



# Food Security

“The Food and Agriculture Organization (FAO) is a specialized agency of the United Nations that leads international efforts to defeat hunger.

Our goal is to achieve food security for all and make sure that people have regular access to enough high-quality food to lead active, healthy lives. With over 194 member states, FAO works in over 130 countries worldwide. We believe that everyone can play a part in ending hunger.”



Source: <http://www.fao.org/about/en/>

Photo by [Lothar Dieterich](#) จาก [Pixabay](#)



The Census creates guidelines to generate internationally comparable figures on variables defining the structure of agriculture. This Census helps countries to carry out their national agricultural censuses using standard international concepts, definitions and methodology.

The Fertilizer Programme is established, under the umbrella of the Freedom from Hunger Campaign "to improve crop production and farmers' incomes through the efficient use of fertilizers." The programme soon expands its scope to include all aspects of efficient crop production, such as improved varieties, better soil management and weed control as well as more efficient plant protection.

**FAO is born**



1945

- The Second World Food Survey
- International Plant Protection Convention (IPPC)
- The Desert Locust Programme

1952:

This support comes mainly in the form of international, regional and national training centers, courses and seminars, fellowships, study tours and expertise in breeding, seed improvement, certification and distribution of seeds.

1957: World Seed Campaign

1963:

- **Codex Alimentarius**
- World Food Congress
- World Food Programme is born
- 3rd World Food Survey

**"food law"** and its role as a coordinating mechanism for developing food standards is unquestioned. The published Codex is set to protect the health of consumers and ensure fair practices in food trade.

1946:

- The special meeting on urgent food problems
- 1st World Food Survey

1950: The World Census of Agri.

1954: FAO Principles of surplus disposal and guiding lines

1961:

- FAO & UNESCO Soil Map
- **Fertiliser Programme**
- Freedom from Hunger Campaign

1966: World Land Reform Conference

1970:

- 2nd World Food Congress
- Indicative World Plan for Agri. Development

In the early 1970s, a time of global food crises, the concept of food security initially focused on ensuring food availability and the price stability of basic foods, which was due to the extreme volatility of agricultural commodity prices and turbulence in the currency and energy markets at that time.

FAO recommends a number of appropriate approaches to assure orderly trade of foodstuffs that might have been accidentally contaminated with radionuclides.

## Food security

1974:

- World Food Conference
- Committee on World Food Security

1976: FAO's Technical Cooperation Programme

1979:

- World Conference on Agrarian Reform
- 16 Oct : World Food Day

1982: International Seed Information System

1985: 5th World Food Survey

1987: Food Safety in International Trade

1988: Africa Real-Time Environmental Monitoring System (ARTEMIS)

1971: Consultative Group on International Agricultural Research (CGIAR)

1972: UN Conference on the Human Environment

1977:

- The Global Information and Early Warning System (GIEWS)
- 4th World Food Survey

1984: World Conference on Fisheries

1986 : Launch of FAOSTAT

Concentrates on strengthening its existing programmes in a wide range of areas that includes forest resources, genetic resources, wildlife, waste disposal and recycling technologies and food contamination control.

1992: World Declaration & Plan of Action on Nutrition

1994: Special Programme for Food Security (SOFS)

1993: World Agriculture : Towards 2010

1995:  
- Emergency Prevention System for Transboundary Animal and Plant Pests and Diseases (EMPRES)  
- The Code of conduct for responsible fisheries

1996:  
- World Food Summit  
- Rome Declaration on World Food Security

1998: Rotterdam Convention on the Prior Informed Consent Procedure

1997: TeleFood Campaign

1999: Fisheries Agreement Register (FARISIS)

2000: Strategy for the Horn of Africa

2001: International treaty on Plant Genetic Resources for F&A

2002: World Food Summit

2004: Guideline **THE RIGHT TO FOOD**

2006: Crisis Management Centre for Animals

2008: Climate Change Conference

2009: World Summit on Food Security

2012: Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests

2014:  
- Blue Growth Initiative for the Seas  
- 2nd International Conference on Nutrition  
- Principles for Responsible Investment in Agriculture and Food Systems  
- Global Soil Partnership

2016: UN



2016: Port State Measure Agreement

2015: UN Millenium Development Goals (MDGs)

2019:  
- Urban Food Agenda  
- Un Decade of Family Farming 2019-2028  
- Hand-inHand Initiative

The main outcomes of the high-level ministerial conference are the Rome Declaration on Nutrition and the Framework for Action.

2020: Plant health beyond 2020

A comprehensive study of natural and agricultural crop resources and livestock production.  
Suwanna Sayruamyat

# Definition of food security

## 1974 World Food Summit

- The concept of food security was defined then at the World Food Conference in 1974 as **“the availability at all times of adequate world food supplies of basic foodstuffs to sustain a steady expansion of food consumption and to offset fluctuations in production and prices”**.

Availability

## 1983 FAO expanded the concept

- A deeper grasp of the functioning of agricultural markets under stress conditions, and how at-risk populations found themselves unable to access food. Then, a revised definition of food security evolved to **“ensuring that all people at all times have both physical and economic access to the basic food that they need”**.

Accessibility

## 1986 World Bank

- World Bank published its seminal report Poverty and Hunger. This introduced a time scale for food security by distinguishing between chronic food insecurity, associated with poverty, and acute, transient food insecurity, caused by natural or man-made disasters. These were reflected in a further extension of the concept of food security to include: **“access of all people at all times to enough food for an active, healthy life”**.

Stability

Utilisation

## 1996 World Food Summit:

- **“Food security, at the individual, household, national, regional and global levels [is achieved] when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life”**

# World Food Summit in 1996

“Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life”.

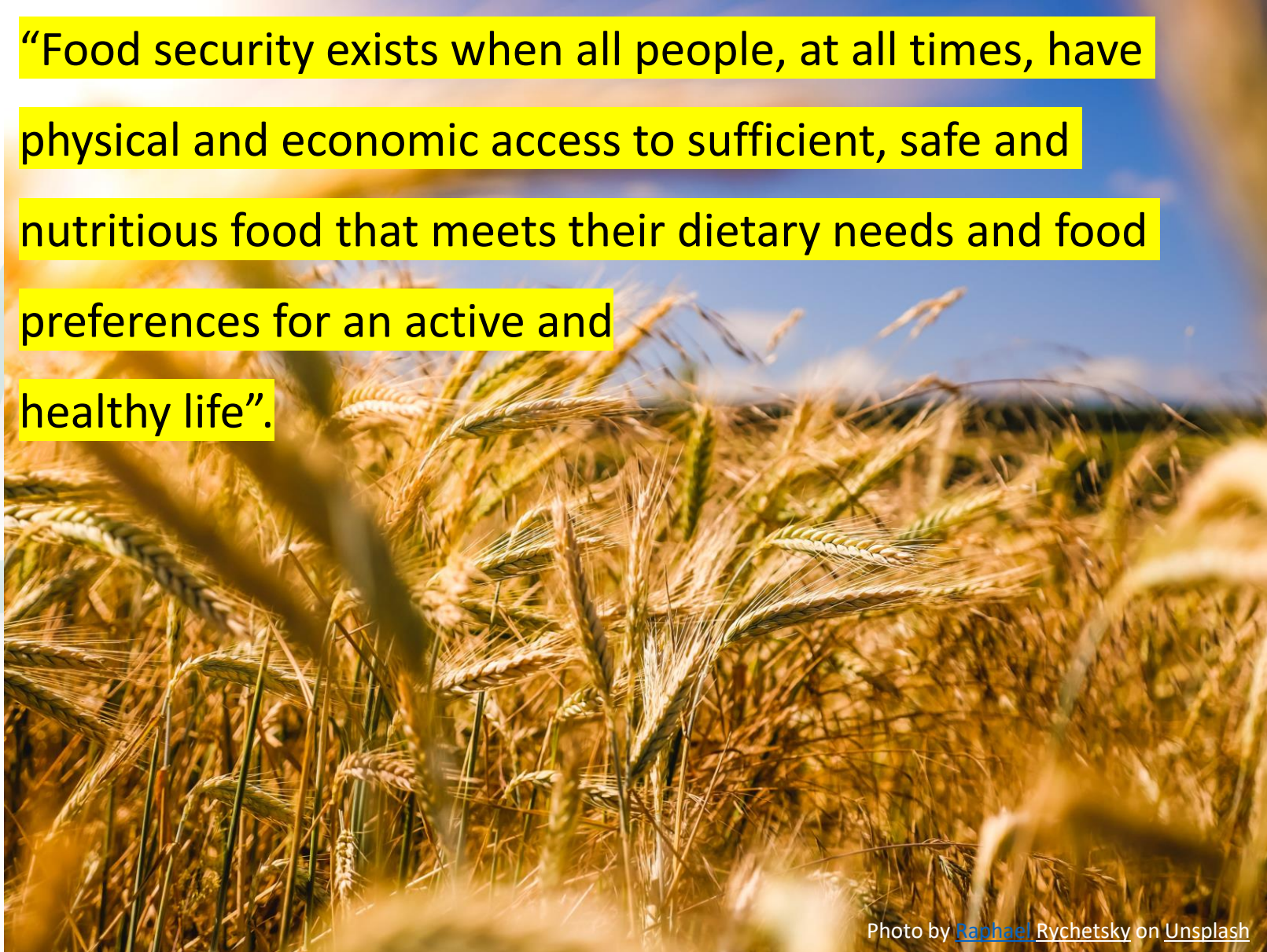


Photo by [Raphael Rychetsky](#) on [Unsplash](#)

The 1996 WFS exemplified this direction of policy by making the primary objective of international action on food security halving of the number of hungry or undernourished people by 2015.

## 2001 The State of Food Insecurity in the World

- “Food security [is] a situation that exists when 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 life”



**Consumption**

**Individuals and Households**

<https://www.fao.org/3/y4671e/y4671e06.htm#fn32>



# Definition points to the following dimensions of food security

## Food availability

The availability of sufficient quantities of food of appropriate quality, supplied through domestic production or imports (including food aid).

## Food Utilization

Utilization of food through adequate diet, clean water, sanitation and health care to reach a state of nutritional well-being where all physiological needs are met. This brings out the importance of non-food inputs in food security.

## Food access

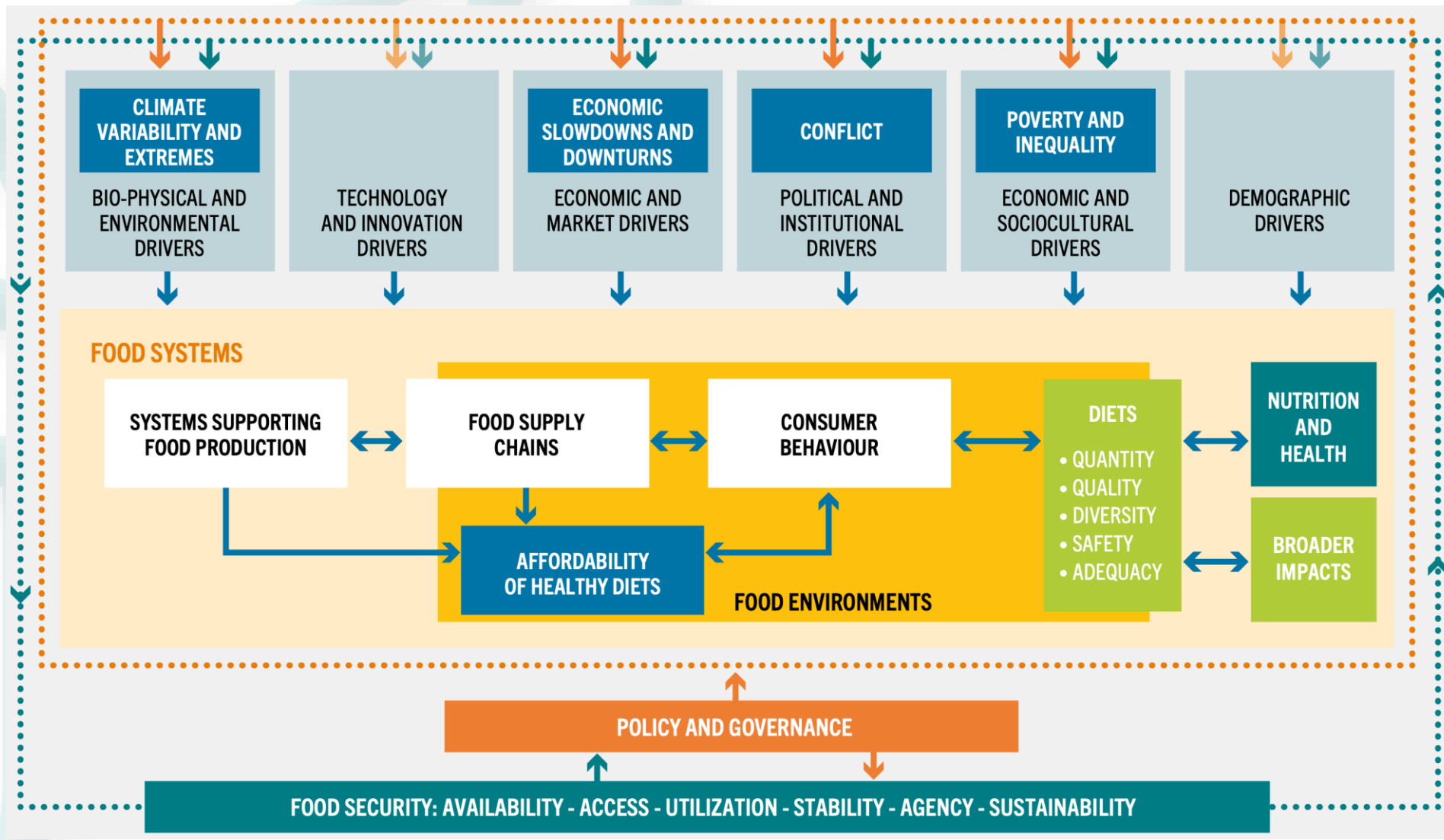
Access by individuals to adequate resources (entitlements) for acquiring appropriate foods for a nutritious diet. Entitlements are defined as the set of all commodity bundles over which a person can establish command given the legal, political, economic and social arrangements of the community in which they live (including traditional rights such as access to common resources).

## Food Stability

To be food secure, a population, household or individual must have access to adequate food at all times. They should not risk losing access to food as a consequence of sudden shocks (e.g. an economic or climatic crisis) or cyclical events (e.g. seasonal food insecurity). The concept of stability can therefore refer to both the availability and access dimensions of food security.

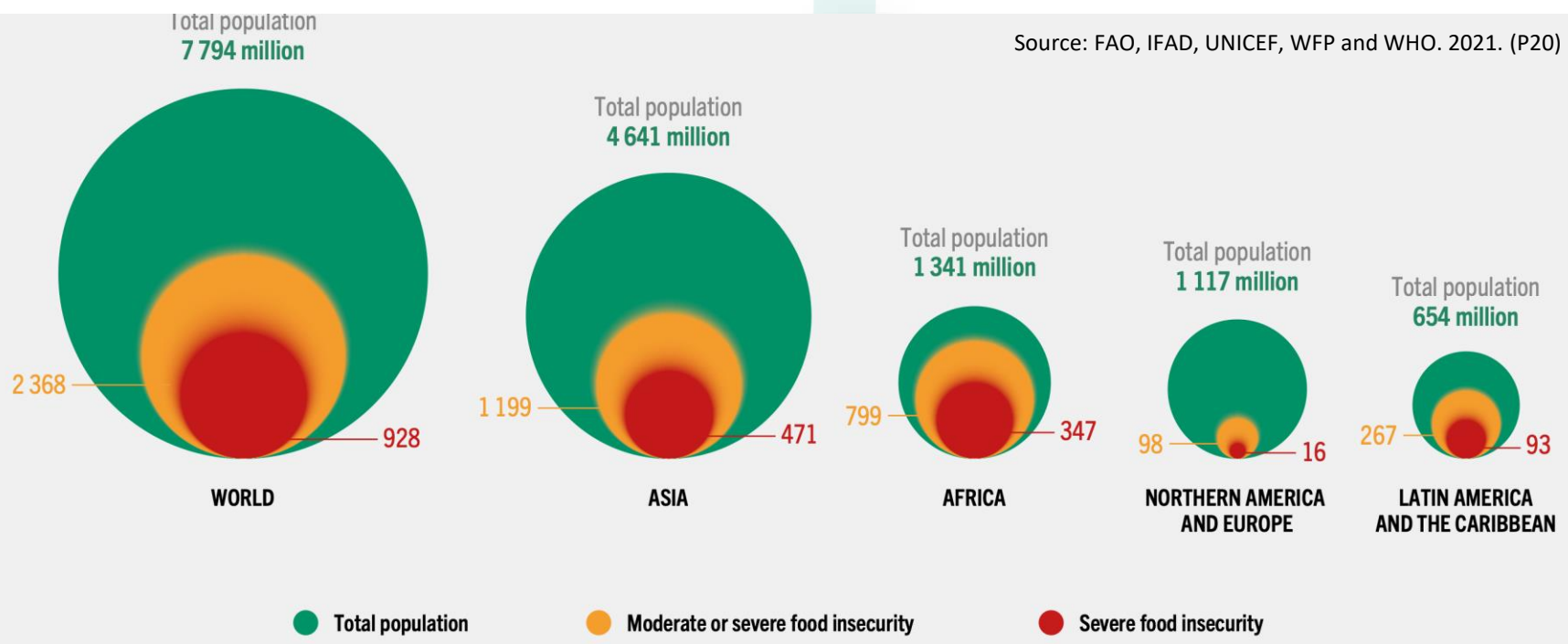
[https://www.fao.org/fileadmin/templates/faoitaly/documents/pdf/pdf\\_Food\\_Security\\_Cocept\\_Note.pdf](https://www.fao.org/fileadmin/templates/faoitaly/documents/pdf/pdf_Food_Security_Cocept_Note.pdf)

# Impacts of drivers on food systems, undermining food security & nutrition



HLPE. 2020. Food security and nutrition: building a global narrative towards 2030. A report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security. Rome. Source: FAO, IFAD, UNICEF, WFP and WHO. 2021. (P53)

NUMBER (MILLIONS) IN 2020



# Food Insecurity Concentration and Distribution

## Food Insecurity Experience Scale (FIES)

During the last 12 months, was there a time when, because of lack of money or other resources:

You were worried you would not have enough food to eat?

You ate only a few kinds of foods?

You ate less than you thought you should?

You were hungry but did not eat?



You were unable to eat healthy and nutritious food?

You had to skip a meal?

Your household ran out of food?

You went without eating for a whole day?

# Six pathways to address major drivers behind recent food security and nutrition trends

## COUNTRY CONTEXT

Major drivers of food insecurity and malnutrition:

- conflict
- climate variability and extremes
- economic slowdowns and downturns
- unaffordability of healthy diets

→ underlying poverty and inequality

One or more possible pathways towards transformation of food systems:

**1** Integrating humanitarian, development and peacebuilding policies in conflict-affected areas

**2** Scaling up climate resilience across food systems

**3** Strengthening resilience of the most vulnerable to economic adversity

**4** Intervening along the food supply chains to lower the cost of nutritious foods

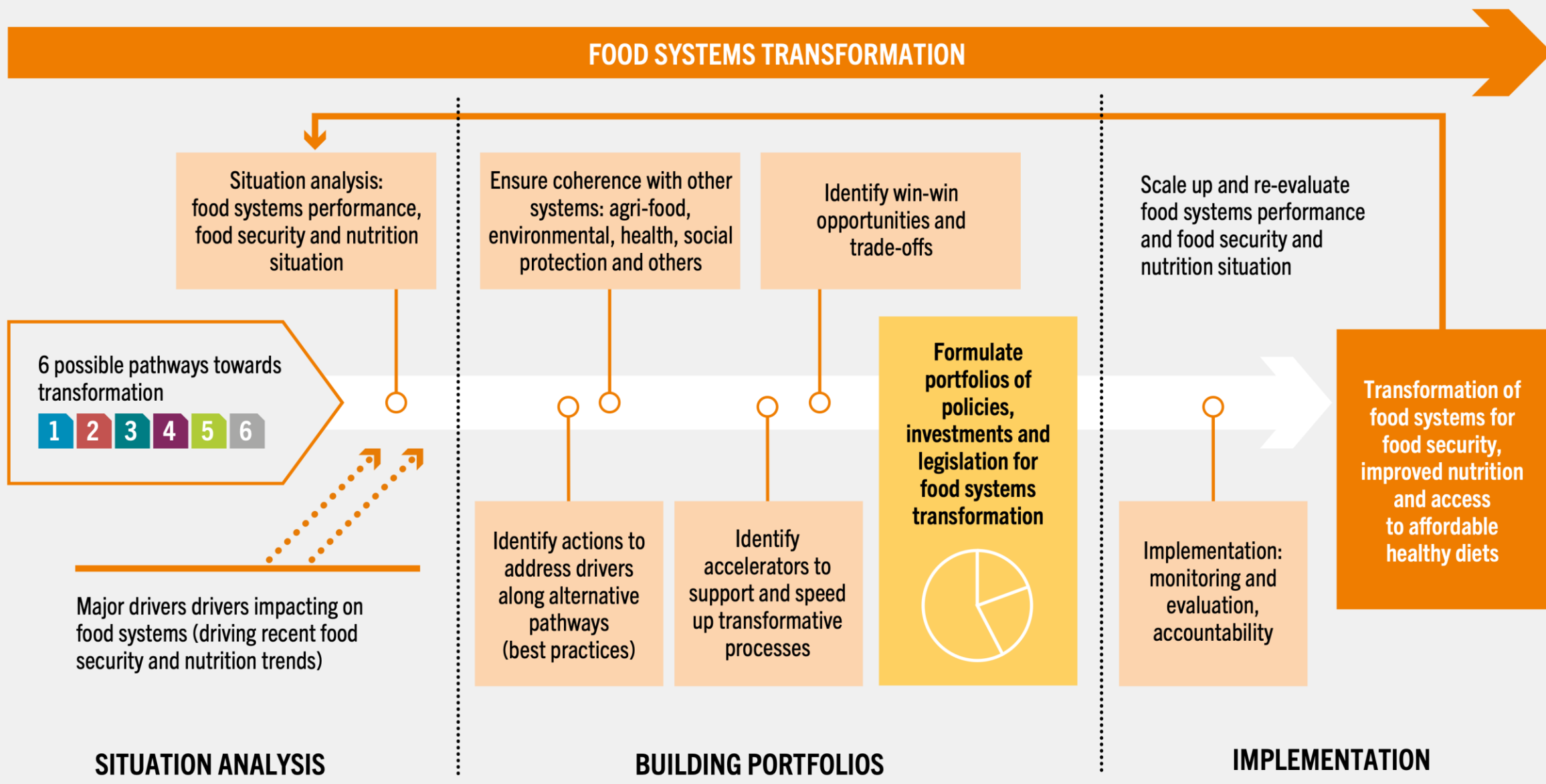
**5** Tackling poverty and structural inequalities, ensuring interventions are pro-poor and inclusive

**6** Strengthening food environments and changing consumer behaviour to promote dietary patterns with positive impacts on human health and the environment

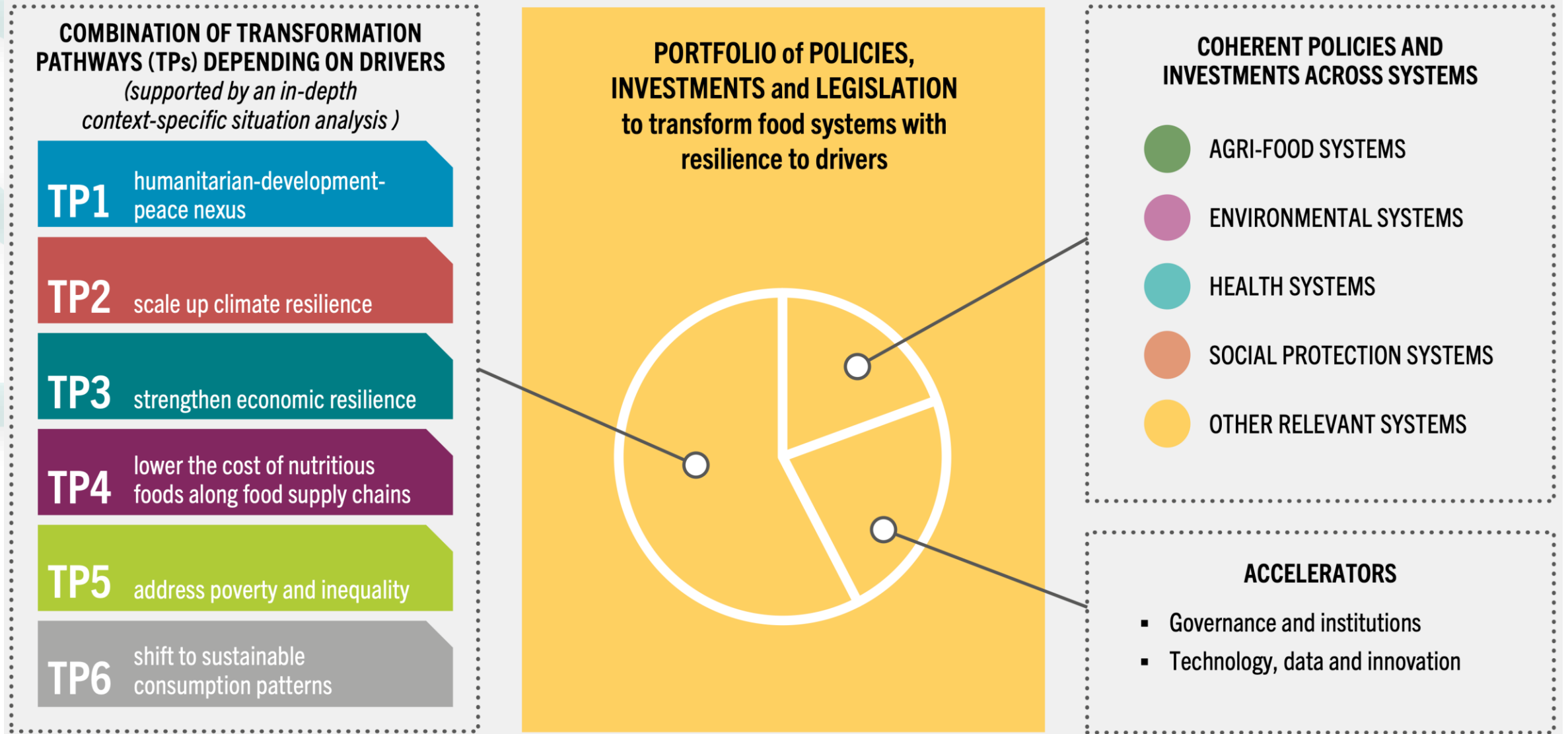
Transformation of food systems for food security, improved nutrition and access to affordable healthy diets for all

# Steps towards food systems transformation for more affordable healthy diets

## FOOD SYSTEMS TRANSFORMATION



# Key elements of a portfolio of policies and investments



Source: FAO, IFAD, UNICEF, WFP and WHO. 2021. The State of Food Security and Nutrition in the World 2021. Transforming food systems for food security, improved nutrition and affordable healthy diets for all. Rome, FAO. <https://doi.org/10.4060/cb4474en>

# The Economic Times (16.07.2020) : Pandemic, supply disruptions pose risk to food security; urgent actions needed says World Bank led joint statement



Citing World Food Programme data, the joint statement said the number of acute food insecure people increased to 345 million in 82 countries. "Making matters worse, around 25 countries have reacted to higher food prices by adopting export restrictions affecting over 8 percent of global food trade,".

<https://economictimes.indiatimes.com/small-biz/trade/exports/insights/pandemic-supply-disruptions-pose-risk-to-food-security-urgent-actions-needed-says-world-bank-led-joint-statement/articleshow/92912679.cms?from=mdr>

WASHINGTON: The Covid-19 pandemic, its resultant interruption in international supply chains, the ongoing conflict in Ukraine severely disrupting food, fuel and fertilizer markets, countries across the world now need to strengthen safety nets, facilitate trade, boost food production, and invest in resilient agriculture to avert any food security crisis.

COUNTRY	TYPE OF FOOD PRODUCT	BAN END DATE
ARGENTINA	Soybean oil, soybean meal,	Dec 31, 2023
ALGERIA	Pasta, wheat derivatives, vegetable oil, sugar	Dec 31, 2022
EGYPT	Vegetable oil, maize	June 12, 2022
	Wheat, flour, oils, lentils, pasta, beans	June 10, 2022
INDIA	Wheat	Dec 31, 2022
INDONESIA	Palm oil, palm kernel oil	Dec 31, 2022
IRAN	Potatoes, eggplant, tomatoes, onion	Dec 31, 2022
KAZAKHSTAN	Wheat, wheat flour	June 15, 2022
KOSOVO	Wheat, corn, flour, vegetable oil, salt, sugar,	Dec 31, 2022
TURKEY	Beef, mutton, goat meat, butter, cooking oils	Dec 31, 2022
UKRAINE	Wheat, oats, millet, sugar	Dec 31, 2022
RUSSIA	Sugar, sunflower seeds	Aug 31, 2022
	Wheat, meslin, rye, barley, maize	June 30, 2022
SERBIA	Wheat, corn, flour, oil	Dec 31, 2022
TUNISIA	Fruits, vegetables	Dec 31, 2022
KUWAIT	Chicken meat products, grains, vegetable oils	Dec 31, 2022

<https://www.cnn.com/2022/05/18/countries-banning-food-exports-amid-rising-prices-inflation.html>



# Food loss and food waste

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FB Page: EatEcon<sup>16</sup>



Facts	source
1. There is enough food produced in the world to feed everyone.	<a href="https://www.worldhunger.org/world-hunger-and-poverty-facts-and-statistics/">https://www.worldhunger.org/world-hunger-and-poverty-facts-and-statistics/</a>
2. One third of all food produced is lost or wasted –around 1.3 billion tonnes of food – costing the global economy close to \$940 billion each year.	<a href="#">FAO Save Food Global Food Waste and Loss Initiative</a>
3. Up to 10% of global greenhouse gases comes from food that is produced, but not eaten.	United Nations Environment Program (UNEP) (2021). Food Waste Index Report 2021.
4. Wasting food is worse than total emissions from flying (1.9%), plastic production (3.8%) and oil extraction (3.8%).	<a href="#">WRI: World GHG Emissions 2016</a> & <a href="https://www.nature.com/articles/s41558-019-0459-z">https://www.nature.com/articles/s41558-019-0459-z</a>
5. If food waste was a country, it would be the third biggest emitter of greenhouse gases after USA and China.	<a href="#">FAO Food Wastage Footprint Report 2013</a>
6. Food rotting in landfill releases methane – 28x stronger than carbon dioxide.	<a href="#">IPCC Special Report on Climate Change and Land</a>
7. If one quarter of the food currently lost or wasted could be saved, it would be enough to feed 870 million hungry people.	<a href="#">FAO The State of Food Insecurity in the World 2015</a>
8. Almost half of all fruit and vegetables produced are wasted (that’s 3.7 trillion apples).	<a href="#">FAO Infographic – Global Initiative on Food Loss and Waste Reduction</a>

## FIAL (2021) -National Food Waste Strategy Feasibility Study report that

1. Australia waste 7.6 million tonnes of food each year, 70% of this is perfectly edible and food waste cost the economy \$36.6 billion a year.
2. Majority of food waste in Australia comes from our homes (2.5 million tonnes)
3. Food waste costs households \$2,000 - \$2,500 per year.
4. More than 25 million hectares of land is wasted to grow food that is not eaten.
5. The top five most wasted foods in Australia are vegetables, bread, fruit, bagged salad, and leftovers.
6. 1 in 6 Australian's experienced food insecurity in the last year and 1.2 million were children.
7. Demand for food relief is higher than ever. OzHarvest has experienced a 46% increase in new charities needing food since March 2020.
8. 1 in 3 people who are food insecure have never experienced food insecurity before and 64% of people who are seeking food relief are employed.



- <https://www.ozharvest.org/food-waste-facts/>
- <https://www.fial.com.au/sharing-knowledge/food-waste>



<http://www.teachsdgs.org/resources.html>  
<https://twitter.com/unep/status/639574897501577217>

Photo courtesy of United Nations System Staff College  
<https://blog.entrepreneurship.asu.edu/2021/04/20/engaging-middle-schoolers-with-sustainable-development-goals/>

**1 NO POVERTY**



**2 ZERO HUNGER**



**3 GOOD HEALTH AND WELL-BEING**



**4 QUALITY EDUCATION**



**5 GENDER EQUALITY**




**6 CLEAN WATER AND SANITATION**



**7 AFFORDABLE AND CLEAN ENERGY**



**8 DECENT WORK AND ECONOMIC GROWTH**



**9 INDUSTRY, INNOVATION AND INFRASTRUCTURE**



**10 REDUCED INEQUALITIES**



**11 SUSTAINABLE CITIES AND COMMUNITIES**



**12 RESPONSIBLE CONSUMPTION AND PRODUCTION**



**13 CLIMATE ACTION**



**14 LIFE BELOW WATER**



**15 LIFE ON LAND**



**16 PEACE, JUSTICE AND STRONG INSTITUTIONS**

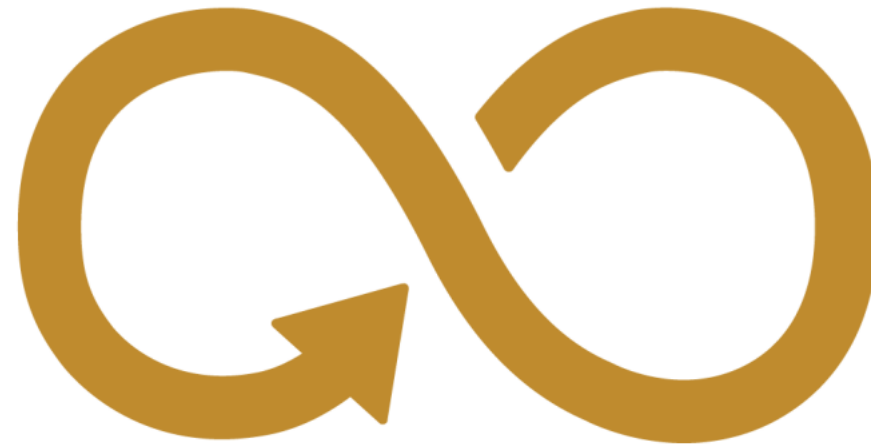


**17 PARTNERSHIPS FOR THE GOALS**





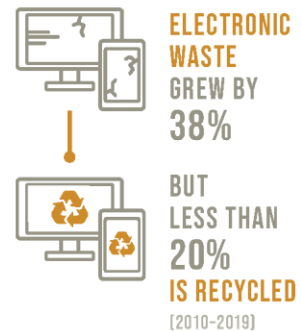
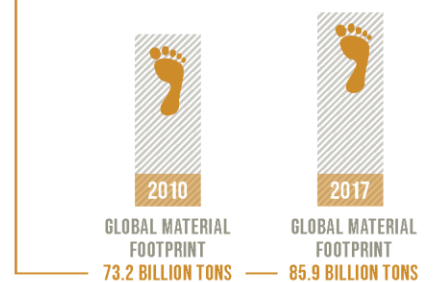
# 12 RESPONSIBLE CONSUMPTION AND PRODUCTION



## ENSURE SUSTAINABLE CONSUMPTION AND PRODUCTION PATTERNS

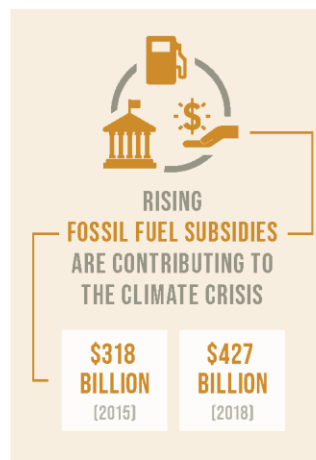
### BEFORE COVID-19

THE WORLD CONTINUES TO USE NATURAL RESOURCES **UNSUSTAINABLY**



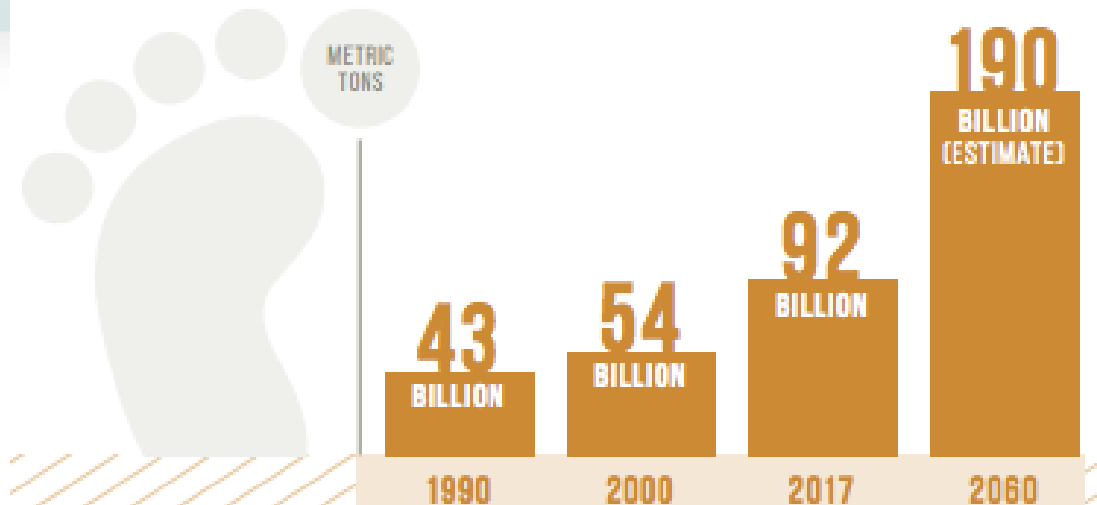
### COVID-19 IMPLICATIONS

THE PANDEMIC OFFERS AN OPPORTUNITY TO **DEVELOP RECOVERY PLANS** THAT BUILD A MORE SUSTAINABLE FUTURE



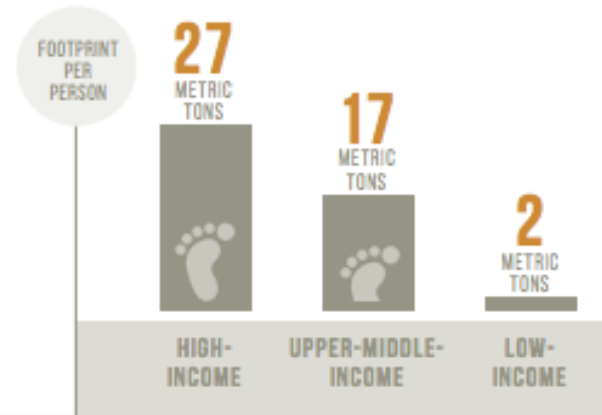
**13.8%**  
OF FOOD IS LOST IN SUPPLY CHAINS (2016)

# THE GLOBAL MATERIAL FOOTPRINT IS RAPIDLY GROWING, OUTPACING POPULATION AND ECONOMIC GROWTH



## MATERIAL FOOTPRINT PER CAPITA IN HIGH-INCOME COUNTRIES IS

**60% HIGHER** THAN IN UPPER-MIDDLE-INCOME COUNTRIES **AND MORE THAN 13 TIMES** THE LEVEL OF LOW-INCOME COUNTRIES



DEVELOPED COUNTRIES USE ONE FIFTH OF NATURAL RESOURCES

TO PRODUCE THE SAME AMOUNT OF ECONOMIC OUTPUT AS DEVELOPING COUNTRIES

NEARLY 100 COUNTRIES ARE ACTIVELY ADOPTING POLICIES AND MEASURES TO PROMOTE SUSTAINABLE CONSUMPTION AND PRODUCTION

303 POLICIES AND INSTRUMENTS ARE IN PLACE GLOBALLY



# 12

## Responsible consumption and production

2015-2019  
Output, Impact, Collaboration

Research supporting SDG12 has grown since 2015, with a compound annual growth rate of 11.6% compared to nearly 3.5% for research in all fields.

China produces the most research supporting SDG12, followed by the US, United Kingdom, India and Italy. Seven of the 10 most prolific locations are high income locations (accounting for more than 37,400 publications); two are upper-middle income locations (China and Brazil) and one is a lower-middle income location (India). No low income locations featured in the top 50.

The top five locations for which research on SDG12 represents the largest share of their research portfolio are Ghana, Nigeria, Sri Lanka, Latvia and Malaysia.

International collaboration yielded 24% of research on SDG12. High income locations collaborated with low income locations on 1% of their total SDG12 research, while nearly 58% of the related output from low income locations came from collaboration with high income locations.

As a measure of academic impact measured by citation, the field weighted citation impact (FWCI) for SDG12 research was above average every year, with an average of 1.36 over the period.

 **RELX**  
SDG Resource Centre



This analysis builds on Elsevier's Sustainability Science in a [Global Landscape](#) report, which was released in 2015 to coincide with the launch of the SDGs. See a [2017 update](#) on key findings on the RELX SDG Resource Centre. Help us to provide insight into SDG research. [Click here to review the research](#). See the [methodology and definitions](#).

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**84,127**  
Publications in period

**11.6%**  
Compound Annual Growth Rate in the period

**61.7%**  
Publications from high-income locations

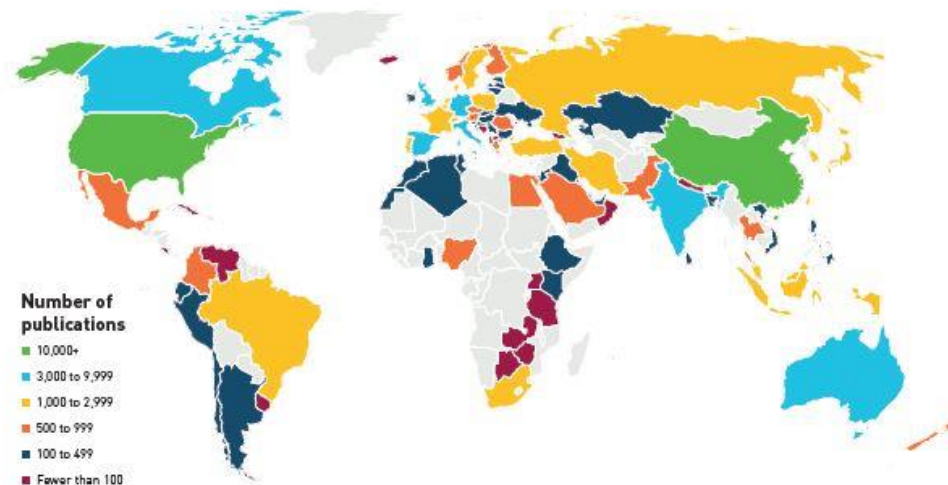
**2.0%**  
Academic corporate collaboration

**0.2%**  
Publications from low-income locations

**1.36**  
Field-Weighted Citation Impact

**24.2%**  
Publications with international collaboration

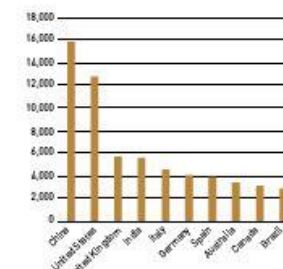
**What is FWCI?**  
Field-weighted citation impact is an indicator of scholarly impact based on the number of times the publication was cited in other research. An FWCI of above 1.0 indicates the impact is above the normalised average.



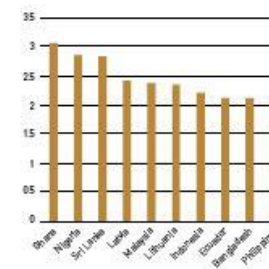
### Key themes in SDG12 Research



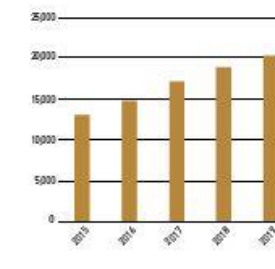
### Top 10 locations by publication



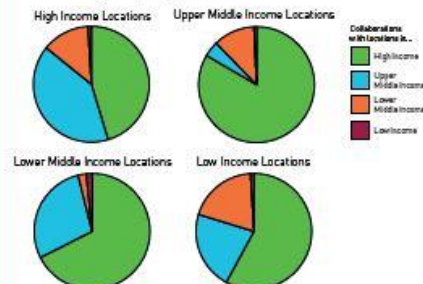
### Top 10 locations by RAI \*(Relative Activity Index)



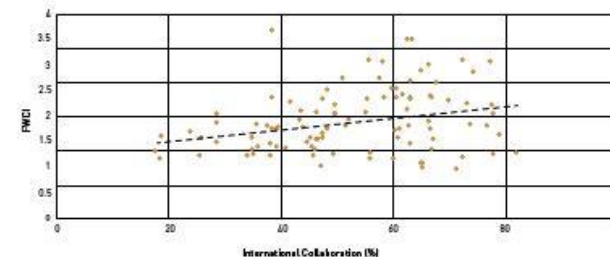
### Volume of publications supporting SDG12



### International collaboration between income groups by location

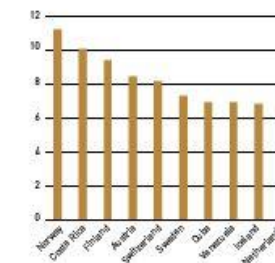


### International collaboration and research impact



\*Relative Activity Index is a measure of the proportion of the country's research output in the subject, relative to the proportion seen globally

### Top 10 locations for corporate-academic collaboration

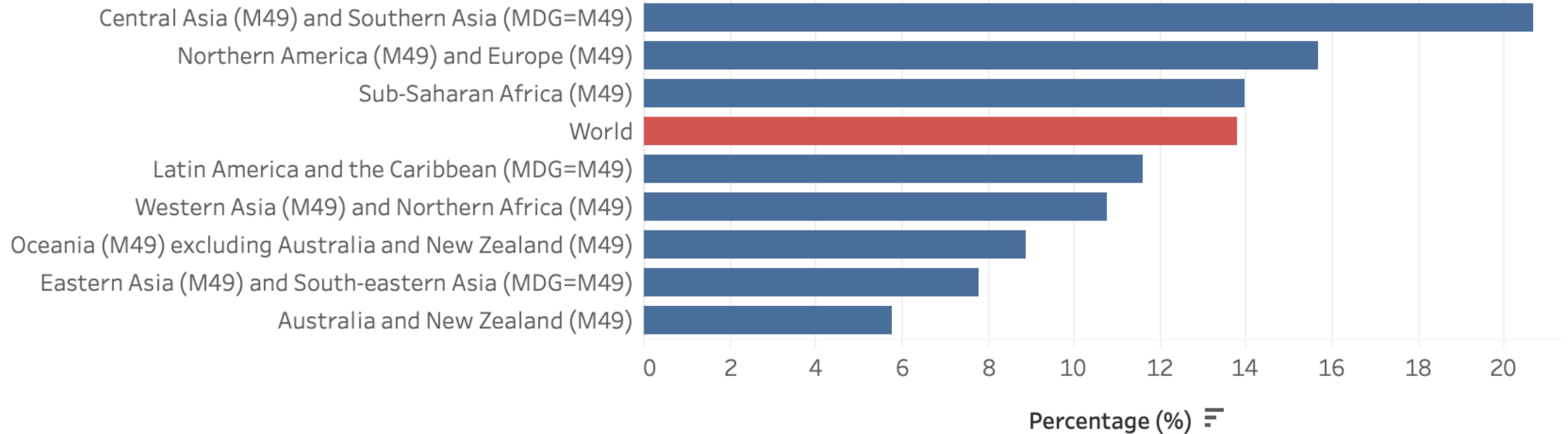




# From Food to Food Waste



## Sub-indicator 12.3.1.a - Food Loss Index from post-harvest to distribution, 2016



# From Food to Food Waste



Large quantity

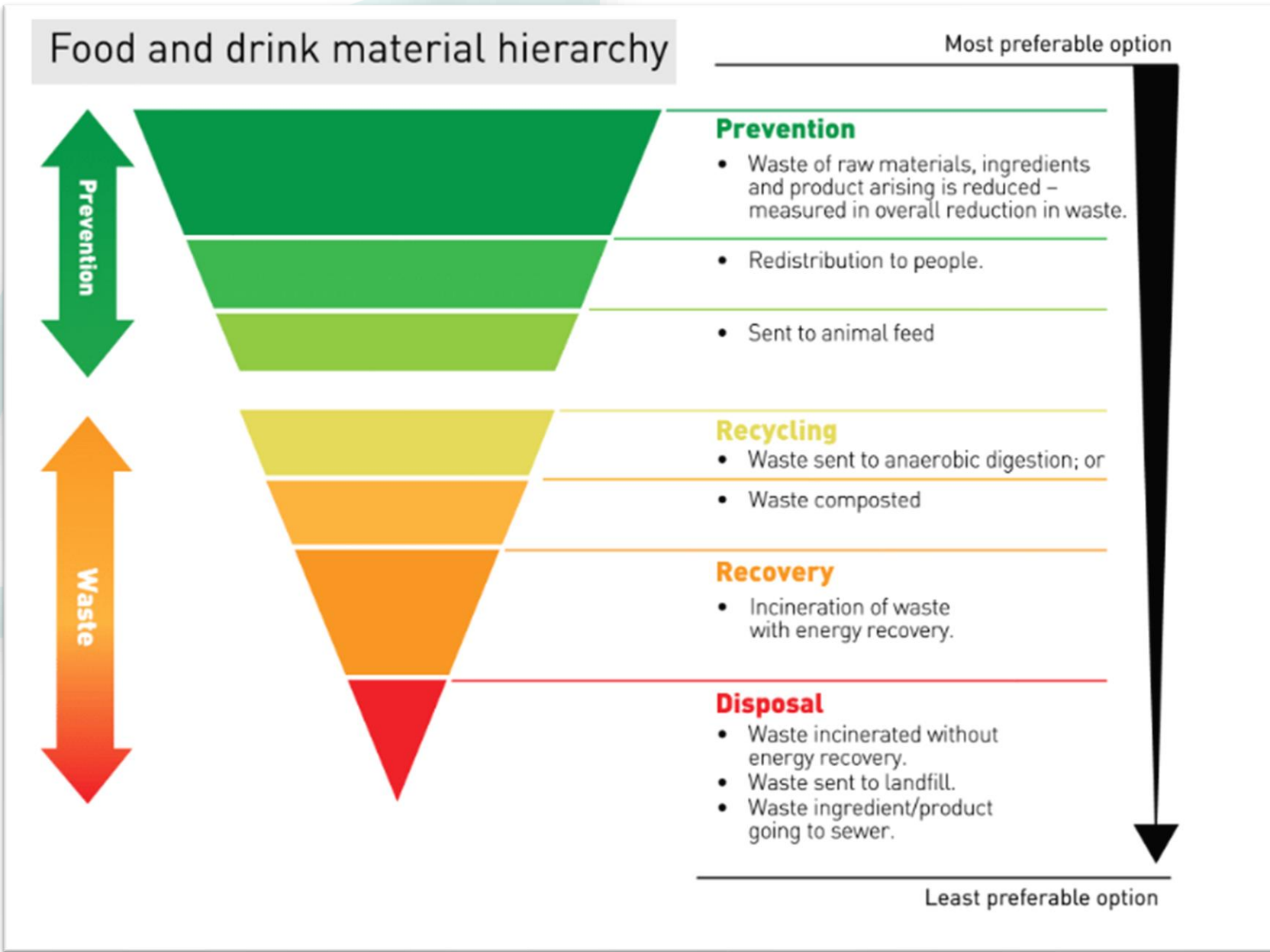


Below criteria/satisfaction



Poor quality

Poor quality [http://www.tei.or.th/en/blog\\_detail.php?blog\\_id=72](http://www.tei.or.th/en/blog_detail.php?blog_id=72)



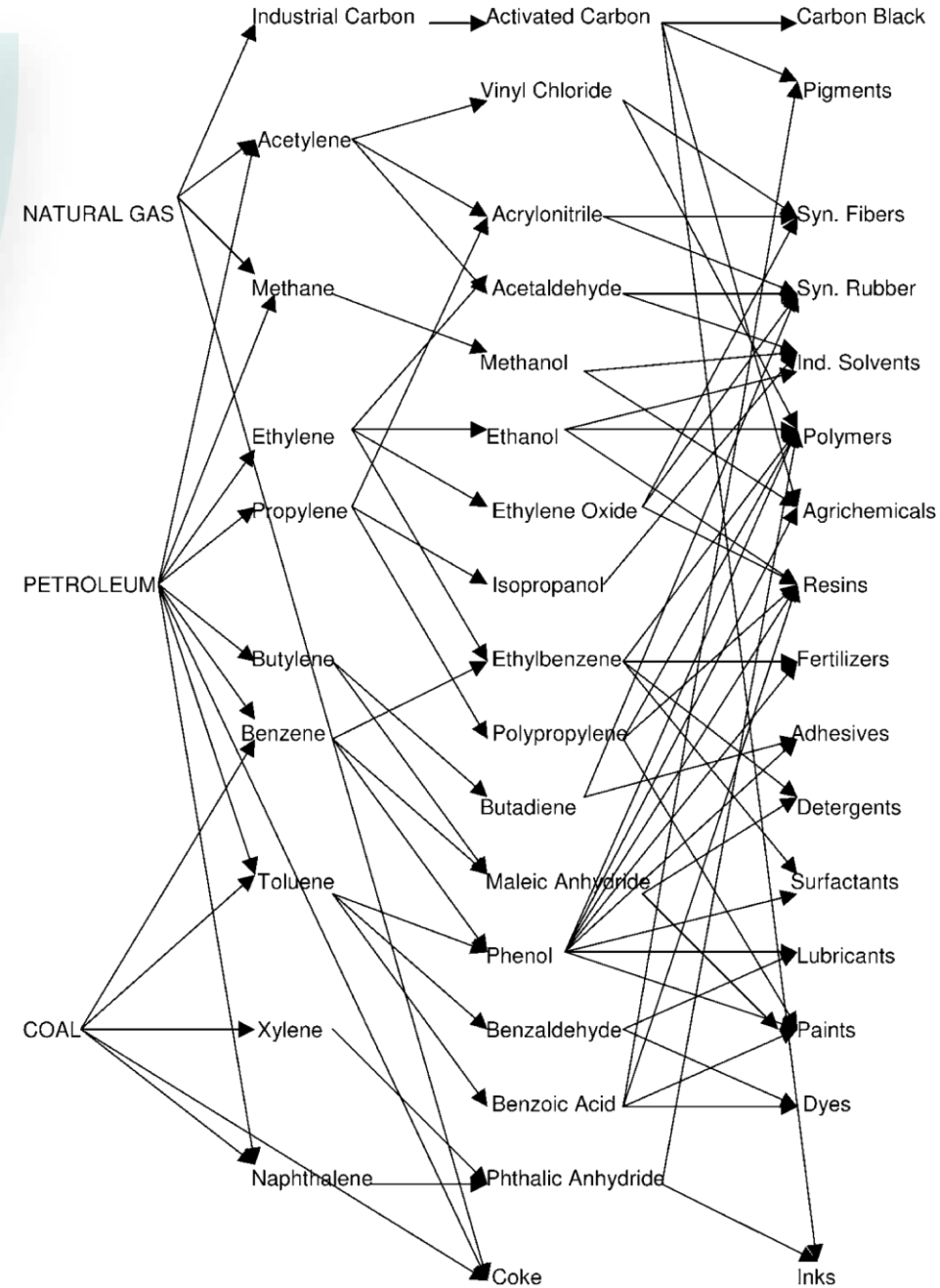
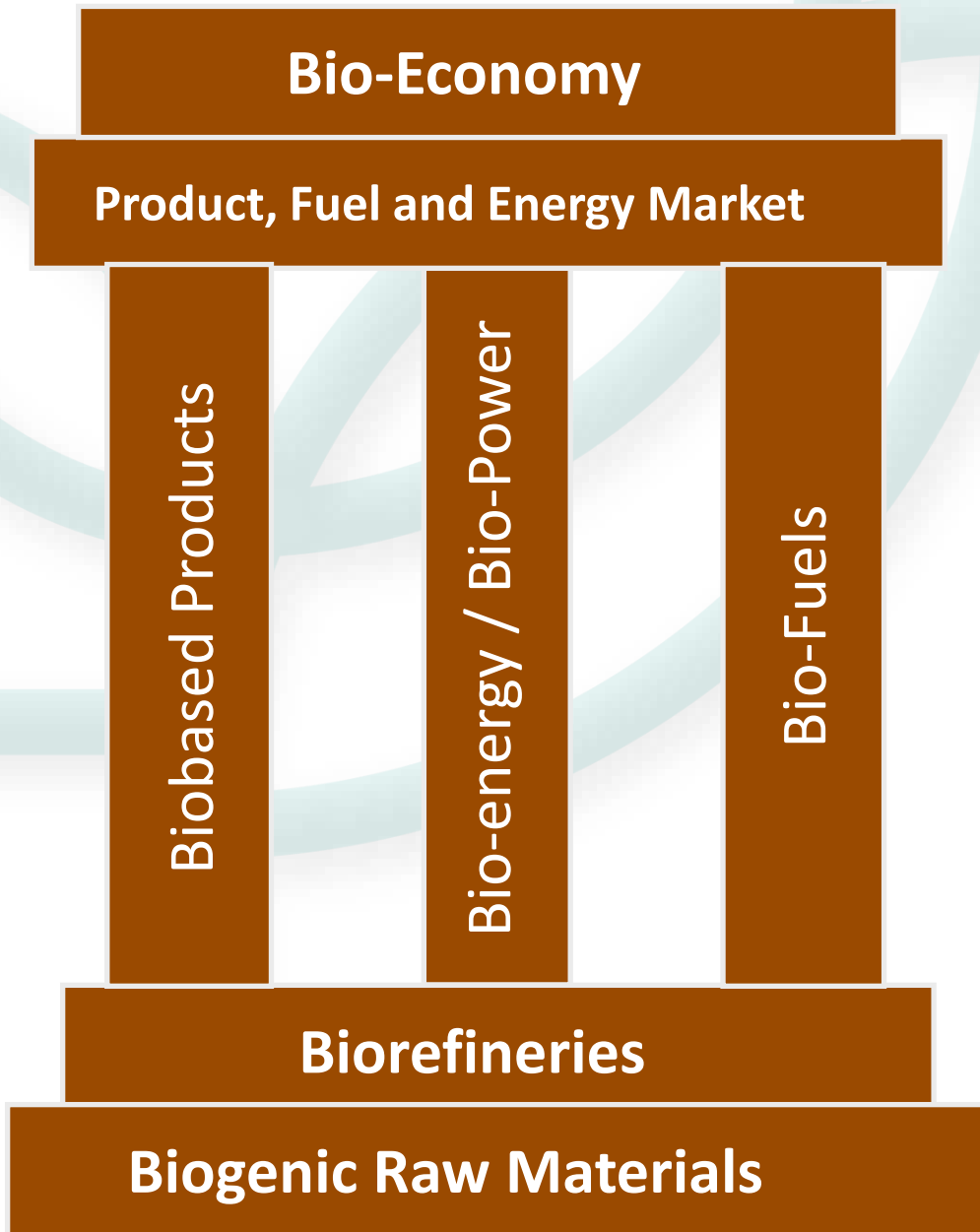
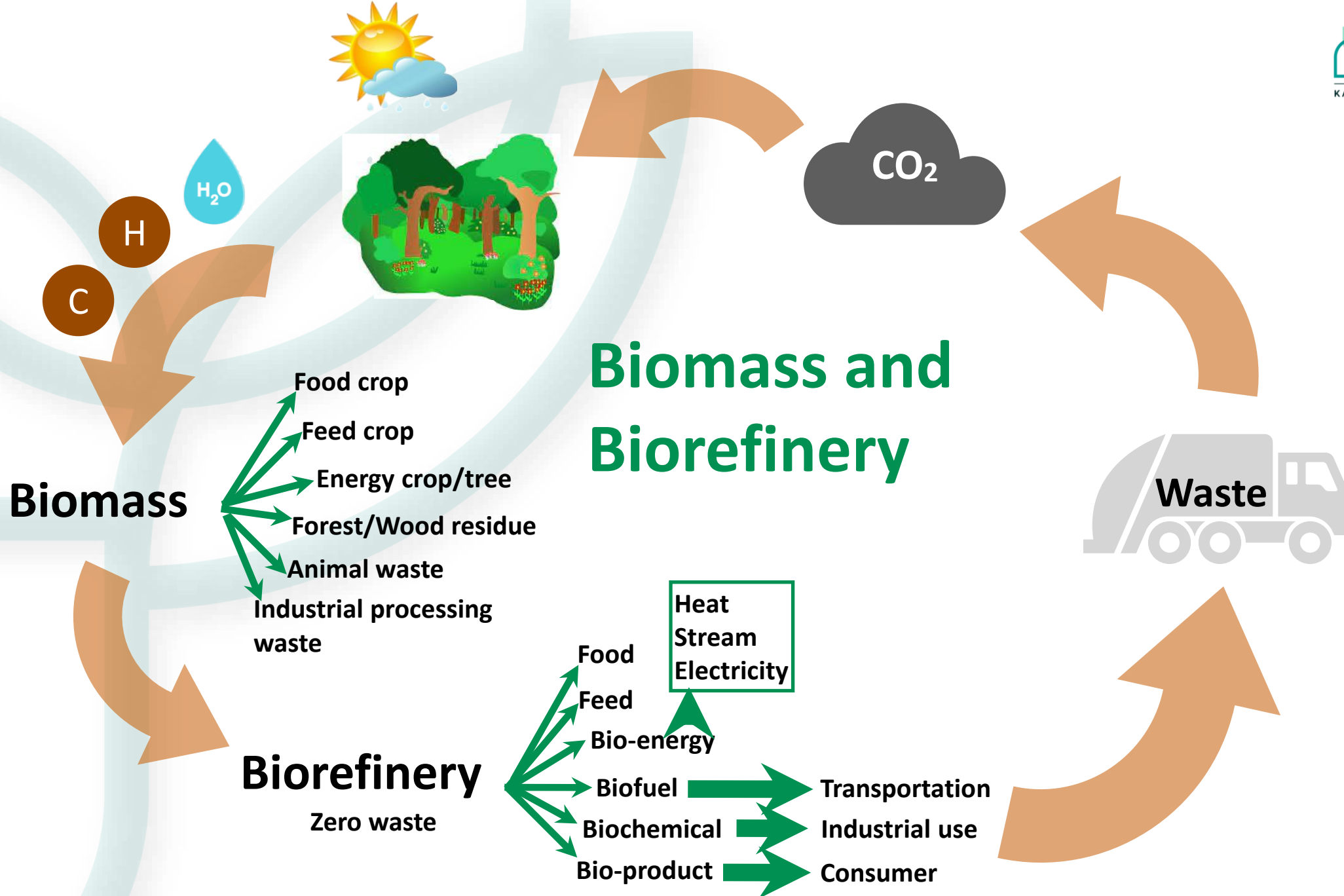


Fig. 5.1 Fossil sources of industrial organic chemicals [1].



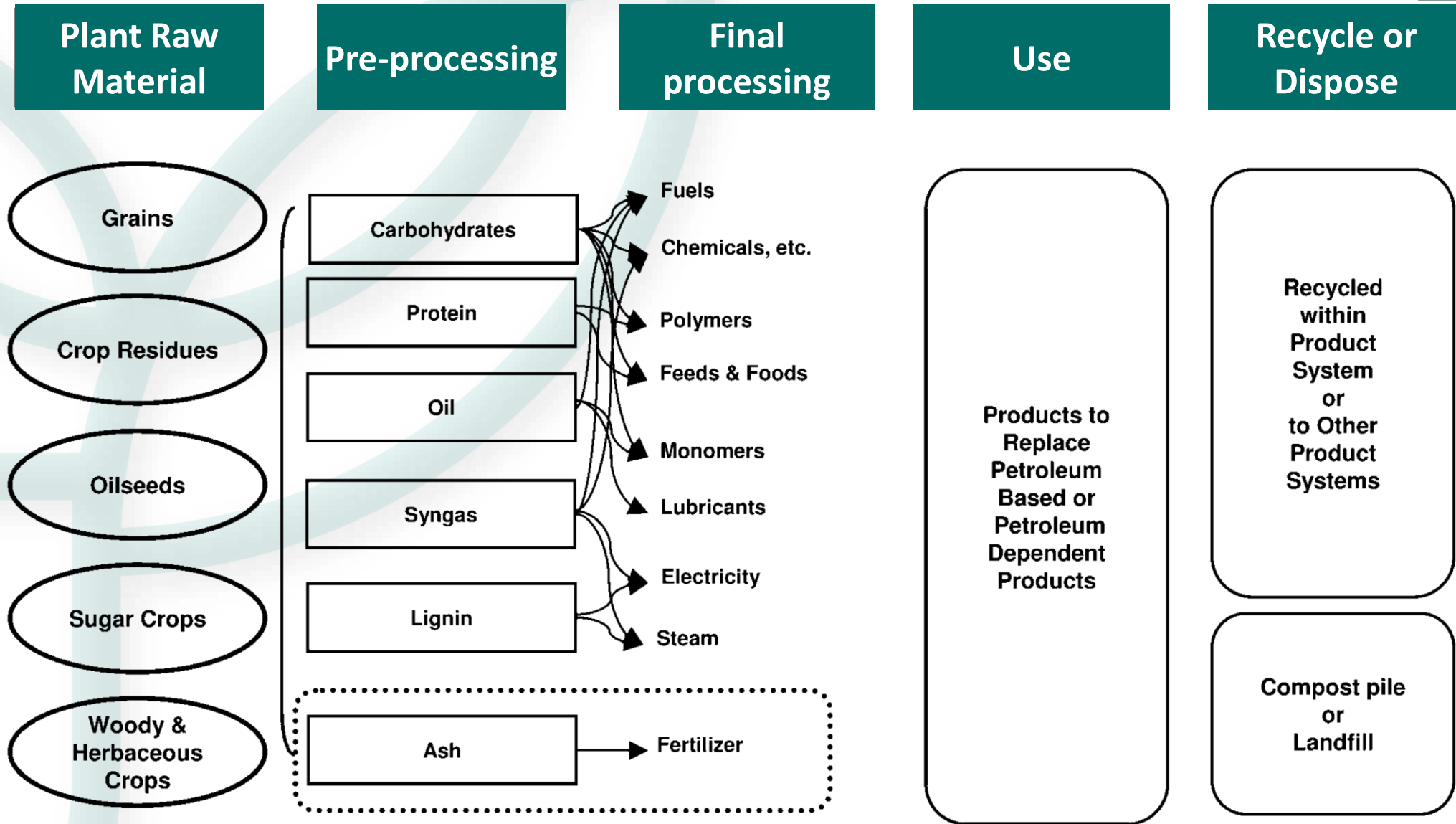
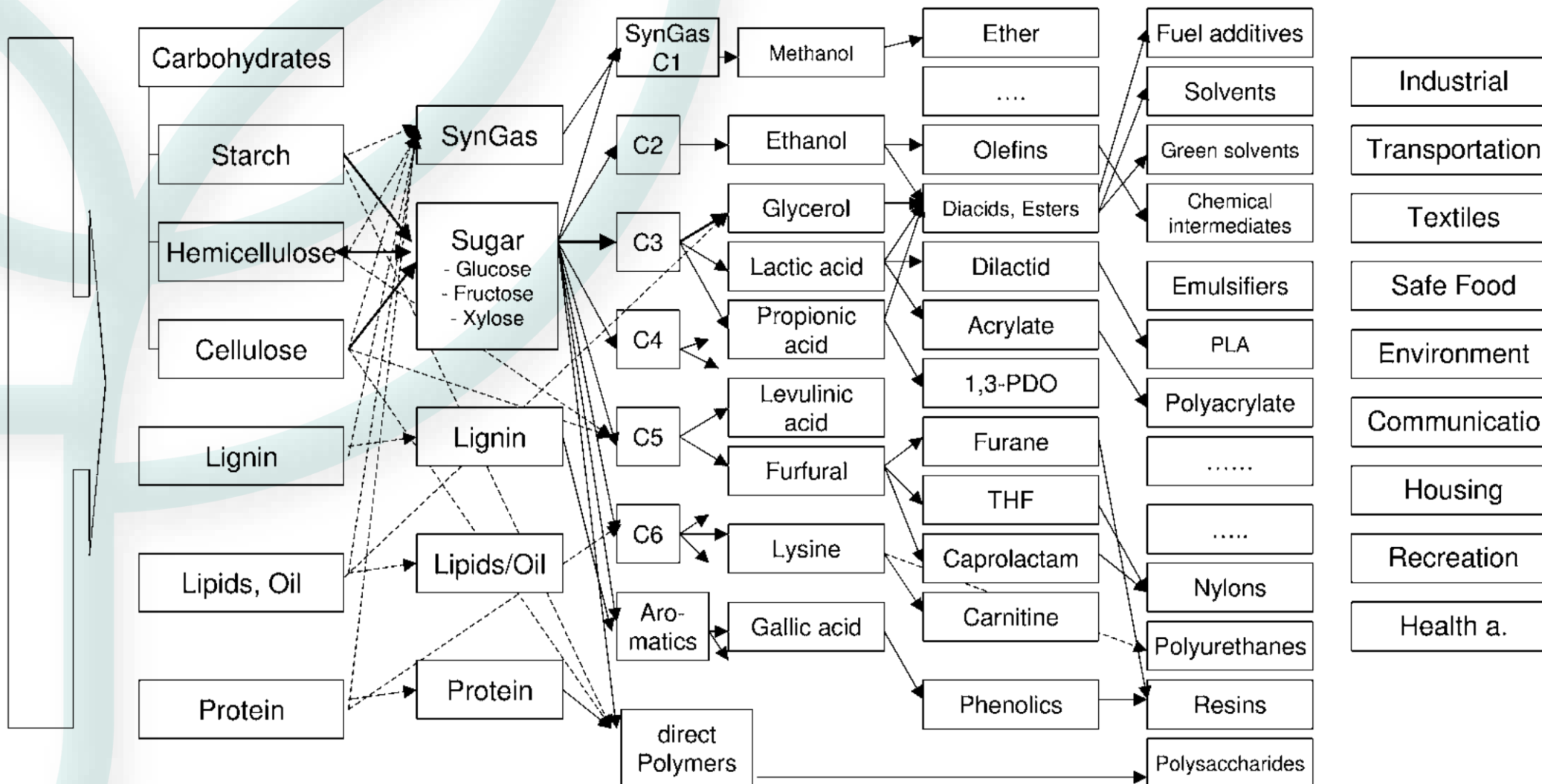


Fig. 2.2 Life cycle overview of biobased products [9].

Source: Kamm, Gruber and Kamm. 2006. Biorefineries - Industrial Processes and Products : Status Quo and Future Directions Volume 1. Weinheim: Wiley-VCH

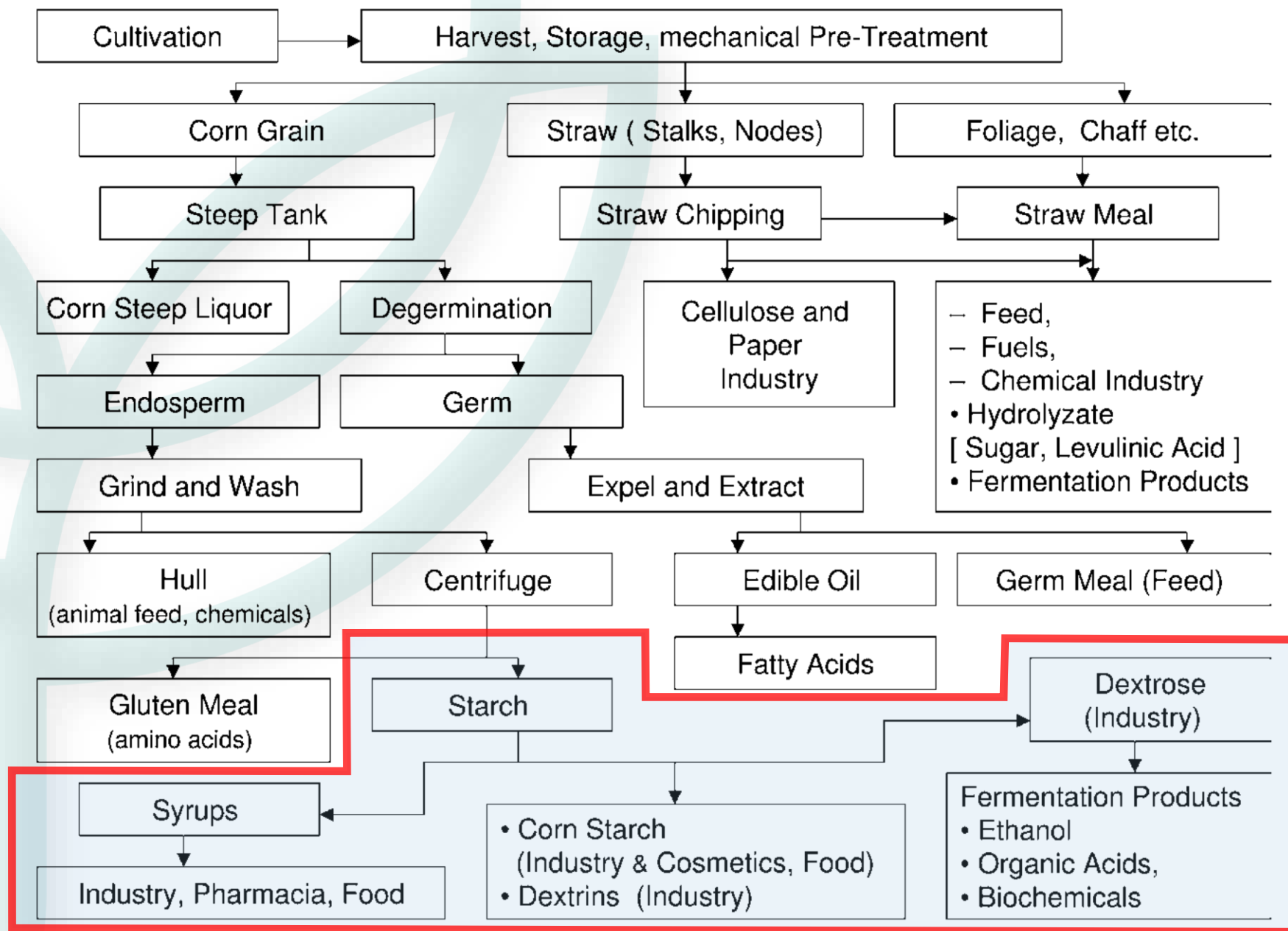
Biomass	Precursors	Platforms	Building blocks	Secondary chemical	Intermediates	Products / uses
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Source: Kamm, Gruber and Kamm. 2006. Biorefineries - Industrial Processes and Products : Status Quo and Future Directions Volume 1. Weinheim: Wiley-VCH

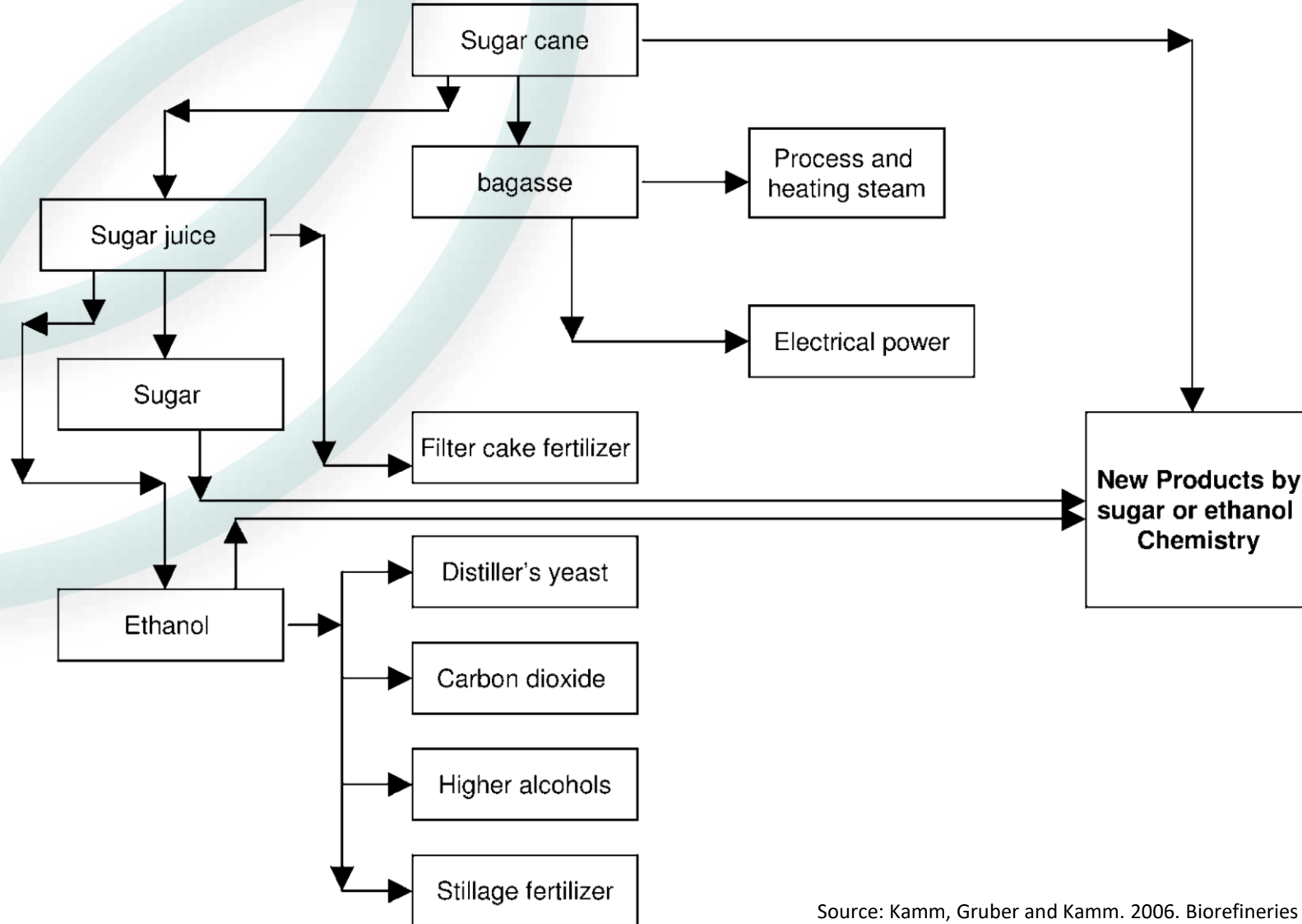
**Fig. 1.8** Model of a biobased product flow-chart for biomass feedstock [98].





**Fig. 1.15** Products from a whole-crop wet mill-based biorefinery.

# Sugar cane agro-industry in Brazil



Source: Kamm, Gruber and Kamm. 2006. Biorefineries - Industrial Processes and Products : Status Quo and Future Directions Volume 1. Weinheim: Wiley-VCH

**Fig. 10.1** Sugar cane processing to sucrose, ethanol, by-products, and new products.

# Tackling Thailand's food-waste crisis



Fig. Shoppers select fresh produce at a supermarket. (Photo by Patipat Janthong)

Source: <https://www.bangkokpost.com/opinion/opinion/1778159/tackling-thailands-food-waste-crisis>