2017 SEARCA PROFESSORIAL CHAIR

THE PHILIPPINE FOOD SYSTEMS: CHALLENGES AND OPPORTUNITIES IN THE 21ST CENTURY

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Food technology

The application of food science and related fields in post harvest handling, preparation, processing, packaging, storage and distribution for the improvement of **food security** and well being of *individuals, families and institutions*. It includes the social, cultural, economic, managerial and environmental aspects of **food systems** (FST Section, FSN Department 2003)

Nutrition 230

- Food science and nutrition topics related to **food systems, food security and food safety.**
- Elective course for graduate students from the DFSN and other departments of CHE

SEAMEO SEARCA

FOOD SECURITY

REVIEW

Food Security: The Challenge of Feeding 9 Billion People

H. Charles J. Godfray,[1]* John R. Beddington,[2] Ian R. Crute,[3] Lawrence Haddad,[4] David Lawrence,[5] James F. Muir,[6] Jules Pretty,[7] Sherman Robinson,[8] Sandy M. Thomas,[9] Camilla Toulmin[10]

12 FEBRUARY 2010 VOL 327 **SCIENCE** www.sciencemag.org

Food and Agriculture Organization of the United Nations

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Feeding nine billion in 2050

FAO and CGIAR conference to address research priorities for ensuring food and nutrition security for the world's poorest

Related links

Food security futures conference

Challenge of feeding 142 million Filipinos in 2045

OUTLINE

- INTRODUCTION
- CHALLENGES
- OPPORTUNITIES
- SUMMARY
- ACKNOWLEDGMENTS
- REFERENCES

WHAT ARE FOOD SYSTEMS?

FOOD SYSTEMS

- Include all stages of keeping populations fed (Welvaert, 2016):

Harvesting

Processing

Transforming

Packing

Marketing

Consuming

FOOD SYSTEMS

- A broader perspective of food systems involve:

✓interactions between and within biogeophysical and human environments

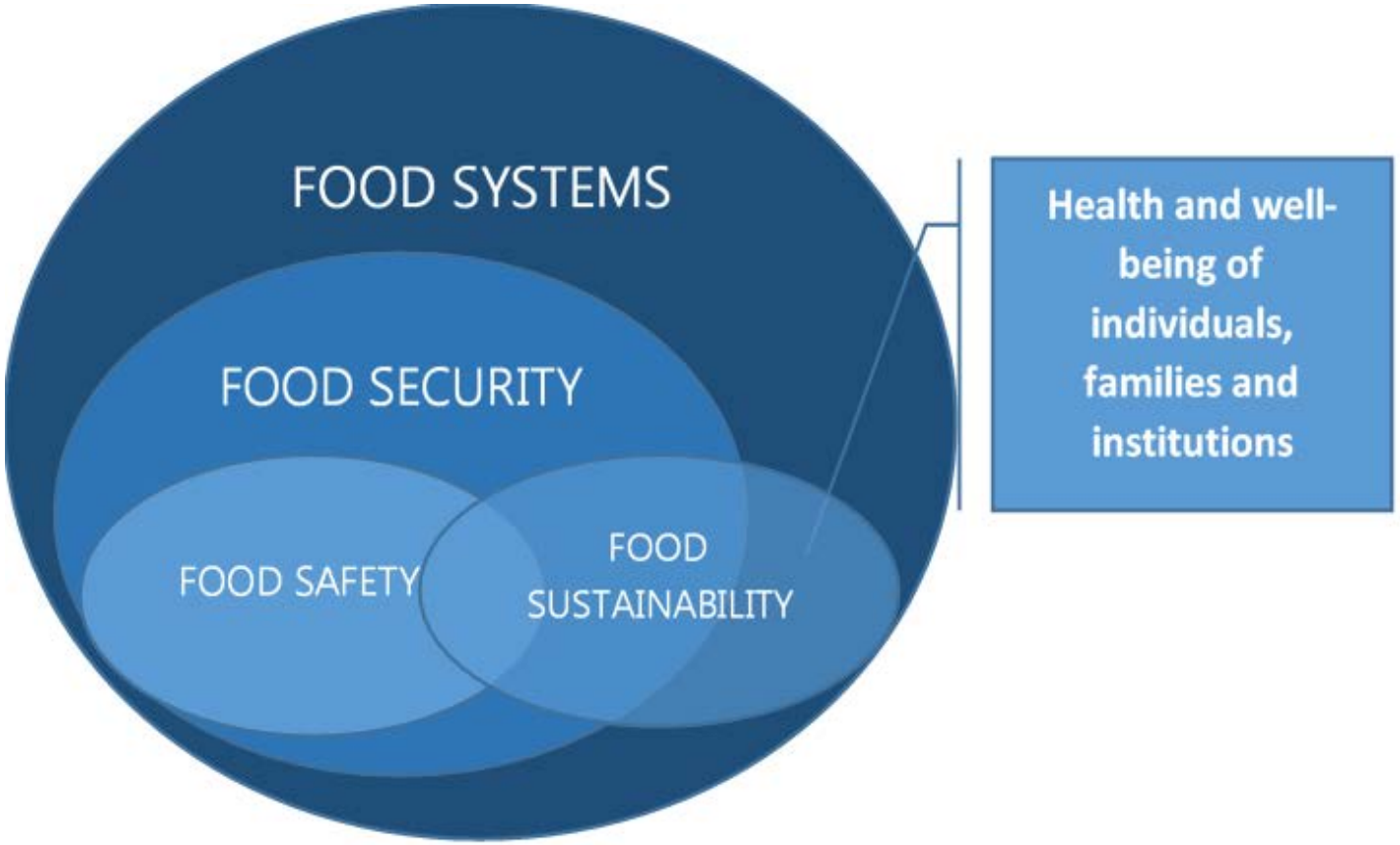
✓the activities themselves

✓the outcomes of these activities (contributions to food security, environmental security and social welfare)

✓other determinants of food security

Ericksen, 2008

FS^3 of FOOD SYSTEMS



Villarino, unpublished

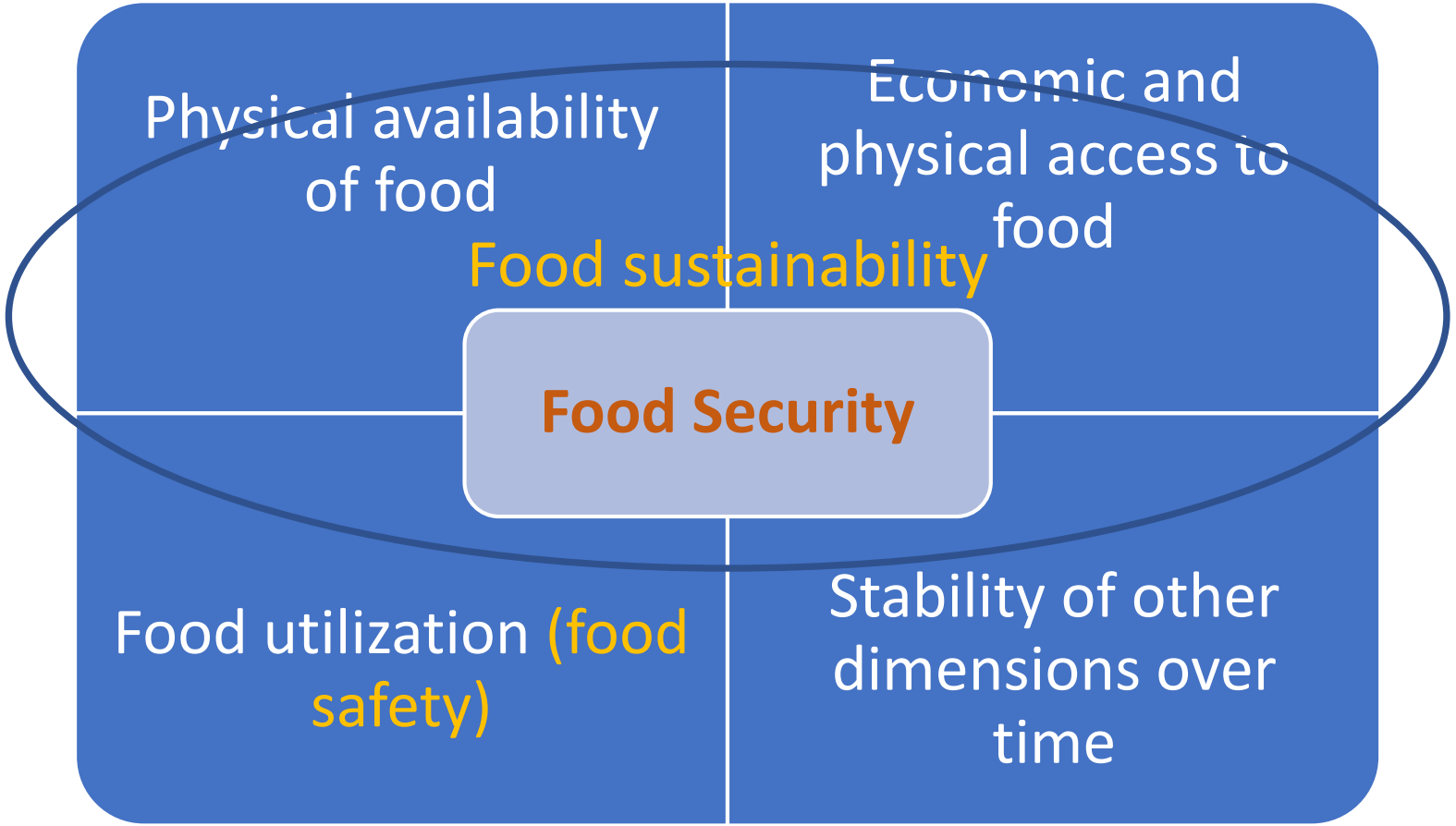
FS^3 of FOOD SYSTEMS

- Important elements of the 17 SDGs of the UN (UN, 2015)
- Goals 2 & 12
- Important role in the other goals due to interrelationships of these goals

FS^3 of FOOD SYSTEMS

- Food systems must achieve and maintain the FS^3 not only to safeguard the health and well-being of individuals but their immediate environment, i.e., families and institutions, for the benefit of national and global communities.

FS³ of FOOD SYSTEMS



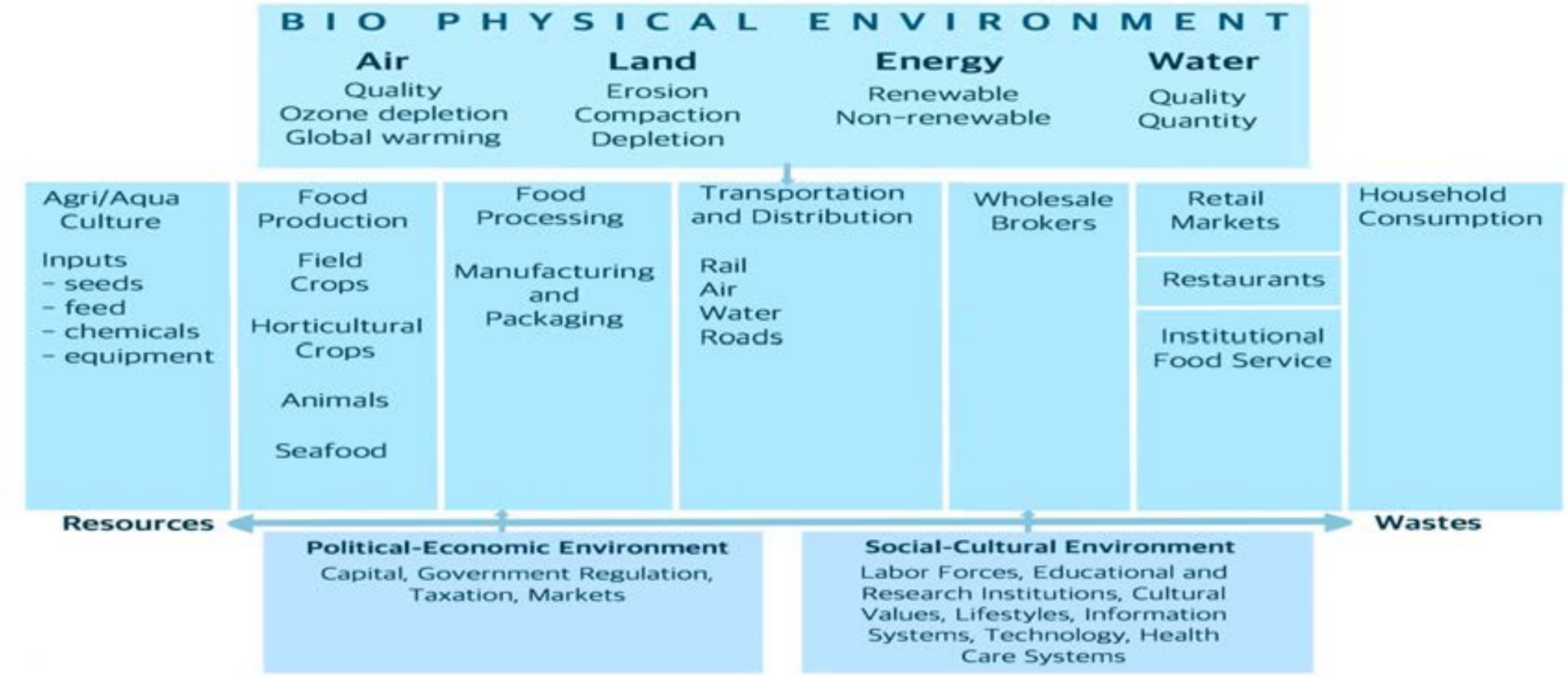
MODELS OF FOOD SYSTEMS

- Linear
- Circular
- Combined

MODELS OF FOOD SYSTEMS

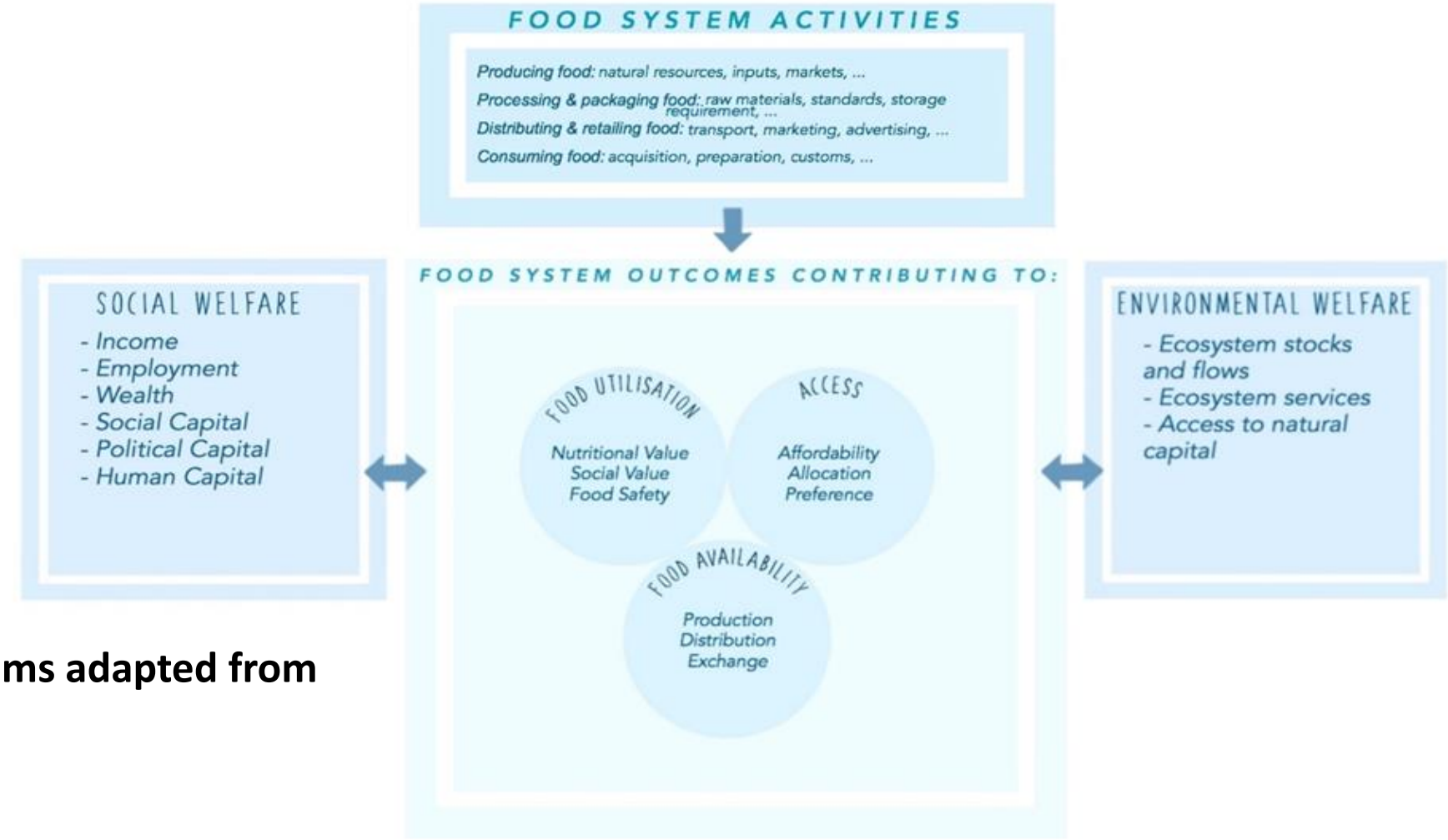
Linear model of food systems (based on abridged definition of Welvaert, 2016)

MODELS OF FOOD SYSTEMS



Linear model of food systems (Kickbusch, 2010)

MODELS OF FOOD SYSTEMS

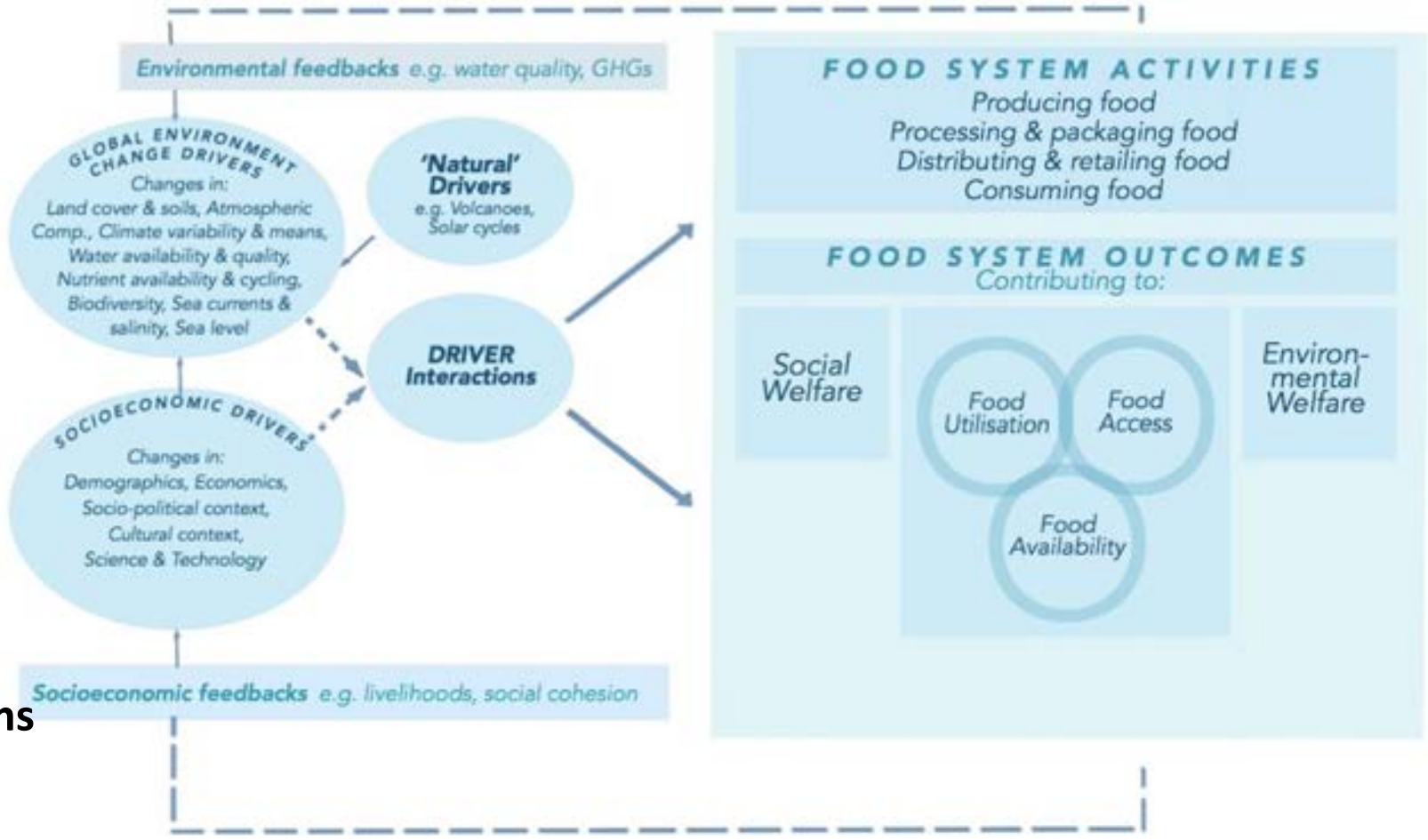


Linear model of food systems adapted from Ericksen (2008)

MODELS OF FOOD SYSTEMS

Circular models of food systems

MODELS OF FOOD SYSTEMS

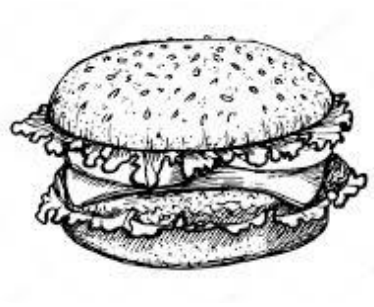


Combined model of food systems (Ericksen, 2008)

TYPES OF FOOD SYSTEMS

Traditional

Mixed



Modern

LEVELS OF FOOD SYSTEMS

LEVELS OF FOOD SYSTEMS

- **Individual**

Physical
Psychological
Physiological
Social
Economic
FACTORS

Life experiences

LEVELS OF FOOD SYSTEMS

- **Individual**
  - ❖ **Drives the market**

FILIPINOS FLOCK TO FASTFOOD RESTAURANTS AND CONVENIENCE STORES TO GET THEIR MEALS

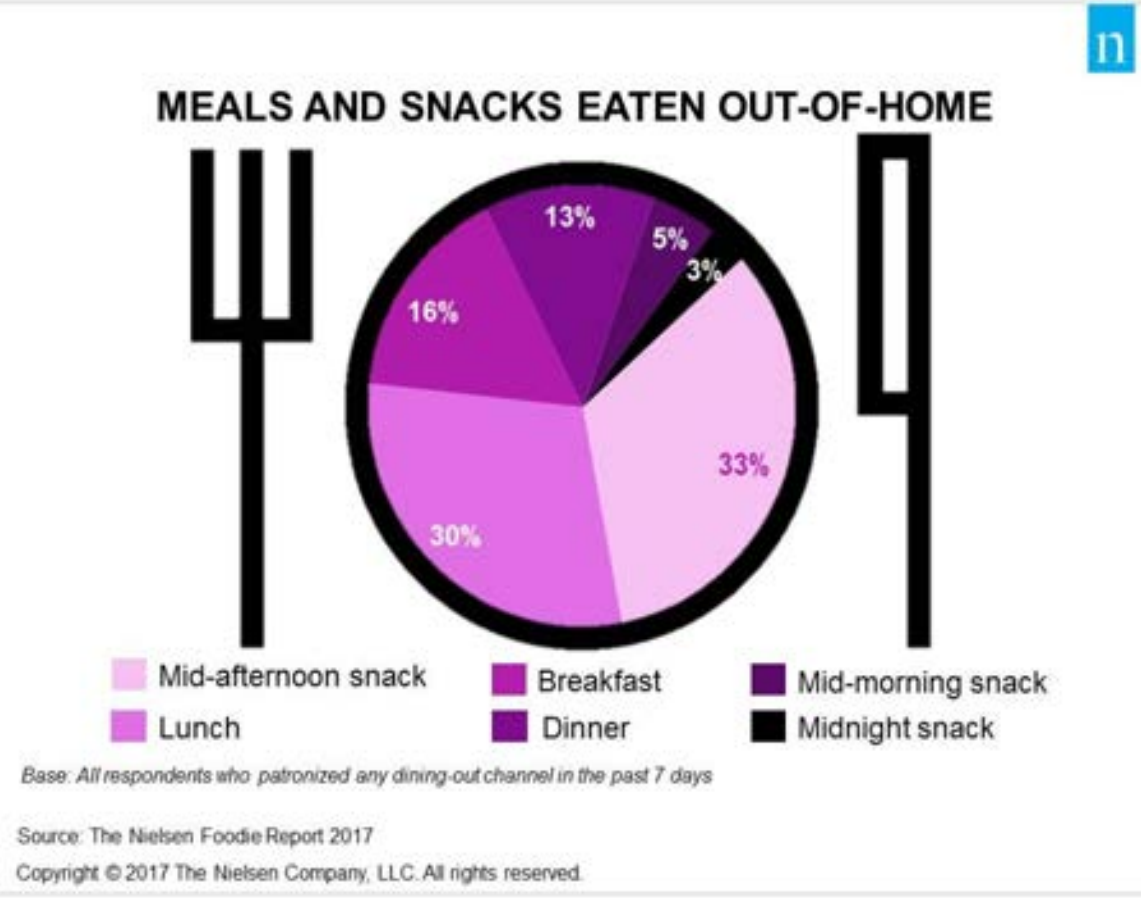
DEMOGRAPHICS | 12-19-2014

There are now fewer shopping baskets containing food items that need to be cooked at home as Filipinos go to fast food restaurants and convenience stores to grab a meal.

Nielsen, 2014

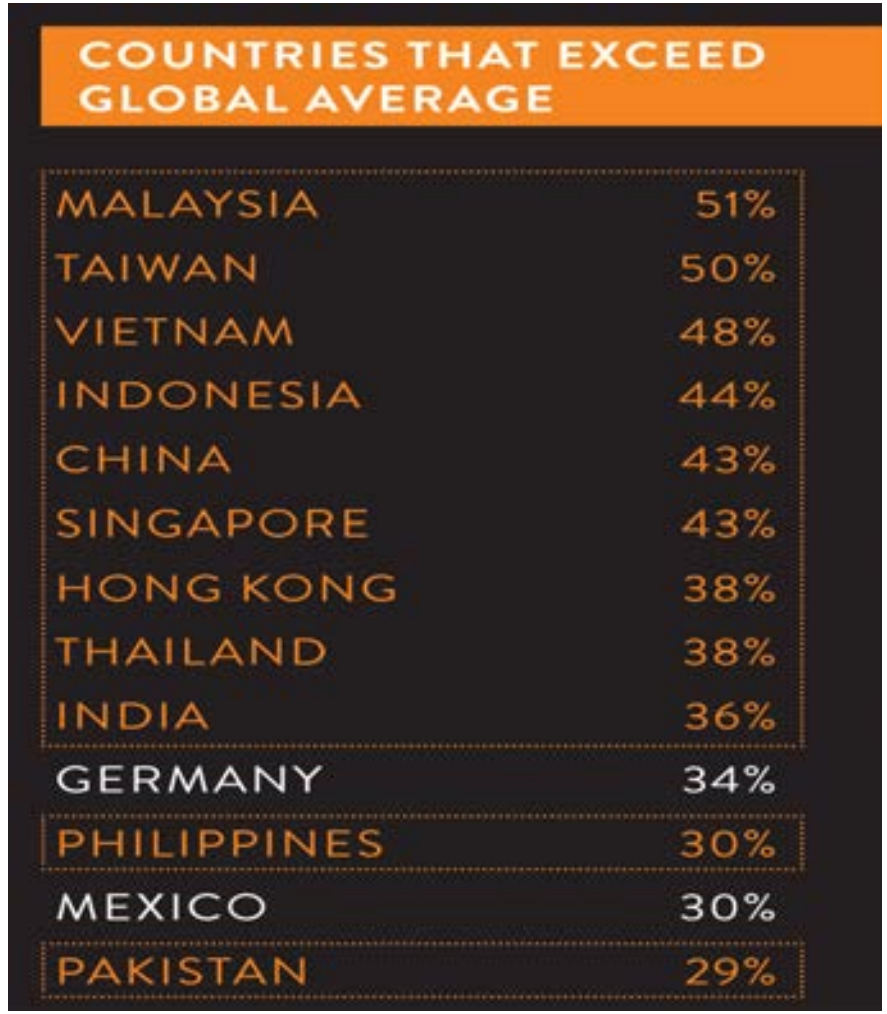
LEVELS OF FOOD SYSTEMS

- **Individual**



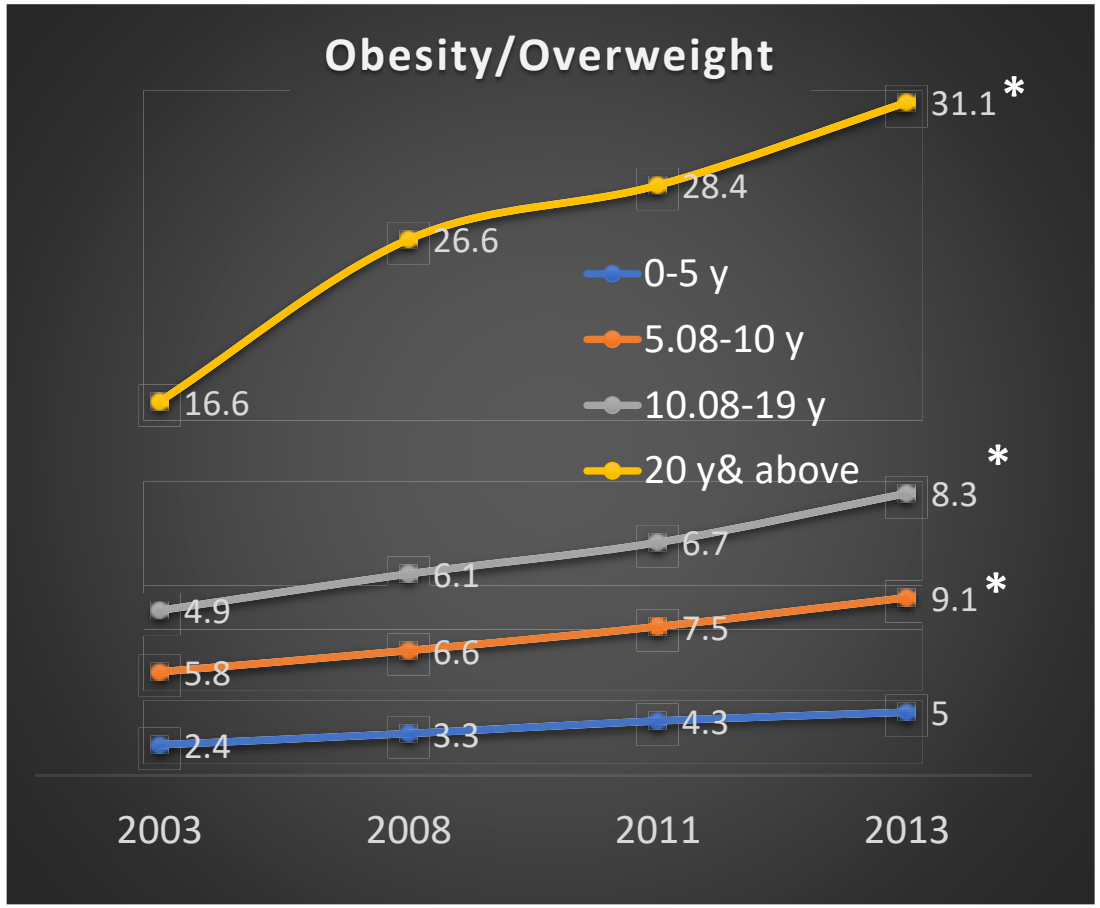
LEVELS OF FOOD SYSTEMS

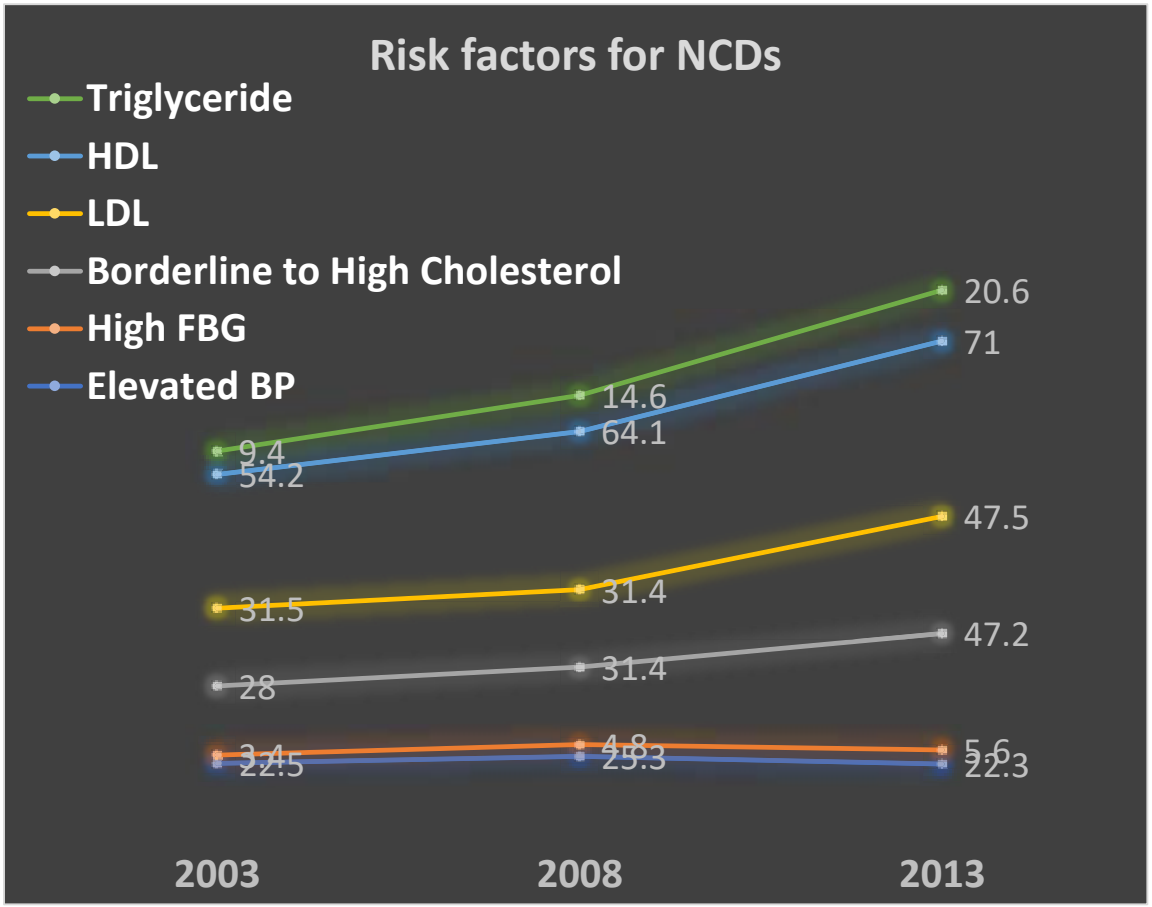
- **Individual**



Levels of food systems

- **Trends in Filipinos' nutritional and health status (FNRI, 2015)**





Levels of food systems

- **Ten leading causes of deaths in 2013**
  (PSA, 2016)

65% of deaths caused by NCDs

Diseases of the heart
Diseases of the vascular system
Malignant neoplasms
Pneumonia
Accidents
Diabetes mellitus
Tuberculosis
Chronic lower respiratory diseases
Nephritis, nephrotic syndrome
Certain conditions originating in perinatal period

Levels of food systems

- **Ten leading causes morbidity in 2013**
  (PSA, 2016)

Acute respiratory infection
ALTRI & pneumonia
Hypertension
Bronchitis
Influenza
Urinary tract infection
Acute water diarrhea
TB respiratory
Acute febrile illness
Dengue fever

LEVELS OF FOOD SYSTEMS

- **Individual**

PHILIPPINES

Health is Filipinos' top personal concern for 3 years now – Pulse Asia

As for urgent national concerns, stable prices of commodities and improving workers' pay top Filipinos' list, according to the national survey in December

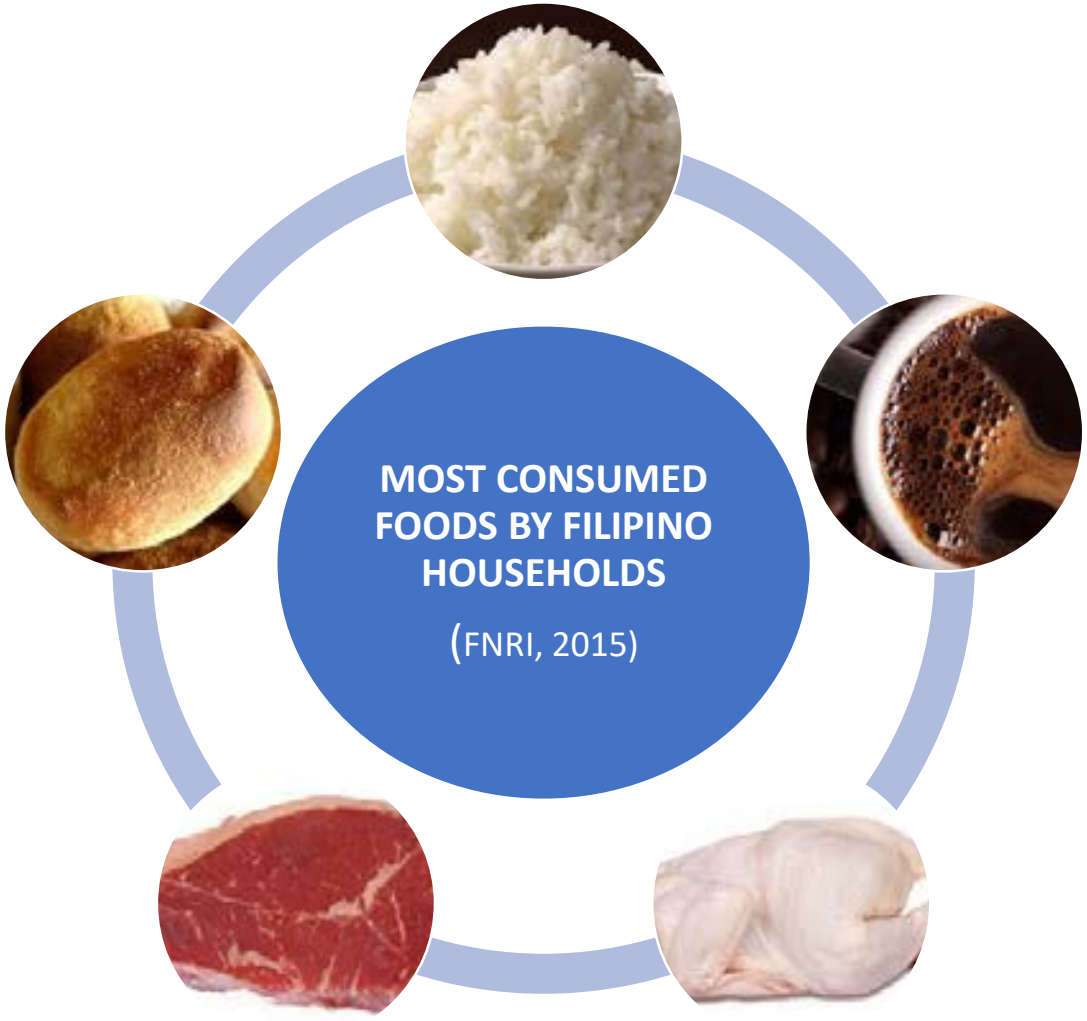
Jodesz Gavilan @jodeszgavilan
Published 7:23 PM, January 11, 2016
Updated 12:23 PM, January 12, 2016

Fortified with micronutrients	High in protein and dietary fiber	More fruits and vegetables	Non-GMO	No artificial colors and flavors	Low in cholesterol, salt, fat, sugar & CHO

HEALTHY ATTRIBUTES OF FOOD FILIPINOS ARE LOOKING FOR (Nielsen, 2015)

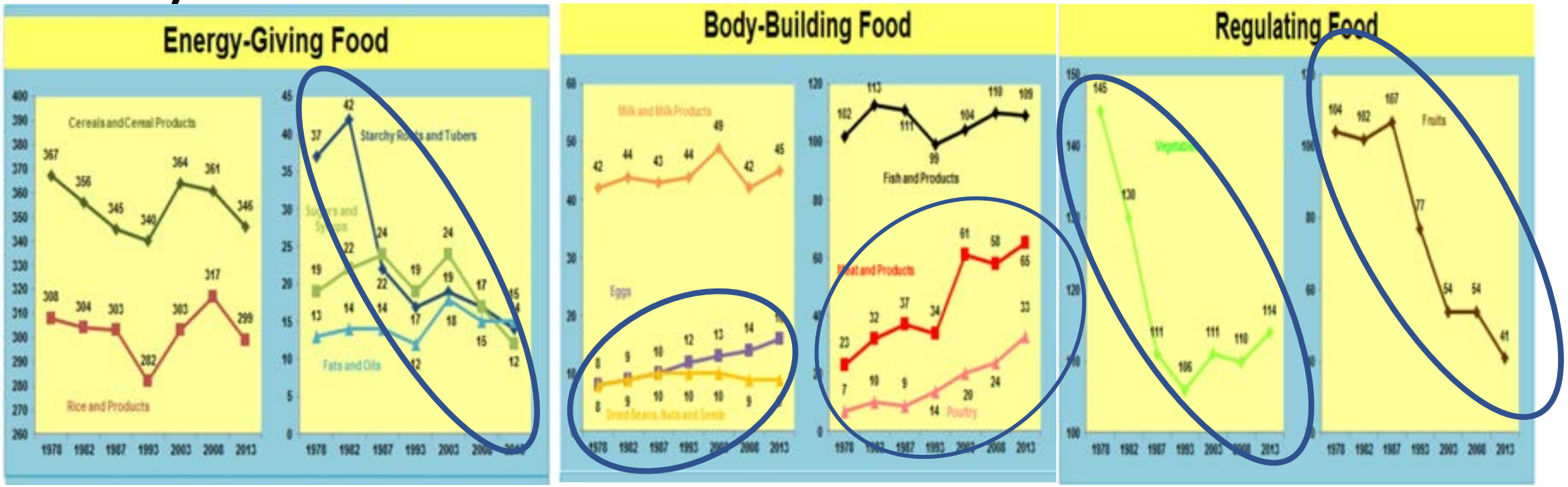
LEVELS OF FOOD SYSTEMS

- **Household**
  - ❖**Extension of the individual level**



Levels of food systems

- **Trends in Filipino household consumption pattern (1978-2013)**



Starchy roots and tubers | **Eggs** | **Meat & poultry** | **Vegetable** | **Fruits**

FNRI, 2015

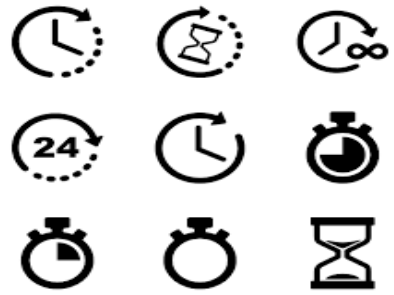
LEVELS OF FOOD SYSTEMS

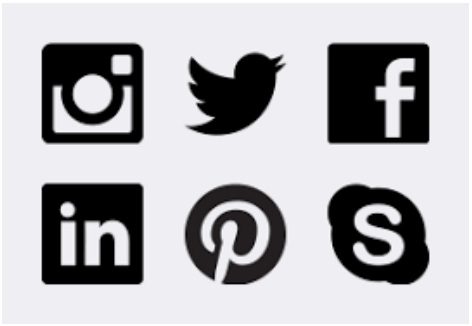
- **Household**
  - ❖More than 1/3 of Filipino households take their meals outside their homes (FNRI, 2015)

LEVELS OF FOOD SYSTEMS

- **Household**

More and more Filipino households "eat out" or consume food prepared away from home (FAFH) (Rufino, 2015)





LEVELS OF FOOD SYSTEMS

- **Local**
  - ❖Farm to the consumer or to institutions in the same geographic location as the farm
  - ❖Food reaches the users without travelling too far or does not go through various levels of marketing i.e., middlemen in processing, packaging, transporting and selling

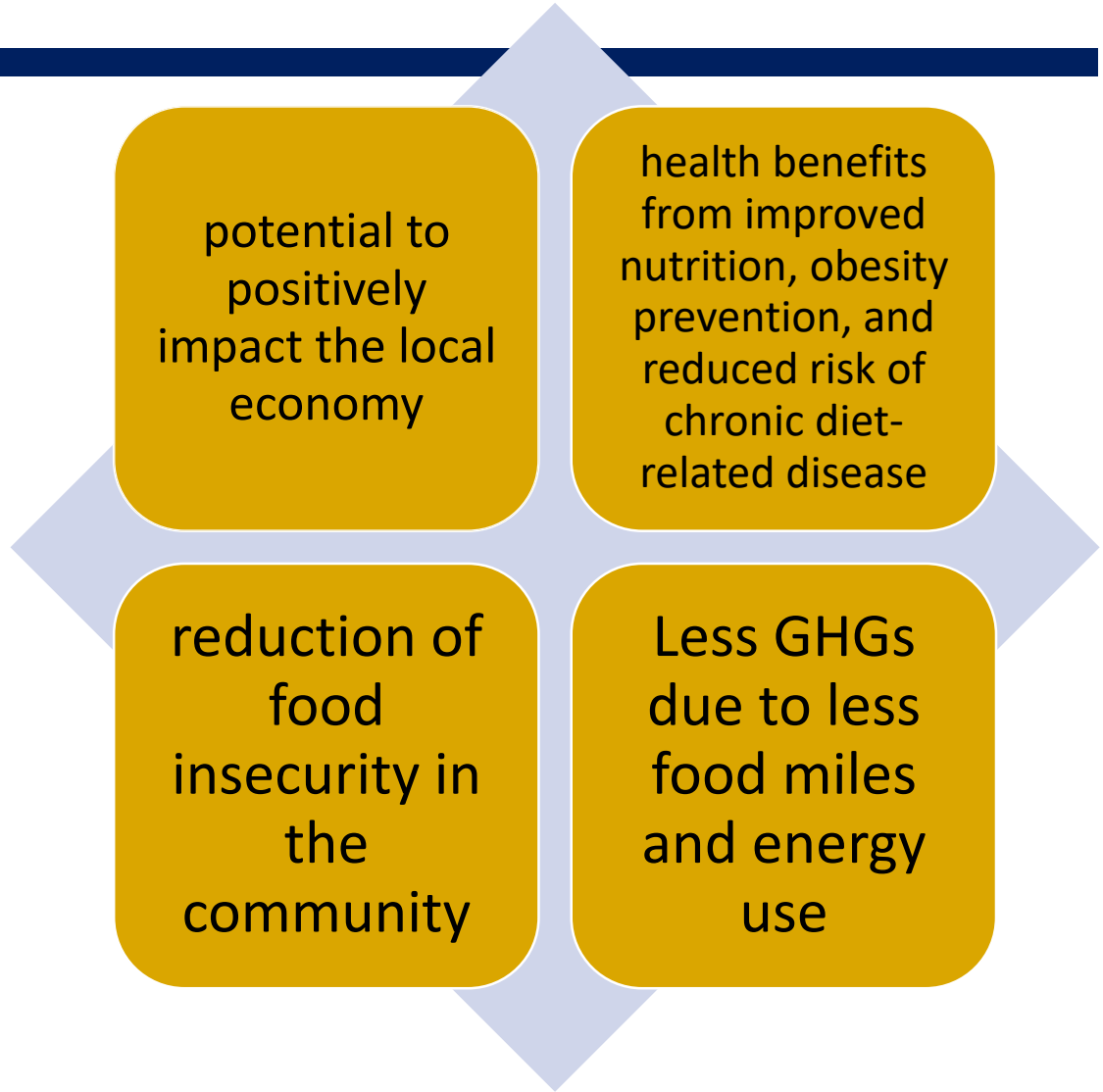
LEVELS OF FOOD SYSTEMS

- **Local**
  - ❖Locavores-eat food from local sources
  - ❖Farm to table

LEVELS OF FOOD SYSTEMS

- **Local**

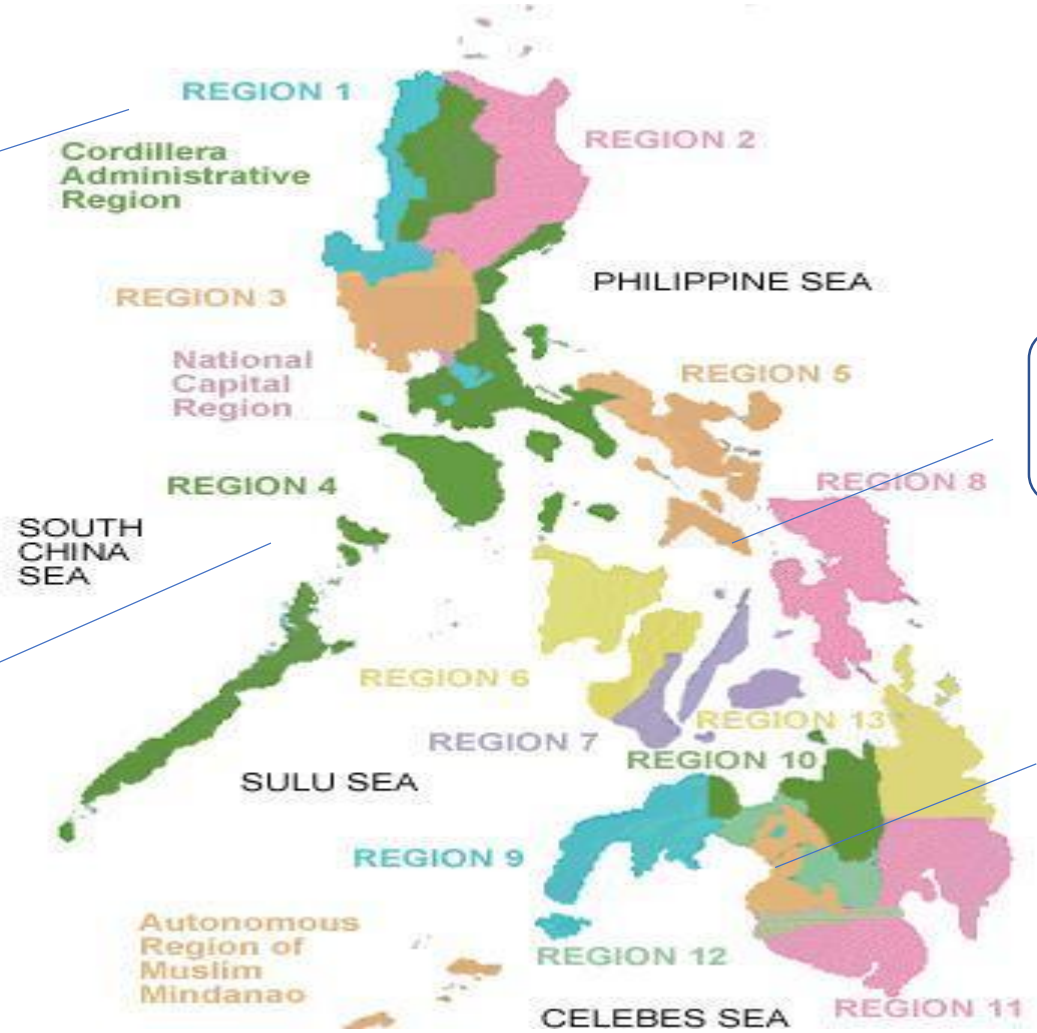
Benefits from consuming locally sourced foods (Martinez, 2010)



LEVELS OF FOOD SYSTEMS

- **Regional**

Vegetable dishes



Dried fish and mango

Coconut dishes and delicacies

Fruits; cacao

LEVELS OF FOOD SYSTEMS

- **National**
  - ❖Managed by the government and involves laws, policies and standards on food
  - ❖DA, DOH, DOST, DTI
  - ❖Food Safety Act of 2013 (RA 10611, 2013), an *"Act to strengthen the food safety regulatory system in the country to protect consumer health and facilitate market access of local foods and food products, and for other purposes".*

LEVELS OF FOOD SYSTEMS

- **National**
  - ❖May also be described by agriculture and culture

LEVELS OF FOOD SYSTEMS

- **Global**

Source: https://www.foodsafetymagazine.com/magazine-archive1/junejuly-2014/ifte28099s-global-food-traceability-center-untangling-the-food-supply-chain/

Global Supply Chain Complexity

bleached wheat flour
malted barley flour
thiamine
riboflavin
Niacin
folic acid
reduced iron
Water
corn syrup
sesame seeds
soybean oil
Yeast
Salt
calcium sulfate
calcium carbonate
calcium silicate
soy flour
baking soda
wheat gluten
calcium propionate
enzyme
mono- and diglycerides
diacetyl
tartaric acid
esters
ethanol
sorbitol
polysorbate 20
potassium propionate
sodium stearoyl lactylate
corn starch
ammonium chloride
ammonium sulfate
calcium peroxide
ascorbic acid
azodicarbonamide

Milk
milkfat
Water
cream
sodium citrate
salt
sodium phosphate
sorbic acid
artificial color

cheese culture
acetic acid
soy lecithin
Enzymes
starch

Cucumbers
water
Vinegar
Salt
calcium chloride
Alum
natural flavorings
polysorbate 80
turmeric

USDA inspected beef

Soybean oil
pickles
distilled vinegar
water
egg yolks
HF corn syrup
sugar
onion powder
corn syrup
spice
spice
extractives
salt
xanthan gum
mustard flour
prop. glycol
alginate
sodium benzoate
potassium sorbate
mustard bran
garlic powder
hydrolyzed proteins
caramel color
paprika
Turmeric
calcium disodium EDTA

lettuce

dehydrated onions

Grill Seasoning
Salt
Pepper
cottonseed oil
soybean oil

NATIONAL CENTER FOR FOOD PROTECTION AND DEFENSE
A HOMELAND SECURITY CENTER OF EXCELLENCE

PRIMARY PRODUCTION ➤ HARVEST ➤ TRANSPORTATION ➤ STORAGE ➤ PROCESSING ➤ DISTRIBUTION ➤ RETAIL/FOOD SERVICE ➤ CONSUMER

Globalizing the Cheeseburger

Vinegar
Argentina
Australia
Austria
Belgium
Brazil
Canada
China
Chile
Colombia
Denmark
Dom. Rep
France
Germany
Greece
Hong Kong
Israel
Italy
Japan
S. Korea
Lebanon
Peru
Poland
Portugal
Serbia
Philippines
Russia
S. Africa
Singapore
Spain
Sweden
Turkey
Taiwan
U.K.

Garlic Powder
Brazil
Canada
China
Germany
India
Israel
Japan
S. Korea
Mexico

Tomatoes
Belgium
Canada
Colombia
Costa Rica
Dom. Rep.
Guatemala
Israel
Morocco
Mexico
Netherlands
New Zealand
Poland
Spain

Beef
Australia
Canada
Chile
Costa Rica
Honduras
Japan
Mexico
Nicaragua
New Zealand
Uruguay

Wheat Gluten
Australia
Belgium
Canada
China
Czech Rep.
France
Germany
Kazakhstan
Lithuania
Netherlands
Poland
Russia
Switzerland
Thailand
U.K.

NATIONAL CENTER FOR
FOOD PROTECTION AND DEFENSE
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PRIMARY PRODUCTION ➤ HARVEST ➤ TRANSPORTATION ➤ STORAGE ➤ PROCESSING ➤ DISTRIBUTION ➤ RETAIL/FOOD SERVICE ➤ CONSUMER

WHAT ARE THE CHALLENGES IN PHILIPPINE FOOD SYSTEMS?

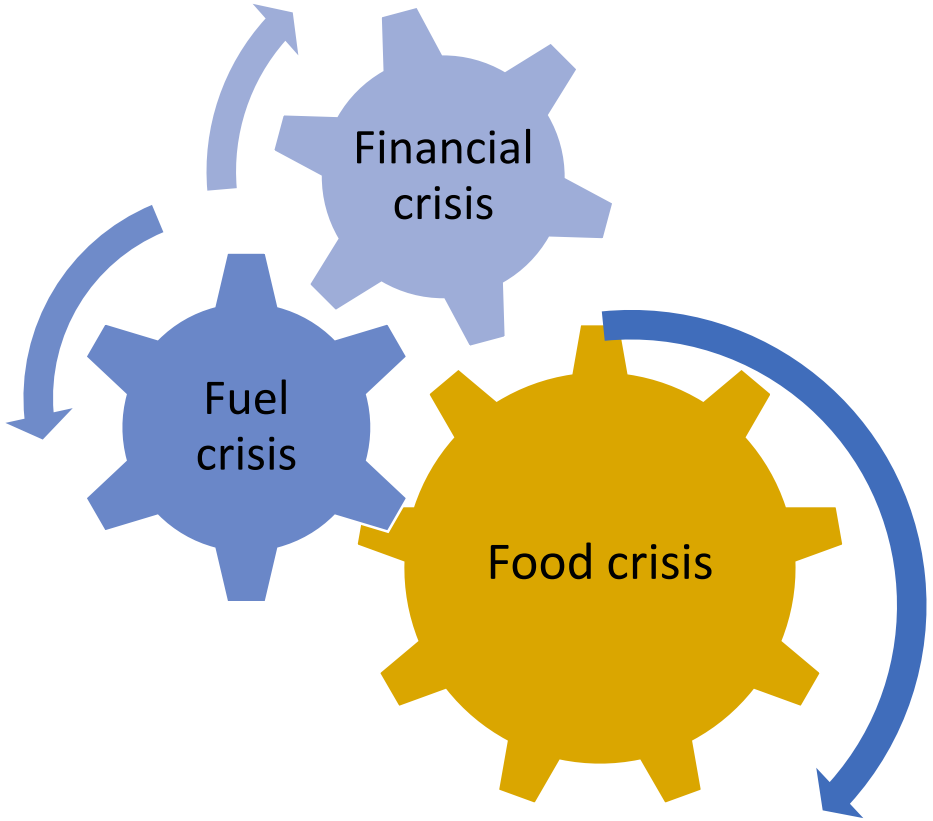
CHALLENGES

- Economic Issues
- Environmental Issues
- Political Issues
- Social Issues

ECONOMIC ISSUES

The 3GF (food, fuel and financial) crises of 2008
Rise of the middle class
Urbanization
International trade

The 3GFs of 2008

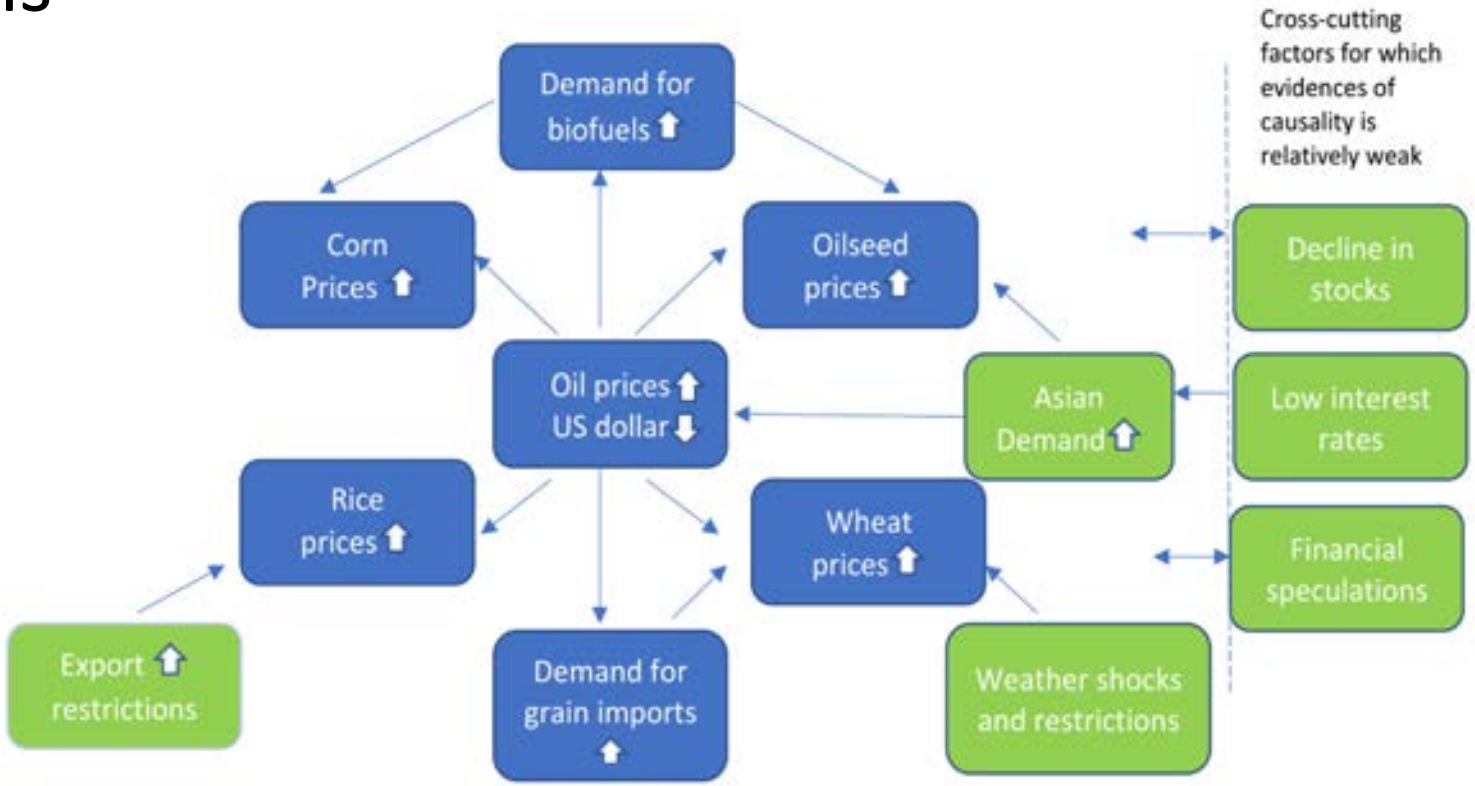


IMPACTS:

- **High prices of staples**
- High processing and distribution cost
- Low purchasing power due to high prices of food and unemployment
- Increased cases of hunger and malnutrition

The 3GFs of 2008

- Food crisis

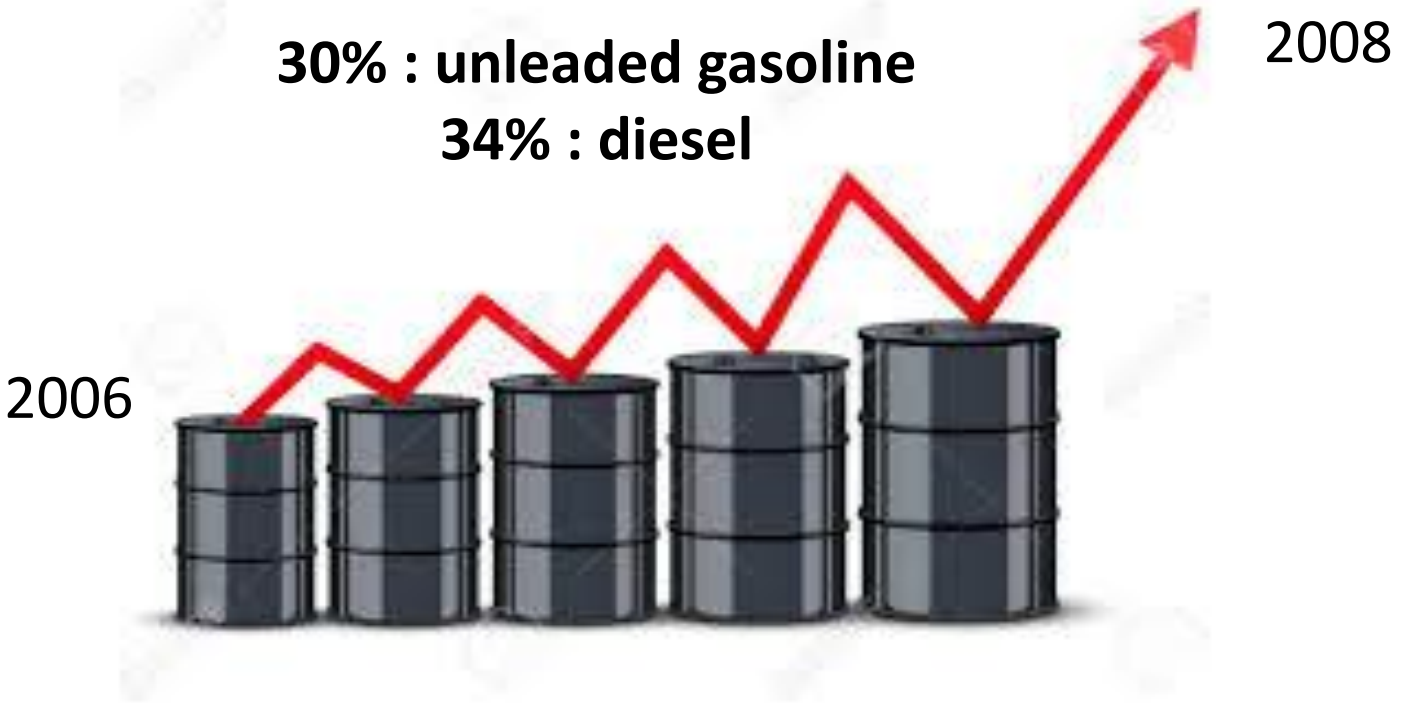


The "near-perfect storm" model of the global food crisis (Headey and Fan, 2010)

Note: Boxes in green denote less significant, crop-specific causes. The rise in oil prices and decline of the US dollar are shown together because they are universal factors that may be causally related

The 3GFs of 2008

- Fuel crisis
  - ❖Stagnation in global production of oil and strong demand (Hamilton, 2009)



The 3GFs of 2008

- Financial crisis

Mishkin (2011)

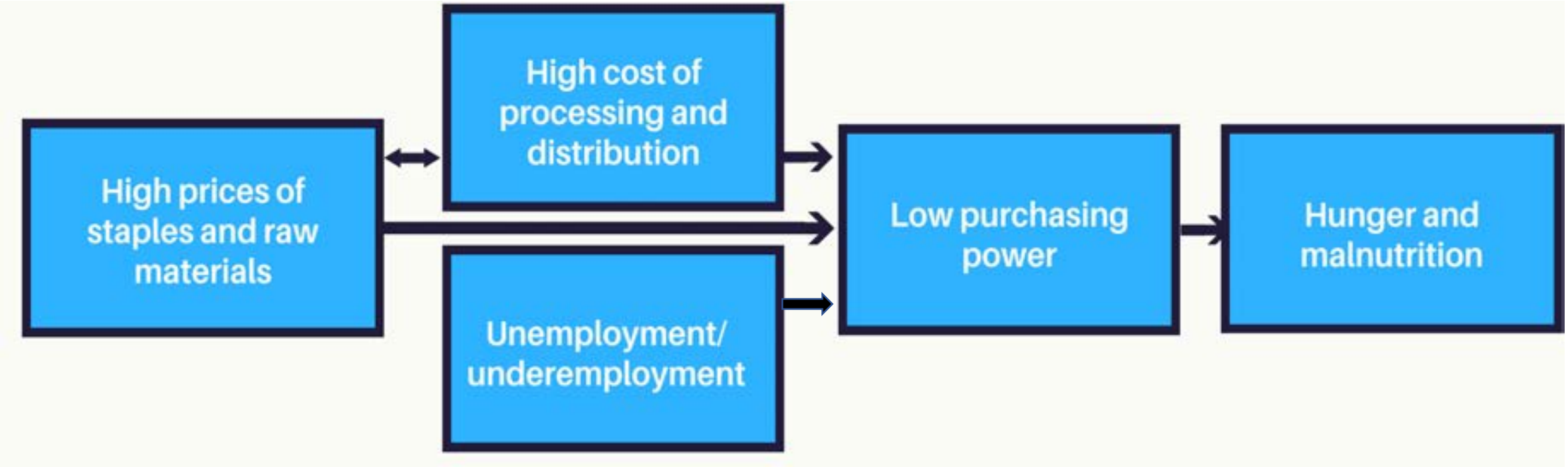
The 3GFs of 2008

- Financial crisis

Mishkin (2011)

- Loss of livelihood
- GDP growth 7.1% to 3.8%
- Remittances of OFW affected

The 3GFs of 2008



The interrelated impacts of the 2008 3GF (global financial, food and fuel) crises on Philippine food systems (constructed by the author)

The 3GFs of 2008

SOCIAL WEATHER STATIONS

INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE
IFPRI

SERIOUS

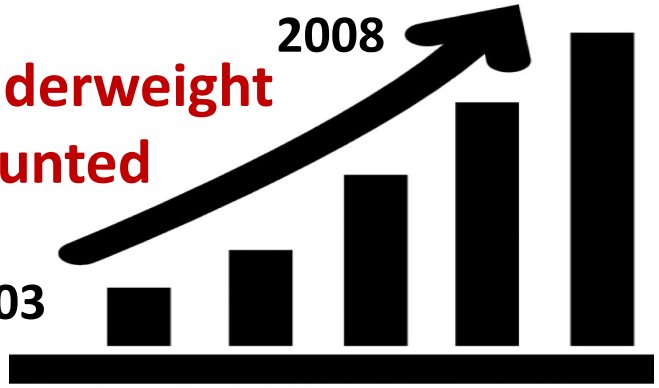
GLOBAL HUNGER INDEX

16.23 (2007) & 14.0 (2008)

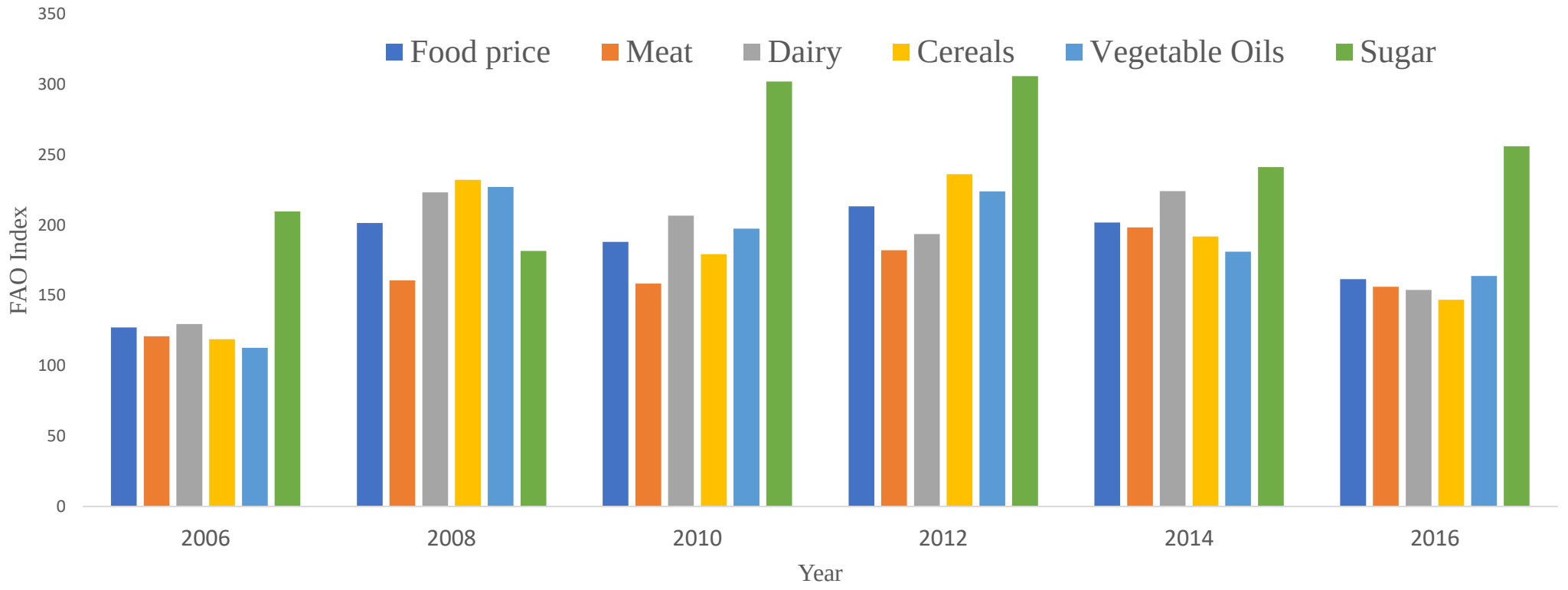
DOST- FNRI

24.6%- underweight

26.3% - stunted

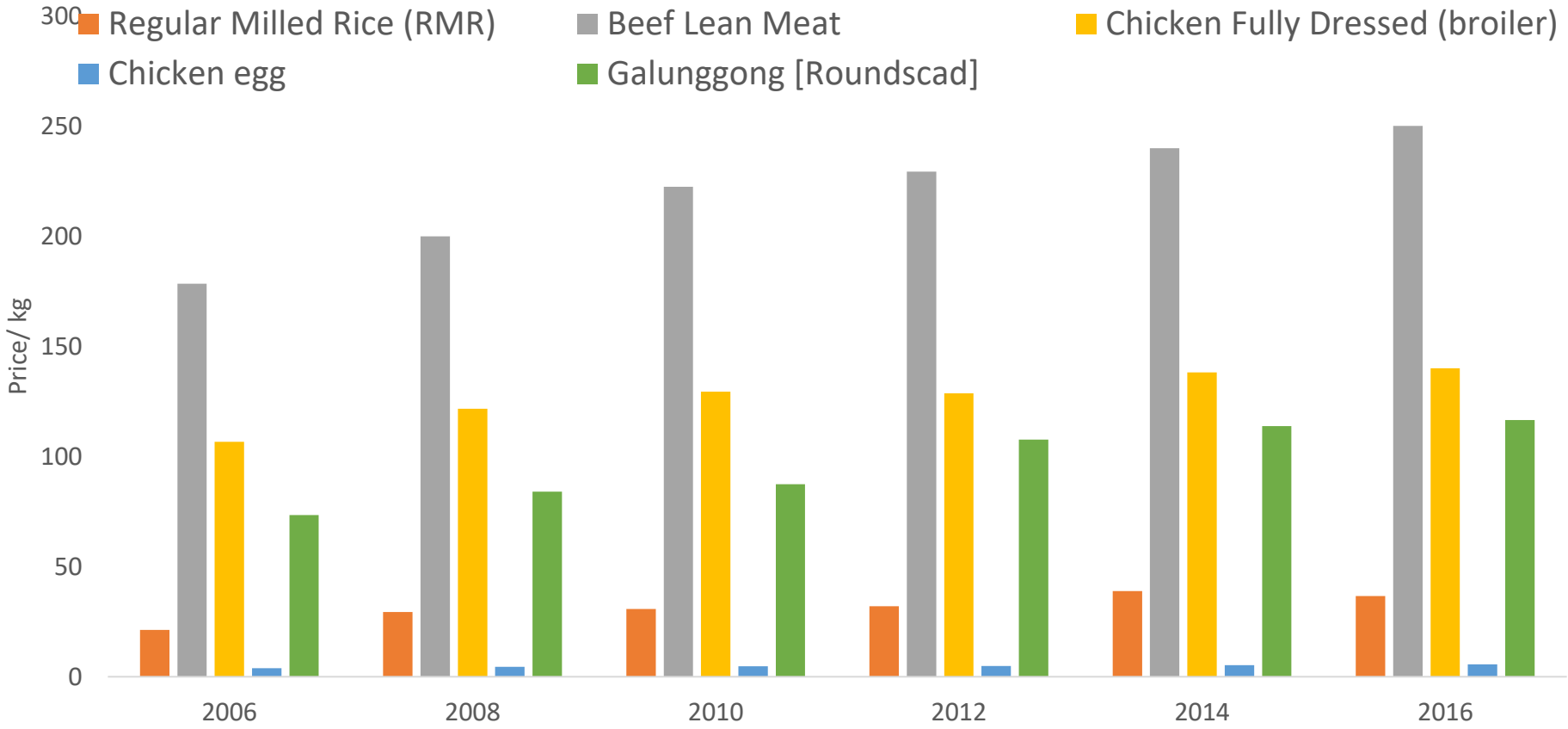


The 3GFs of 2008



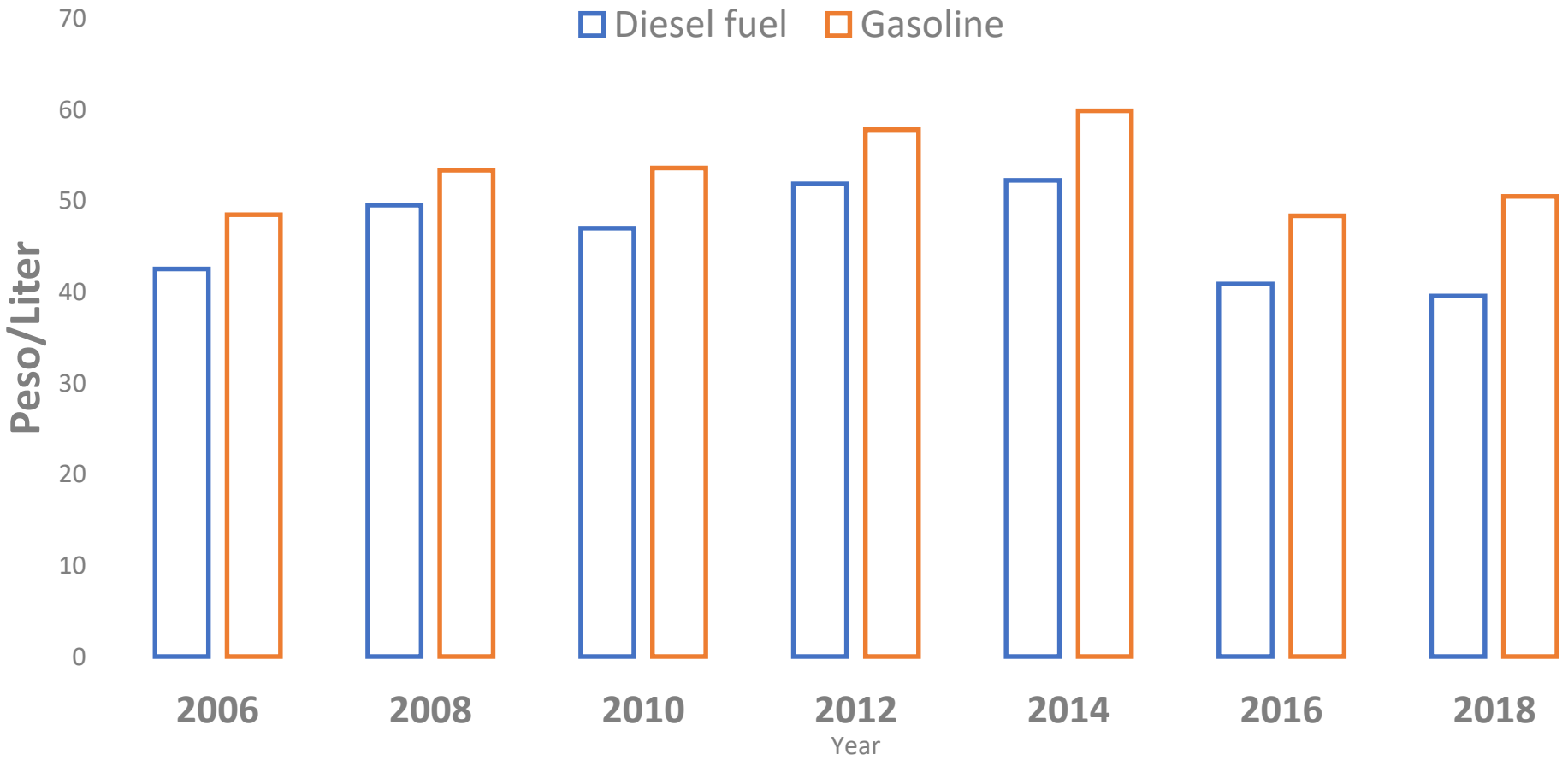
The FAO food price index and specific commodity indices (FAO, 2018)

The 3GFs of 2008



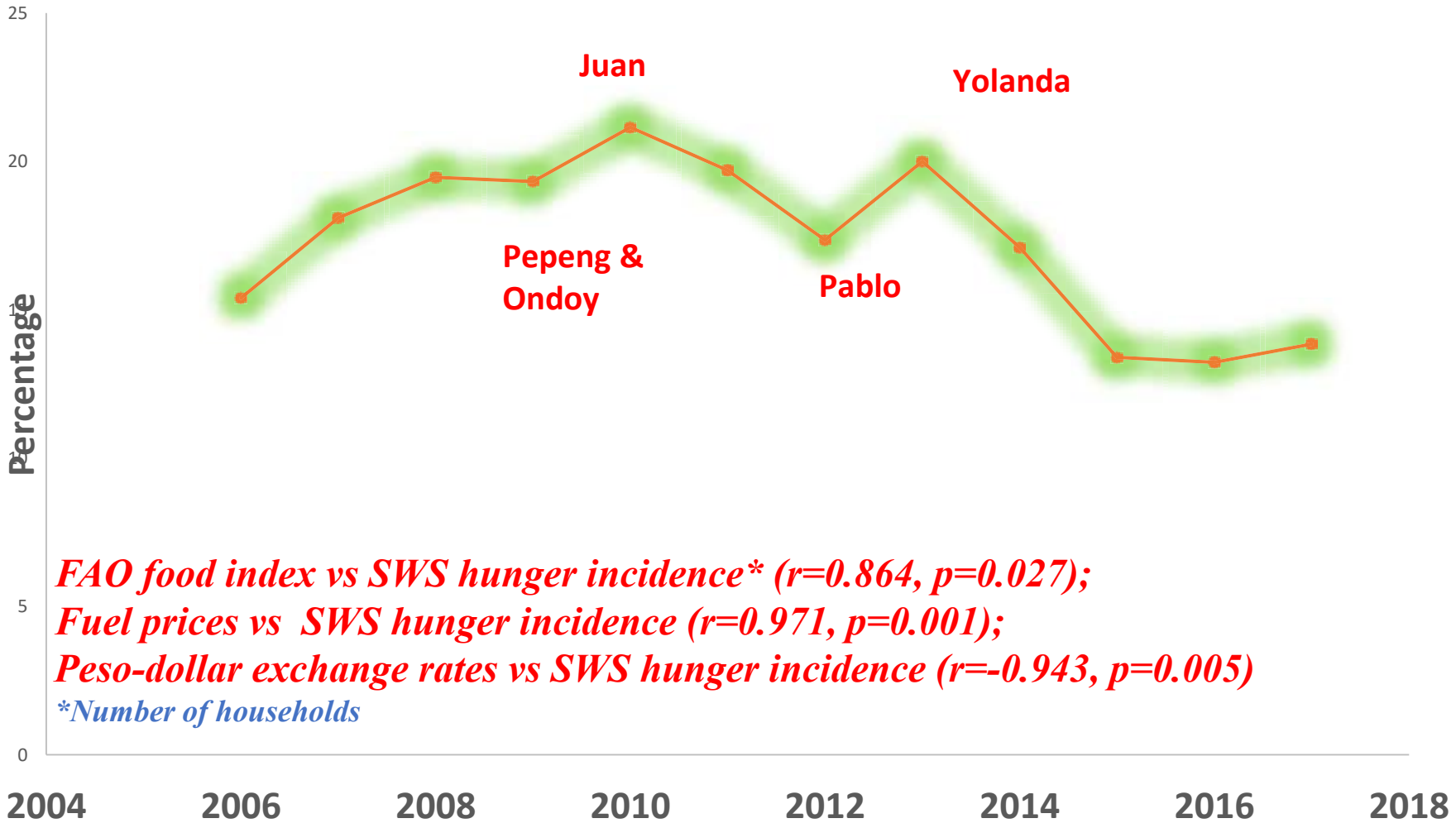
The average retail price of food commodities in the Philippines from 2006 to 2016 (PSA, 2018)

The 3GFs of 2008



Pump prices of diesel fuel and gasoline from 2006 to 2018 (Word Bank, 2018; DOE, 2018)

The 3GFs of 2008



FAO food index vs SWS hunger incidence (r=0.864, p=0.027);*
Fuel prices vs SWS hunger incidence (r=0.971, p=0.001);
Peso-dollar exchange rates vs SWS hunger incidence (r=-0.943, p=0.005)

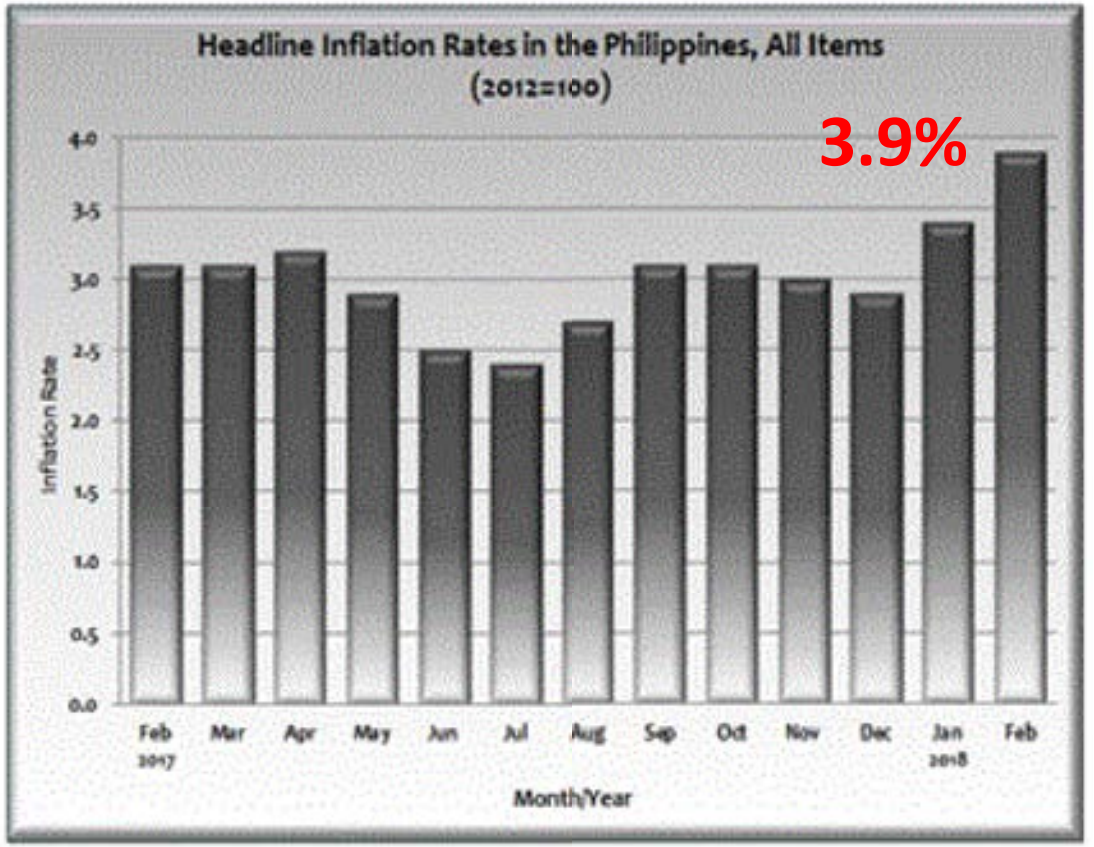
**Number of households*

The 3GFs of 2008

The 3GFs of 2008

DRINKS USING SUGAR AND ARTIFICIAL SWEETENERS	DRINKS USING HIGH FRUCTOSE CORN SYRUP	EXEMPTED
 P6 per liter	 P12 per liter	 Milk (Plain milk, infant formula milk, growing up milk, powdered, ready to drink, flavored, fermented) Instant coffee 100% natural fruit and vegetable juices Meal replacement Medically indicated beverages Sweetened beverages using coco sugar and stevia

FUEL (PER LITER)	2018	2019	2020
 DIESEL Current: no tax	P2.50	P4.50	P6
 LPG Current: no tax	P1	P2	P3
 GAS Current: P4.35	P7	P9	P10



The 3GFs of 2008

REPUBLIC OF THE PHILIPPINES
NATIONAL ECONOMIC AND DEVELOPMENT AUTHORITY

NEDA PUSHES FOR MEASURES TO CURB INFLATION

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March 6, 2018

MANILA – Measures to curb inflation and cushion its impact on the poor are urgently needed, the National Economic and Development Authority said, as the inflation rate for February 2018 reached the upper band of the government's target.

The Philippine Statistics Authority reported that February 2018 inflation was at 3.9 percent, with faster increases in the price of food and non-alcoholic beverages (4.8%), transport (5.8%), alcoholic beverages and tobacco (16.9%), furnishing, household equipment, and routine maintenance of the house (2.5%), restaurant and miscellaneous goods and services (2.5%), and clothing and footwear (2.0%).

The 3GFs of 2008

While still within the 2.0-4.0 percent target of the government, Socioeconomic Planning Secretary Ernesto M. Pernia said that the government should remain vigilant and prepared to implement measures that will mitigate the upside risks to inflation.

"The transitory impact of the **TRAIN Law and the continued depreciation of the Philippine peso will mainly influence price movements in the coming months**, and we must ensure that mitigating measures should be in place", the NEDA official said. (NEDA, 2018)

ECONOMY 2,367 SHARES

BSP raises 2018 inflation forecast to 4.3%

By: Ben O. de Vera- Reporter / @bendeveraINQ Philippine Daily Inquirer / 05:30 AM February 09, 2018

The Bangko Sentral ng Pilipinas expects inflation to average 4.3 percent this year and breach the 2-4 percent projected range due to the impact on consumer prices of the first tax reform package and the expected oil price hikes.

LATEST STORIES MOST READ

NEWSINFO

Hyundai's pick for frigate system 'not bad for Navy'

MARCH 08, 2018 07:40 AM

The 3GFs of 2008

TRAIN TAX LAW

TAX REFORM FOR ACCELERATION AND INCLUSION

Rise of the middle class

About AmBisyon Natin 2040

AmBisyon Natin 2040 represents the collective long-term vision and aspirations of the Filipino people for themselves and for the country in the next 25 years. It describes the kind of life that people want to live, and how the country will be by 2040. As such, it is an anchor for development planning across at least four administrations.

330 participants and 42 FGDs
June 5 to August 5, 2015

Rise of the middle class

Realizing the AmBisyon

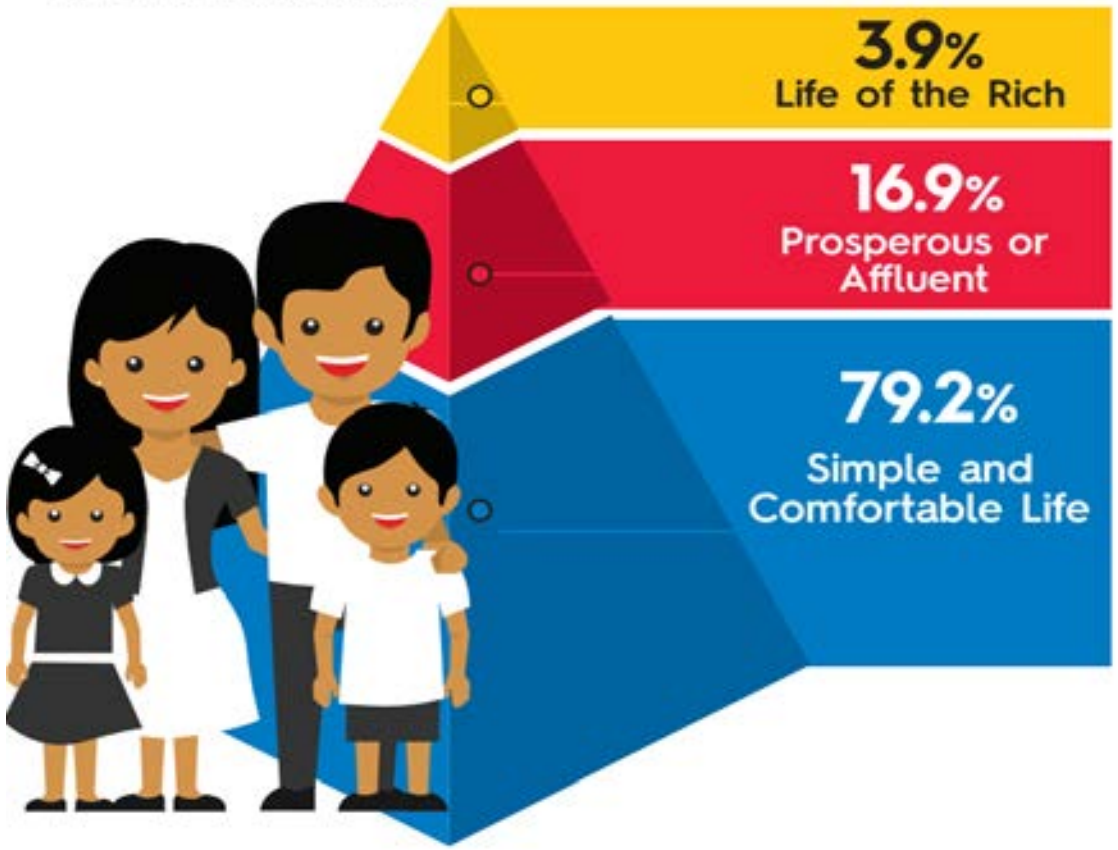
All sectors of society, whether public or private, should direct their efforts towards creating opportunities for Filipinos to enjoy a ***matatag, maginhawa at panatag na buhay***. Government, in particular, must use its tools of fiscal, monetary and regulatory policies to steer the development path towards enabling Filipinos to attain their **AmBisyon**. This pertains to all dimensions of development: economic, human and physical capital, institutional, social and cultural.

By 2040, the Philippines is a prosperous middle class society where no one is poor. People live long and healthy lives and are smart and innovative. The country is a high-trust society where families thrive in vibrant, culturally diverse, and resilient communities.

Filipinos live in a prosperous, predominantly middle class society where no one is poor.

Rise of the middle class

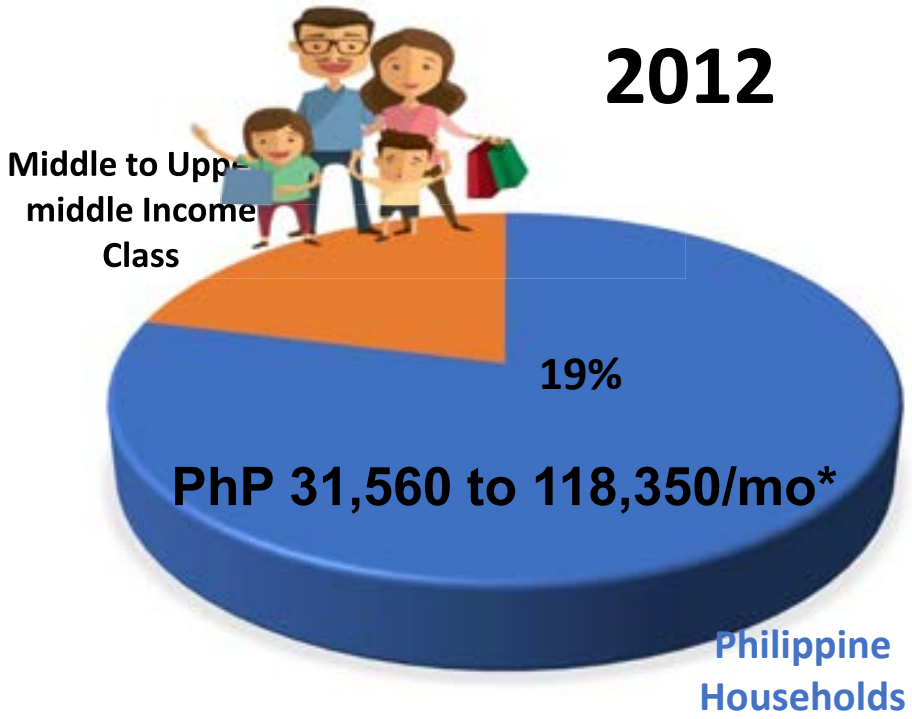
Figure 1: Idea of Desired Life Status

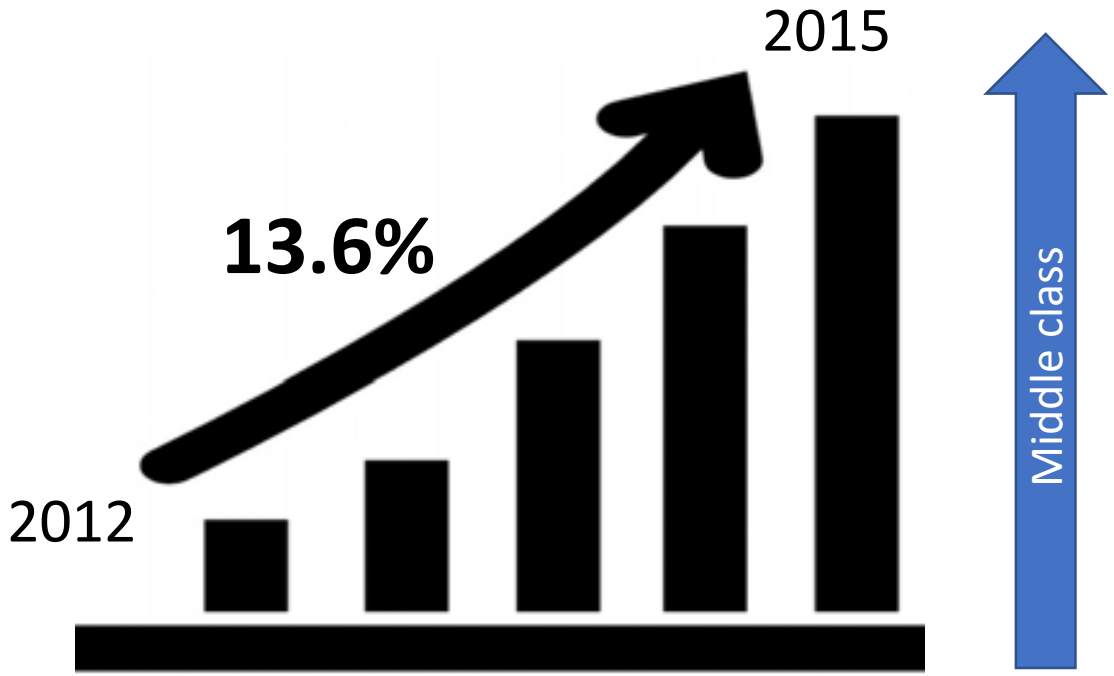


Source: https://www.rappler.com/business/economy-watch/137891-ideal-monthly-income-neda-2040-vision

Rise of the middle class

- Filipino middle class households

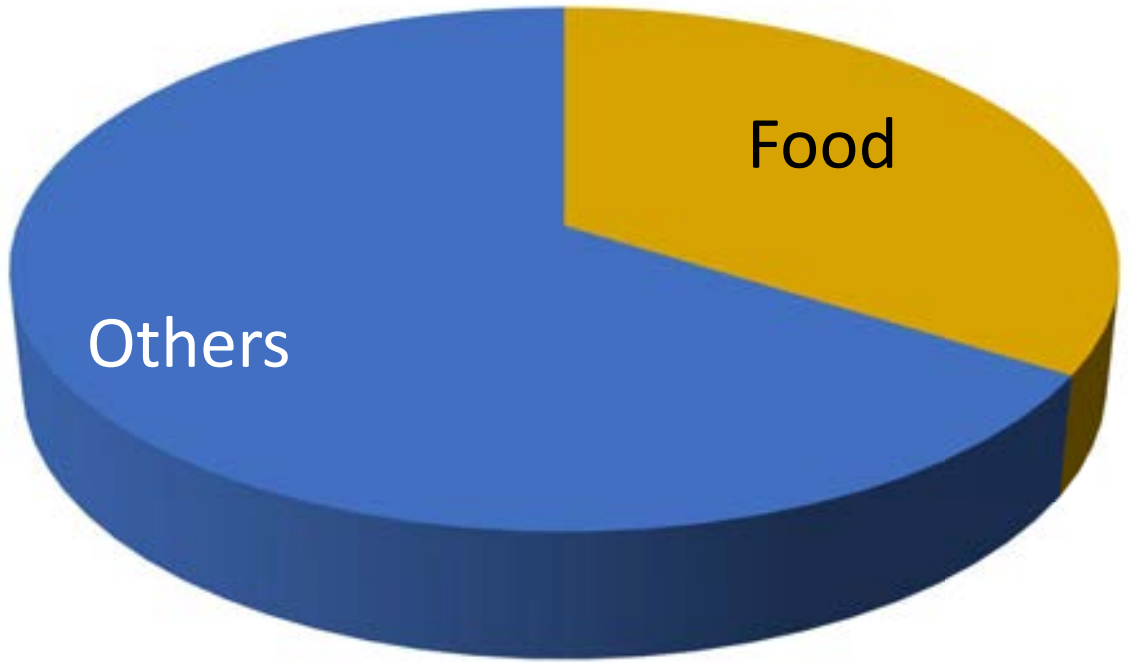




Albert et al., 2015; PSA, 2012; 2015

Rise of the middle class

- **Filipino families' food expenditure**



Percentage of total income

(PSA, 2012; 2015)

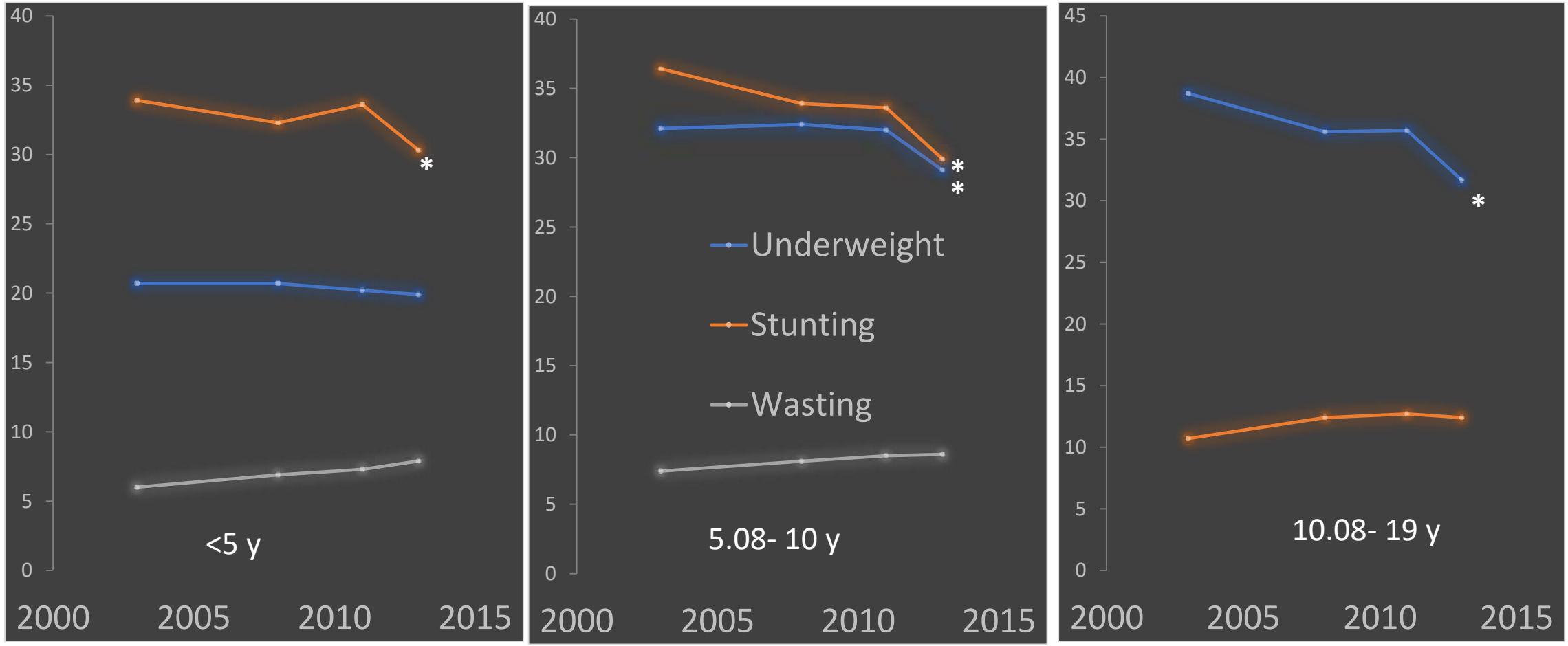
Rise of the middle class

SWS, 2018

Total hunger incidence

Rise of the middle class

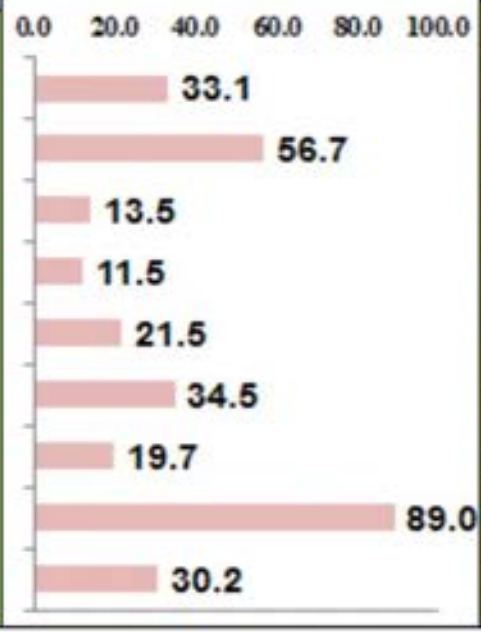
- **Trends in Filipinos' nutritional status (FNRI, 2015)**

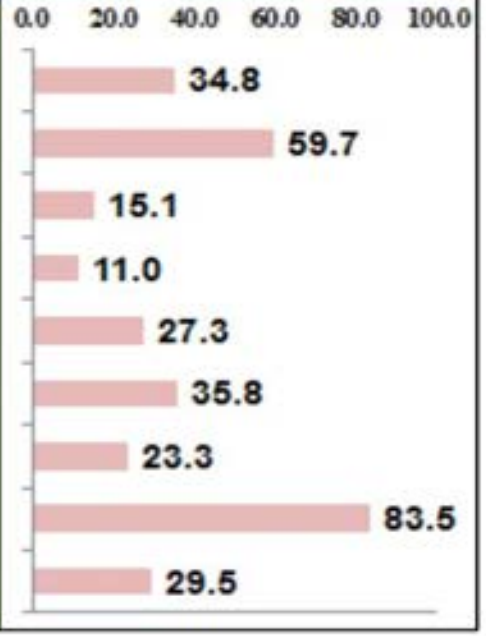


Rise of the middle class

- **Trends in Filipino household's dietary intakes** (FNRI, 2015)

2008			2013		
Energy and Nutrients	Mean Intake	Proportion of households that met RENI	Energy and Nutrients	Mean Intake	Proportion of households that met RENI
Energy (kcal)*	1867	33.1	Energy (kcal)*	1810	34.8
Protein (g) **	57.1	56.7	Protein (g) **	56.5	59.7
Iron (mg) **	9.7	13.5	Iron (mg) **	9.4	15.1
Calcium (g) **	0.42	11.5	Calcium (g) **	0.39	11.0
Vitamin A (mcg RE) **	451.6	21.5	Vitamin A (mcg RE) **	519.5	27.3
Thiamin (mg) **	0.85	34.5	Thiamin (mg) **	0.82	35.8
Riboflavin (mg) **	0.73	19.7	Riboflavin (mg) **	0.75	23.3
Niacin (mg) **	21.3	89.0	Niacin (mg) **	18.3	83.5
Vitamin C (mg) **	47.1	30.2	Vitamin C (mg) **	43.9	29.5

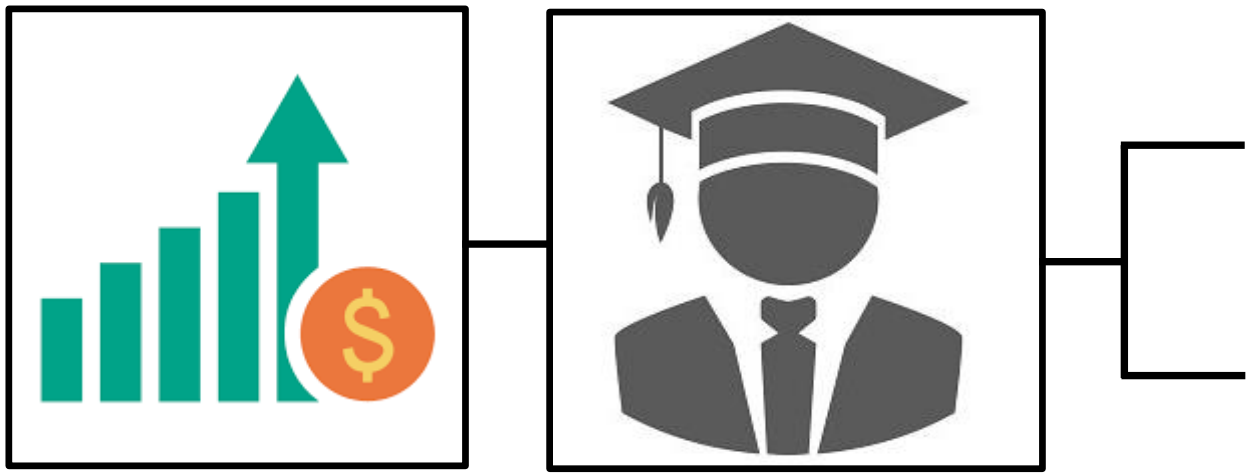




* 100% RENI ** 80% RENI
Note: Using 2002 RENI

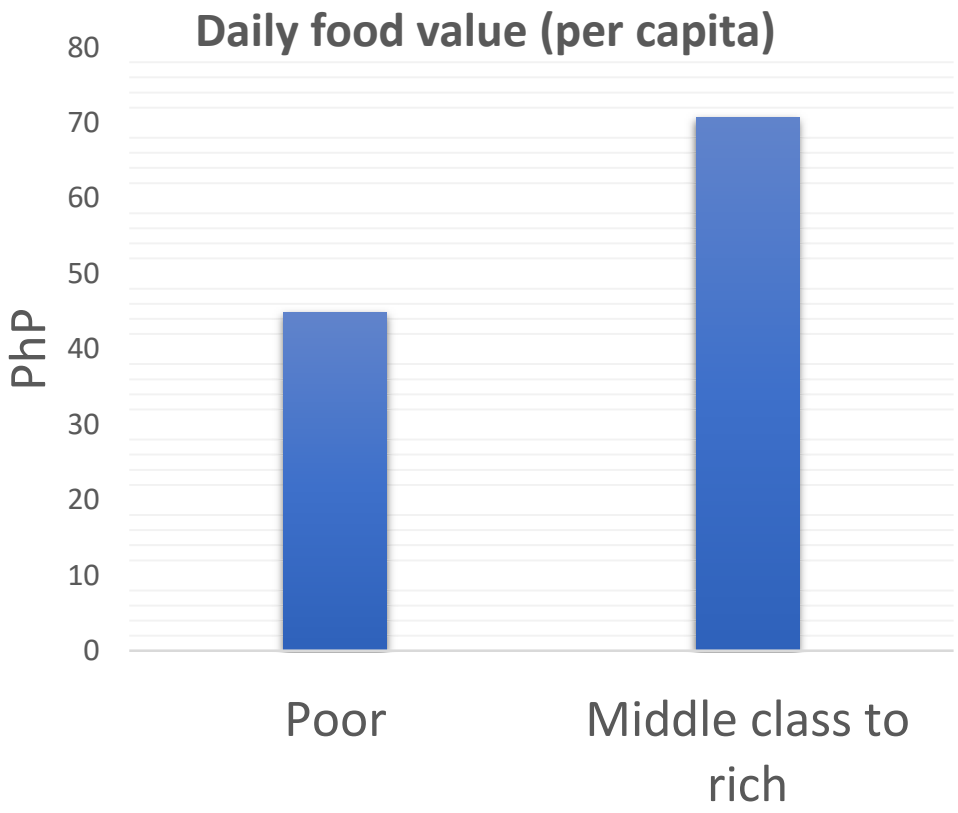
Rise of the middle class

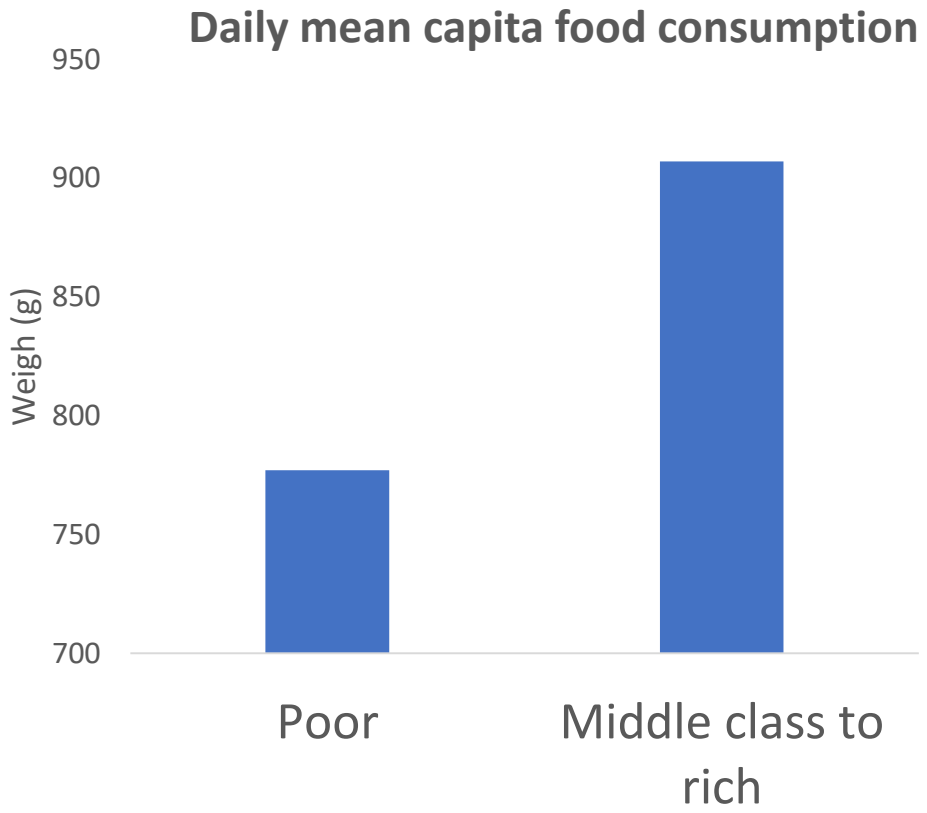
- **Income and food consumption** (Adam Drewnowski & Darmon, 2005; Mullie *et al.,* 2010; Kearney 2010)



Rise of the middle class

- **Filipino household food consumption profile**

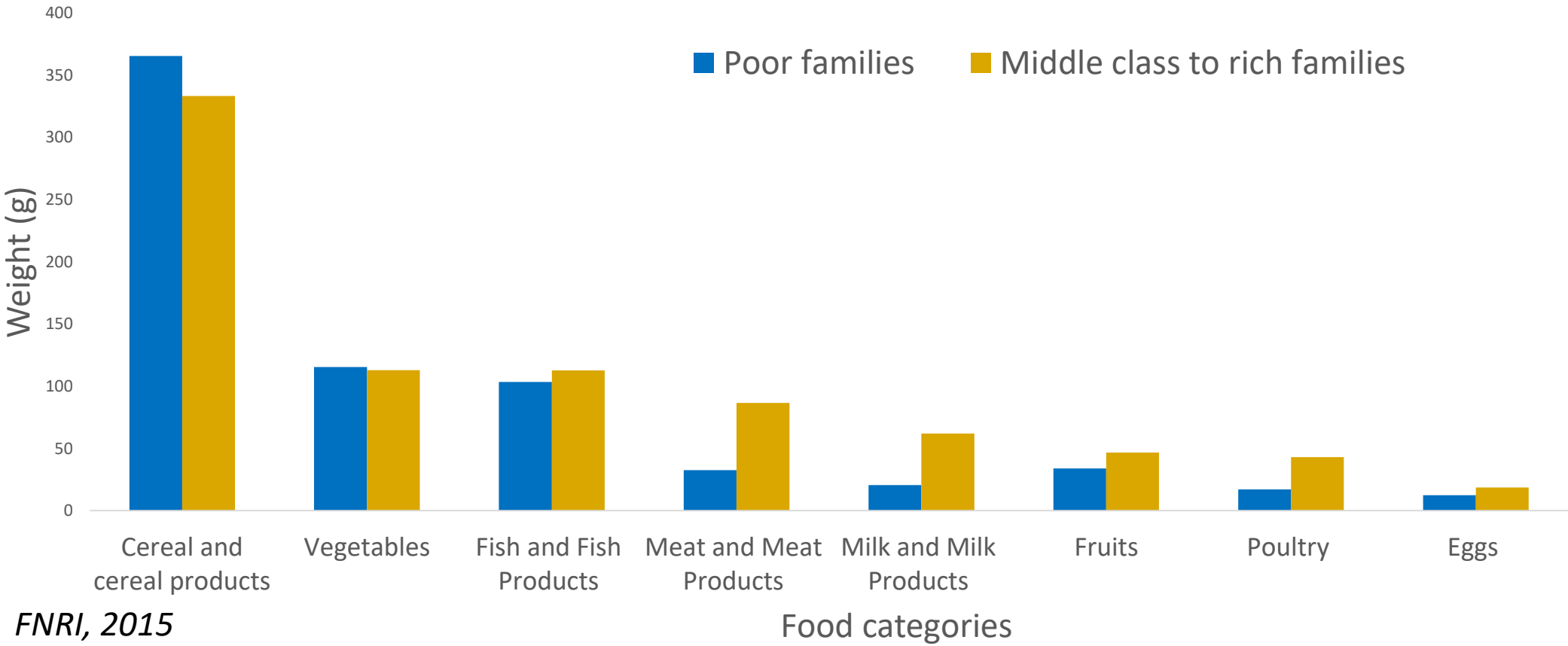




FNRI, 2015

Rise of the middle class

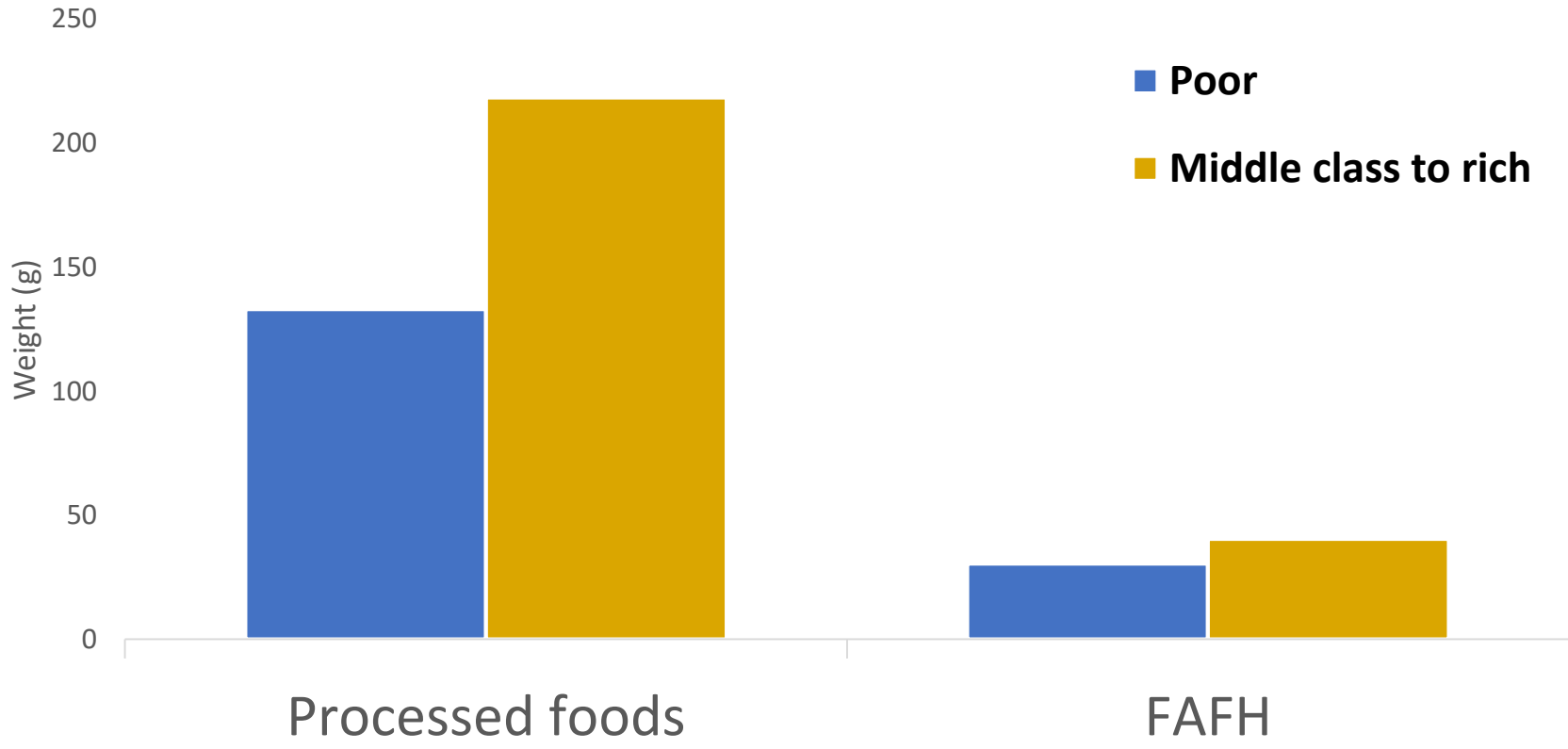
- **Filipino households' food consumption pattern (per capita)**



FNRI, 2015

Rise of the middle class

- **Filipino households' food consumption pattern**

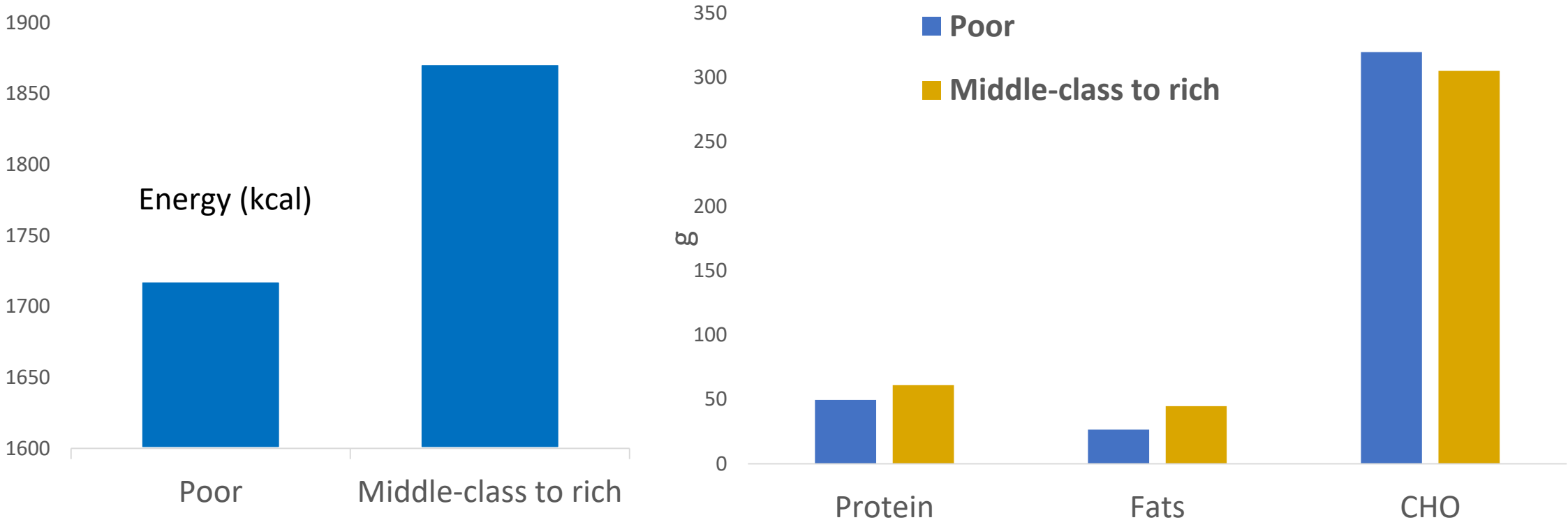


Per capita consumption of Filipino households per day

FNRI, 2015

Rise of the middle class

- **Filipino households' energy and nutrient intakes**

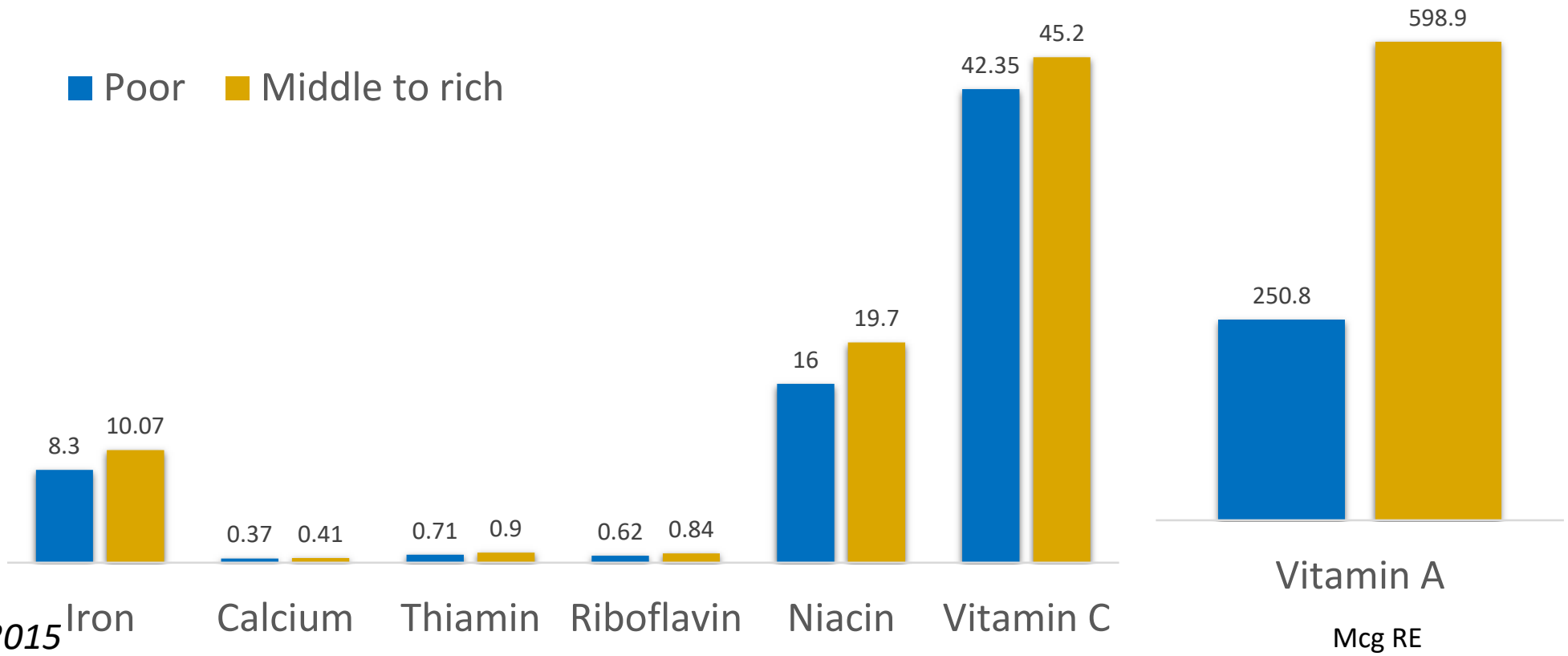


Filipino household energy and macronutrient intake

FNRI, 2015

Rise of the middle class

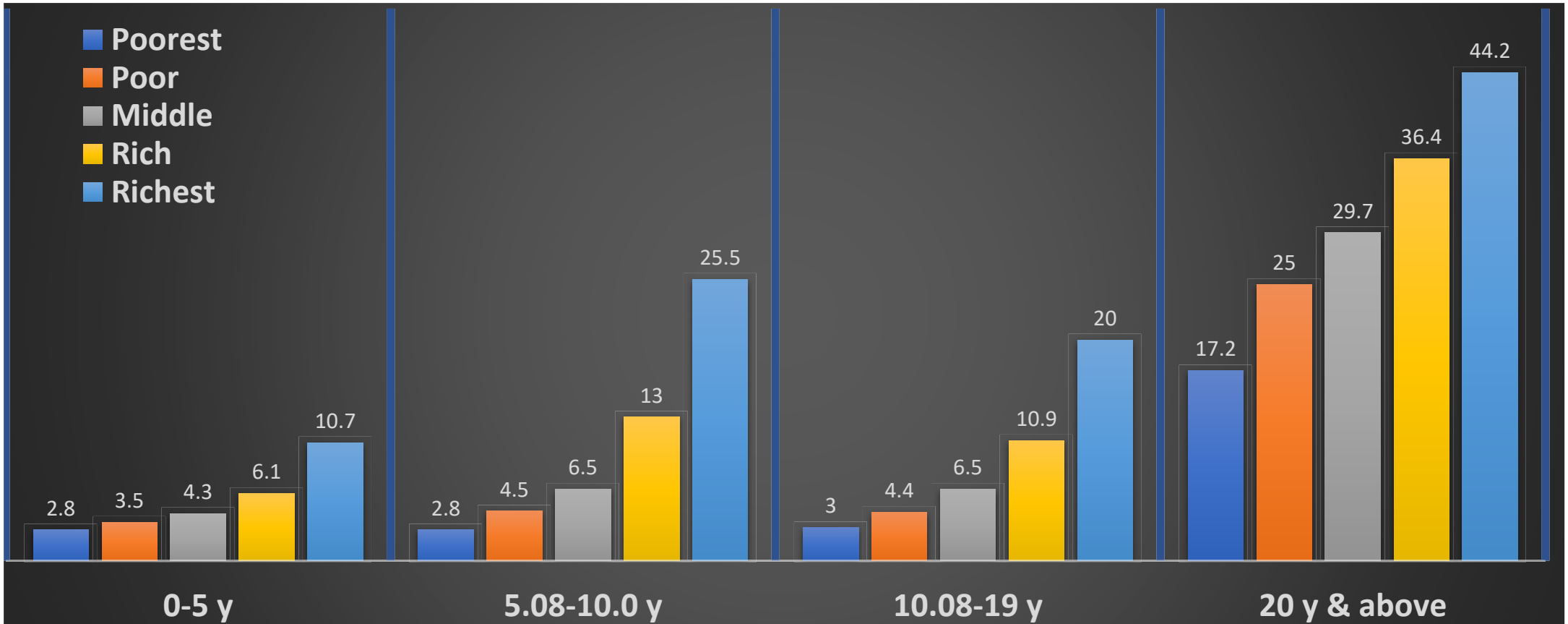
- **Filipino households' nutrient intakes**



FNRI, 2015

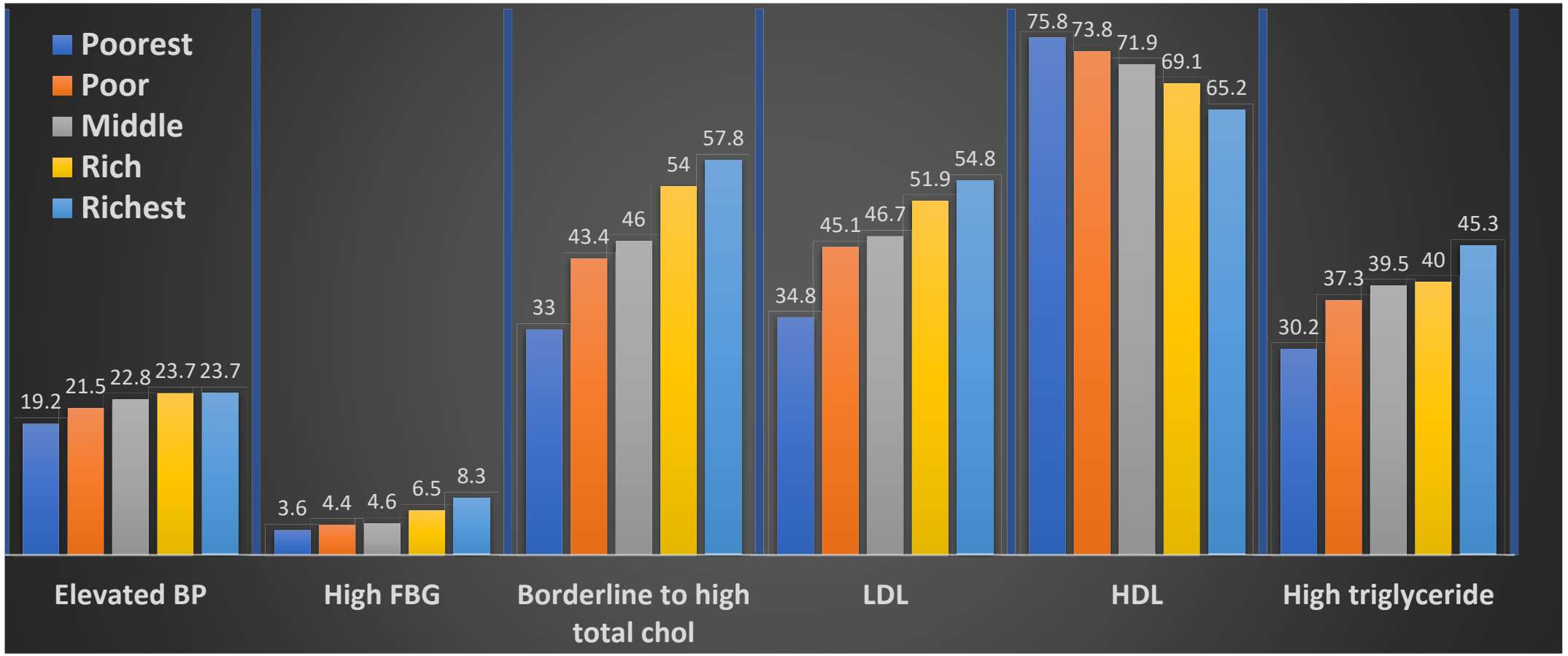
Rise of the middle class

- **Filipinos' nutritional status (overweight/obesity)** **(FNRI, 2015)**



Rise of the middle class

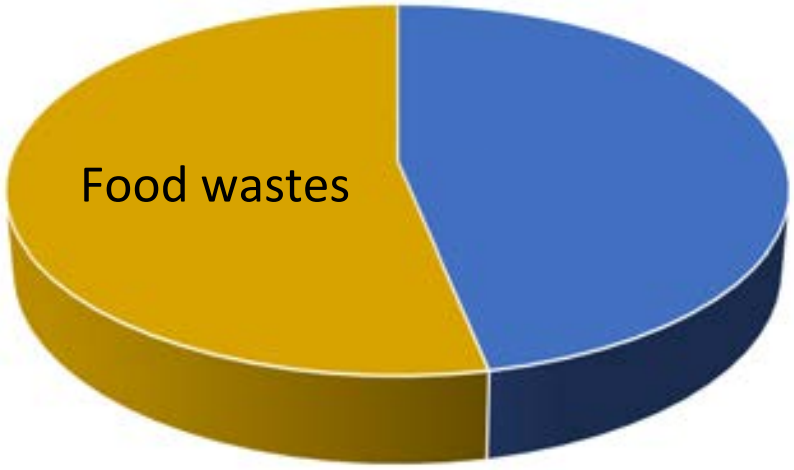
- **Filipino adults' risk factors for NCDs (FNRI, 2015)**



Rise of the middle class

Rise of the middle class

- **Filipino households' food wastes**



FNRI, 2015

Rise of the middle class

- **Increase in take home pay with TRAIN Law**

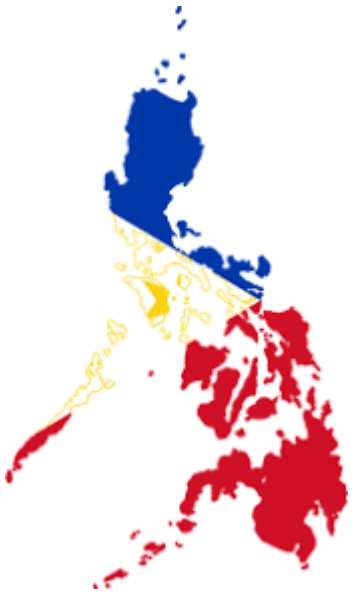
ANNUAL SALARY	TAX SCHEDULE (2018 - 2022)	TAX SCHEDULE (2023 ONWARDS)
Not over P250,000	0%	0%
Over P250,000 but not over P400,000	20% of the excess over P250,000	15% of the excess over P250,000
Over P400,000 but not over P800,000	P30,000 + 25% of the excess over P400,000	P22,500 + 20% of the excess over P400,000
Over P800,000 but not over P2 million	P130,000 + 30% of the excess over P800,000	P102,500 + 25% of the excess over P800,000
Over P2 million but not over P8 million	P490,000 + 32% of the excess over P2 million	P402,500 + 30% of the excess over P2 million
Over P8 million	P2,410,000 + 35% of the excess over P8 million	P2,202,500 + 35% of the excess over P8 million

Urbanization

2050 64%

2014 54%

UN, 2014



2010 45.3%

2007 42.4%

PSA, 2016

Urbanization

2012 to 2013
AS: 31% ↓
A&FSE: 72% ↑
FP: 37% ↑

1991 to 2002
FA: 9.97 to 9.56 M Ha
AFA: 2.16 to 1.98 Ha

2013 to 2015
Agricultural crops: 50% ↓
Livestock: 5% ↑
Poultry: 6% ↑
Meat product import: 37% ↑

PSA, 2016

Urbanization

2012: 1871 (FM)++

1.3 M*

18-50 sq m**

2-4 h***

*++PSA, 2016*World Bank, 2016;**Saloma & Akpedonu, 2016; ***Limkin, 2015*

Urbanization

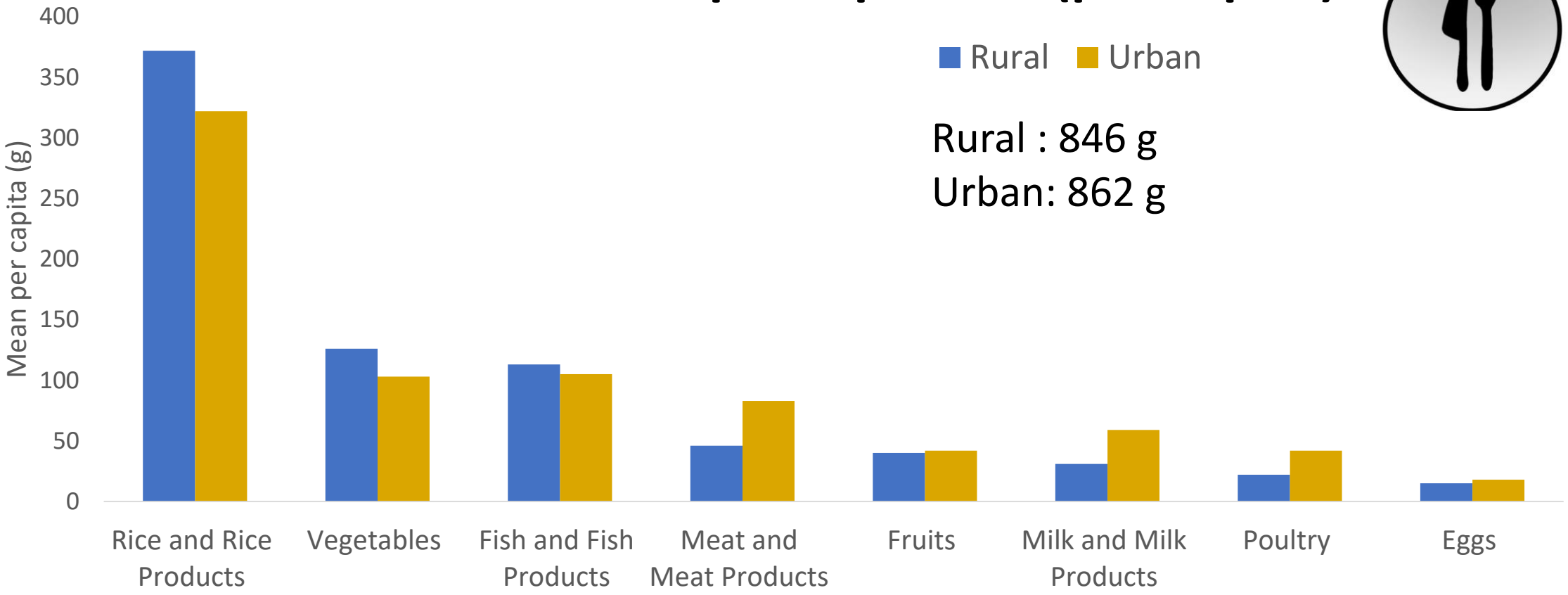
2016: **4478**
SM, HM & CS
2015: **84250**
FSE

2015: **61%** of total retail food sales came from MOM & POP *(sari-sari)* stores

(USDA FAS, 2016)

Urbanization

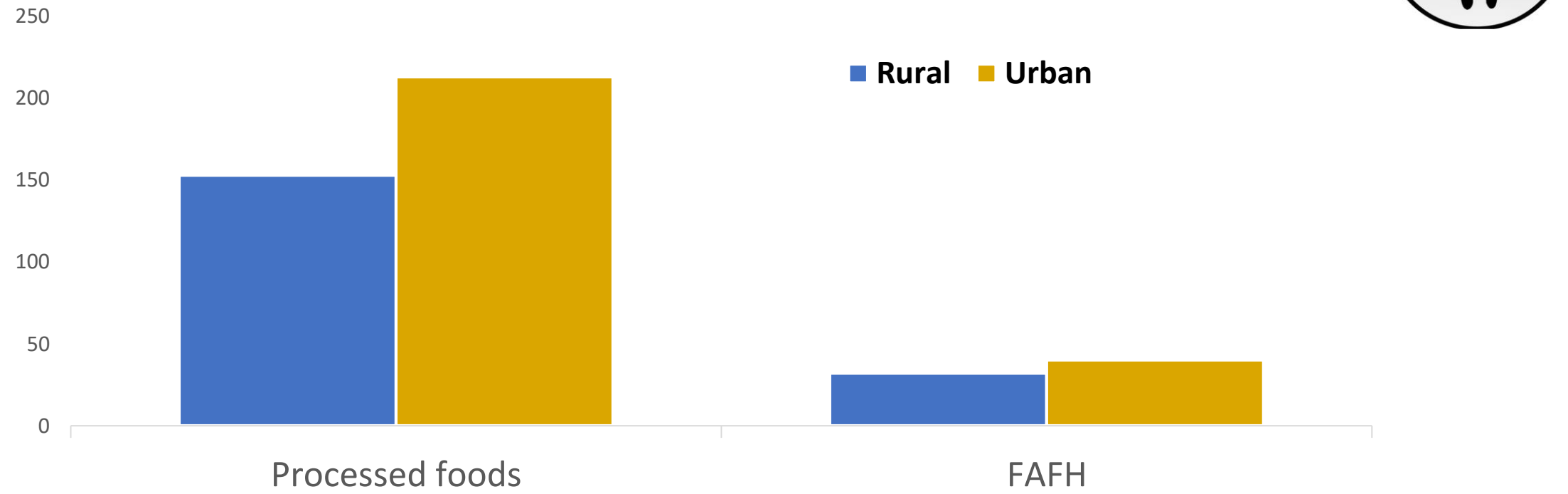
- **Urban households' consumption pattern (per capita)**



FNRI, 2015

Urbanization

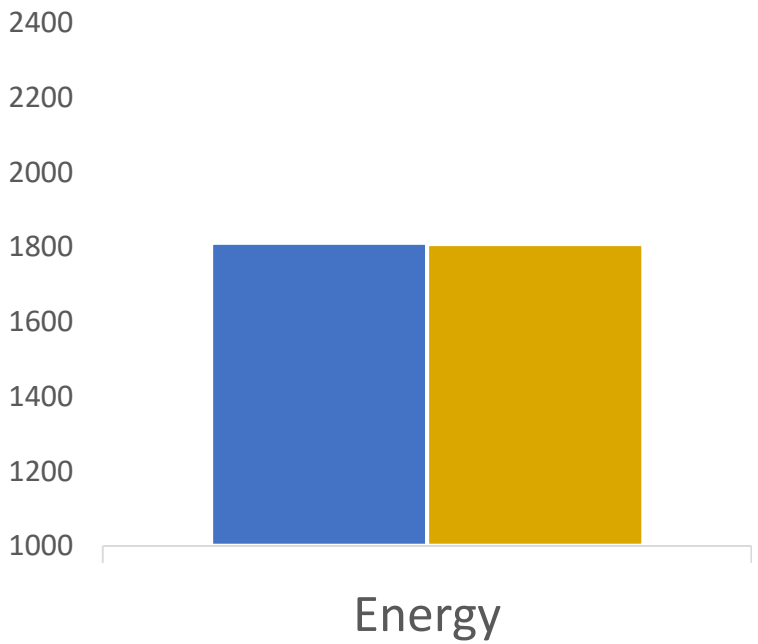
- **Urban households' consumption pattern (per capita)**

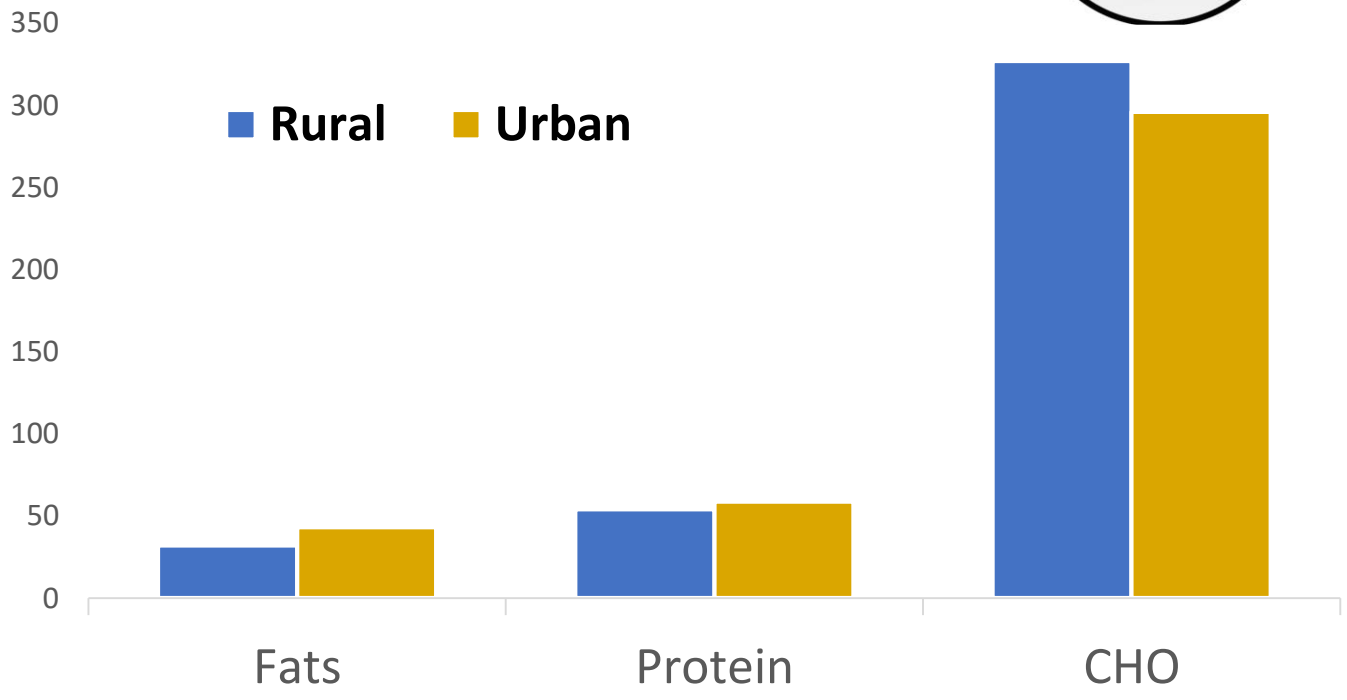


FNRI, 2015

Urbanization

- **Urban households' energy and nutrient intakes (per capita)**

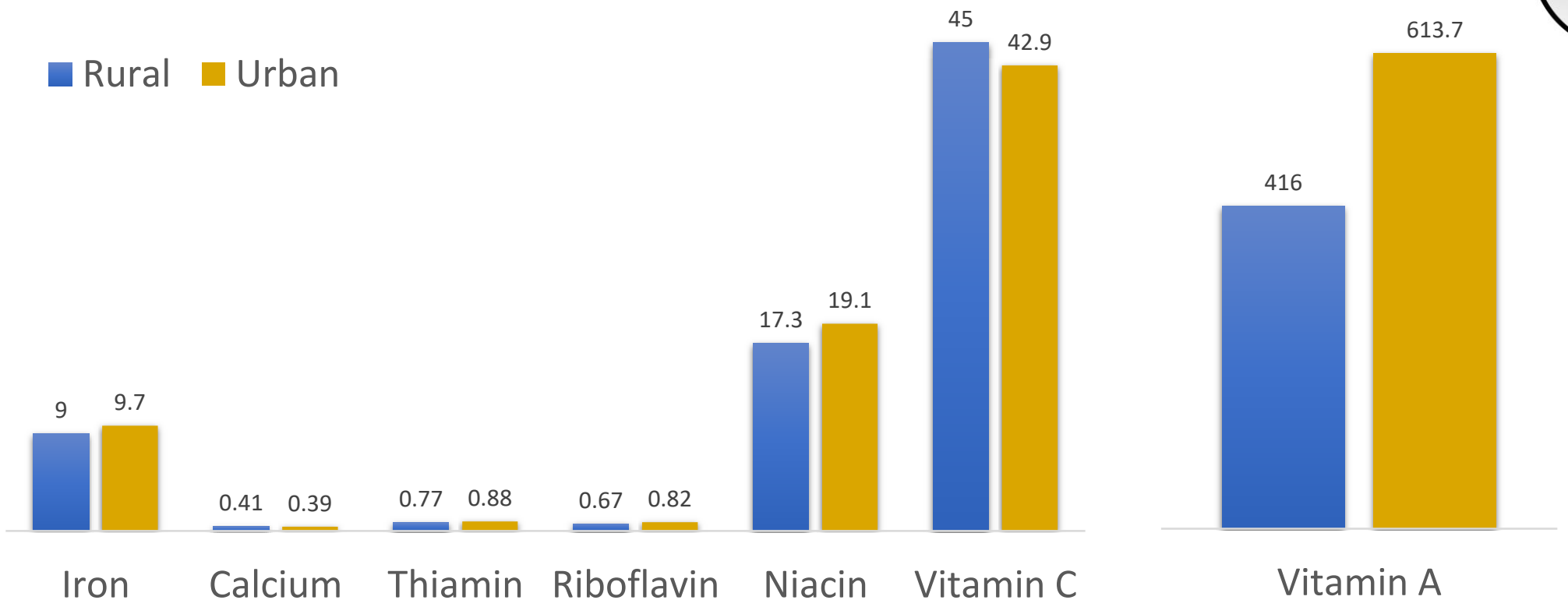




FNRI, 2015

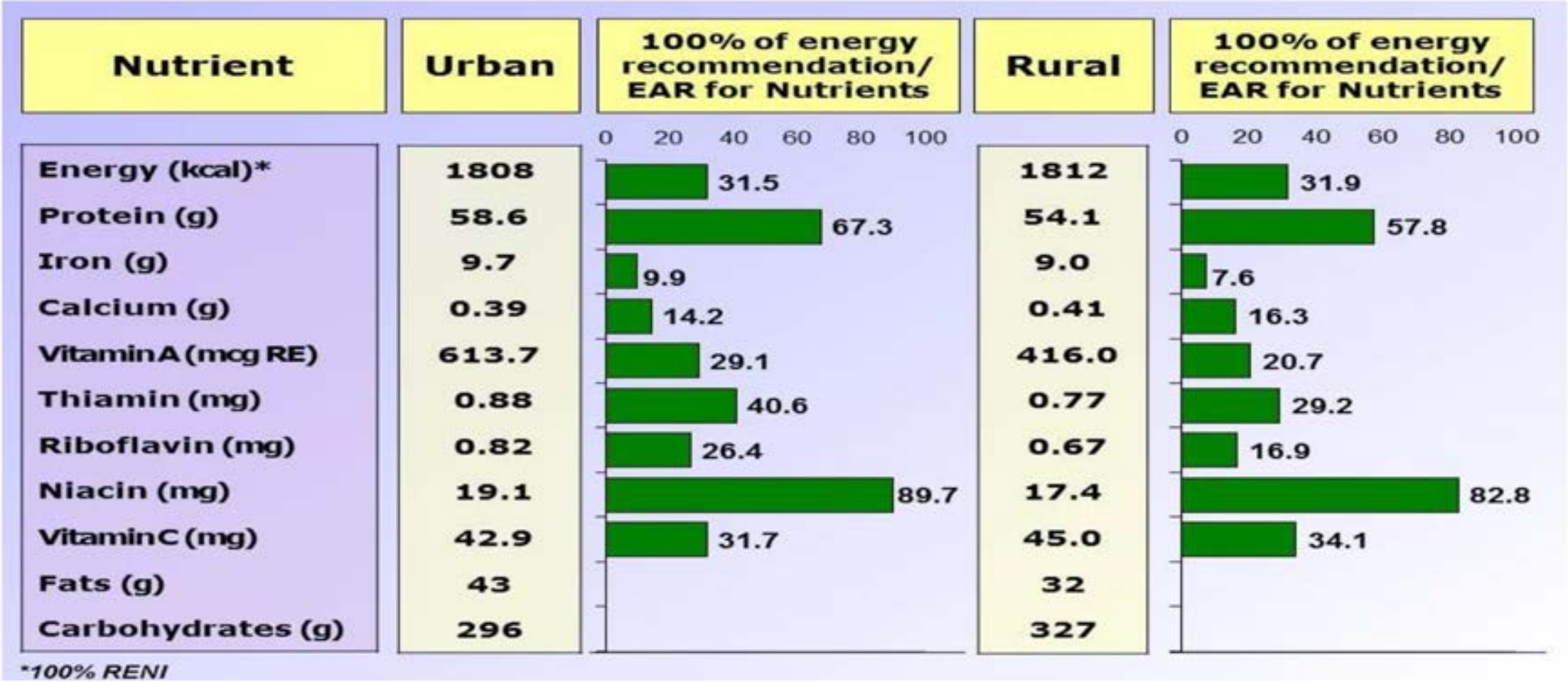
Urbanization

- **Urban household nutrient intakes (per capita)**



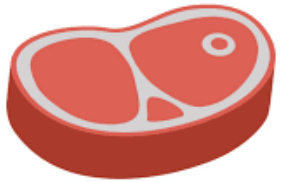
FNRI, 2015

Urbanization



FNRI, 2015

Urbanization



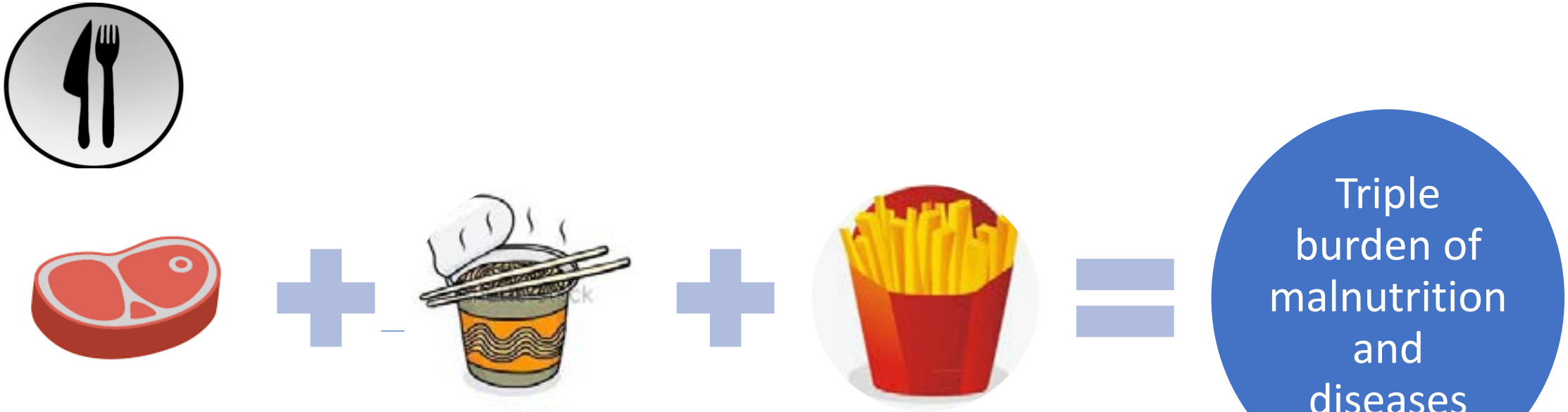
Triple burden of malnutrition and diseases

Urbanization

Triple burden of malnutrition : undernutrition, micronutrient deficiencies and obesity and overweight
(FAO, 2013)

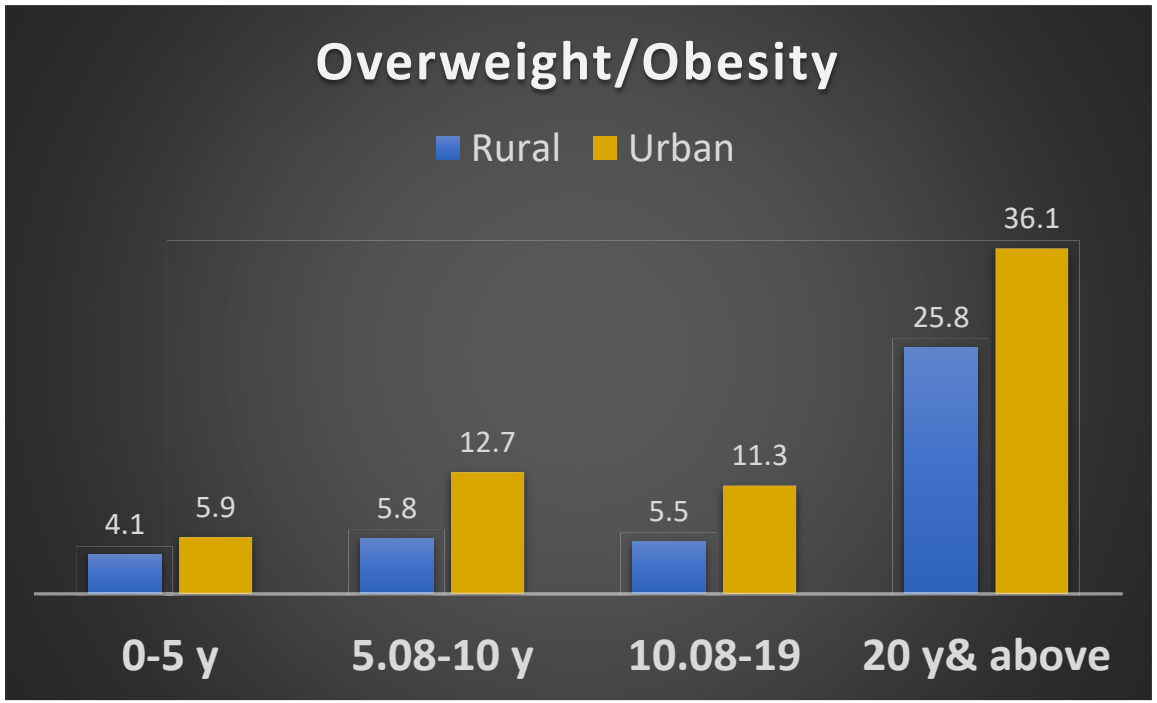
Triple burden of malnutrition and diseases

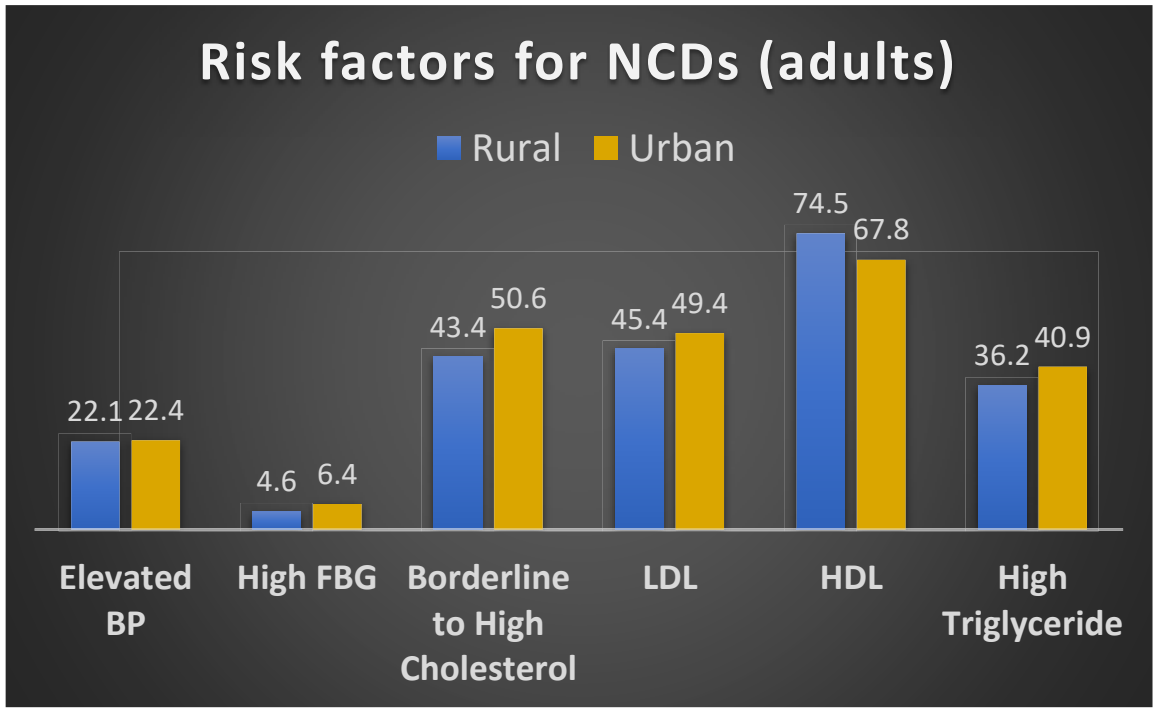
Urbanization



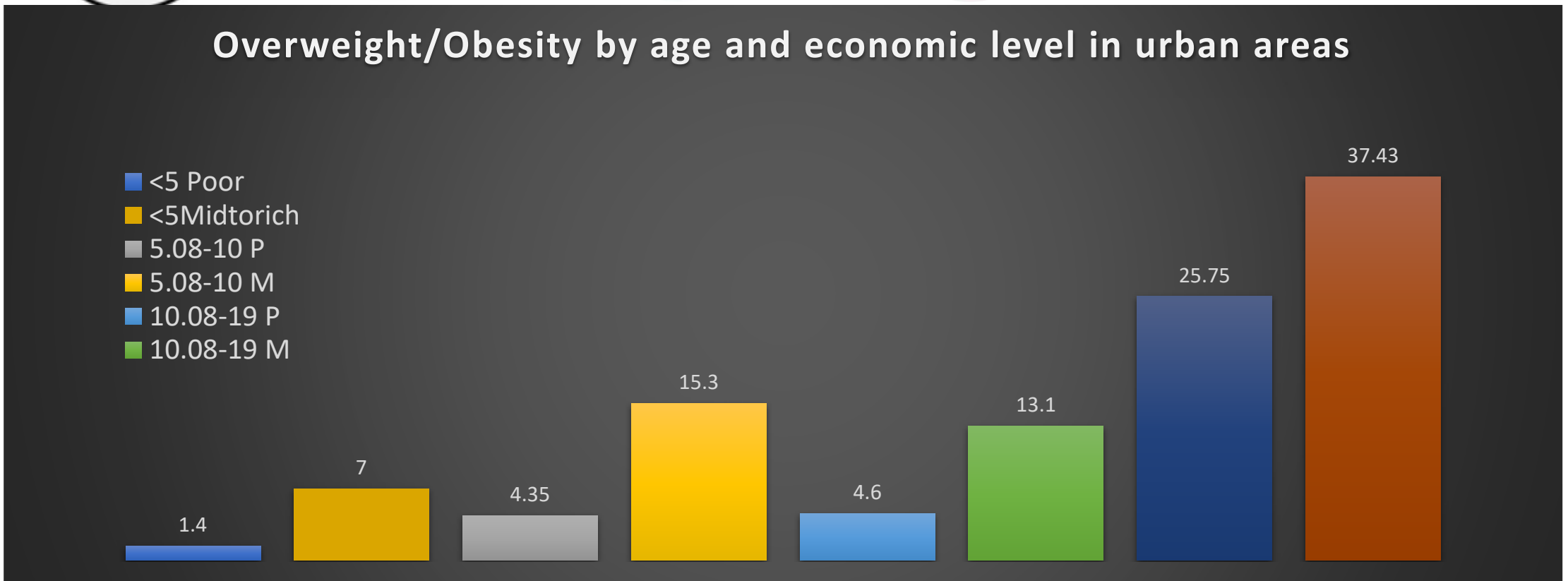
Triple burden of diseases: communicable diseases (caused by microbiological agents), noncommunicable diseases (caused by consumption and lifestyle practices), and diseases related to rapid urbanization and industrialization (e.g. substance abuse, mental illness) ***(Ortiz & Ebrigo, 2017)***

Urbanization

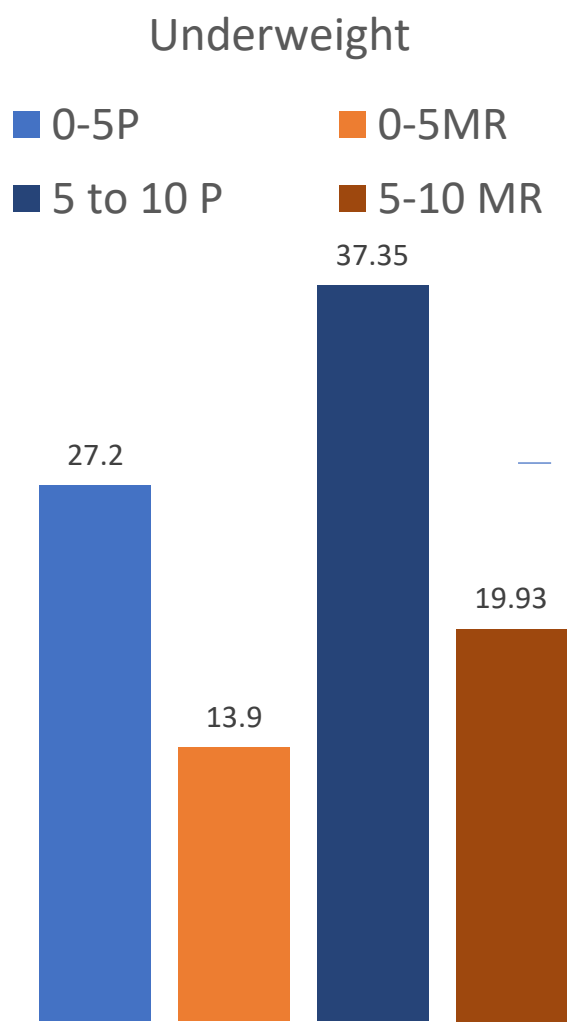


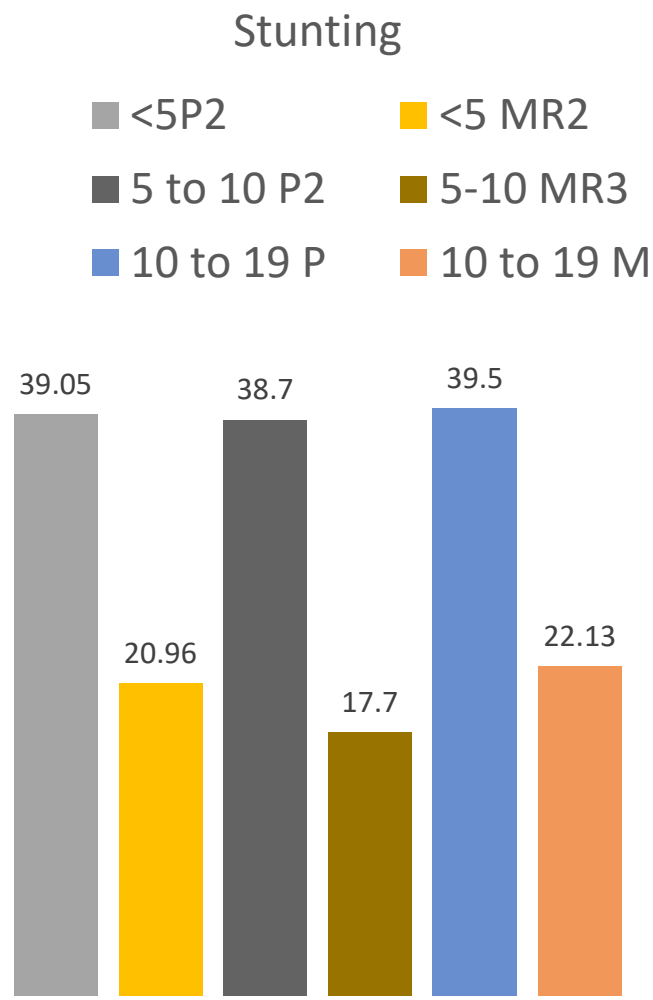


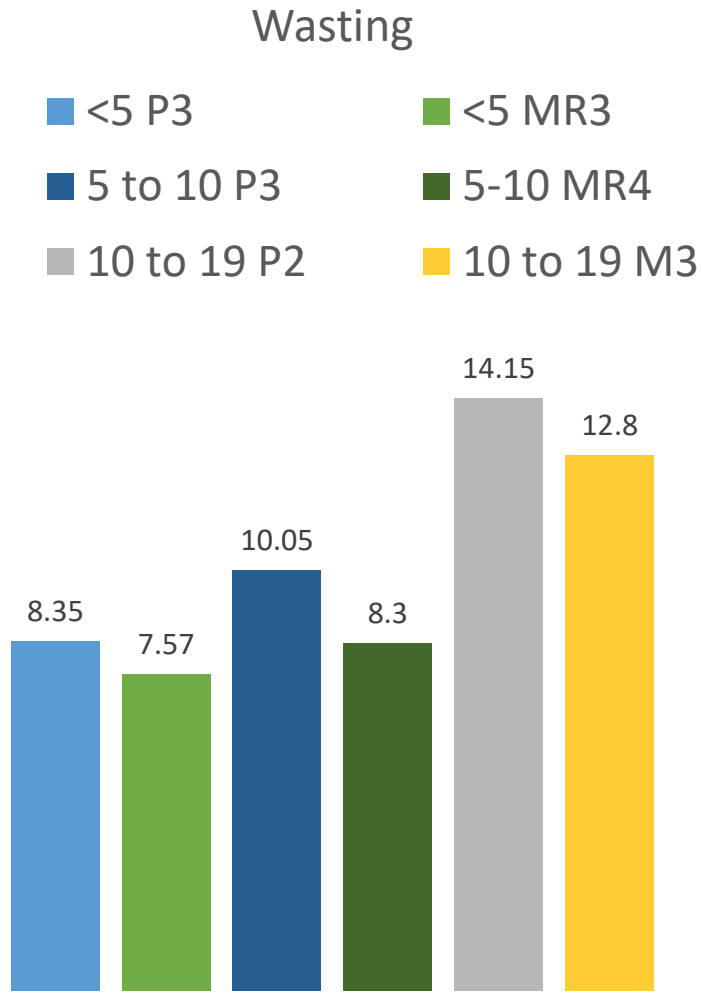
Urbanization



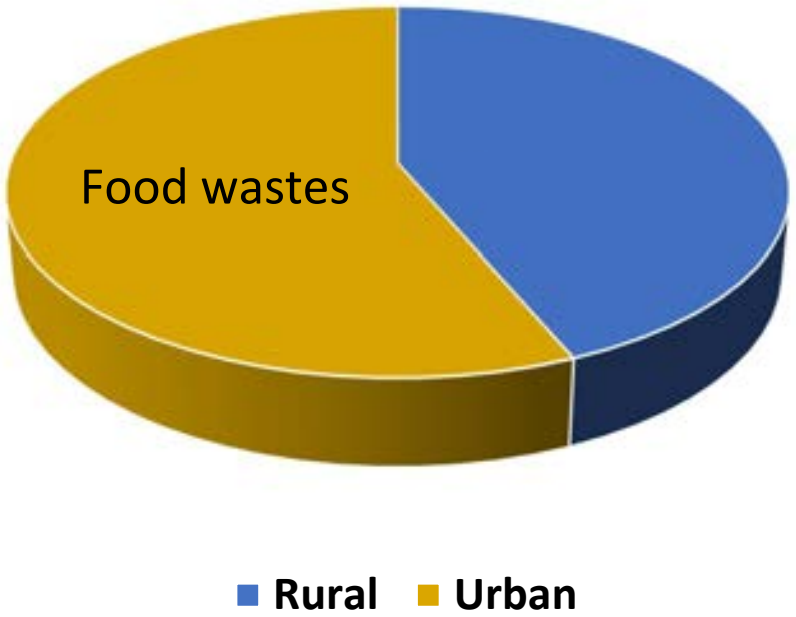
Urbanization

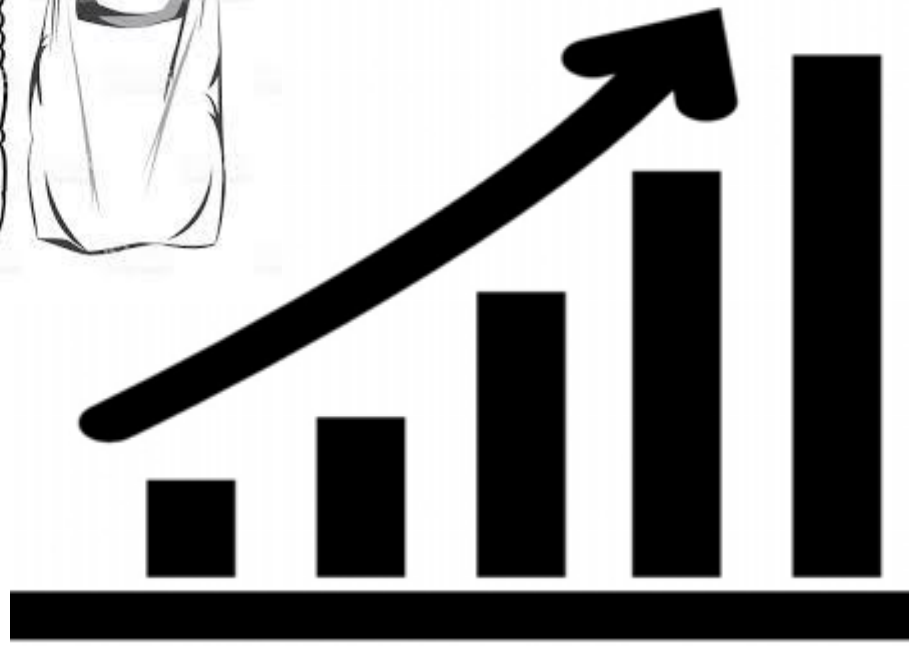






Urbanization



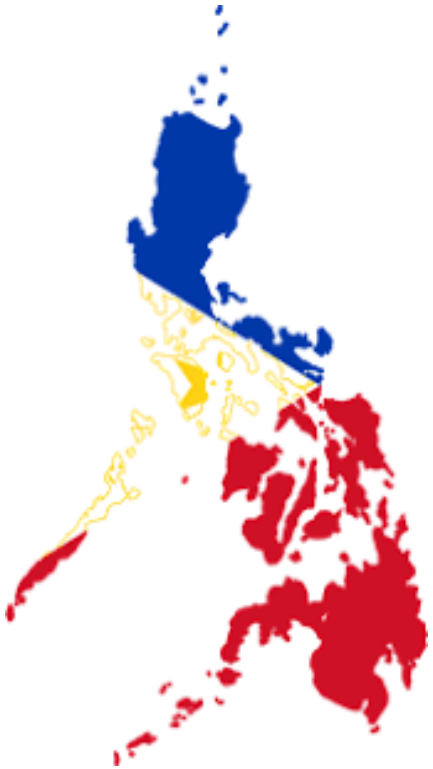


International trade

Opportunity	Threat
• Increases food supply • Contribute to higher income • Smooth out food deficits and surpluses • Restrictions : negative impact to food security	• Food sovereignty and right to determine shape of food systems • Risks of liberalized trade-uneven

Clapp, 2015

International trade



Member of the World Trade Organization (WTO) since January 1995 and the General Agreements on Tariffs and Trade since December 1979

Free Trade Agreements (FTAs) with the: (1) ASEAN Free Trade Area (AFTA), (2) ASEAN, (3) ASEAN plus Six (ASEAN +6), (4) ASEAN in Trade Goods Agreement (ATIGA), (5) European Free Trade Association (EFTA), and (6) Philippine-Japan Economic Partnership Agreement (PJEPA)

WTO, 2018; DTI, 2018

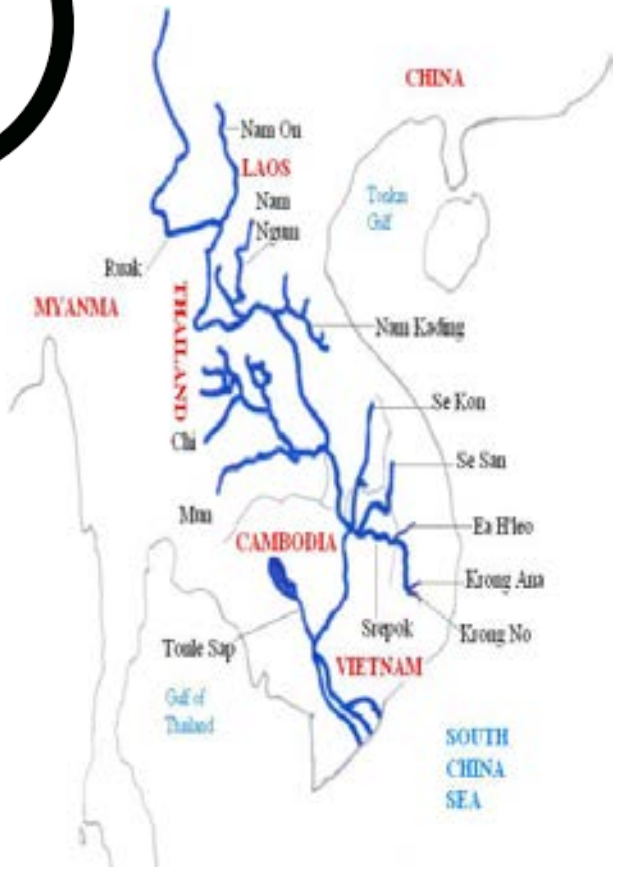
International trade

WHY DO WE NEED TO IMPORT RICE

2017: 1.7 MMT (USDA, 2018)

PHP 12.41 per kg

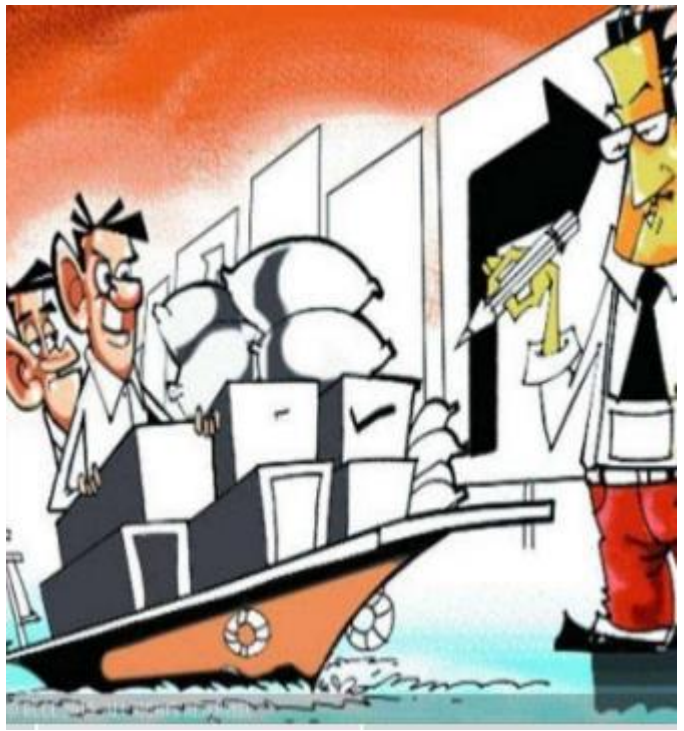
PHP 6.53 per kg



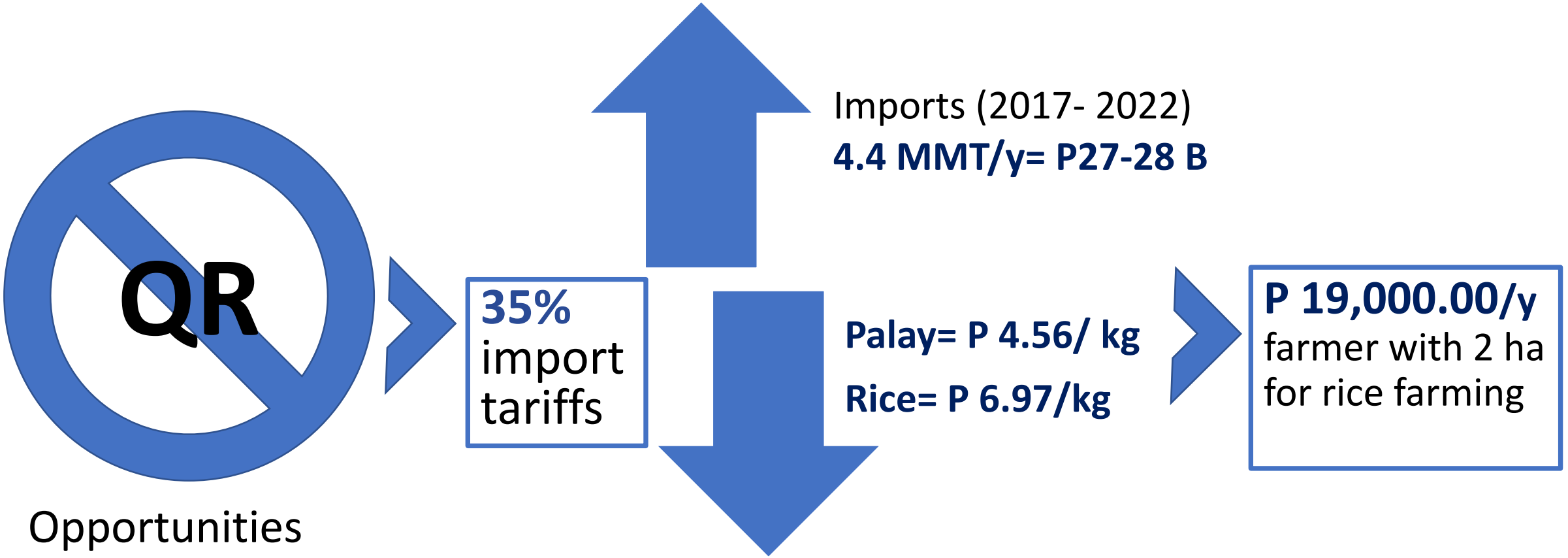
Dawe et al., 2006; Dawe, 2014

International trade

- QR limit rice imports to protect local rice producers and to boost rice self-sufficiency (Briones, Galana & Tolin, 2017).
- QR specify the Minimum Access Volume (MAV) of 805,200 MT will be imposed a 35% in-quota tariff while in excess, the out-of-quota tariff is 50% (US export, 2016).
- QR expired in July 01, 2017 but extended for another 3 years (EO 23, 2017).



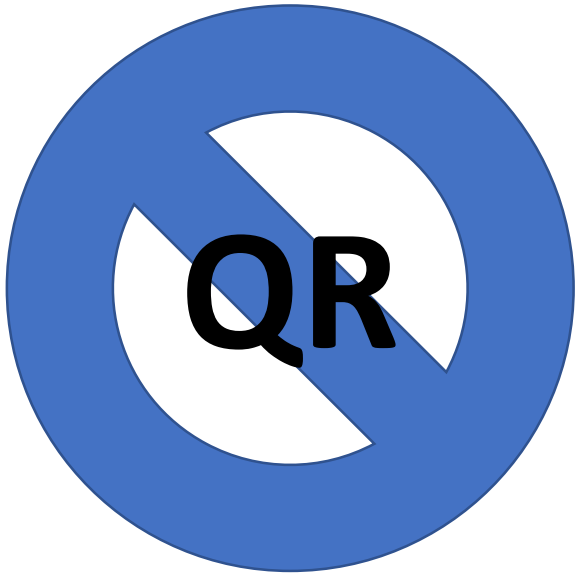
International trade

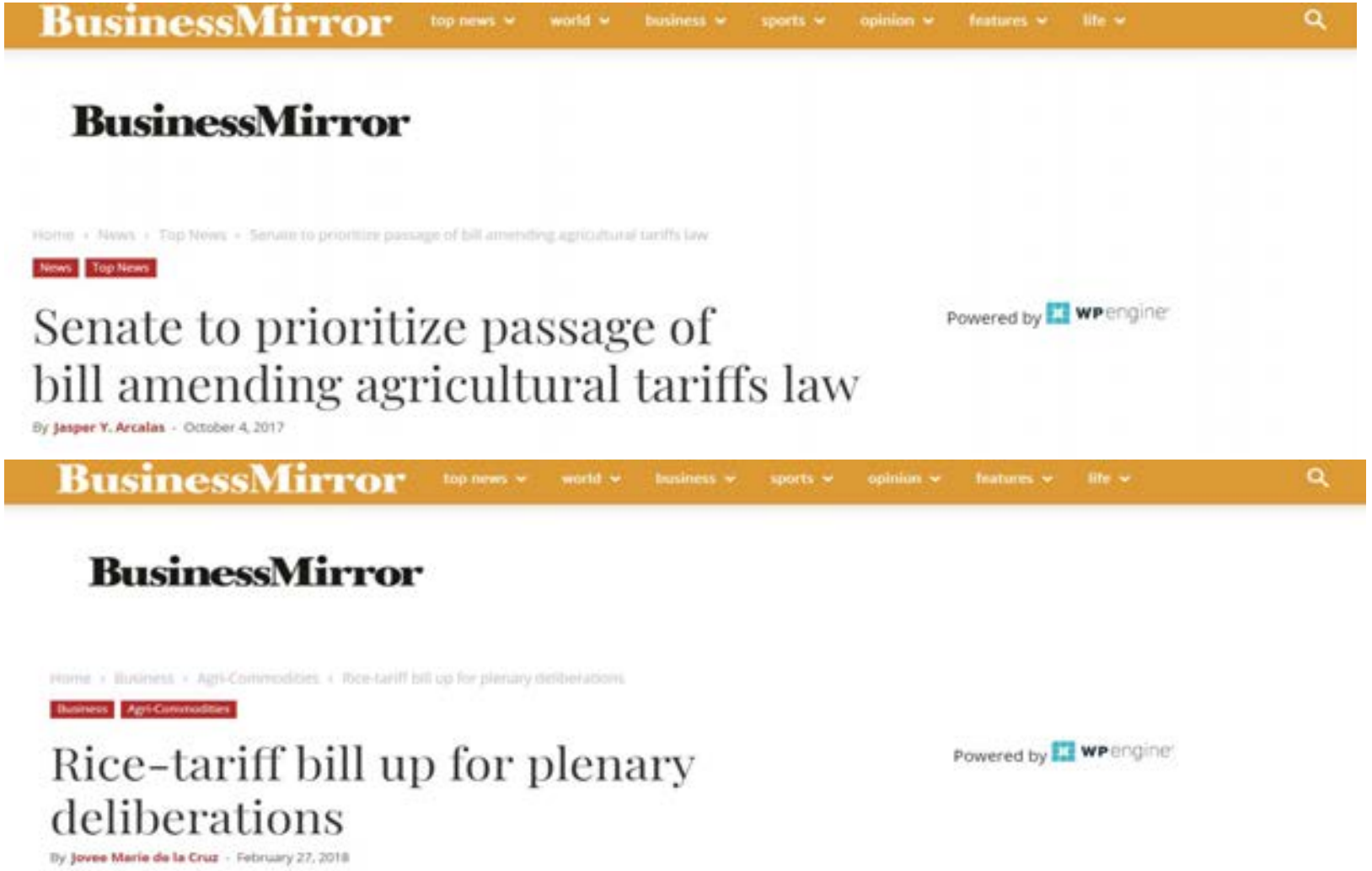


Opportunities

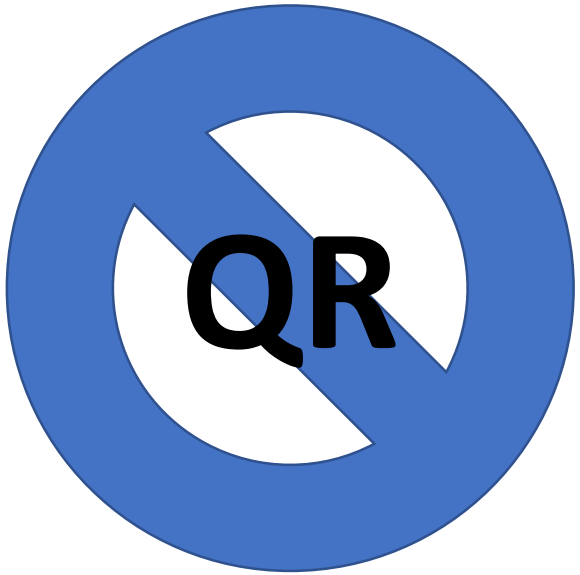
Briones et al., 2017; Briones & Tolin, 2015;

International trade





International trade



Threats

Price ↓ Imports ↑ = Palay production & output ↓

price= decrease in income

Farmers not ready for a post-QR due poor agricultural infrastructure and our country's vulnerability to natural disasters and climate-change

Rice cartels will take advantage of the situation and that smuggling will proliferate

Coronaton, 2015; Mendoza, 2017

International trade

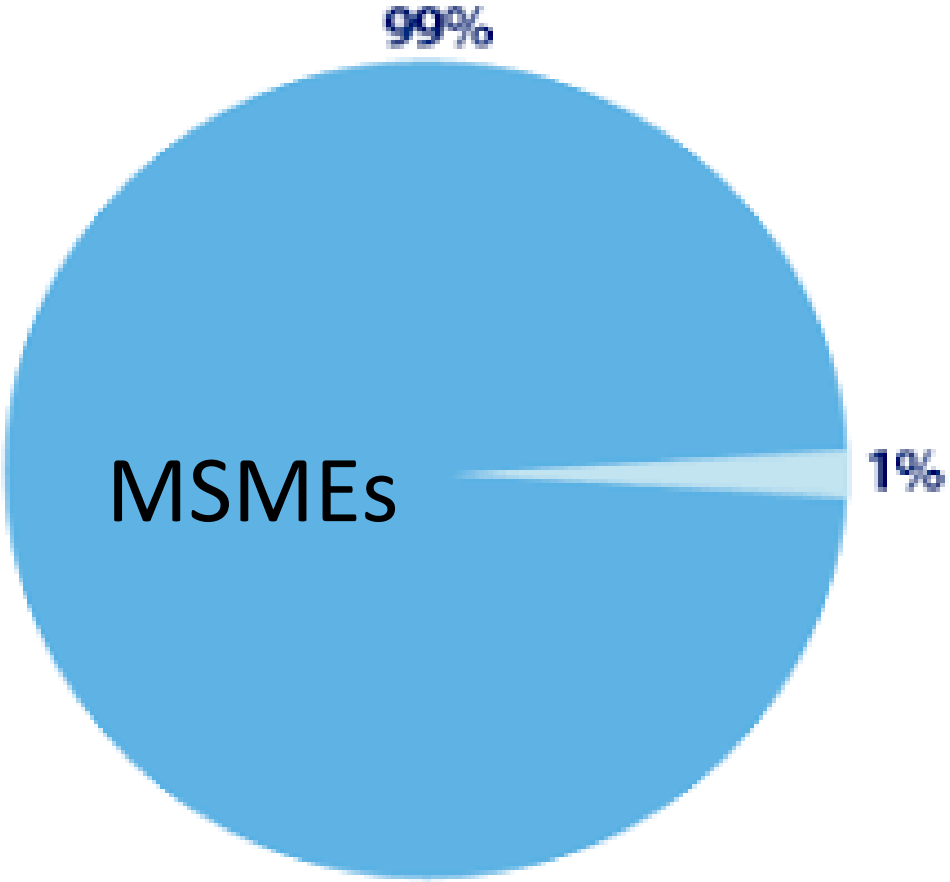
- Non-tariff measures (NTMs)
  - ❖Sanitary and Phytosanitary (SPS)
    - ❖set out the basic rules for food safety and animal and plant health standards
    - ❖harmonize SPS measures through international standards with the FAO/WHO Codex Alimentarius
  - ❖Technical Barriers to Trade (TBT)
    - ❖ensure that technical regulations, standards, and conformity assessment procedures are non-discriminatory and do not create unnecessary obstacles to trade

WTO, 2018

International trade

SPS & TBT

Bases of the implementation of food safety standards for **domestic and international trade** in all member countries of the WTO.



Philippine Food Manufacturing

Aldaba, 2012

International trade

- Food miles

- energy use and contribution to climate change
- dependence on fossil fuels
- traffic congestion
- social and economic impacts on rural communities and developing countries

(Stancu & Smith, 2006).

International trade

- Food miles

Local products may lead to more GHG emissions compared to imported food (Lewis & Mitchell 2014)

Bulk of GHG emissions from food are in the production phase (Weber & Matthews, 2008)

Shifting < one day /wk cal from red meat and dairy products to chicken, fish, eggs or a vegetable-based diet less GHG (Weber & Matthews, 2008)

Local foods only reduces global emissions when undertaken in regions with relatively low emissions (Avetisyan et al., (2014)

ENVIRONMENTAL ISSUES

Natural disasters
Climate change
Solid wastes
Food losses and wastes

Natural disasters

Typhoon belt in the Pacific and Pacific Ring of Fire

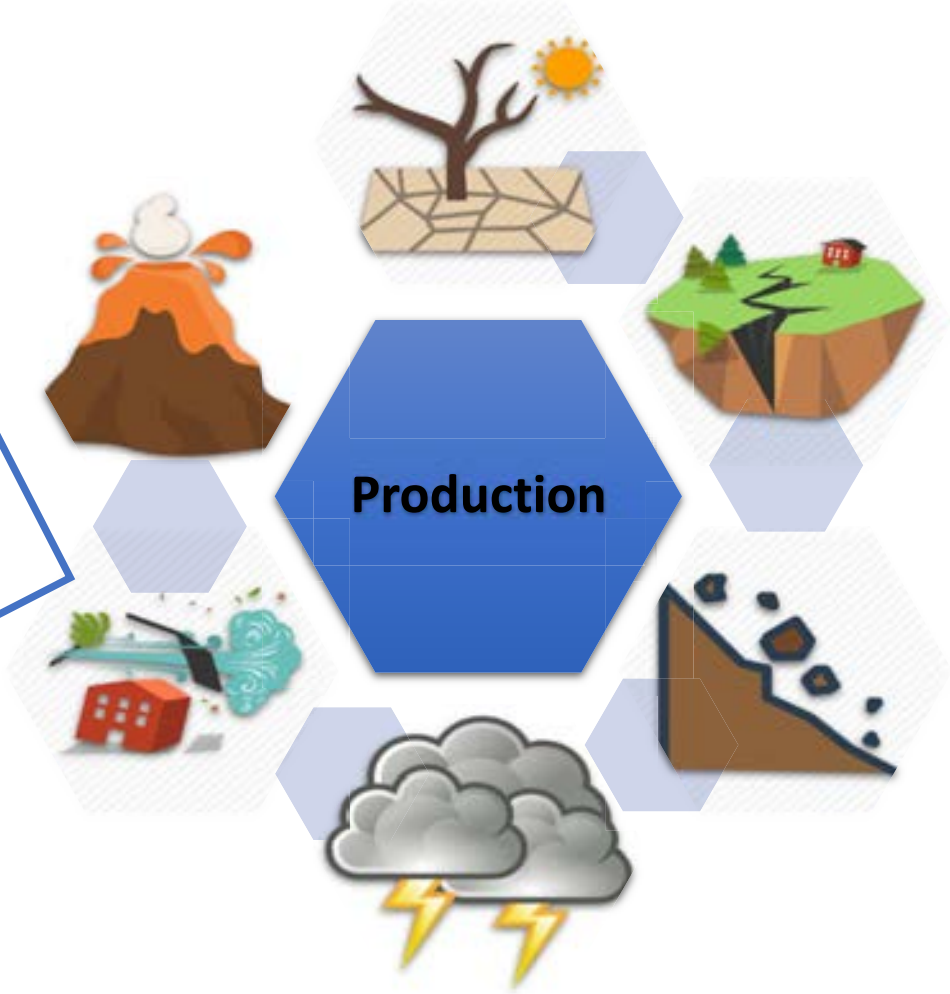
4th among countries hit by the highest number of disasters from 1995-2015 affecting **130 million people** (CRED & UNSIDR 2015).

27.69 WorldRisk Index and ranks **3rd** amongst 171 countries based on exposure to natural hazards, vulnerability to hazards, coping capacities and adapting capacities as presented in the WorldRiskReport 2017 (Schrader, 2017).

Natural disasters

- Can disrupt the entire food system from production, processing, marketing, distribution and preparation of food

2006 -2013
75 disasters
25% damage & losses in agriculture= 3.8 B USD



FAO, 2015

Natural disasters

Typhoon Yolanda

2013

✓People affected

- 16.08 M people
- 6,300 were killed

✓Damages:

- Property and agriculture:

PhP 95.48 billion.

Mayon Volcano eruption

2018

✓People affected

- 84.4 Th people

✓Damages

- Agriculture and fisheries

3.2 M USD

- Livestock and poultry

512 Th USD

NDRMMC, 2013; UN OCHA, 2018

Natural disasters

- Paddy rice production at provincial level
- Paddy rice production at national level
- Food security of households
  - **meal proportioning, reducing number of meals by children or skipping meals for whole day**

Israel & Briones, 2013

Natural disasters

- Households that are directly affected by disasters seek shelter in evacuation centers, which are normally crowded and lack food and sanitation which eventually breed diseases and cause malnutrition (Briones et al., 2017).

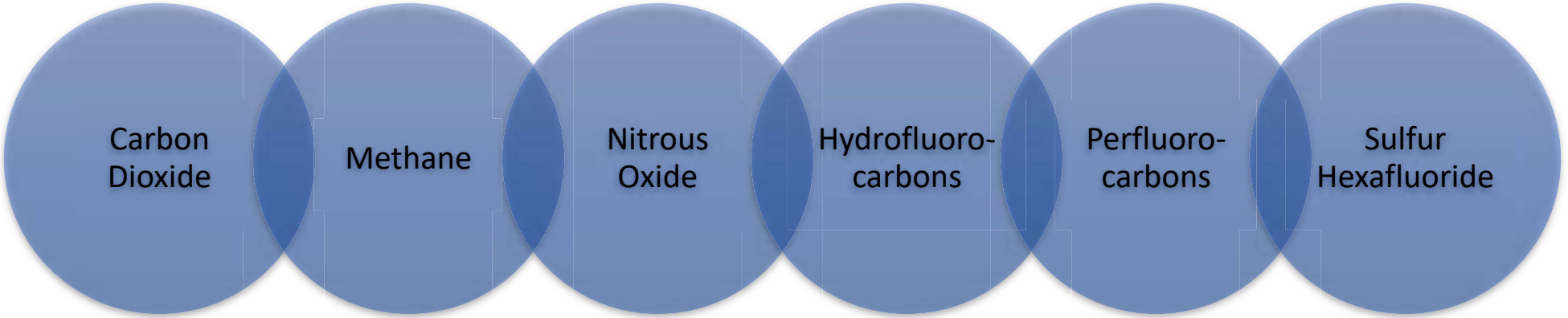
Climate Change

13th-most climate vulnerable among 186 countries by Verisk Maplesoft (Oxford Business Group, 2016)

5th in the Global Climate Risk Index (CRI) by Greenwatch (Kreft et al., 2016)

Climate Change

- One of the main drivers of climate change is the greenhouse gases (GHGs)



Climate Change

- **Carbon footprint** total amount of GHGs

Climate Change

- Philippine carbon footprint =0.39% of global emissions as of 2012 (WRI, 2015)

0.20%

0.12%

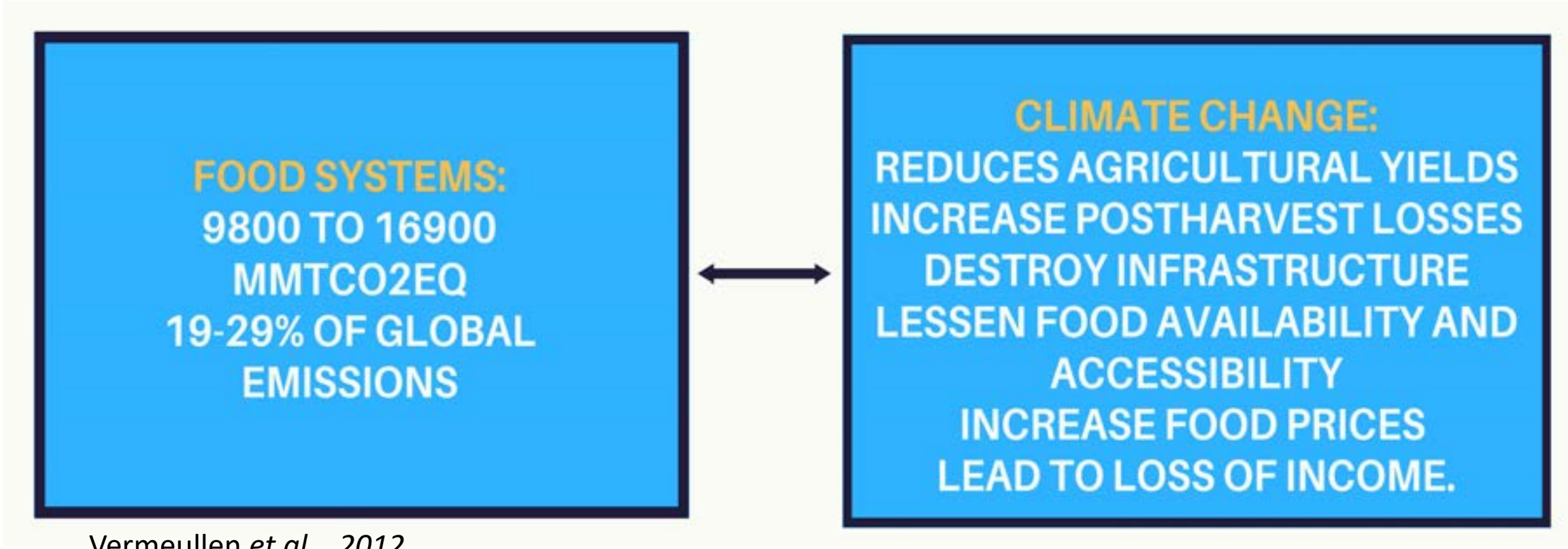
0.03%

0.02%

WRI, 2015

Climate Change

- Two-way relationship of food systems and climate change



Vermeullen *et al. , 2012*

Climate Change

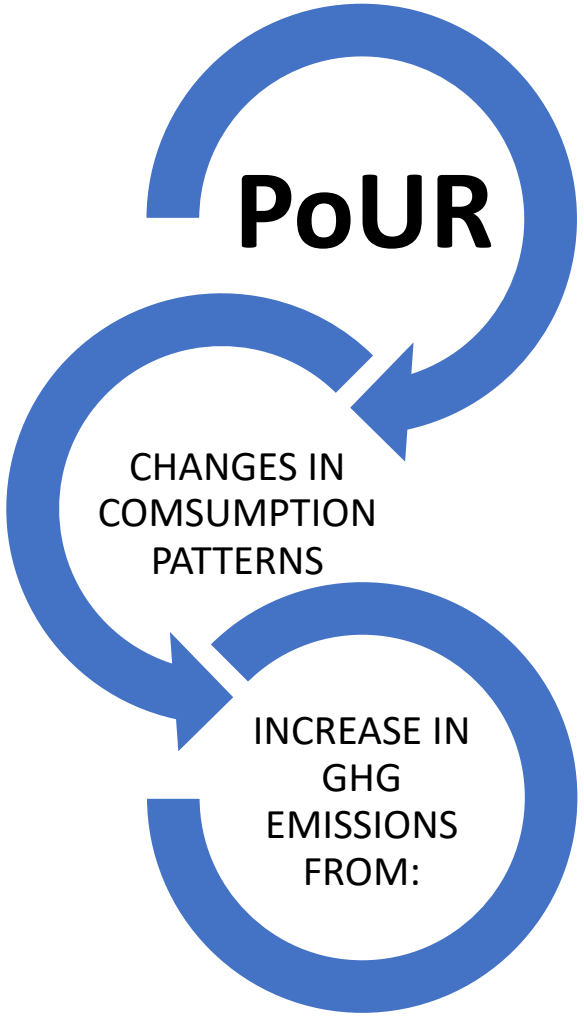
FAO, 2018

1990-2014

- **Production**
  - 14146 CO_2Eq*
- **Industrial**
  - 6167.23 CO_2Eq
- **Wastes**
  - 13164.21 CO_2Eq

rice cultivation (61.2%), enteric fermentation (14.4%) manure management (6.8%), synthetic fertilizers (6.6%), manure left on pasture (5%), crop (3%), manure applied to soils (2.1%) and burning crop residues

Climate Change

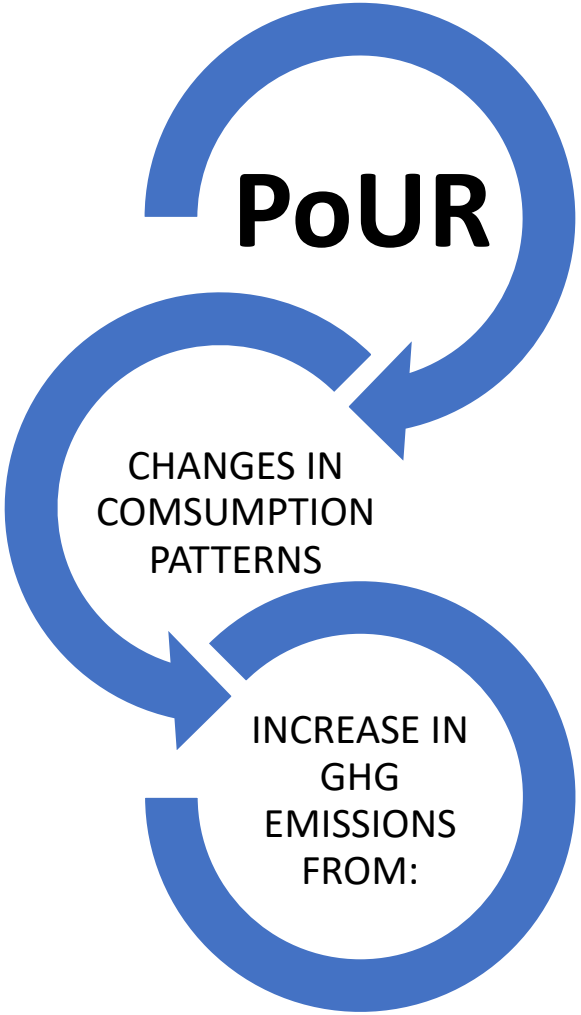


Population growth

Urbanization

Rising incomes

Climate Change



Population growth

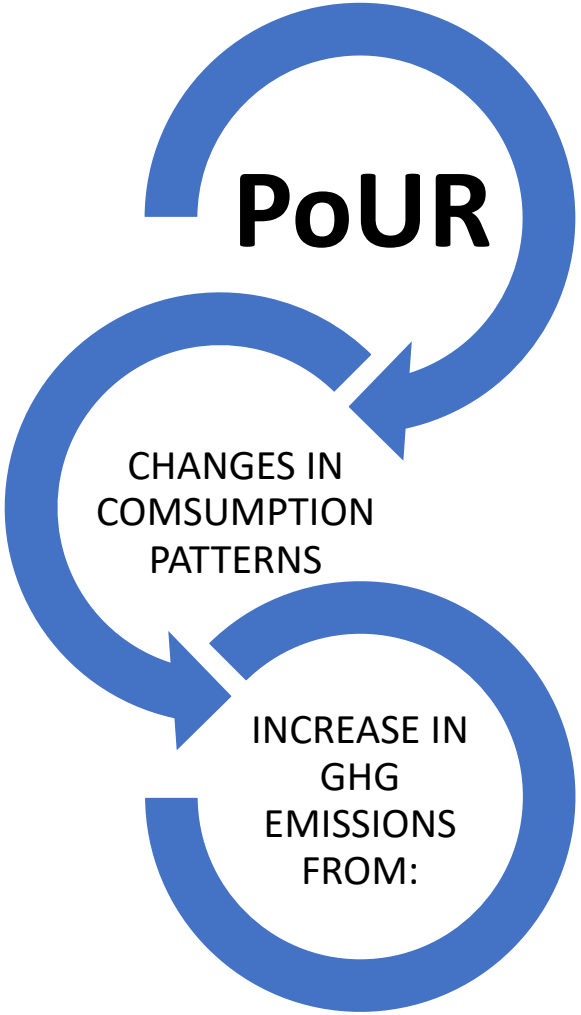
Urbanization

Rising incomes

GHG emissions: High meat eaters>medium meat eaters>low meat eaters> fish eaters>vegans
(Scarborough et al., 2013)

- Increased demand for cereals and animal-based products
- Increased demand for processed and packaged foods
- Increased demand for FAFH

Climate Change



Population growth

Urbanization

Rising incomes

GHG emissions: High meat eaters>medium meat eaters>low meat eaters> fish eaters>vegans
(Scarborough et al., 2013)

- Increased demand for cereals and animal-based products
- Increased demand for processed and packaged foods
- Increased demand for FAFH

- Increase in agricultural activities and outputs i.e., rice and livestock
- Increase processing, packaging and distribution activities
- Increase in packaging and food wastes

Climate Change

Philippine Climate Change Projections

- Country will get warmer
- Warmer and drier summer months
- Temperature will rise by 0.9-11°C in 2020 and 1.8-2.2°C in 2050
- Seasonal mean temperatures will increase
- Southwest and northeast monsoons including last quarter of the year will get wetter leading to flooding
- No. of dry days (>2.5 mm of rain) will increase
- Heavy daily rainfall (>300 mm) events will continue to increase in Luzon and Visayas

(PAGASA, 2011)

Possible Impacts on Philippine Food System

WATER RESOURCES

- Irrigation will be affected
- Energy from dams will decrease
- Increased flooding and landslides

AGRICULTURE

- Decreased yields
- Increased incidences of diseases in plants and animals

FORESTRY

- Forest fires
- Loss of livelihood

COASTAL RESOURCES

- Decreased yields

Loss in income

HUMAN HEALTH

- Higher morbidity and mortality from water-based and vector borne diseases
- Increased health risk for children, elderly
- Poorer air quality in urbanized areas
- Severe malnutrition

Climate Change

Philippine Climate Change Projections

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(PAGASA, 2011)

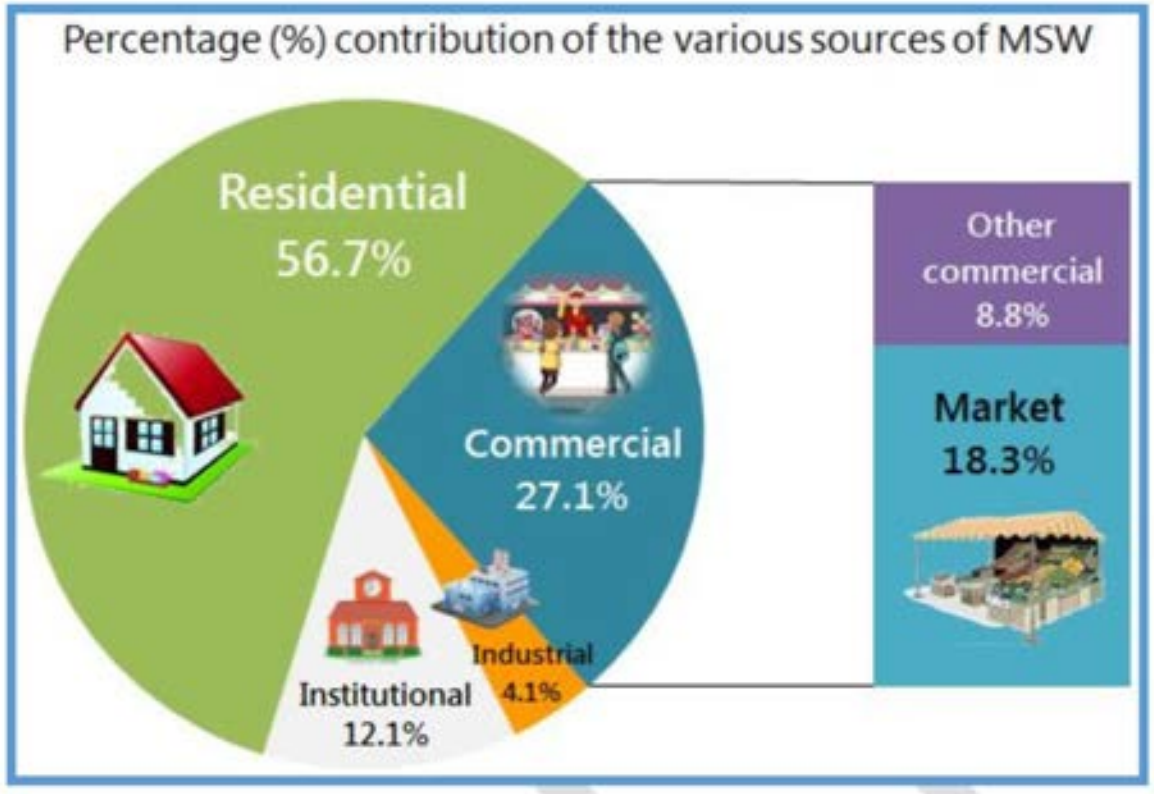
Possible Impacts on Philippine Food System

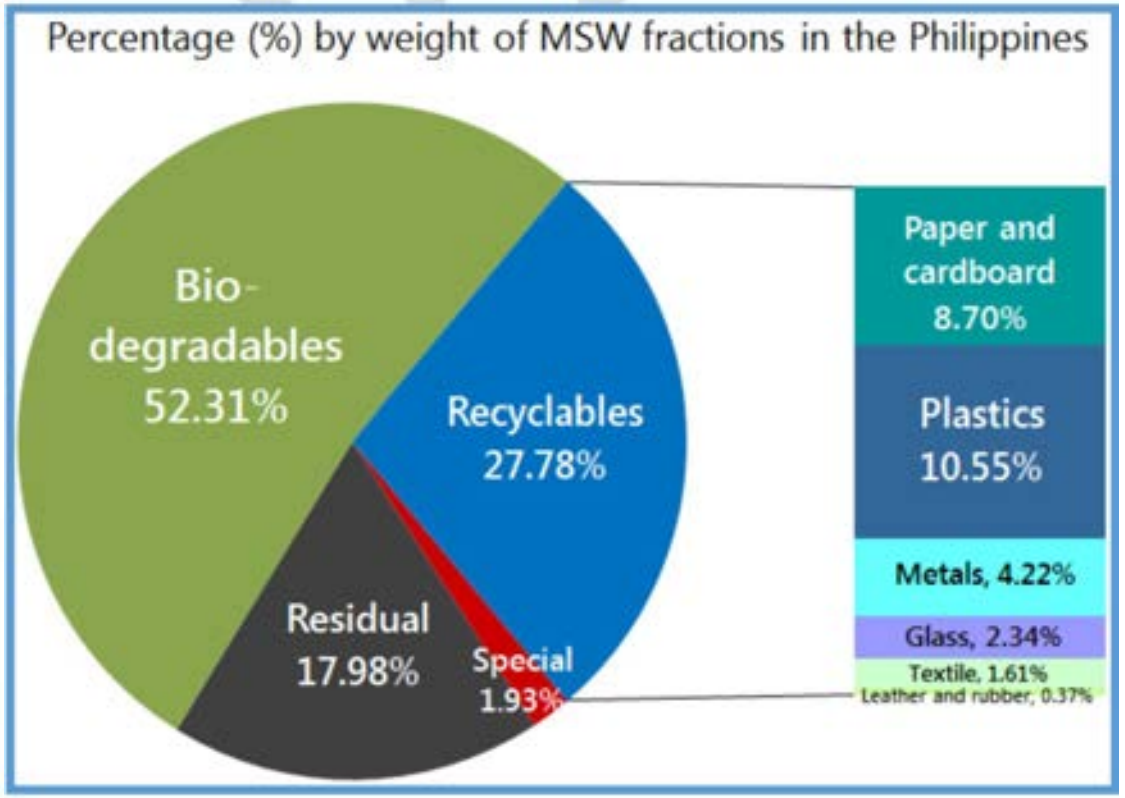
Decrease GPV of agriculture by 40% in 2050 (Dait, 2013)

Incidences of foodborne illnesses increases (Tirado *et al.*, 2010)

Malnutrition and hunger increase (FAO, 2016)

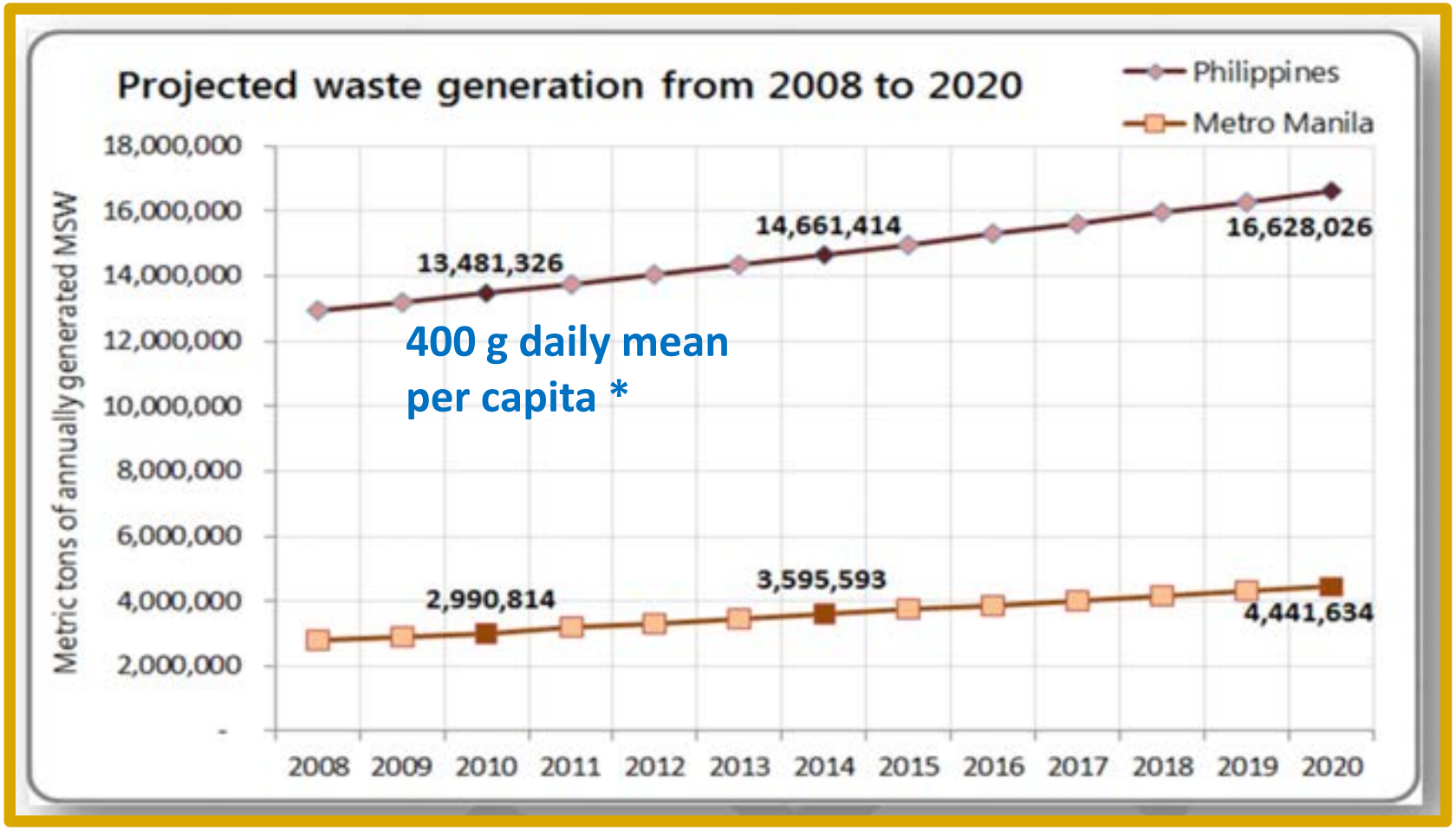
Solid wastes





(NSWMC, 2015)

Solid wastes



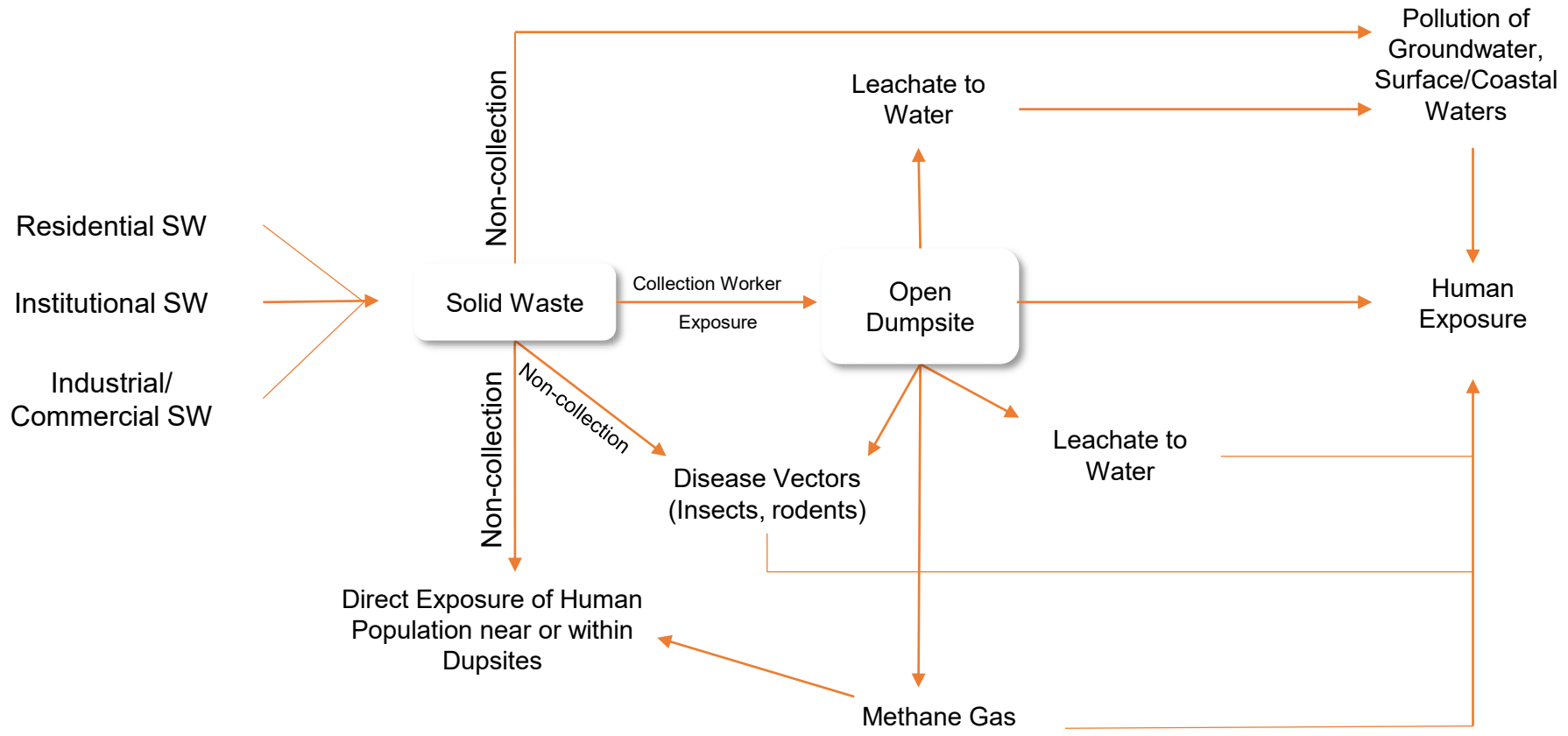
2025 @ **47.3%** urbanization rate

900 g daily mean per capita ** in urban areas

28.4 MMT

**NSWMC, 2015; **World Bank, 2012*

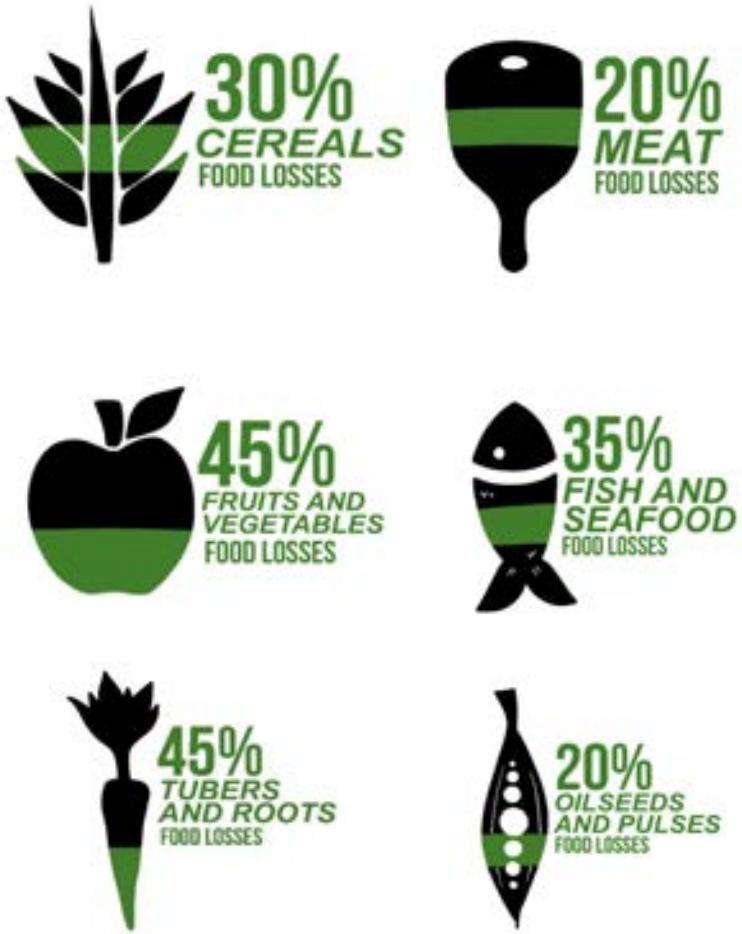
Solid wastes



Solid Waste Exposure Pathway (NSWMC, 2015)

Food losses and wastes

1/3 or 1.3 billion tons is lost or wasted annually (Gustavsson et al., 2011).



Food losses and wastes

Postharvest

1 to 14 g per capita per day**

Retail

9-37%*

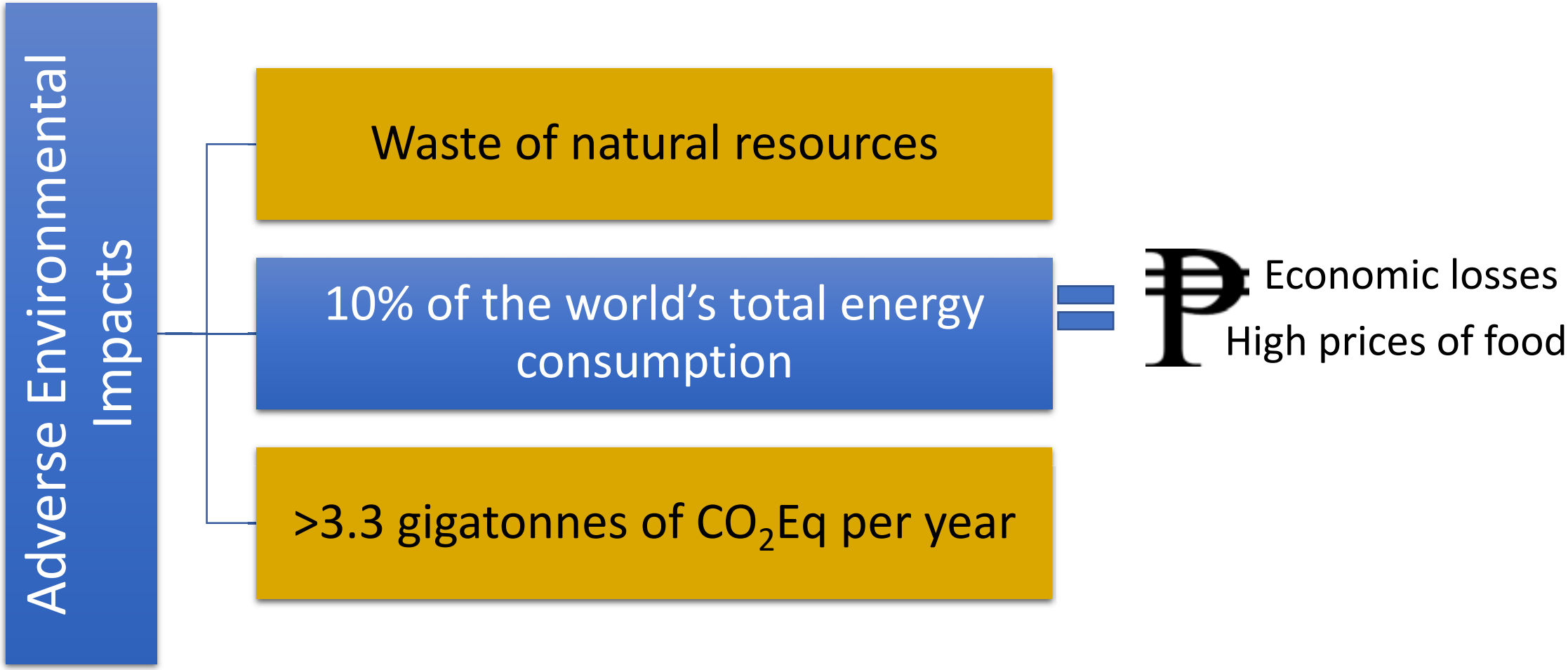
17 g: lunch *

Household

Can feed additional
346 Th to 4.68 M
Filipinos a day

** Mopera, 2016;**PSA, 2017 & FNRI, 2015; *** Rome-Laude, unpublished*

Food losses and wastes



POLITICAL ISSUES

Armed conflicts
Corruption

Armed conflicts

MAOIST

MORO

5 DECADES OF FIGHTING

(Ferrer & Cabangbang, 2012).

Armed conflicts

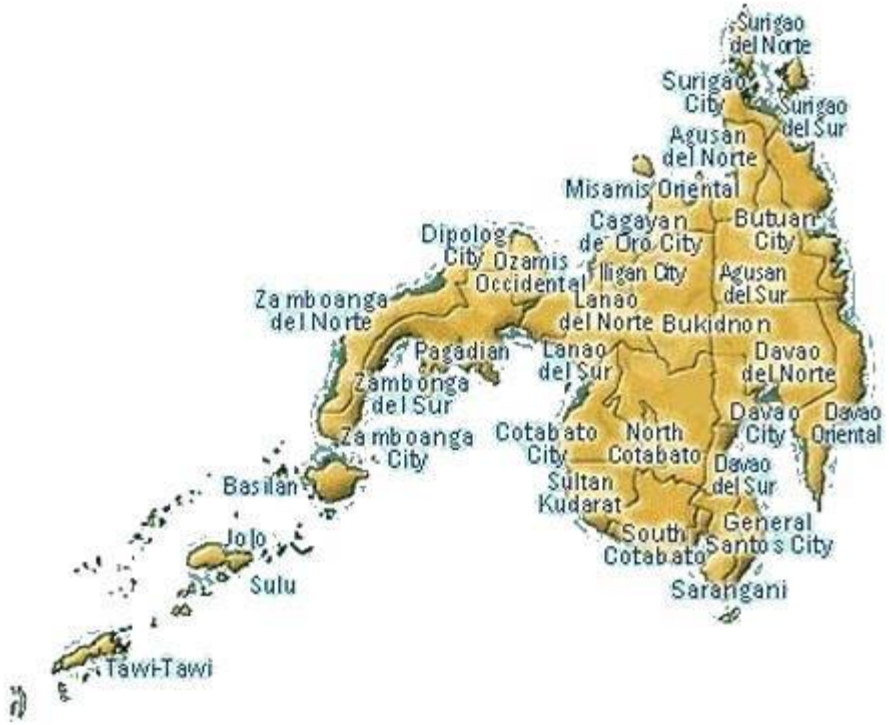
- The irony of Mindanao

- 2^{nd} largest group of islands in the Philippines
- Home to almost 1/4 of the country's population
- 1/3 of land devoted to agriculture with 8 major river basins, and most regions outside the typhoon belts
- 40% of the country's food requirements
- >30% of national food trade, being a major producer of pineapple, banana and coffee

(NEDA, 2010.

Armed conflicts

- The irony of Mindanao



High prevalence of malnutrition:
Zamboanga Peninsula: 38.7% stunted pre-school children; 44.3% stunted 6-10 y.o.
SOCCSKSARGEN: 36.3% stunted pre-school children; 41.9% wasted adolescents
ARMM: 42.6% wasted adolescents

(FNRI, 2015)

Armed conflicts

- Case of Marawi

Damaged PhP 8 billion of infrastructures and properties (LCP, undated)

Economic loss
~PhP 4 billion (LCP, undated)

Displaced more than 77,000 families or 353,000 individual (UNHCR, 2017)

Armed conflicts

- Case of Marawi

EFFECTS ON FOOD SYSTEMS OF MARAWI RESIDENTS:

1. Loss of livelihood
2. Malnutrition and hunger which led to death

Corruption

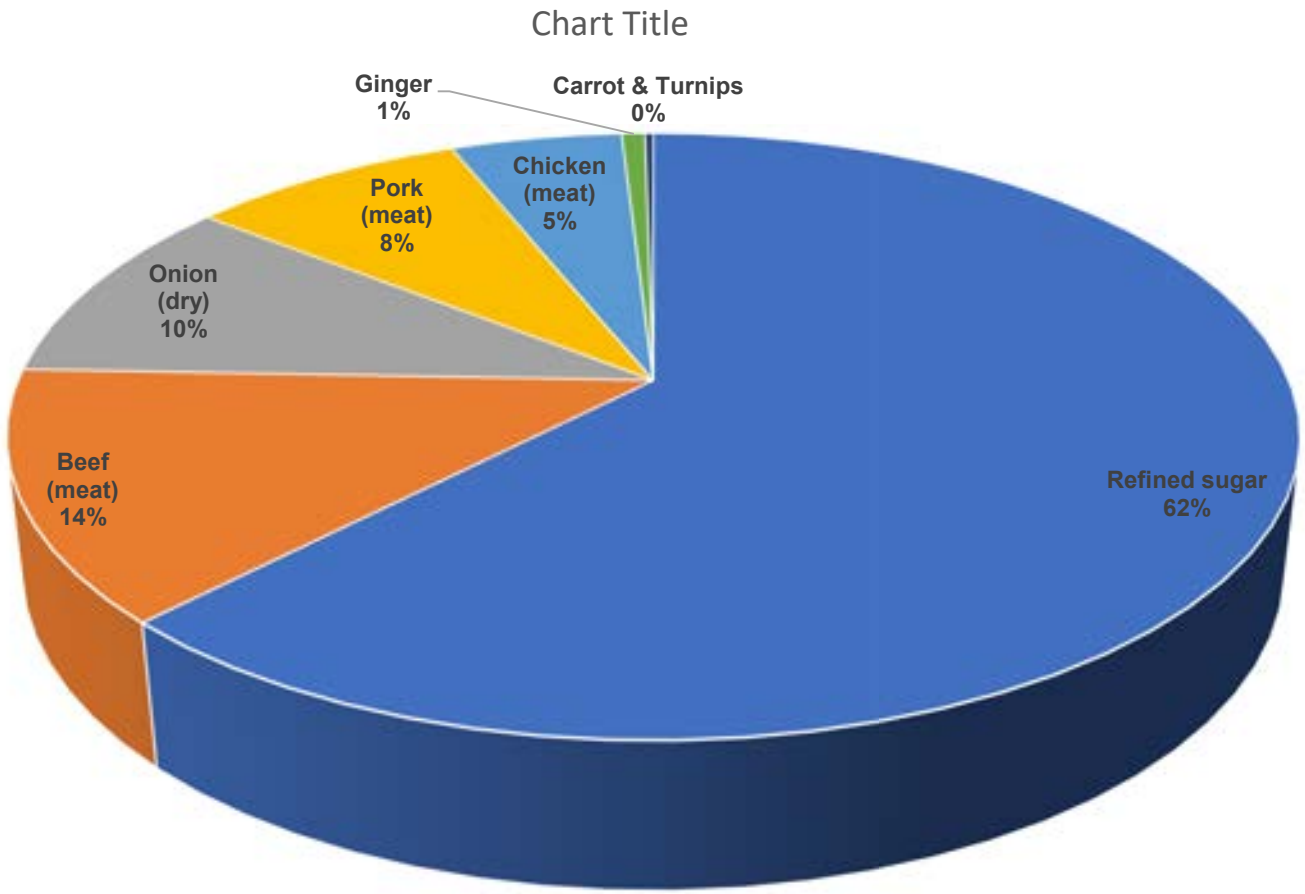
111th out of 176 =score of 34/100 in the 2017 Corruption Perceptions Index (Transparency International, 2017),

34th out of 214 countries in the Control of Corruption under the 2016 Worldwide Governance Indicators (The World Bank Group, 2018)

Lost an average of **$9.02 billion** per year from 2004-2013 on illicit financial flow, ranking **19th** amongst developing countries (Kar and Spanjers, 2015).

Corruption

- Smuggling
  - Rice: 4.34 billion MT valued at 1.2 billion USD from 1986 to 2009
  - Other smuggled food: 2.1 million MT equivalent to 1.3 million USD



SEARCA, 2014

Corruption

SECTIONS Thursday, March 15, 2018 INQUIRER.NET TODAY'S PAPER

46 SHARES

6-M kilos of 'expired' imported pork smuggled to PH, says SINAG

INQUIRER.net / 07:31 PM August 12, 2014

MANILA, Philippines—The Samahang Industriya ng Agrikultura (SINAG) disclosed Tuesday that nearly six million kilos of expired imported meat that did not undergo required quarantine tests and food safety examinations may have been smuggled into the Philippines.

Bureau of Customs. INQUIRER FILE PHOTO

In a statement, SINAG said data obtained from Bureau of Customs (BOC) sources showed that 121.6 million kilos of imported pork meat were e this year. However, official

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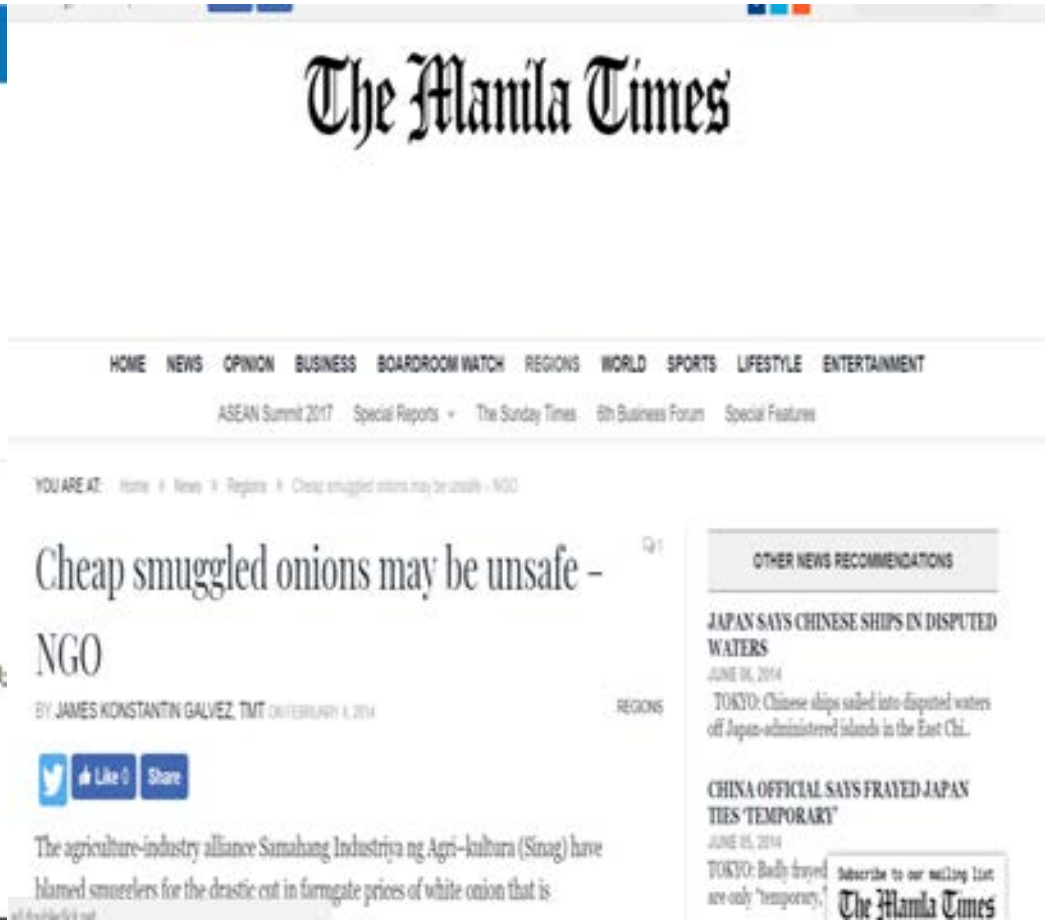

The Manila Times

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Cheap smuggled onions may be unsafe – NGO

BY JAMES KONSTANTIN GALVEZ, TMT

REGIONS

Like 0 Share

The agriculture-industry alliance Samahang Industriya ng Agri-kultura (Sinag) have blamed smugglers for the drastic cut in farmgate prices of white onion that is

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TOKYO: Badly frayed ... are only "temporary,"

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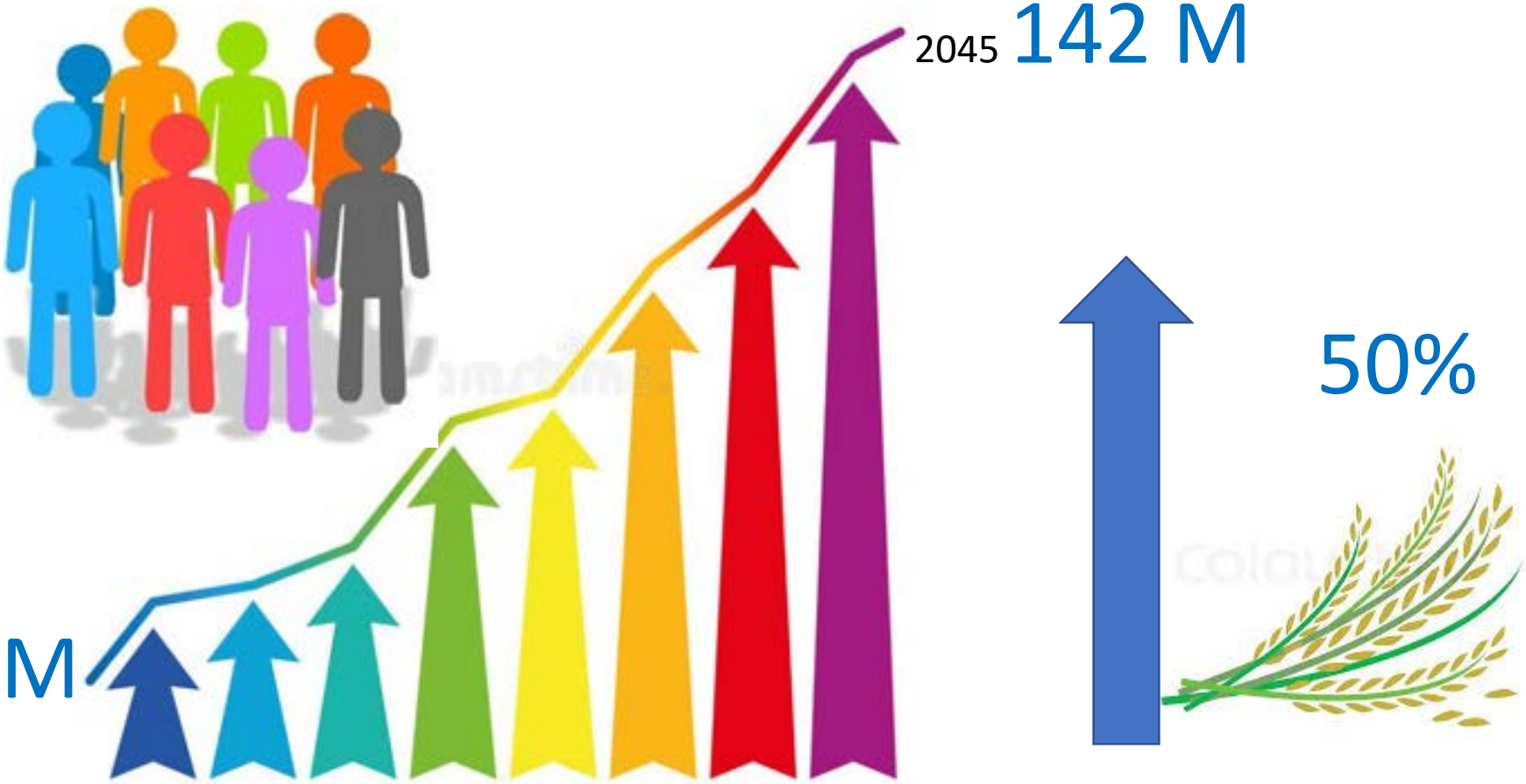
The Manila Times

SEARCA, 2014

SOCIAL ISSUES

Population growth and changing demographics
Infrastructure
Migration

Population growth and changing demographics



PSA, 2014

Population growth and changing demographics

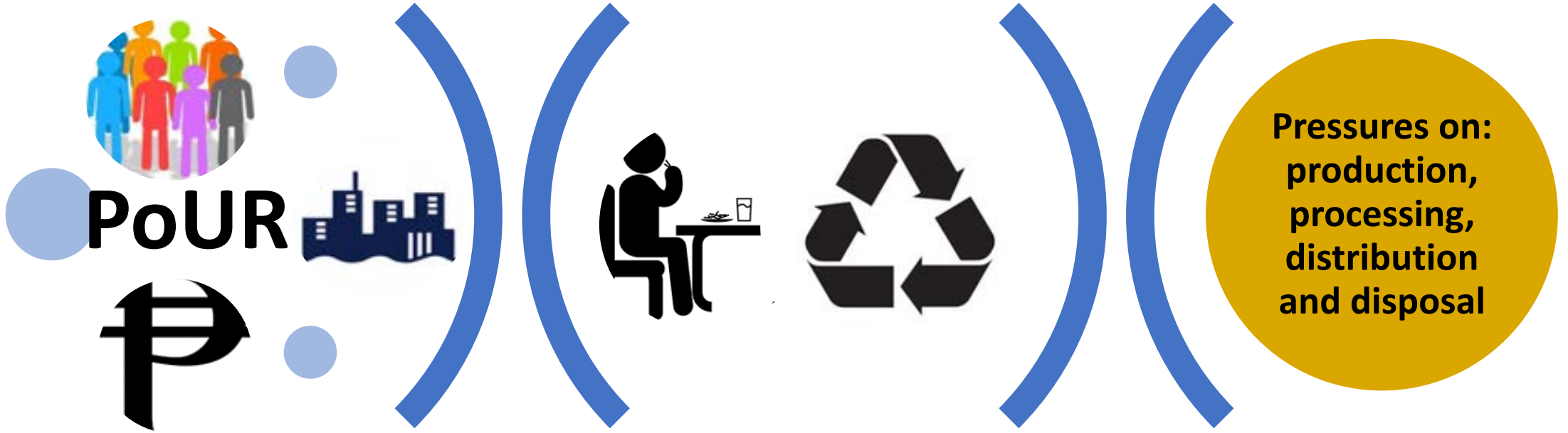
The projected amounts of food needed in 2045 to feed 142 million Filipinos[1]

Food items[2]	Per year (MMT)	Per day(TMT)
Rice and Rice Products	15.48	42.46
Corn and Corn Products	1.14	3.27
Starchy Roots and Tubers	0.71	1.99
Sugars and Syrups	0.57	1.70
Fats and Oils	0.71	2.13
Fish and Fish Products	5.68	15.48
Meat and Meat Products	3.41	9.23
Poultry	1.70	4.69
Eggs	1.28	2.27
Milk and Milk Products	2.27	6.39
Dried Beans, Nuts and Seeds	0.43	1.28
Vegetables	5.96	16.19
Fruits	2.13	5.82
Beverages	1.14	3.27

[1]Based on the mean capita consumption of Filipino households (FNRI, 2015a)

[2]In raw and processed as purchased form

Population growth and changing demographics



Triple threats

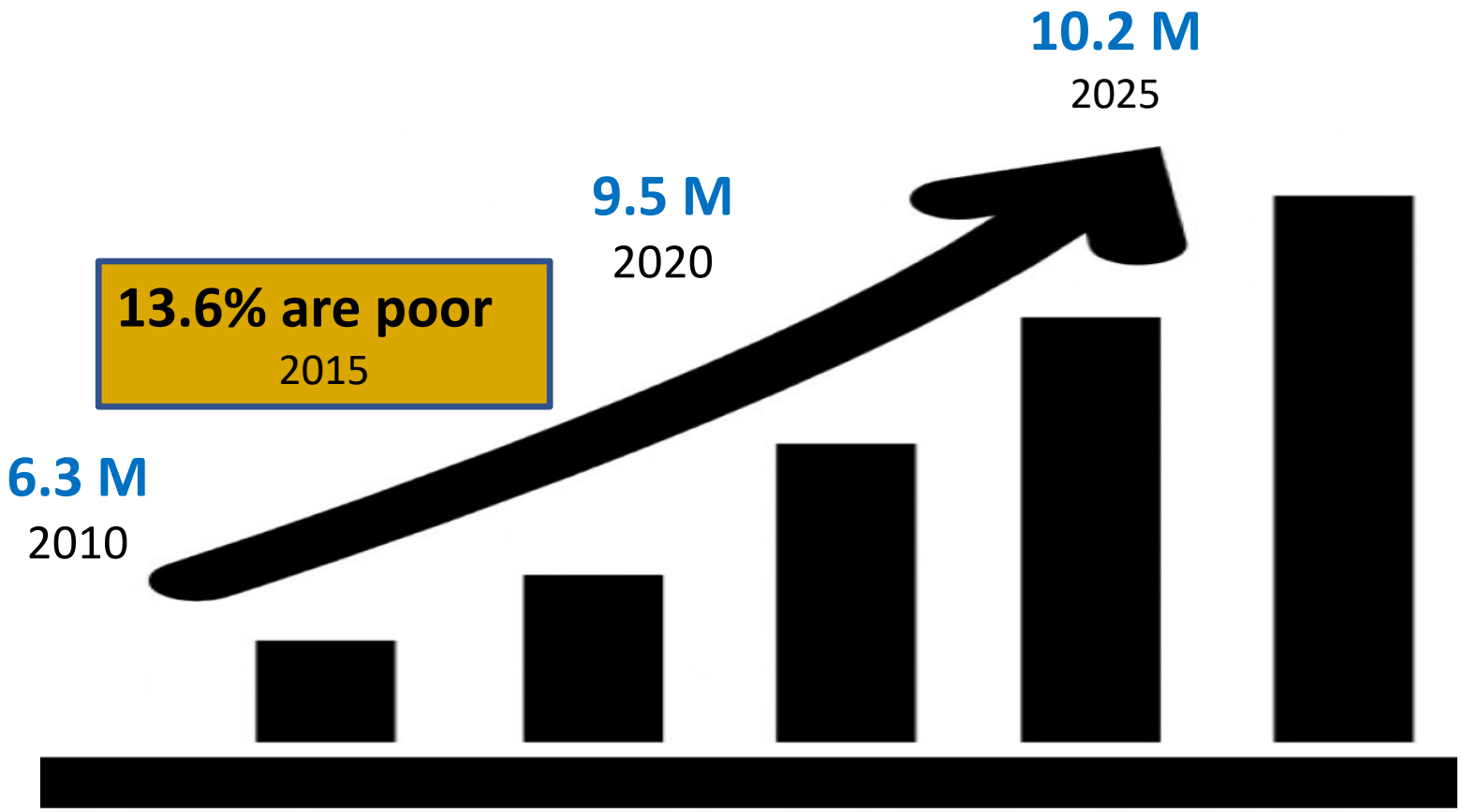
Food system

Population growth and changing demographics

- Increase in the elderly population
- Shrinking household size
- Change in household structure

Population growth and changing demographics

- Increase in the elderly population



PSA, 2015

Population growth and changing demographics

- Increase in the elderly population
  - ❖ Vulnerable to malnutrition (WHO, 2018)
  - ❖ Decrease in appetite due to Dysphagia (difficulty in swallowing), and ageing-related taste, olfaction and vision impairments (Rothenberg & Wendin, 2015)
  - ❖ Texture modification to make food acceptable (Funami, 2016)

Population growth and changing demographics

- Increase in the elderly population
  - ❖Filipino senior citizens' food consumption

< 1/5 of met the Estimated Average Requirements (EAR) for energy (17.4%), iron (8.9%), calcium (7%), vitamin A (14.1%), vitamin C (17.1%), thiamin (15.8%), and riboflavin (10%)

Population growth and changing demographics

- Increase in the elderly population
  - ❖Ageing agricultural sector

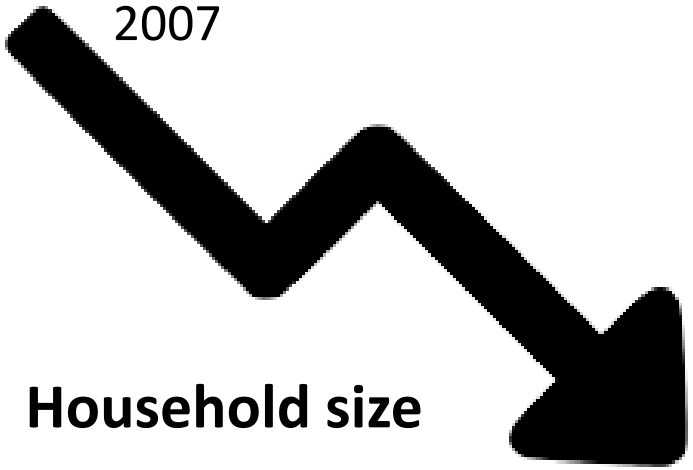
48 to 55 years old

NEDA, 2017

Population growth and changing demographics

- Decrease in household size & change in structure

4.8
2007



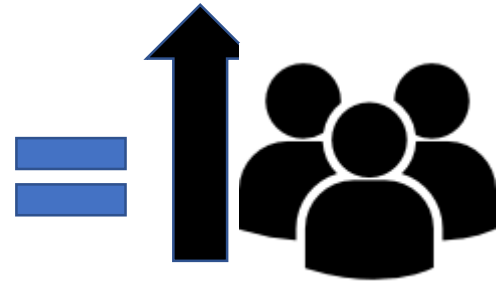
Household size

4.4
2015

No. of single (5%), widowed (5%), divorced/separated (14%)

2007

2010



Mean capita consumption per member

PSA, 2018

Population growth and changing demographics

- Decrease in household size & change in structure

SINGLE OR ONE-PERSON HOUSEHOLD (OPH)

2011: 242 million or 13% of the total households (Shin-Hyun, 2012)
2017: 300 million or 15% of total households (Chamie, 2017).

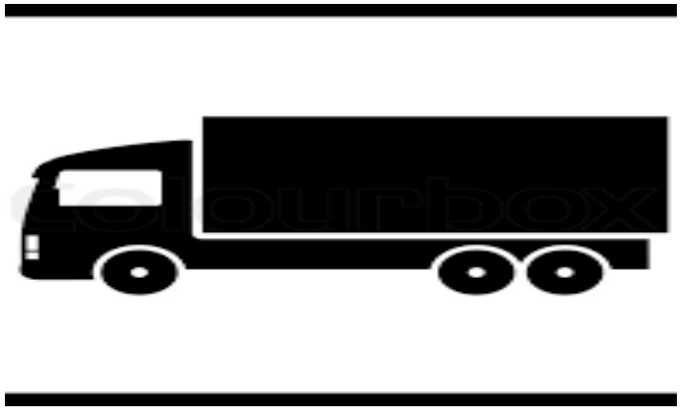
5% OPH in 2008 which is roughly 5.02 million in 2015 (based on PSA projected population growth) (UNFPA, 2012)

Population growth and changing demographics

- Decrease in household size & change in structure

Chakraborty et al., 2016

Infrastructure



significant post-harvest losses, i.e. around 15% for rice, 7% for corn, 16-40% for vegetables and 5-48% for fruits

susceptible to damage from flooding and extreme weather events and are often not passable during the wet season

physical constraints to port infrastructure results to high inter-island shipping costs

OECD, 2017

Infrastructure

NATION 2,080 SHARES

Jica: Traffic congestion now costs P3.5 billion a day

By: Ben O. de Vera- Reporter / @bendeveraINQ Philippine Daily Inquirer / 12:10 PM February 22, 2018

oto / EDWIN BACASMAS

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Infrastructure

- Metro Manila road infrastructure
  - low-quality public transport, traffic congestion, poor road network quality and inadequate network quality (NEDA, 2017).
- Economic cost of traffic congestion in Metro Manila will reach PhP 6 billion a day by 2030 if there is no intervention (JICA, 2014)

Migration

"**Migration** is a worldwide phenomenon" - FAO, 2017c

2015

244 million

international migrants

2013

More than 10 million Filipinos abroad are with permanent, temporary and illegal status. 25% are considered OFWs.

2010

Approx. 173 million international migrants globally

UN 2015; CFO, 2013; PSA, 2014

Migration

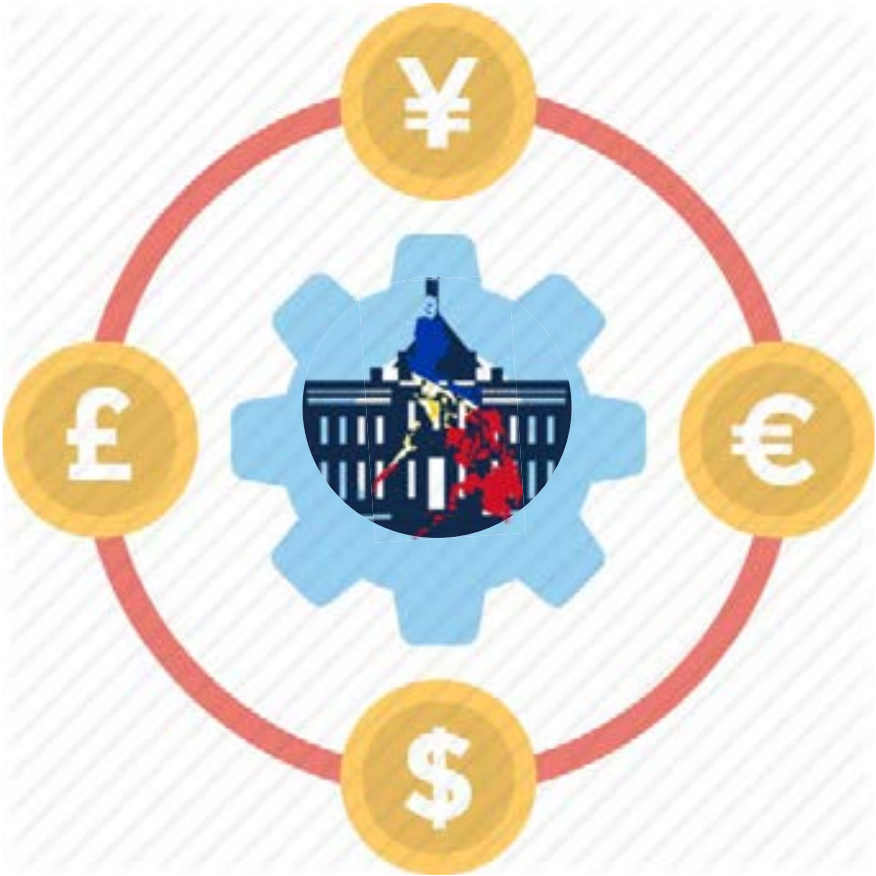
Remittances from OFW are one of the main drivers of the Philippine economy.

2016

PhP 202.3 billion

remittances from OFW=

10.2% of the GDP



(World Bank 2017)

Migration

Improved purchasing power positive effects on per capita calorie consumption and food diversity (Nguyen & Winters, 2011)

Consumption of more food, access to more expensive food and shift towards a more diversified, high-protein and micronutrient-rich diet (Karamba, Quiñones, & Winters 2011)

Enhanced child growth patterns (Azzarri & Zezza, 2011)

No effect on total food expenditures per capita, and minimal effect on food expenditure pattern; shift on food consumption in high migration regions towards potentially less nutritious foods such as sugar, beverages and food eaten outside home (Romano & Traverso, 2017)

Migration

Families of Filipino migrants spend their remittances on basic commodity such as food, clothing and shelter (Rispens-Noel, 2018; Aldaba & Opiniano, 2008)

+ Number of OFWs per region vs mean capita daily food consumption of Filipino households and intake of cereal products, fats and oils, meat and dairy products in 2013 (PSA, 2017; FNRI, 2015)

WHAT ARE THE OPPORTUNITIES IN PHILIPPINE FOOD SYSTEMS?

Opportunities

- Science, technology & innovation (STI)
- Sustainable food systems (SFS)
- Research & trade cooperation (RTC)

Science, technology and innovation (STI)

FOOD MEGATRENDS

and examples of opportunities for research and collaboration

(Augustin et al., 2016).

Science, technology and innovation (STI)

Sector	R&D Programs	R&D Projects
National Integrated Basic Research Agenda (NIBRA)	Food and nutrition security Food safety and biodiversity studies	Epidemiology of food and feed-borne contaminants Diseases and pathogens of important crops Safety analysis of raw and processed foods
Health	Functional foods Nutrition and food safety Disaster risk reduction-health Climate change adaptation-Health	Development of functional foods (e.g. guyabano, malunggay, sweet potato Fortified multi-nutrient growth products and rice extrudate Ready to use therapeutic foods and food for emergencies Omic Technologies for Health and Wellness

Examples of the priority research and development (R&D) programs and projects under the DOST's HNRDA 2017-2022 that pertain to Philippine food systems.

Science, technology and innovation (STI)

Sector	R&D Programs	R&D Projects
Agriculture Aquatic and Natural Resources (AANR)	Postharvest, processing and product development Applied genomics	Postharvest, processing and product development of priority commodities (e.g.legumes, cacao, rootcrops, goat) Application of genomics in breeding and selection Development of standards
Industry and Emerging Technology	Food and Nutrition Security Intelligent Transportation Solutions	Rapid test kits for contaminants Value-adding of fishery by-products Smart and green packaging technology Cost-effective alternative mass transport systems and components Commuters and public utility vehicle information systems

Examples of the priority research and development (R&D) programs and projects under the DOST's HNRDA 2017-2022 that pertain to Philippine food systems.

Science, technology and innovation (STI)

Sector	R&D Programs	R&D Projects
Disaster Risk Reduction and Climate Change Adaptation	Warning and risk assessment Technology Development and Application for Climate Change Mitigation and Adaptation	Web-based and mobile phone-based warning and information Impact-based/risk-based modelling and forecasting Microbial Biotechnology for Sustainable Waste Management and Alternative Energy Source

Examples of the priority research and development (R&D) programs and projects under the DOST's HNRDA 2017-2022 that pertain to Philippine food systems.

Sustainable Food Systems (SFS)

Global Action for Sustainable Consumption and Production

10YFP

Sustainable Food Systems PROGRAMME

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

Sustainable Food Systems (SFS)

Sustainable Food Systems (SFS)

Aims to lessen food wastage and contribute to the improvement of the implementation of SCP processes in the foodservice sector

(WWF,2017)

Sustainable HORECA

Sustainable Food Systems (SFS)

- ***Philippine Good Agricultural Practices (PhilGAP) Certification Program***
  - ❖Good agricultural practices (GAP) refer to practices that address environmental, economic and social sustainability for on-farm processes, and which result in safe and quality food and nonfood agricultural products (FAO, 2008).

Sustainable Food Systems (SFS)

- ***National Organic Agriculture Program (NOAP, RA 10068)***
  - ❖promotion and commercialization of organic farming practices,
  - ❖cultivation and adoption of production and processing methods which have already been developed, or to be developed,
  - ❖continuing research and upgrading thereof, the capacity building of farmers and the education of consumers thereon, the extension of assistance to LGUs, POs, NGOs and other stakeholders
  - ❖documentation and evaluation of the program

Sustainable Food Systems (SFS)

- ***Gulayan sa Paaralan Progam (GPP)***
  - ❖Supports the hunger mitigation initiatives of the government and encourages public elementary and secondary schools to establish school gardens to ensure continuous supply of vegetables for the School-Based Feeding Progam, and other feeding programs
  - ❖Appreciation of agriculture as a life support system

Sustainable Food Systems (SFS)

- ***National Agri-fishery Mechanization Program*** *(NAFMP, RA 10601)*
  - ❖Mechanization
    - ✓can possibly enhance the agricultural uplands, hilly production system
    - ✓reduce or minimize postharvest losses
    - ✓ reduce pressures in the environment that would in turn achieve food security

Sustainable Food Systems (SFS)

- *Food Donation Act (RA 9803, 2009)/ Food Surplus Act (HB 2469)/ Zero Food Waste Act (SBN 357)*
  - ❖The Food Donation Act of 2009 is an act to encourage the donation of food for charitable purposes to alleviate national poverty and reduce food wastage (RA 9803, 2009)

Sustainable Food Systems (SFS)

- *Food Donation Act (RA 9803, 2009)/ Food Surplus Act (HB 2469)/ Zero Food Waste Act (SBN 357)*
  - ❖*Food Surplus Act (HB 2469)/ Zero Food Waste Act (SBN 357)*- promote, facilitate, and ensure the reduction of food waste through redistribution and recycling
  - ❖Requires food-related businesses (e.g. food manufacturers, supermarkets, restaurants, cafeterias, and hotels) to donate edible food wastes which are unadultered and in good condition to food banks.

Sustainable Food Systems (SFS)

RAPPLER News Video Business Newsbreak MovePH Views Life & Style Entertainment Sports Tech BrandRap X

#HUNGERPROJECT

Senate bill: Restaurants must donate excess food to charities

The proposed Zero Food Waste Act seeks to improve the state of food security in the Philippines

Jodesz Gavilan
@jodeszgavilan

Published 4:45 PM, July 24, 2016
Updated 4:45 PM, July 24, 2016

ITFS - Davao GAP ....pdf pidseid1702 (2).pdf A-Long-Term-Visio....p... AmbisyonHighligh....pdf

Sustainable Food Systems (SFS)

Section 5. Food-related Business Waste Reduction Strategy. — Food-related businesses such as food manufacturers, supermarkets, restaurants, cafeterias, and hotels are hereby required to:

a. Submit an initial report to the DSWD and DENR that contains data on the amount (in tons) of its edible and inedible food waste in the past year, organized according to the manner of disposal, including donation, composting or discarding.
b. Submit an annual report to the DSWD and DENR that contains data on the amount (in tons) of its edible and inedible food waste in the immediately precedent year, organized according to the manner of disposal, including donation, composting, or discarding.
c. Enter into a contract with food banks to redistribute edible food waste to the food insecure.
d. Shoulder the costs of transporting edible food waste from business location to the food bank's warehouse or distribution center.
e. Ensure that edible food waste is unadulterated and in good condition upon arrival at the food bank's distribution center.
f. Enter into a contract with waste management and recycling enterprises to recycle inedible food waste into fertilizer or compost.
g. Shoulder the costs of transporting inedible food waste from collection areas to waste management sites.
h. Reach and maintain food waste levels at the target set by the DENR.

Sustainable Food Systems (SFS)

The Global FoodBanking Network

GFN E-LEARNING NEWS CONTACT US

WHAT WE DO | WHY WE EXIST | WHO WE ARE | TAKE ACTION

TAKE ACTION ›

Hunger is often not a food problem; it's a logistics problem. Approximately 15-30% of food in emerging economies is wasted. Each year billions of pounds of food go to waste, while 1 in 4 people are malnourished. Food banking systems capture surplus food and deliver it to the people who need it most, engaging all sectors of society (governments, business, and civil) in the process. Food banks acquire donated food, much of which would otherwise be wasted, from farms, manufacturers, distributors, retail stores, consumers, and other sources, making it available to those in need through an established network of community agencies. These agencies include school feeding programs, food pantries, soup kitchens, AIDS and TB hospices, substance abuse clinics, after-school programs, and other nonprofit programs that provide food to the hungry.

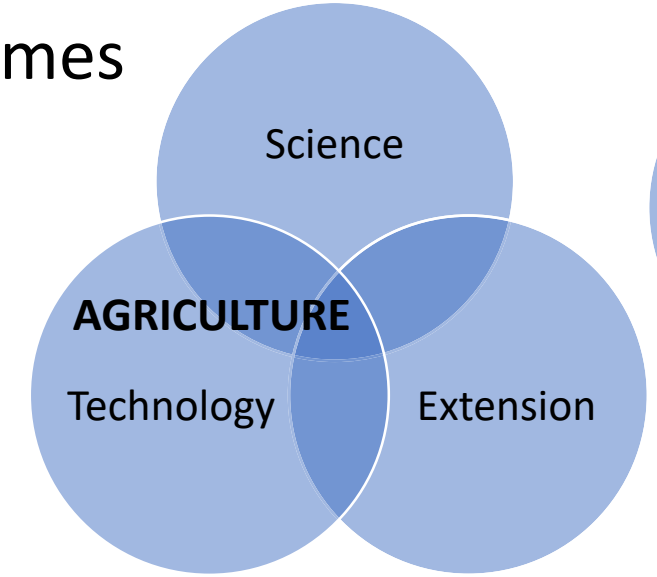
Research & trade cooperation

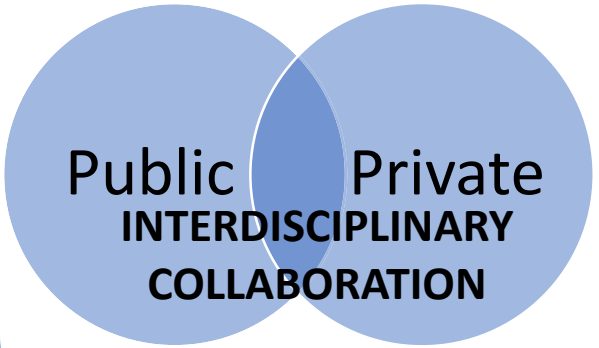
- Goal 17: Revitalize the global partnership for sustainable development
  - Finance
  - Technology
  - Capacity-building
  - Trade
  - Systemic issues

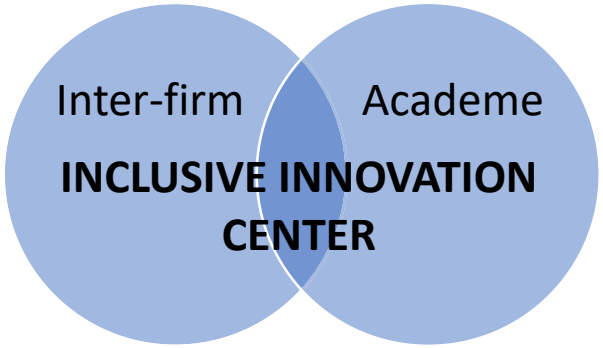
Research & trade cooperation

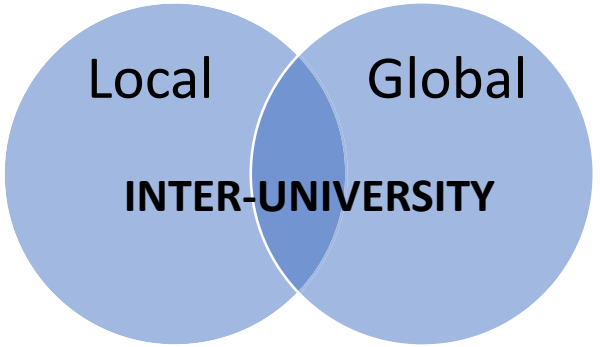
- National collaboration schemes

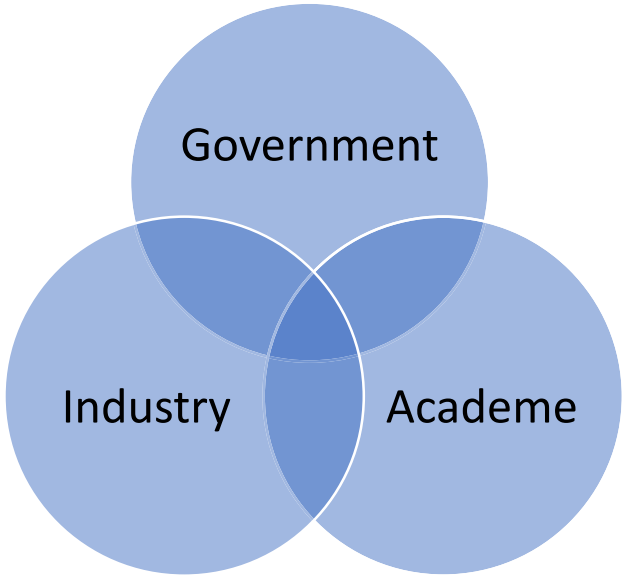
Philippine Development Plan 2017-2022











Research & trade cooperation

- National collaboration schemes

S4CP

endeavors to significantly accelerate Science, Technology and Innovation (STI) in the country through massive **increase in investment** on S&T Human Resource Development and R&D through the program

Research & trade cooperation

Accelerated R&D Program for Capacity Building of Research and Development Institutions and Industrial Competitiveness

NICER

Accelerate industrial competitiveness by **capacitating HEIs in the Regions** to undertake quality research that will promote regional development

RDLead

Employ experts with strong leadership, management and innovative policy-making proficiencies to be in charge of strengthening the research capabilities of the HEIs

CRADLE

Create a synergistic **relationship between the academe and the industry** with the goal of invigorating R&D

BIST

Level-up the Philippine Industrial Sector through the industry R&D, and acquisition of strategic and relevant technologies to enhance their technology level and production processes.

Science for Change Program (S4CP)
DEPARTMENT OF SCIENCE AND TECHNOLOGY

Research & trade cooperation

- International collaboration schemes

1. Increase engagement of international talents to optimize the delivery of quality instruction as well as the quality and quantity of research and innovations (p. 156); and
2. Intensify international cooperation in STI (p. 225)

Research & trade cooperation

- International collaboration schemes

Food and Agriculture Organization of the United Nations

2030 AGENDA FOR SUSTAINABLE DEVELOPMENT

THIRD INTERNATIONAL CONFERENCE FINANCING FOR DEVELOPMENT 13-16 JULY 2015 · ADDIS ABABA · ETHIOPIA TIME FOR GLOBAL ACTION

PARIS2015 UN CLIMATE CHANGE CONFERENCE COP21·CMP11

UNITED NATIONS DECADE OF ACTION ON NUTRITION 2016-2025

Sendai Framework for Disaster Risk Reduction 2015 - 2030

Research & trade cooperation

- International collaboration schemes

- public-private collaboration
- talent mobility, people to people connectivity, and inclusiveness
- enterprises support
- public awareness and STI enculturation .

Research & trade cooperation

- International collaboration schemes

- building science capacity
- promoting enabling environment for innovation
- enhancing regional science and technology connectivity

Research & trade cooperation

- Trade cooperation
  - ❖Universal, rules-based, open, non-discriminatory and equitable multilateral trading system under WTO, including through the conclusion of negotiations under its Doha Development Agenda
  - ❖Increase the exports of developing countries with a target of **doubling the least developed countries' share of global exports by 2020;**

Research & trade cooperation

- Trade cooperation
  - ❖Timely implementation of duty-free and quota-free market access on a lasting basis for all least developed countries, consistent with WTO decisions

Summary

- Philippine food systems- challenges

Dependent on food and fuel prices, financial elements and international trade

Influenced by consumption patterns due to rising incomes & urbanization

Vulnerable to disasters (natural and man-made) and climate change

Generate losses and wastes with environmental, social and economic costs

Tremendous pressure from population growth and changing demographics,

Inefficiencies due to poor infrastructure

Summary

- Philippine food systems- opportunities

How can we feed 142 million Filipinos in 2045?

We all need to pitch in and do our share for a better Philippine food system that hopefully can be enjoyed by the next generation of

ACKNOWLEDGMENTS

Nutrition 230 students

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SEAMEO SEARCA

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