepreneurship



Increasing access to markets



Resilience to socioeconomic shocks



Resilience to environmental impact

Strategy 1

Socioeconomic Empowerment and Inclusive Participations

Mission 4

Strategy 4.1: Socioeconomic Empowerment and Inclusive Participations focuses on fostering inclusive socioeconomic growth by empowering vulnerable groups through targeted agricultural and entrepreneurial initiatives. This strategy acknowledges that IPLCs and low-income groups face systemic challenges such as limited access to resources, market barriers, and lack of technical support, which hinder their ability to achieve economic resilience and sustainable livelihoods. Addressing these barriers is vital for creating equitable opportunities within Malaysia's agrofood systems while contributing to national food security goals.

The strategy aligns with the broader mission of ensuring inclusivity in agrofood systems by promoting empowerment and self-reliance through capacity-building initiatives and tailored support mechanisms. It focuses on unlocking the economic potential of vulnerable groups, transforming them into active contributors to the national economy while preserving their cultural and environmental heritage.

This initiative emphasises supporting IPLCs in cultivating high-value crops, fisheries, and livestock. By providing these groups with training, access to modern farming tools, and support for value-chain integration, the strategy aims to increase the productivity and profitability of IPLCs, thereby fostering economic resilience.

Additionally, the strategy encourages entrepreneurial initiatives among low-income communities, particularly women, through capacity-building programmes, access to financing, and market linkages. Success stories such as the #KebunMandiriOA project in Gua Musang demonstrate how agricultural entrepreneurship can address local food security challenges while generating income.



Aims to increase the productivity and profitability

CASE STUDY

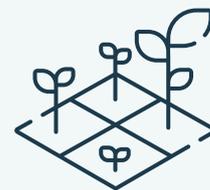
#KebunMandiriOA Project Empowering the Socioeconomic Status of the Orang Asli Community in Gua Musang

Amidst the COVID-19 pandemic, Indigenous communities in Gua Musang, Kelantan faced severe challenges in sustaining their socioeconomic wellbeing and food security due to restricted movement and diminished income sources. Disruptions to traditional livelihoods, exacerbated by deforestation and the effects of climate change, intensified their plight, necessitating innovative solutions. Recognising these challenges, Persatuan Aktivis Sahabat Alam (KUASA), with support from Yayasan Hasanah and the GEF-UNDP Small Grants Programme, initiated the #KebunMandiriOA project.

In line with the successful approach of the Ladang Komuniti Orang Asli initiative, this project **engaged approximately 20 to 40 participants from six settlements, each allocated between 1 and 2 acres of land for communal farming**. Participants received comprehensive training and were equipped with the necessary tools and infrastructure, including modern irrigation systems, farming equipment, and a combination of organic farming methods integrated with traditional agricultural knowledge. This holistic support ensured the participants were well-prepared to optimise the potential of their land and improve agricultural productivity.



Communal farming



Extensive training and well equipped tools



SUCCESS STORY

After two years, the project yielded a diverse array of crops, including sweet corn, lemongrass, eggplant, ginger, and bananas, alongside chicken and tilapia farming. The surplus produce not only met the dietary needs of the communities but also generated substantial income, with nearly 80% of the yield sold locally and in major markets such as Perak.

The initiative addressed local food security and socioeconomic needs, providing a sustainable solution for indigenous communities in Gua Musang. Sales revenue, totaling nearly RM30,000 within six months, was equitably distributed among participants, fostering economic resilience and self-reliance.



Sweet corn Lemongrass Eggplant



Ginger Banana Chicken Tilapia



▲ RM 30,000
in 6 months

Malaysia holds significant potential for its local products, driven by its exceptional biodiversity, diverse cultural heritage, and advantageous position within the global trade network. The country's agricultural sector produces a wide range of high-value niche and specialty products, including tropical fruits and indigenous foods. Promoting locally produced niche and specialty products empowers marginalised communities to access high-value markets, fostering economic inclusion and resilience. Enhancing the production, branding, and marketing of indigenous food products such as sago and linut creates lucrative income streams while preserving traditional knowledge and cultural heritage. These initiatives celebrate the uniqueness of local produce, positioning it as a competitive advantage in both domestic and international markets, while simultaneously promoting sustainable practices and safeguarding Malaysia's rich cultural legacy.



Revitalising rural areas is crucial for fostering inclusive economic growth, reducing urban migration pressures, and preserving cultural and agricultural heritage. Rural revitalisation ensures that communities remain vibrant and economically viable, directly contributing to national development. Cooperatives play a pivotal role in this transformation, acting as powerful mechanisms for collective action. They enable smallholders and vulnerable groups to pool resources, share expertise, and achieve economies of scale, which reduces operational costs and enhances competitiveness.

Improving bargaining power and access to larger, more lucrative markets enables Cooperatives to help rural producers address challenges such as market fragmentation and limited infrastructure. This strategy prioritises strengthening cooperative-based initiatives, particularly in rural areas, to enhance productivity, foster community-driven economic opportunities, and build resilient local economies. Through these efforts, cooperatives become catalysts for rural development, bridging gaps in resources and connectivity while empowering communities to thrive in a sustainable and equitable manner.

Strategy 2

Mission
4Strengthen Rural Food Security
Ecosystem

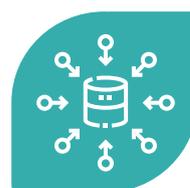
Strategy 4.2: Strengthen Rural Food Security Ecosystem focuses on enhancing the economic vitality and resilience of rural areas by strengthening food security ecosystems. This strategy acknowledges the critical role of rural regions in Malaysia's agrofood systems and aims to address the disparities in access to resources, market opportunities, and infrastructure that often hinder rural economic growth and food security.

The strategy aims to accelerate the growth and broaden the market reach of rural niche and specialty products. Malaysia's agricultural diversity offers immense potential for high-value products that cater to both domestic and international markets. Supporting the production, branding, and marketing of indigenous goods such as tropical fruits, sago, and specialty rice varieties creates new income streams for rural producers while preserving cultural heritage and traditional knowledge. This approach not only enhances rural economic resilience but also positions Malaysia's unique agricultural products as competitive offerings in the global market.

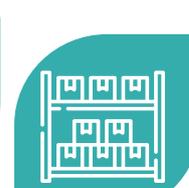
Another key component of this strategy involves transforming existing collection centres into advanced hubs for aggregation, storage, and distribution. These upgraded centres will enhance productivity and ensure that rural producers have greater access to efficient supply chains, reducing post-harvest losses and improving market linkages. Such improvements create a robust ecosystem that supports smallholders and cooperatives, enabling them to compete effectively and meet market demands.

Additionally, the strategy places a strong emphasis on maximising the potential of community centres as catalysts for economic growth and development. These centres are envisioned as multifunctional hubs that provide capacity-building programmes, access to financial services, and entrepreneurial

training, equipping rural populations with the skills and resources needed to innovate and expand their activities. The strategy aims to address systemic barriers such as limited market access, inadequate technical support, and resource constraints. This approach not only fosters economic empowerment but also strengthens local resilience, enabling communities to play a pivotal role in advancing national food security goals while ensuring inclusive and sustainable development.

ADVANCED
HUBS

Aggregation



Storage



Distribution

Strategy 3

Integrated Food Empowerment and Social Safety Nets for Vulnerable Groups

Mission 4

Strategy 4.3: Integrated Food Empowerment and Social Safety Nets for Vulnerable Groups focuses on creating a robust framework to address food insecurity among Malaysia's vulnerable populations. This strategy combines immediate food relief measures with long-term capacity-building initiatives to empower vulnerable groups, ensuring their resilience in the face of shocks.

Food insecurity remains a pressing issue in Malaysia, particularly for low-income households, marginalised communities, and nutritionally vulnerable groups such as children, the elderly, and women. These populations are disproportionately affected by systemic inequalities, economic fluctuations, and external shocks such as natural disasters or global supply chain disruptions. The lack of consistent access to sufficient and nutritious food leaves these groups at constant risk of falling deeper into food insecurity during crises.

Addressing food insecurity among vulnerable groups requires a comprehensive approach that goes beyond providing temporary relief. It is essential to empower these communities as active participants in securing their own food needs, fostering self-reliance, economic stability, and sustainable growth. This empowerment is key to breaking the persistent cycle of food insecurity and creating inclusive growth.

Economic barriers to food access remain a critical challenge for vulnerable populations. To address this, the strategy emphasises initiatives that make essential goods affordable and accessible through subsidised pricing schemes and localised distribution systems. These measures ensure that underserved communities, particularly in high-risk regions, can reliably access basic necessities without financial strain. Creating equitable access to essential goods directly supports food security, promotes social equity, and reduces the risk of recurrent food insecurity.

Given the cyclical nature of food insecurity, short-term assistance must be integrated with robust long-term social safety nets to ensure resilience and recovery. Emergency food assistance during crises is complemented by systemic support structures, such as food subsidies, conditional cash transfers, and targeted feeding programmes, which provide a safety net for at-risk populations. These efforts not only protect vulnerable groups during periods of hardship but also build the foundation for sustained food security, ensuring that these populations can recover and thrive over time.

Key programmes such as the Food Bank Malaysia initiative and the Food Feeding Programme play pivotal roles in this strategy. Expanding the reach of the Food Bank Malaysia initiative leverages surplus food to meet immediate nutritional needs while addressing food waste, aligning with broader sustainability goals. Similarly, the Food Feeding Programme is scaled to include more diverse demographic groups and tailored dietary requirements, ensuring consistent access to safe and nutritious meals for those in need.

This integrated approach ensures that vulnerable populations are supported not only through immediate relief but also by creating the structural conditions needed to achieve long-term food security and resilience. Through a combination of targeted assistance, community empowerment, and systemic reforms, Strategy 4.3 strives to build an agrofood system that leaves no one behind.

ENABLERS

The success of the NFSP 2030 hinges on a robust framework of enablers designed to support and operationalise its strategic missions and goals. These enablers serve as the backbone of the NFSP 2030, providing the necessary governance, resources, capabilities, and innovations to ensure a resilient, inclusive, and sustainable agrofood systems in Malaysia. They bridge gaps in coordination, capacity, and infrastructure while fostering collaboration among stakeholders across the public, private, and community sectors.



GOVERNANCE AND POLICY

Robust governance and clear policy frameworks are fundamental to ensuring the resilience, sustainability, and inclusivity of Malaysia's agrofood systems. Despite existing mechanisms to address food security, the fragmentation of roles across various government agencies and states often leads to inefficiencies and gaps in implementation. As Malaysia faces increasing food security challenges, including climate change, resource scarcity, and global market vulnerabilities, a unified and strategic governance framework is essential to streamline efforts and address systemic issues. This enabler aims to establish cohesive governance, ensure legislative clarity, and empower state-level actions, fostering a comprehensive and integrated approach to food security.

The National Food Security Council will act as the central governing body responsible for coordinating food security efforts across all sectors and levels of government. Building on the foundation of the existing Food Security Coordination Committee (FSCC), the Council will be empowered to make high-level decisions, harmonise policies, and oversee the implementation of the NFSP 2030. It will provide strategic leadership, align efforts among ministries and drive collaborative solutions to emerging challenges.

To ensure the long-term sustainability of Malaysia's agrofood systems, this strategy emphasises the formulation of a comprehensive legislative framework. The Food Security Act will enshrine key principles of sustainability, resilience and inclusivity into law. It will provide legal mechanisms for enforcing food security standards, protecting critical resources and integrating food security considerations into national development policies.

Additionally, recognising Malaysia's diverse agroecological and socioeconomic contexts, this strategy encourages states to adopt tailored food security strategies. These strategies will align with national goals while addressing state-specific challenges and opportunities. A strong emphasis will be placed on incorporating nutrition as a core element of state-level planning, ensuring a localised approach to improving dietary diversity, accessibility, and overall food security.



HUMAN CAPITAL

The sustainability and resilience of Malaysia's agrifood system depend on the development of a skilled, motivated, and innovative workforce. However, the sector faces significant challenges, including an ageing farming population, declining interest among youth in agricultural careers, and skills gaps in modern and sustainable farming practices. In addressing these challenges, human capital development is critical, particularly in stimulating innovation and ensuring the sector's ability to adapt to technological advancements. The primary focus of this catalyst is to cultivate a new generation of agricultural professionals while equipping existing producers with the knowledge and resources needed to thrive in the modern agrifood landscape.

The agriculture sector's long-term sustainability depends on attracting and retaining younger generations. Programmes such as the Young Agropreneur Programme provide targeted support, including grants, technical training, and mentorship opportunities. These initiatives aim to make agriculture a viable and appealing career option for youth, leveraging their innovation, energy, and familiarity with technology to modernise the sector.

Practical, hands-on learning is a cornerstone for equipping producers with the expertise necessary to thrive in a modern, sustainable agricultural landscape. Farmer Field Schools (FFS) serve as an effective platform for experiential training, offering specialised instruction in critical areas such as precision agriculture, climate-smart farming techniques, and integrated pest management. These programmes empower farmers to enhance productivity, optimise resource use, and adapt to the challenges posed by climate change and market fluctuations, fostering resilience and ensuring long-term viability in the agricultural sector.



*Precision
agriculture*



*Climate-smart
farming
techniques*



*Integrated pest
management*

Additionally, agricultural extension services play a pivotal role in transforming research into actionable practices, acting as a vital link between innovation and implementation. Strengthening these services enhances support networks for producers, equipping them with the tools and knowledge to improve productivity, adaptability, and competitiveness. Tailored advisory programs ensure farmers have access to region-specific insights and cutting-edge technologies, enabling them to respond effectively to challenges such as shifting market demands and climate variability while capitalising on emerging opportunities.

Agricultural extension services play a pivotal role in translating research into actionable practices, acting as a vital link between innovation and implementation. Strengthening these services enhances support networks for producers, equipping them with the tools and knowledge to improve productivity, adaptability, and competitiveness in dynamic market environments. Tailored advisory programs provide farmers with access to cutting-edge technologies and region-specific insights, empowering them to respond effectively to evolving challenges, such as climate variability and market demands, while seizing emerging opportunities.

Embedding sustainable consumption and production principles into school curricula is essential for nurturing a future-oriented understanding of agrofood systems. This strategy fosters an early appreciation among younger generations of agroecological balance, resource efficiency, and nutritional health. By cultivating a culture of sustainability through education, the initiative seeks to instil values that influence lifelong behaviour, creating a societal shift towards sustainable practices. Empowering the next generation with this knowledge lays the foundation for a more resilient and environmentally conscious food system in Malaysia.



CASE
STUDYYoung Agropreneur Unit (UAM)
- Young Agropreneur Grant

Established under the Ministry of Agriculture and Food Security (MAFS), the Young Agropreneur Unit (UAM) addresses the **issue of youth disengagement in the agriculture sector**. UAM encourages youth participation in entrepreneurial programmes to explore the sector's potential as a rewarding career option. Through the Young Agropreneur Programme, UAM promotes interest in agricultural entrepreneurship among those aged between 18 and 40, **offering financial and technical assistance, including grants, financing, and technical courses** across various agricultural sub-sectors. In 2020, the Young Agropreneur Grant was made available year-round, resulting in a **significant increase in recipients and funding compared to previous years**.



Figure 56: Young Agropreneur Grant



KEY TAKEAWAYS

Technical
support and
knowledge
sharing

Participants in the programme receive guidance from field officers designated by various ministry departments or agencies, who monitor their progress and report on farm output and income data.

Opportunity of
engagement
with ministry
leadership

UAM also engages young entrepreneurs through programmes like **Jelajah Agropreneur Muda (JAM)**, which provide opportunities to showcase businesses and connect with ministry leadership. These initiatives demonstrate effective strategies to enhance youth engagement and entrepreneurship in Malaysia's agriculture sector.



SUCCESS STORY

Ramanaidu Kalaichewan¹⁸⁷, a former pilot from Kedah who transitioned to grain corn farming. After receiving the grant in 2016 amounting to RM15,000, he now earns RM5 million annually and serves as a mentor to other young farmers. Ramana has emerged as a leader in the grain corn industry, pioneering the use of modern machinery in production.

¹⁸⁷Vinothaa, S. (2022, June 16). Pilot turned farmer finds 'corny' niche. Malaysiakini.

DATA

Reliable data and advanced technology are indispensable for creating efficient, adaptive, and transparent agrofood systems. Despite its potential, Malaysia's agrofood sector faces challenges such as fragmented information systems, limited access to real-time data, and insufficient comprehensive metrics to assess food security. Addressing these gaps is essential to fostering a data-driven approach to enhance productivity, resilience, and equity in the nation's agrofood systems.



Developing accessible online resource centres and integrated real-time monitoring systems is a cornerstone strategy for empowering stakeholders across Malaysia's agrofood value chain. These platforms are designed to deliver timely and accurate information on market trends, weather conditions, resource availability, and supply chain dynamics. Equipped with such data, producers, policymakers, and businesses can make informed decisions to mitigate risks associated with supply chain disruptions, climate variability, and market fluctuations. The ability to act proactively based on real-time insights significantly enhances the agility and efficiency of Malaysia's agrofood systems.

Real-time monitoring systems further support coordination and transparency, enabling more efficient resource allocation and fostering trust among stakeholders. These systems also enable more precise and effective policymaking. Interventions become more targeted and timely, addressing the specific needs of diverse regions and populations while bolstering overall system resilience.

Traditional food security assessments often rely on narrow metrics, which fail to capture the multifaceted nature of modern agrofood systems. Expanding food

security indicators to include both quantitative and qualitative dimensions is critical for providing a comprehensive understanding of dietary patterns, nutritional outcomes, and regional disparities. This approach goes beyond caloric intake to assess dietary diversity, micronutrient adequacy, and food accessibility gaps. With such nuanced indicators, strategies can be tailored to address disparities and ensure inclusive, equitable outcomes across the nation.

Food loss and waste represent another significant inefficiency in Malaysia's agrofood systems, undermining availability, sustainability, and economic productivity. Establishing systematic metrics to quantify food loss and waste at every stage of the supply chain is essential for identifying key bottlenecks. With accurate and actionable data, targeted solutions can be designed to reduce inefficiencies, optimise resource use, and minimise environmental impact. These metrics-based interventions empower stakeholders to adopt best practices, innovative technologies, and sustainable solutions that mitigate waste while enhancing supply chain performance.

RESEARCH, DEVELOPMENT, COMMERCIALISATION, INNOVATION (R&D&C&I) AND TECHNOLOGIES

R&D&C&I and Technologies form the foundation of a modern, competitive, and sustainable agrofood system. In Malaysia, the agrofood sector faces pressing challenges, including fragmented research efforts, underfunded innovation projects, and limited adoption of emerging technologies, particularly among SMEs. Overcoming these obstacles is essential to unlocking the sector's potential to meet rising food demands, achieve economic growth, and ensure environmental sustainability.



Currently, the lack of coordination among research institutions has led to fragmented and siloed efforts, limiting the impact and scalability of R&D initiatives. This disjointed approach hinders the sector's ability to address systemic challenges such as climate change adaptation, productivity enhancement, and resource efficiency. Additionally, underinvestment in research and innovation has constrained the exploration of transformative solutions in critical areas, leaving the sector ill-prepared to compete globally. Furthermore, many SMEs in the agrofood sector face high barriers to adopting advanced technologies due to financial constraints, insufficient technical expertise, and inadequate support systems, limiting their ability to modernise and thrive in competitive markets.

To address these challenges, the strategy begins with aligning research priorities across government institutions and fostering collaborations with science and technology entities. Coordinated R&D efforts ensure that research initiatives are directed towards high-impact areas such as yield optimisation, climate adaptation, and sustainable farming practices that balance technological innovation with ecological integrity. A unified approach facilitates resource pooling, knowledge sharing, and the scaling of successful innovations, creating a more cohesive and effective R&D ecosystem that is responsive to national priorities and global trends.

Increasing funding for R&D&C&I projects is another critical pillar of this strategy. Investments in areas such as precision agriculture, biotechnology, and climate-smart technologies are essential for driving agricultural productivity and sustainability. Enhanced funding not only accelerates technological breakthroughs but also fosters partnerships between academia, industry, and the government. This synergy ensures that innovations move seamlessly from research to practical implementation, bolstering Malaysia's position in the global agrofood landscape and driving long-term competitiveness.

Empowering SMEs through technological adoption is a key focus of this strategy. SMEs are the backbone of Malaysia's agrofood systems, yet many struggle to access modern tools and technologies. By providing targeted financial incentives, capacity-building programmes, and accessible technical support, the strategy aims to lower barriers to innovation for SMEs. This inclusive approach ensures that the benefits of R&D&C&I and Technologies efforts extend to all levels of the value chain, driving efficiency, reducing waste, and enhancing market integration. Empowering SMEs with advanced technologies positions them as active contributors to the nation's food security and economic development.

FINANCE

Effective financial mechanisms are essential to achieving sustainability and resilience in Malaysia's agrofood systems. Despite their critical role, the sector faces persistent challenges, including limited access to affordable credit, insufficient risk management solutions, and a lack of tailored financial products designed for farmers, SMEs, and vulnerable groups. These challenges are further exacerbated by high upfront costs, volatile market conditions, and increasing climate risks, creating barriers to investment in sustainable practices and innovation. To overcome these barriers, this enabler focuses on enhancing access to innovative financing solutions, strengthening risk mitigation frameworks, and promoting financial inclusion across the agrofood ecosystem. These measures aim to empower stakeholders, including farmers, agribusinesses, and SMEs—to improve productivity, adapt to changing conditions, and contribute meaningfully to Malaysia's food security goals.



Recognising the vulnerabilities of Malaysia's agrofood systems to climate change, natural disasters, and market fluctuations, the strategy emphasises the development of a comprehensive National Agricultural Insurance Policy. This policy will offer financial protection to farmers and fishers against risks such as crop failures, livestock losses, and extreme weather events. Drawing from successful regional models, such as Thailand's crop insurance scheme, the policy will leverage PPP to pool resources and manage risks effectively. Agricultural insurance stabilises incomes, enables quicker recovery from crises, and encourages investment in sustainable practices. Subsidised premiums and streamlined claim processes will ensure accessibility for smallholders and marginalised groups, safeguarding their livelihoods and strengthening resilience at the grassroots level.

Additionally, building financial literacy among farmers and rural communities is integral to empowering stakeholders and driving economic resilience. Tailored financial literacy programmes will equip participants with the skills to navigate financial systems, secure credit, and manage risks effectively.

A particular focus will be placed on digital financial inclusion, leveraging mobile banking and fintech platforms to extend access to underserved populations in remote areas. These efforts will address structural inequalities in financial systems, ensuring that all stakeholders, regardless of location or scale, can participate in and benefit from the agrofood economy.

COMMUNICATION

Effective communication is a critical element in fostering transparency, trust, and active participation within Malaysia's agrofood systems. It ensures that policymakers, farmers, and the public have access to reliable and timely information in order to make informed decisions. However, fragmented messaging, inconsistent coordination, and insufficient funding currently hinder efforts to create unified narratives and impactful campaigns. These challenges limit the effectiveness of initiatives aimed at achieving food security and sustainability goals.



To overcome these barriers, the Communication Enabler focuses on establishing a streamlined and coordinated approach to disseminating information. This approach leverages strategic funding and innovative tools to enhance outreach, engage stakeholders, and align communication efforts with Malaysia's broader food security priorities. The ultimate objective is to create an inclusive information ecosystem that supports the transformation of Malaysia's agrofood systems.

A central governing body will be established to streamline communication efforts across government agencies, the private sector, and civil society. This framework will eliminate fragmented messaging, reduce duplication of efforts, and ensure the dissemination of consistent and accurate information. Centralised coordination enhances trust, fosters collaboration, and amplifies the impact of food security initiatives by aligning messages with national priorities.

Dedicated funding will be allocated to develop and implement targeted communication programmes. These programmes will include awareness campaigns on sustainable agricultural practices, nutrition, food safety, and food waste reduction. Strategic funding also supports the adoption of advanced communication tools such as social media platforms,

mobile applications, and interactive portals, enabling campaigns to reach diverse and geographically dispersed audiences.

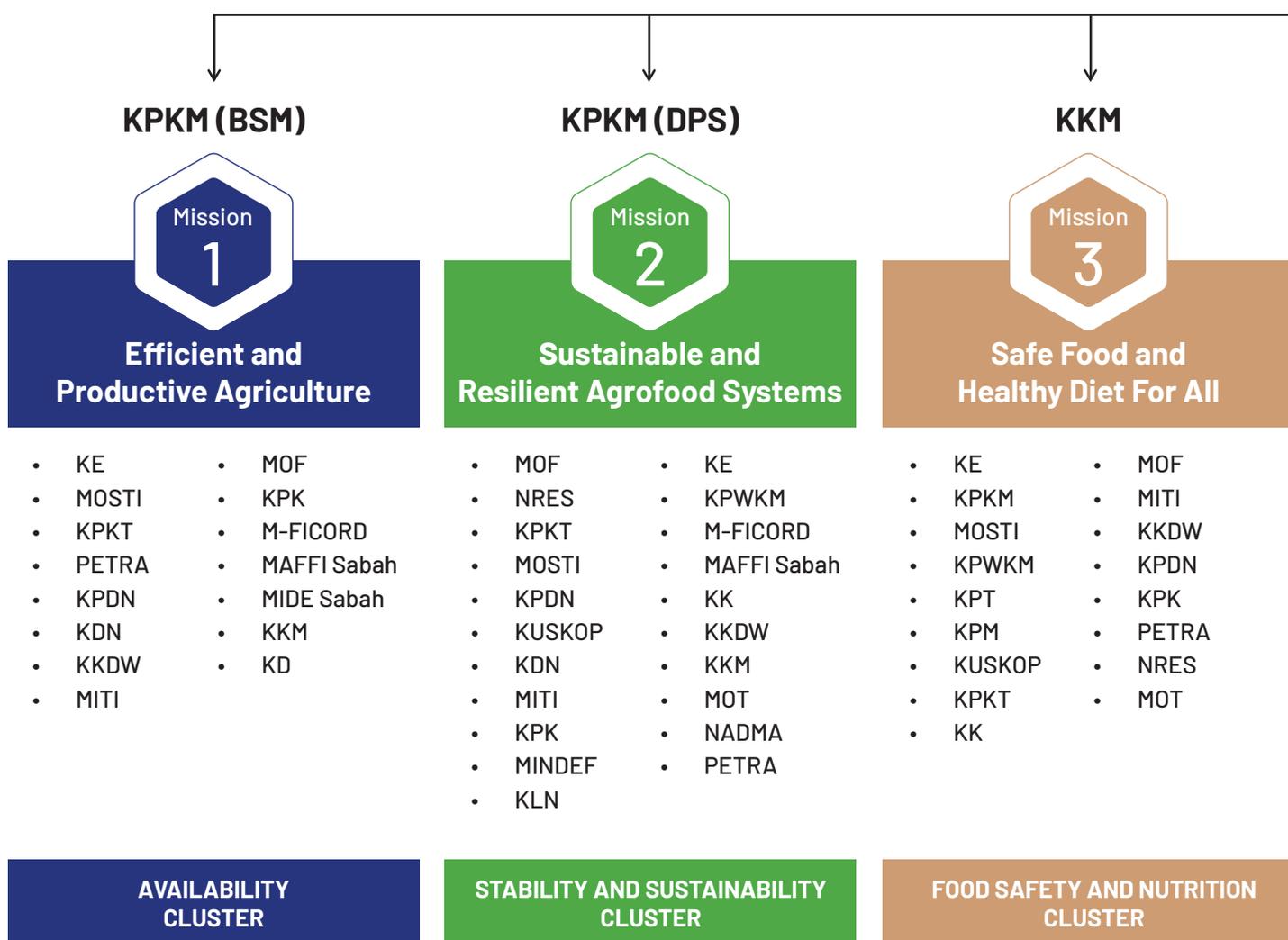
Additionally, communication campaigns will be designed to encourage sustainable consumption, reduce food waste, and foster the adoption of nutrition-sensitive practices. This strategy focuses on behavioural change to empower consumers to make informed choices that align with Malaysia's environmental, health, and food security goals.

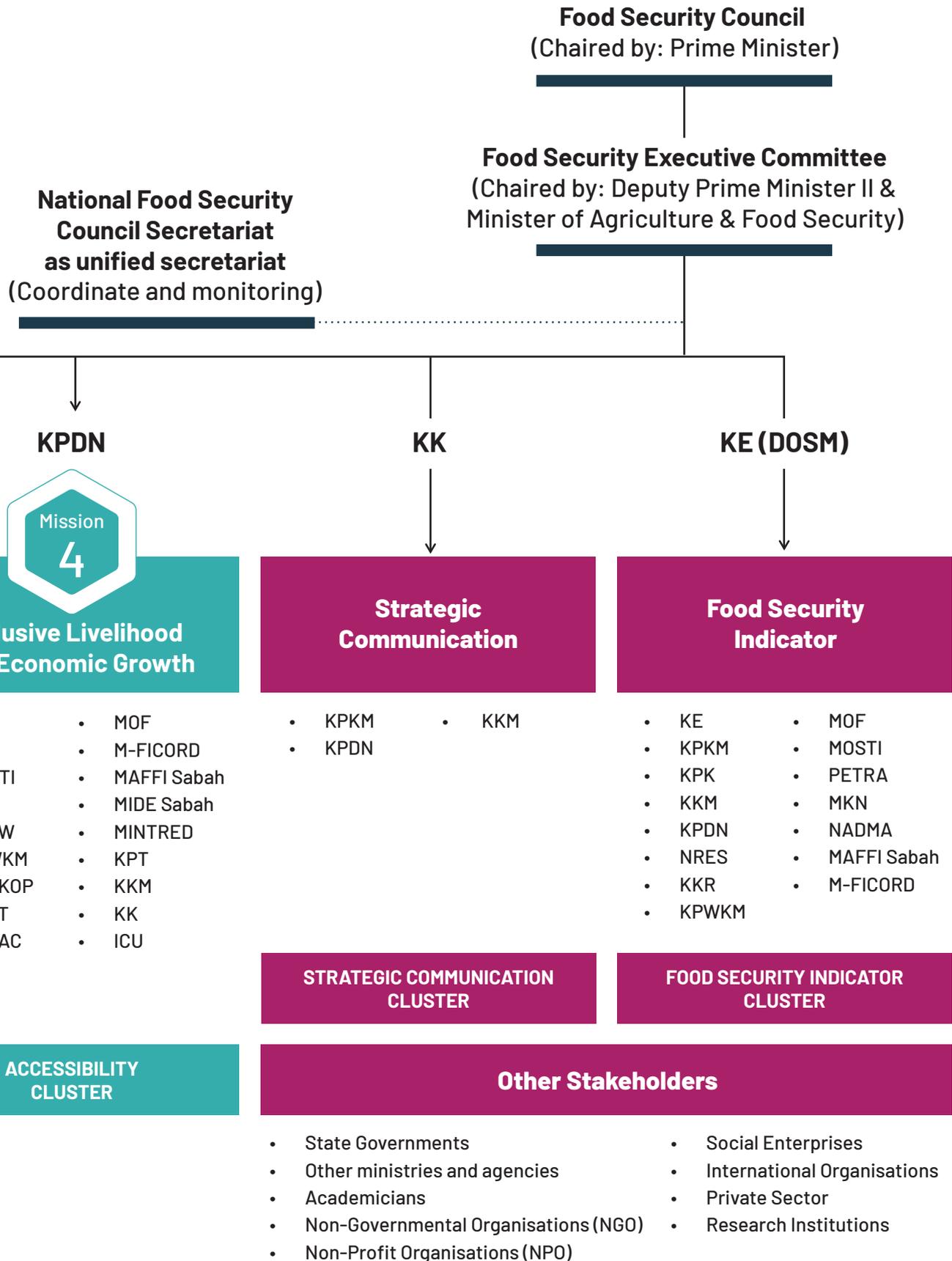
The integration of digital platforms, including mobile applications and online resource centres, will ensure that critical information is accessible to all stakeholders, particularly rural and underserved communities. Real-time updates on market trends, weather conditions, and agricultural best-practices will enable proactive decision-making.

Training and capacity-building programmes for government officials, extension workers, and private-sector actors will strengthen their ability to communicate effectively. These efforts will ensure that messaging is not only clear and impactful but also culturally and contextually relevant, enhancing its resonance across diverse audiences.

NFSP 2030: GOVERNANCE AND MONITORING MECHANISM

The NFSP 2030 will be overseen by the National Food Security Council, an enhanced version of the existing Cabinet Committee on National Food Security Policy (FSCC). The Ministry of Agriculture and Food Security (MAFS), through the FSCC Secretariat, will serve as the unified and coordinated secretariat responsible for monitoring and implementing the NFSP 2030 to ensure effective governance and execution.





National Food Security Policy Monitoring and Implementation Committee

Chairperson	: Secretary-General (KSU)
Alternate Chairperson	: Deputy Secretary-General (TKSU)
Membership	: 1. Relevant Ministries and Agencies involved in food security 2. Secretariat of the Food Security Cluster Committee
Secretariat	: Policy and Strategic Planning Division, Ministry of Agriculture and Food Security (MAFS)
Meeting Frequency	: Twice a year
Functions	: 1. Monitor the implementation of the National Food Security Action Plan 2. Review and endorse monitoring reports as well as the performance of programme/initiative

Working Committee on the Monitoring and Implementation of the National Food Security Policy

Chairperson	: Deputy Secretary-General (TKSU)
Alternate Chairperson	: Senior Undersecretary (SUB), Policy and Strategic Planning Division (DPS)
Membership	: Ministries and Agencies that involved in food security related matters
Secretariat	: Policy and Strategic Planning Division, Ministry of Agriculture and Food Security (MAFS)
Meeting Frequency	: Twice a year
Functions	: 1. Prepare monitoring reports and evaluate program achievements for presentation to the National Food Security Policy Monitoring and Implementation Committee 2. Conduct a comprehensive review of the policy and its programmes/initiatives every two years





CONCLUSION

CONCLUSION

The NFSP 2030 sets out a transformative roadmap for Malaysia's agrofood systems, focusing on the urgent need for efficiency, resilience, sustainability, and inclusivity. As a strategic framework, it responds to emerging challenges in food security through integrated, mission-driven initiatives that enhance productivity, adaptability, and sustainability across the agrofood sector.



The NFSP 2030 aligns seamlessly with key national policies such as the MADANI Framework, RMK13, RFN4, and 19 ministerial policies that intersect with food security. This alignment ensures coherence in addressing systemic vulnerabilities while promoting synergy across diverse sectors. Its collaborative approach engages government, industry, and community stakeholders, driving a unified effort to balance economic growth, environmental stewardship, and social equity within Malaysia's agrofood systems.

The policy outlines actionable targets designed to transform Malaysia's agrofood systems across four core objectives. It prioritises efficiency by optimising resource utilisation and modernising operations to enhance the sector's competitiveness in both global and domestic markets. To address external shocks and challenges, the policy focuses on building resilience, creating robust systems capable of withstanding the impacts of climate change, economic disruptions, and global supply chain uncertainties. Sustainability is embedded through the adoption of circular economy principles, reducing environmental footprints, and preserving ecosystems to secure critical resources for future generations. Additionally, the policy promotes

inclusivity, ensuring equitable access to nutritious food while fostering active participation among smallholders, women, and other vulnerable groups in the agrofood economy. Together, these objectives set a comprehensive foundation for a thriving, sustainable, and inclusive agrofood system.

The NFSP 2030 is more than a policy document, it is a national commitment to achieving food security through innovation, collaboration, and inclusivity. As Malaysia journeys toward 2030, the policy serves as a cornerstone for advancing agrofood systems that not only meet the dietary needs of the present generation but also ensure a sustainable and equitable future for all.



7.0 REFERENCES

- Abhishek Bisht & Sury Pratap Singh. (2024). Postharvest losses and management of horticultural produce: A Review. *Journal of Scientific Research and Reports*, 30(3), 305 - 320. <https://doi.org/10.9734/jsrr/2024/v30i31881>
- Agricultural Science and Technology Indicators (ASTI), International Food Policy Research Institute (IFPRI), Asia-Pacific Association of Agricultural Research Institutions (APAARI), & Malaysian Agricultural Research and Development Institute (MARDI). (2020, April). ASTI Country Brief: Malaysia. <https://www.asti.cgiar.org/sites/default/files/pdf/Malaysia-CountryBrief-2020.pdf>
- Ahmad Ashraf Ahmad Shaharudin & Mohd Amirul Rafiq Abu Rahim. (2020). Agriculture Exodus? Insights from Youth Aspirations. *Khazanah Research Institute (KRI)*. https://www.krinstitute.org/Discussion_Papers-@-Agriculture_Exodus%5E_Insights_from_Youth_Aspirations.aspx
- Alderman, H., Hoddinott, J., & Kinsey, B. (2006). Long term consequences of early childhood malnutrition. *Oxford Economic Papers*, 58(3), 450-474. <https://doi.org/10.1093/oep/gpl008>
- American Psychological Association (APA). (2008). Policy statements and resolutions related to children, youth and families. <https://www.apa.org/pi/families/resources/policy>
- Amran, F. N. F., & Abdul Fatah, F. (2020). Insights of women's empowerment and decision-making in rice production in Malaysia. *Food Research*, 4(S5), 53-61. [https://doi.org/10.26656/fr.2017.4\(S5\).013](https://doi.org/10.26656/fr.2017.4(S5).013)
- Arndt, C., Diao, X. S., Dorosh, P., Pauw, K., & Thurlow, J. (2023). The Ukraine war and rising commodity prices: Implications for developing countries. *Global Food Security*, 36. <https://doi.org/10.1016/j.gfs.2023.100680>
- Arujanan, M. (2023, March 28). Cultivated meat for M'sian consumers in 2025. *The Petri Dish*. <https://thepetridish.my/2023/03/28/cultivated-meat-for-msian-consumers-in-2025/>
- Asif Raihan, Mohammad Ridwan, & Md Shoaibur Rahman. (2024). An exploration of the latest developments, obstacles, and potential future pathways for climate-smart agriculture. *Climate Smart Agriculture*, 1(2). <https://doi.org/10.1016/j.csag.2024.100020>
- Azizah Osman, Nazamid Saari, Rosli Saleh, Jamilah Bakar, Noor Diana Zainal, & Masturina Yacob. (2009). Post-harvest handling practices on selected local fruits and vegetables at different levels of the distribution chain. *Journal of Agribusiness Marketing*, 2, 39-52. <https://www.fama.gov.my/volume2-issue1-post-harvest-handling>
- Bedi, R. S. (2022, January 28). Malaysia massive floods result in RM6.1 billion losses, Selangor worst hit. *Channel News Asia (CNA)*. <https://www.channelnewsasia.com/asia/malaysia-floods-2021-2022-losses-statistics-department-2465656>
- Beniot, M. C. (2021, December 17). Logistics & intelligent transport: Califrais raises €1.5 million from the STEF group. *Actua*. <https://www.actua.com/en/news/logistics-intelligent-transport-califrais-raises-e1-5-million-from-the-stef-group/>
- Biswas, A., Sarkar, S., Das, S., Dutta, S., Roy Choudhury, M., Giri, A., Bera, B., Bag, K., Mukherjee, B., Banerjee, K., Gupta, D., & Paul, D. (2025). Water scarcity: A global hindrance to sustainable development and agricultural production – A critical review of the impacts and adaptation strategies. *Cambridge Prisms: Water*, 3. <https://doi.org/10.1017/wat.2024.16>
- Bryant, C. J. (2022). Plant-based animal product alternatives are healthier and more environmentally sustainable than animal products. *Future Foods*, 6. <https://doi.org/10.1016/j.fufo.2022.100174>

-
- Buelva, A. (2023, May 22). Malaysian insect meal maker breaks into EU pet market. Pet Food Industry. <https://www.petfoodindustry.com/pet-food-market/article/15469834/malaysian-insect-meal-maker-breaks-into-eu-pet-market>
 - Capaldo, J., Karfakis, P., Knowles, M., & Smulders, M. (2010). A model of vulnerability to food insecurity. Food and Agriculture Organization of the United Nations (FAO), Agricultural Development Economics Division (ESA). <https://doi.org/10.22004/ag.econ.289020>
 - Chew, A. (2021, April 06). Malaysians feel healthier in the new normal – Herbalife Nutrition Survey. Health Matters. <https://www.healthmatters.com.my/malaysians-feel-healthier-in-the-new-normal-herbalife-nutrition-survey/>
 - Chung, J. (2022, October 18). Agricultural firm promoting new collapsible crates. Taipei Times. <https://www.taipeitimes.com/News/taiwan/archives/2022/10/18/2003787266>
 - Chung, A, Y. C., Khen, C. V., Unchi, S., & Momin. (2002). Edible insects and Entomophagy in Sabah, Malaysia. *Malayan Nature Journal*, 56(2), 131-144. https://www.researchgate.net/publication/329105297_Edible_insects_and_Entomophagy_in_Sabah_Malaysia
 - Cohen, M. J., & Garrett, J. L. (2010). The food price crisis and urban food (in) security. *Environment & Urbanization*, 22(2), 467-482. <https://doi.org/10.1177/0956247810380375>
 - Committee on World Food Security (CFS). (2014). Global strategic framework for food security and nutrition. https://www.fao.org/fileadmin/templates/cfs/Docs1314/GSF/GSF_Version_3_EN.pdf
 - Council of the European Union and the European Council. (2025, January 31). How the Russian invasion of Ukraine has further aggravated the global food crisis. <https://www.consilium.europa.eu/en/infographics/how-the-russian-invasion-of-ukraine-has-further-aggravated-the-global-food-crisis/>
 - Crippa M., Solazzo, E., Guizzardi, D., Monforti-Ferrario, F., Tubiello, F. N., & Leip, A. (2021). Food systems are responsible for a third of global anthropogenic GHG emissions. *Nature Food*, 2, 198–209. <https://doi.org/10.1038/s43016-021-00225-9>
 - Department of Statistics Malaysia (DOSM). (2024, July 24). Economic Census 2023: All Sectors. Ministry of Economy Malaysia. https://www.dosm.gov.my/uploads/release-content/file_20240805122503.pdf
 - Department of Statistics Malaysia (DOSM). (2024, July 30). Labour Force Survey 2019–2023. Ministry of Economy Malaysia. <https://www.dosm.gov.my/portal-main/release-content/labour-force-survey-2023>
 - Department of Statistics Malaysia (DOSM). (2024, July 31). Current Population Estimates Malaysia 2023. Ministry of Economy Malaysia. <https://www.dosm.gov.my/portal-main/release-content/current-population-estimates-malaysia--2023>
 - Department of Statistics Malaysia (DOSM). (2024, November 15). Gross Domestic Product [3Q 2024]. Ministry of Economy Malaysia. <https://www.dosm.gov.my/portal-main/release-content/gross-domestic-product-q32024>
 - Department of Statistics Malaysia (DOSM). (2024, November 20). Labour Productivity, Third Quarter 2024. Ministry of Economy Malaysia. <https://www.dosm.gov.my/portal-main/release-content/labour-productivity-q32024>
 - De Schutter, O. (2009). Dialogue on globalization: International trade in agriculture and the right to food [Occasional Paper No.46]. Geneva, Switzerland, Friedrich-Ebert-Stiftung. <https://www.europarl.europa.eu/cmsdata/191691/20130715ATT69800EN-original.pdf>
 - De Pinto, A., Mohd Mafakkarul Islam, & Katic, P. (2023). Chapter 7 – Food security under a changing climate: Exploring the integration of resilience in research and practice. In Béné, C., & Devereux, S. (Eds), *Resilience and Food Security in a Food Systems Context* (pp. 207-237). <https://doi.org/10.1007/978-3-031-23535-1>
-

-
- Deng, Q., Sharretts, T., Ali, T., Ao, Z. Y. F., Chiarelli, D. D., Demeke, B., Marston, L., Mehta, P., Mekonnen, M., Rulli, M. C., Tuninetti, M., Xie, W., & Davis, K. F. (2025). Deepening water scarcity in breadbasket nations. *Nature Communications*, 16, 1110. <https://doi.org/10.1038/s41467-025-56022-6>
 - Denso. (2024, April 5). Go for sustainable food supply chain. <https://www.denso.com/global/en/driven-base/project/food-distribution/>
 - Dubbeling, M., Carey, J., & Hochberg, K. (2016). The role of private sector in city region food systems. RUAF Foundation. <https://ruaf.org/assets/2019/11/Private-sector-engagement-in-city-region-food-systems-analysis-report.pdf>
 - Ecker, O., & Breisinger, C. (2012). The food security system: A new conceptual framework [IFPRI Discussion Paper 01166]. International Food Policy Research Institute (IFPRI). <https://cgspace.cgiar.org/server/api/core/bitstreams/93d64eb8-b18e-4fe0-ba80-e4c96587a97b/content>
 - Ekta Singh, Aman Kumar, Rahul Mishra, & Sunil Kumar. (2022). Solid waste management during COVID-19 pandemic: Recovery techniques and responses. *Chemosphere*, 288(1). <https://doi.org/10.1016/j.chemosphere.2021.132451>
 - Eng, C. W., Lim, S. C., Ngongo, C., Sham, Z. H., Ishu Kataria, Arunah Chandran, & Feisul Idzwan Mustapha. (2022). Dietary practices, food purchasing, and perceptions about healthy food availability and affordability: A cross-sectional study of low-income Malaysian adults. *BMC Public Health*, 22 (192). <https://doi.org/10.1186/s12889-022-12598-y>
 - Eswaran, V. (2018, December 18). Vegetarianism is good for the economy too. World Economic Forum. <https://www.weforum.org/agenda/2018/12/vegetarianism-is-good-for-the-economy-too/>
 - Etheber, T. (2021, August 25). Rethinking the Wholesale Distribution Workflow (Part 1). FactSet Insight. <https://insight.factset.com/rethinking-the-wholesale-distribution-workflow-part-1>
 - Faridah Suffian & Firdausi Suffian. (2023). Policy analysis: Food security in Malaysia. *Journal of Administrative Science*, 20, 91-111. https://jas.uitm.edu.my/images/2023_MAC/10.pdf
 - Fish catch is fast declining. (2023, November 03). The Star. <https://www.thestar.com.my/news/nation/2023/11/03/fish-catch-is-fast-declining>
 - Food & Hotel Asia (FHA) Food & Beverage. (2023, October 06). Exploring Insects as A Sustainable Food Source. <https://fhafnb.com/fha-insider/exploring-insects-as-a-sustainable-food-source/>
 - Food and Agriculture Organization of the United Nations (FAO). (1996, November 13). Rome declaration on world food security. World Food Summit. <https://www.fao.org/4/w3613e/w3613e00.htm>
 - Food and Agriculture Organization of the United Nations (FAO). (2021). FAO Strategic Framework 2022-2031. <https://www.fao.org/strategic-framework/en>
 - Food and Agriculture Organisation of the United Nations (FAO). (2021). Looking at edible insects from a food safety perspective: Challenges and opportunities for the sector. <https://openknowledge.fao.org/server/api/core/bitstreams/33de5ff0-3b21-4108-98bc-d2f6e190e992/content>
 - Food and Agriculture Organization of the United Nations (FAO). (2024). The State of Agricultural Commodity Markets 2024 – Trade and nutrition: Policy coherence for healthy diets. <https://doi.org/10.4060/cd2144en>
 - Food and Agriculture Organization of the United Nations (FAO). (2025). FAO Food Price Index. <https://www.fao.org/worldfoodsituation/foodpricesindex/en/>
 - Food and Agriculture Organization of the United Nations (FAO). (n.d.). SDG indicators data portal - Indicator 2.1.1 - Prevalence of undernourishment. <https://www.fao.org/sustainable-development-goals-data-portal/data/indicators/2.1.1-prevalence-of-undernourishment/en>
-

- Food and Agriculture Organization of the United Nations (FAO). (n.d.). SDG indicators data portal - Indicator 2.1.2 Prevalence of moderate or severe food insecurity in the population, based on the Food Insecurity Experience Scale. <https://www.fao.org/sustainable-development-goals-data-portal/data/indicators/212-prevalence-of-moderate-or-severe-food-insecurity-in-the-population-based-on-the-food-insecurity-experience-scale/en>
- Food and Agriculture Organization of the United Nations (FAO). (n.d.). Global symposium on soil erosion: Key messages. <https://www.fao.org/about/meetings/soil-erosion-symposium/key-messages/en/>
- Food and Agriculture Organization of the United Nations (FAO) & World Health Organization (WHO). (2019). Sustainable healthy diets - Guiding principles. Rome. <https://iris.who.int/bitstream/handle/10665/329409/9789241516648-eng.pdf?sequence=1>
- Food and Agriculture Organization of the United Nations (FAO) & World Health Organization (WHO). (2019). Hazards associated with animal feed. <https://openknowledge.fao.org/server/api/core/bitstreams/ea2eaa1b-84cc-4411-9528-79b5ceec5d13/content>
- Food and Agriculture Organization of the United Nations (FAO) & World Health Organization (WHO). (2019). The state of food and agriculture 2019: Moving forward on food loss and waste reduction. <https://openknowledge.fao.org/server/api/core/bitstreams/11f9288f-dc78-4171-8d02-92235b8d7dc7/content>
- Food and Agriculture Organization of the United Nations (FAO), International Fund for Agricultural Development (IFAD), United Nations Children's Fund (UNICEF), World Food Programme (WFP), & World Health Organization (WHO). (2020). The state of food security and nutrition in the world 2020: Transforming food systems for affordable healthy diets. <https://openknowledge.fao.org/server/api/core/bitstreams/9a0fca06-5c5b-4bd5-89eb-5dbec0f27274/content>
- Food and Agriculture Organization of the United Nations (FAO), International Fund for Agricultural Development (IFAD), United Nations Children's Fund (UNICEF), World Food Programme (WFP), & World Health Organization (WHO). (2022). The state of food security and nutrition in the world 2022: Repurposing food and agricultural policies to make healthy diets more affordable. <https://openknowledge.fao.org/server/api/core/bitstreams/67b1e9c7-1a7f-4dc6-a19e-f6472a4ea83a/content>
- Food and Agriculture Organization of the United Nations (FAO), International Fund for Agricultural Development (IFAD), United Nations Children's Fund (UNICEF), World Food Programme (WFP), & World Health Organization (WHO). (2023). The state of food security and nutrition in the world 2023: Urbanization, agrifood systems transformation and healthy diets across the rural-urban continuum. <https://openknowledge.fao.org/server/api/core/bitstreams/f1ee0c49-04e7-43df-9b83-6820f4f37ca9/content/cc3017en.html>
- Food and Agriculture Organization of the United Nations (FAO), International Fund for Agricultural Development (IFAD), United Nations Children's Fund (UNICEF), World Food Programme (WFP), & World Health Organization (WHO). (2024). The state of food security and nutrition in the world 2024: Financing to end hunger, food insecurity and malnutrition in all its forms. <https://openknowledge.fao.org/server/api/core/bitstreams/d5be2ffc-f191-411c-9fee-bb737411576d/content>
- Geetha Maniam, Nur Ain Zakaria, Leo, C. P., Vassilev, V., Blay, K. B., Behzadian, K., & Poh, P. E. (2022). An assessment of technological development and applications of decentralized water reuse: A critical review and conceptual framework. *WIREs Water*, 9(3). <https://doi.org/10.1002/wat2.1588>
- Gilchrist, L. (2023, October 25). The future of health and nutrition – Tetra Pak Index 2023. Ipsos. <https://www.ipsos.com/en/future-health-and-nutrition-tetra-pak-index-2023>
- Glauber, J., Laborde, D., & Abdullah Mamun. (2022, May 03). The impact of the Ukraine crisis on the global vegetable oil market. International Food Policy Research Institute (IFPRI). <https://www.ifpri.org/blog/>

impact-ukraine-crisis-global-vegetable-oil-market/

- Hazlin Hassan. (2024, November 22). Malaysia turns to smart farming to boost food security. The Straits Times. <https://www.straitstimes.com/asia/se-asia/malaysia-turns-to-smart-farming-to-boost-food-security>
- Health Hub. (n.d.). Nutri-Grade mark. <https://www.healthhub.sg/programmes/nutrition-hub/nutri-grade-mark>
- Health Promotion Board (HPB) Singapore. (n.d.). Measures for nutri-grade beverages. Ministry of Health Singapore. <https://www.hpb.gov.sg/healthy-living/food-beverage/nutri-grade>
- Healthy meals in schools programme yields positive results, says Zahid. (2024, November 26). The Star. <https://www.thestar.com.my/news/nation/2024/11/26/healthy-meals-in-schools-programme-yields-positive-results-says-zahid>
- Hidayath Hisham. (2024, October 14). Agriculture industry suffers from modernisation gap. The Malaysian Reserve. <https://themalaysianreserve.com/2024/10/14/agriculture-industry-suffers-from-modernisation-gap/>
- HLPE. (2012). Food security and climate change [HLPE Report 3]. A report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security, Rome. https://www.fao.org/fileadmin/user_upload/hlpe/hlpe_documents/HLPE_Reports/HLPE-Report-3-Food_security_and_climate_change-June_2012.pdf
- HLPE. (2017). Nutrition and food systems [HLPE Report 12]. A report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security, Rome. <https://openknowledge.fao.org/server/api/core/bitstreams/4ac1286e-eef3-4f1d-b5bd-d92f5d1ce738/content>
- HLPE. (2020). Food security and nutrition: Building a global narrative towards 2030 [HLPE Report 15]. A report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security, Rome. <https://openknowledge.fao.org/server/api/core/bitstreams/8357b6eb-8010-4254-814a-1493faaf4a93/content>
- Hoddinott, J., Rosegrant, M., & Torero, M. (2012). Investments to reduce hunger and undernutrition [Paper presentation]. 2012 Global Copenhagen Consensus, Lowell, MA, USA. <https://copenhagenconsensus.com/sites/default/files/Hunger+and+Malnutrition.pdf>
- Institute for Health Metrics and Evaluation (IHME). (2025). Diet. <https://www.healthdata.org/research-analysis/health-risks-issues/diet>
- Institute for Public Health (IPH). (2020). National Health and Morbidity Survey (NHMS) 2019: Vol. I: NCDs – Non-Communicable Diseases: Risk Factors and Other Health Problems. National Institutes of Health (NIH), Ministry of Health (MOH) Malaysia. https://iku.moh.gov.my/images/IKU/Document/REPORT/NHMS2019/Report_NHMS2019-NCD_v2.pdf
- Institute for Public Health (IPH). (2023). Technical Report National Health and Morbidity Survey (NHMS) 2022: Maternal and Child Health. National Institutes of Health (NIH), Ministry of Health (MOH) Malaysia. <https://iku.gov.my/images/nhms-2022/TRNHMSmch2022.pdf>
- Institute for Public Health (IPH). (2024). Technical Report National Health and Morbidity Survey (NHMS) 2023: Non-Communicable Diseases and Healthcare Demand. National Institutes of Health (NIH), Ministry of Health (MOH) Malaysia.
- Jamaludin Mat Rashid. (2023, November 06). Aspirasi LZNK Basmi Kemiskinan Melalui SMART SBB. Agrimag. <https://agrimag.my/en/article-details/aspirasi-lznk-basmi-kemiskinan-melalui-smart-sbb>
- Japan National Tourism Organization (JNTO). (2022, January 24). Lunch in Japanese schools. <https://>

education.jnto.go.jp/en/school-in-japan/school-life-in-japan/lunch-in-japanese-schools/

- Joint Research Centre. (2024, February 09). Soil erosion by water could lead to a global loss of up to USD 625 billion by 2070. EU Science Hub, European Commission. https://joint-research-centre.ec.europa.eu/jrc-news-and-updates/soil-erosion-water-could-lead-global-loss-usd-625-billion-2070-2024-02-09_en
- Kanaoujiya, R., Roy, O. S., Amit Jaiswal, Sani Kumar Singh, Abdel Rahman Mohammad Al Tawaha, Shekhar Srivastava, Abdel Razzaq Al-Tawaha, Arun Karnwal, Nesterova, N., Abhishek Singh, Vishnu D. Rajput, Ghazaryan, K., Minkina, T., Iftikhar Ali, & Devarajan Thangadurai. (2025). Chapter 2 - Agricultural water scarcity: an emerging threat to global water security. In Hassan Etesami & Chen, Y. L. (Eds), Sustainable Agriculture under Drought Stress (pp. 15-22). <https://doi.org/10.1016/B978-0-443-23956-4.00002-8>
- Khalidi, J. R., & Tan, G. Z. (2020, February 07). Understanding School Feeding in Malaysia. Khazanah Research Institute (KRI). https://krinstitute.org/assets/contentMS/img/template/editor/20200207_Understanding%20School%20Feeding%20in%20Malaysia.pdf
- Ku, C. H. (2016, June 16). Professional Farmer Shop: Providing a Variety of Safe Taiwan – produced Foods. Taipei Travel. <https://www.travel.taipei/en/news/details/7226>
- Lai, A., Rahimy Rahim, Diyana Pfordten, & Junaid Ibrahim. (2024, March 20). Over 103,000ha of abandoned agricultural lands in Malaysia, says Joseph Kurup. The Star. <https://www.thestar.com.my/news/nation/2024/03/20/over-103000ha-of-abandoned-agricultural-lands-in-malaysia-says-joseph-kurup>
- Løvendal, C. R., Knowles, M., & Horii, N. (2004). Understanding vulnerability to food insecurity: Lessons from vulnerable livelihood profiling. Agricultural and Development Economics Division, Food and Agriculture Organization of the United Nations (FAO). <https://www.fao.org/3/ae220e/ae220e00.htm>
- Løvendal, C. R., & Knowles, M. (2005). Tomorrow's hunger: A framework for analysing vulnerability to food insecurity. Agricultural and Development Economics Division, Food and Agriculture Organization of the United Nations (FAO). <https://www.fao.org/3/af140e/af140e00.htm>
- Malaysia Productivity Corporation (MPC). (2020). Potential application of circular economy concept in livestock production. [https://www.dvs.gov.my/dvs/resources/user_1/2022/BPSPV/SPPU/Potential_Application_of_Circular_Economy_\(CE\)_Concept_in_Livestock_Production_2020_MPC_DVS.pdf](https://www.dvs.gov.my/dvs/resources/user_1/2022/BPSPV/SPPU/Potential_Application_of_Circular_Economy_(CE)_Concept_in_Livestock_Production_2020_MPC_DVS.pdf)
- Malaysian Health Data Warehouse (MyHDW). (n.d.). Health Facts 2024. Ministry of Health (MOH) Malaysia. <https://myhdw.moh.gov.my/public/home>
- Maslow, A. H. (1943, July). A theory of human motivation. *Psychological Review*, 50(4), 370–396. <https://doi.org/10.1037/h0054346>
- Miladinov, G. (2023). Impacts of population growth and economic development on food security in low-income and middle-income countries. *Frontiers in Human Dynamics*, 5. <https://doi.org/10.3389/fhumd.2023.1121662>
- Milan Urban Food Policy Pact (MUFFP). (2024). Wholesale markets: Public spaces for interconnected food policies. <https://wuum.org/wp-content/uploads/2024/11/DEF-MUFPP-WHOLESALE-MARKETS-Report-In-collaboration-with-AICS-and-WUWM-1.pdf>
- Ministry of Agriculture and Food Security (MAFS) Malaysia. (2024, August 13). National Agrofood Policy (NAP 2.0). <https://www.kpk.gov.my/en/agro-food-policy/national-agrofood-policy>
- Ministry of Agriculture and Food Security (MAFS) Malaysia. (2025, December). Malaysia Agrofood in Figures 2024. <https://www.kpk.gov.my/images/08-petak-informasi/penerbitan/perangkaan-agromakanan/Perangkaan-Agromakanan-Malaysia-2023.pdf>
- Ministry of Economy Malaysia. (2023). Mid-Term Review of the Twelfth Malaysia Plan - Malaysia Beyond 2025: A Sustainable and Progressive Society. <https://rmke12.ekonomi.gov.my/ksp/storage/>

fileUpload/2023/09/2023091135_10_beyond_2025.pdf

- Ministry of Economy Malaysia. (n.d.). Socioeconomic statistics: Household income, poverty and household expenditure. <https://ekonomi.gov.my/en/socio-economic-statistics/household-income-poverty-and-household-expenditure>
- Ministry of Education, Culture, Sports, Science, and Technology of Japan (MEXT Japan). (n.d.). Japanese school lunches and shokuiku. https://www.mext.go.jp/content/20230920-mxt_kenshoku-000008678_2.pdf
- Ministry of Finance (MOF) Malaysia. (2023, October 13). Economic Outlook 2024. <https://belanjawan.mof.gov.my/pdf/belanjawan2024/economy/economy-2024.pdf>
- Ministry of Health (MOH) Malaysia. (2022, November 10). Malaysia National Health Accounts (MNHA) steering committee meeting 2022. [https://www.moh.gov.my/moh/resources/Penerbitan/Penerbitan%20Utama/MNHA/Slaid_Pembentangan_Mesyuarat_Jawatankuasa_Pemandu_MNHA_2022_\(10_Nov_2022\)_-_NATIONAL_HEALTH_EXPENDITURE_2011-2021.pdf](https://www.moh.gov.my/moh/resources/Penerbitan/Penerbitan%20Utama/MNHA/Slaid_Pembentangan_Mesyuarat_Jawatankuasa_Pemandu_MNHA_2022_(10_Nov_2022)_-_NATIONAL_HEALTH_EXPENDITURE_2011-2021.pdf)
- Ministry of Health (MOH) Malaysia. (2023). Garis panduan: Pelaksanaan program hidangan berkhasiat di sekolah (HiTS). <https://hq.moh.gov.my/nutrition/wp-content/uploads/2023/12/GP-HiTS.pdf>
- Ministry of Health (MOH) Malaysia. (n.d.). The impact of noncommunicable diseases and their risk factors on Malaysia's gross domestic product. https://www.moh.gov.my/index.php/database_stores/attach_download/554/64
- Ministry of Natural Resources and Environmental Sustainability (NRES) Malaysia. (2022). Fourth Biennial Update Report Under the United Nations Framework Convention on Climate Change. <https://www.mgtc.gov.my/wp-content/uploads/2023/05/Malaysia-BUR-4-UNFCCC.pdf>
- Mohd Syauqi Nazmi, Rozhan Abu Dardak, Nik Rahimah Nik Omar, & Mumammad Najib Othman Ghani. (2022, November 07). Sorghum as a new source of animal feed in Malaysia. Food and Fertilizer Technology Center Agricultural Policy (FFTC-AP) Platform. <https://ap.ffmpeg.org.tw/article/3213>
- MyPF. (2022, August 10). Why have chicken prices increased in Malaysia? Free Malaysia Today. <https://www.freemalaysiatoday.com/category/leisure/money/2022/08/10/why-have-chicken-prices-increased-in-malaysia/>
- National Centers for Environmental information (NCEI). (2024). Monthly global climate report for annual 2023. National Oceanic and Atmospheric Administration (NOAA). <https://www.ncei.noaa.gov/access/monitoring/monthly-report/global/202313>
- National Centers for Environmental information (NCEI). (2024). Global Time Series. National Oceanic and Atmospheric Administration (NOAA). https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/global/time-series/globe/tavg/land_ocean/1/2/1990-2023
- National Geographic. (n.d.). Education: Food. <https://education.nationalgeographic.org/resource/food/>
- Negin Vaghefi, Mad Nasir Shamsudin, Alias Radam, & Khalid Abdul Rahim. (2015). Impact of climate change on food security in Malaysia: Economic and policy adjustments for rice industry. *Journal of Integrative Environmental Sciences*, 13(1), 19-35. <https://doi.org/10.1080/1943815X.2015.1112292>
- Nik Syafiah Anis Nik Sharifulden. (2024, December 04). The forgotten importance of R&D for agriculture and food security. Khazanah Research Institute (KRI). https://www.krinstitute.org/assets/contentMS/img/template/editor/RnD%20Views_Final.pdf
- Norman, J., Kelly, B., Boyland, E., & McMahon, A. (2016). The impact of marketing and advertising on food behaviours: Evaluating interventions to address childhood obesity. *Current Nutrition Reports*, 5, 139-149. <https://doi.org/10.1007/s13668-016-0166-6>

-
- Oda, Y. (n.d.). All about Kyushoku and Shoku-Iku food education. Education in Japan Community Blog. <https://educationinjapan.wordpress.com/student-life-in-japan/all-about-kyushoku-and-bento-lunch-life/>
 - Paku, K. H. (2022, January 21). Nutrition and food education in Japan. Just One Cookbook. <https://www.justonecookbook.com/nutrition-and-food-education-in-japan/>
 - Perry, M., Mardin, K., Chamberlin, G., Busey, E. A., Taillie, L. S., Carpentier, F. R. D., & Popkin, B. M. (2024). National policies to limit food marketing and competitive food sales in schools: A global scoping review. *Advances in Nutrition*, 15(8), 100254. <https://doi.org/10.1016/j.advnut.2024.100254>
 - Petrenko, V., Naumenko, O., Nechai, O., & Bondar, V. (2024). War influence on sunflower seed and oil production in Ukraine. *Proceedings of the 23rd International Scientific Conference, Engineering For Rural Development*. <https://doi.org/10.22616/ERDev.2024.23.TF084>
 - Platform.sh. (2022, December 19). Califrais digitizes Rungis Market via Platform.sh. <https://platform.sh/blog/califrais-digitizes-rungis-market-via-platformsh/>
 - REFRESH & WRAP Global. (2021). Building partnerships, driving change: A voluntary approach to cutting food waste. <https://www.wrap.ngo/resources/guide/building-partnerships-driving-change-voluntary-approach-cutting-food-waste>
 - Salamat Ali. (2022). The Russia-Ukraine Conflict: Implications for Food Security in the Commonwealth. The Commonwealth. <https://www.thecommonwealth-ilibrary.org/index.php/comsec/catalog/book/964>
 - Sarena Che Omar. (2022). Deconstructing Malaysia's food import bill: it is not the only measure of food security. Khazanah Research Institute (KRI). https://www.krinstitute.org/assets/contentMS/img/template/editor/Discussion%20Paper_Food%20Import_SCO_23112022.pdf
 - Sarena Che Omar, Mohd Amirul Rafiq Abu Rahim, Nik Syafiah Anis Nik Sharifulden, Teoh, A. N., Chooi, J. Q., & Lai, C. X. (2022). Uncovering the challenges faced by agrifood smallholders in Malaysia: climate risks, sustainable standards, and gender gap. Khazanah Research Institute (KRI). https://www.krinstitute.org/Publications-@-Understanding_the_Landscape_of_Agrifood_Smallholders_in_Malaysia-;_Climate_Risks,_Sustainable_Standards,_and_Gender_Gap.aspx
 - Shaping the future of Malaysia's food and beverage landscape. (2024, January 01). The Sun. <https://thesun.my/business/shaping-the-future-of-malaysia-s-food-and-beverage-landscape-PK11930618>
 - Sharifah Mahsinah Abdullah. (2021). 90 per cent of smuggled cattle infected with FMD – Maqis. *New Straits Times*. <https://www.nst.com.my/news/crime-courts/2021/03/671991/90-cent-smuggled-cattle-infected-fmd-maqis>
 - Singh, D., Choudhary, M. K., Meena, M. L., & Kumar, C. (2019). Rain Water Harvesting for Food and Livelihood Security: A case study from Pali, India. *Open Agriculture*, 4(1), 767–777. <https://doi.org/10.1515/opag-2019-0071>
 - Siregar, K. (2023, January 12). 'It will be just like rice': Why Indonesia turns to sorghum as alternative staple food. *Channel News Asia (CNA)*. <https://www.channelnewsasia.com/asia/it-will-be-just-rice-why-indonesia-turns-sorghum-alternative-staple-food-3166476>
 - Suez. (2024, March 15). The Rungis International Market has awarded SUEZ a €31 million contract to expand its food and non-food waste sorting and recovery capability. <https://www.suez.com/en/news/press-releases/the-rungis-international-market-awarded-suez-31-million-contract-expand-food-and-non-food-waste-sorting-and-recovery-capability>
 - Susetyo, G. (2017, April 26). Maria Loretha: Championing Sorghum, Flores' Crop of Hope. *Indonesia Expat*. <https://indonesiaexpat.id/travel/maria-loretha-championing-sorghum-floress-crop-hope/>
 - Tabler, T., & Chibanga, J. (2024). Water scarcity in agriculture: The greatest threat to global food security.
-

UT Institute of Agriculture (UTIA), The University of Tennessee. <https://utia.tennessee.edu/publications/wp-content/uploads/sites/269/2024/07/W1252.pdf>

- Tapsir, S., Engku Elini, E. A., Roslina, A., Noorlidawati, A. H., Mohd Hafizudin, Z., Hairazi, R., & Rosnani, H. (2019). Food security and sustainability: Malaysia agenda. *Malaysian Applied Biology*, 48(3), 1-9. https://www.researchgate.net/publication/342276962_Food_Security_and_Sustainability_Malaysia_Agenda
- Taylor, M. K., Sullivan, D. K., Ellerbeck, E. F., Gajewski, B. J., & Gibbs, H. D. (2019). Nutrition literacy predicts adherence to healthy/unhealthy diet patterns in adults with a nutrition-related chronic condition. *Public Health Nutrition*, 22(12), 2157-2169. <https://doi.org/10.1017/s1368980019001289>
- Thornton, P., Gurney-Smith, H., & Wollenberg, E. (2023). Alternative sources of protein for food and feed. *Current Opinion in Environmental Sustainability*, 62. <https://doi.org/10.1016/j.cosust.2023.101277>
- United Nations (UN). (2024). World population prospects 2024: Summary of result. Department of Economic and Social Affairs, Population Division. https://population.un.org/wpp/assets/Files/WPP2024_Summary-of-Results.pdf
- United Nations (UN). (2024). World population prospects 2024: Probabilistic projections. Department of Economic and Social Affairs, Population Division. <https://population.un.org/wpp/downloads?folder=Probabilistic%20Projections&group=Population>
- United Nations Educational, Scientific and Cultural Organization (UNESCO). (2024). 2024 UN World water development report: Water for prosperity and peace. <https://www.unesco.org/reports/wwdr/en/2024/s>
- United Nations Environment Programme (UNEP). (2021, March 01). Food waste index report 2021. <https://www.unep.org/resources/report/unep-food-waste-index-report-2021>
- United Nations Environment Programme (UNEP). (2023, July 06). Why restoring nature is good for farmers, fisheries and food security. <https://www.unep.org/news-and-stories/story/why-restoring-nature-good-farmers-fisheries-and-food-security>
- United Nations Environment Programme (UNEP). (2024, March 27). Food waste index report 2024. <https://www.unep.org/resources/publication/food-waste-index-report-2024>
- Vinothaa, S. (2022, June 16). Pilot turned farmer finds 'corny' niche. *Malaysiakini*. <https://www.malaysiakini.com/news/624875>
- von Braun, J., Afsana, K., Fresco, L. O., & Mohamed Hassan. (2021, August 30). Food systems: Seven priorities to end hunger and protect the planet. *Nature*. <https://www.nature.com/articles/d41586-021-02331-x>
- World Bank Group. (2022, October 17). What you need to know about food security and climate change. <https://www.worldbank.org/en/news/feature/2022/10/17/what-you-need-to-know-about-food-security-and-climate-change>
- World Economic Forum. (2011). Realizing a new vision for agriculture: A roadmap for stakeholders. https://www3.weforum.org/docs/IP/2016/NVA/WEF_IP_NVA_Roadmap_Report.pdf
- World Health Organization (WHO). (2024, October 01). Ageing and health. <https://www.who.int/news-room/fact-sheets/detail/ageing-and-health>
- World Health Organization (WHO). (2024, October 13). Safeguarding and crafting a healthier future: Protecting children from the harmful effect of food marketing. <https://www.who.int/westernpacific/newsroom/feature-stories/item/safeguarding-and-crafting-a-healthier-future---protecting-children-from-the-harmful-effect-of-food-marketing>

-
- World Health Organization (WHO). (2024). Obesity and overweight. <https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight>
 - World Union of Wholesale Markets (WUWM). (2023, September 29). European Wholesale Markets Leading the Way in Food Donation Initiatives. World Union of Wholesale Markets. <https://wuum.org/wp-content/uploads/2023/09/European-Wholesale-Markets-Leading-the-Way-in-Food-Donation-Initiatives.pdf>
 - Yamamoto, M. (2023, June 23). Kyushoku 食 School Lunch in Japan. How to Japan. <https://howtojapan.net/2023/06/23/kyushoku-%E3%83%BC-school-lunch-in-japan/>
-



MINISTRY OF AGRICULTURE
AND FOOD SECURITY

Ministry of Agriculture and Food Security

Aras 14, Wisma Tani, No.28 Persiaran Perdana,
Presint 4, Pusat Pentadbiran Kerajaan Persekutuan,
62624 Putrajaya Malaysia.

e ISBN 978-983-9863-79-6



9 789839 863796