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Is Food Supply Accessible, Affordable, and Stable? The State of Food Security in the Philippines

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Abstract

Based on The Economist's 2021 Global Food Security Index (GFSI), the Philippines ranked 64th out of 113 countries in terms of its four dimensions of food security. After the World War II ended, the world still had to contend with population explosion, hunger, and poverty. The Philippines, just like other countries in the world, was actively searching for solutions through the conduct of research and the implementation of various agricultural programs and nutrition programs aimed at increasing food production and fighting the widespread malnutrition, especially among Filipino children.

Since the term food security was officially defined and become popular in the late 1990s, it has been included in government laws, policies, and programs, such as the *Agriculture and Fishery Modernization Act of 1997*. This paper aims to evaluate the progress of AFMA implementation to date and assess prospects towards completing its Food Security objective.

Using various indicators for the four dimensions of food security, namely, food availability, food accessibility, food utilization, and stability, the paper found that food security goal is yet to be achieved. Even the country's performance in achieving the *Sustainable Development Goal (SDG) 2: Zero Hunger* reflects that there have been some improvements, but significant and major challenges remain to be addressed.

However, it is worth noting that the Department of Agriculture and other government agencies, which are tasked to develop the agriculture sector and ensure food security and nutrition, have made significant strides toward this goal, albeit falling short.

Keywords: food security, food, AFMA, hunger, nutrition, food systems, food availability, self-sufficiency, food utilization, food accessibility, food affordability

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***Ivory Myka R. Galang*[1]**

1. Introduction

Considering the worldwide economic and social disruptions brought about by the COVID-19 pandemic, food security is proven to be one of the major and urgent issues that governments have to address. Especially when many countries tightened their borders and trade of goods and services slowed down, those countries with efficient and reliable food systems were seen to be in a better position to cater to the needs of their people—both the food consumers and food producers. This is evidenced by slower increase in food inflation rates among high-income countries as opposed to low- and lower middle-income countries. Modern and efficient food systems (usually adopted in high-income countries) do not only ensure ample supply of food amidst crisis, but also keep food prices at affordable levels.

After the World War II ended, the world continued to face big battles, which are population explosion, hunger, and poverty. The Philippines, just like other countries in the world, tried to find solutions through the conduct of research and the implementation of various agricultural programs and nutrition programs aimed at increasing food production and fighting the widespread malnutrition, especially among Filipino children. Understandably, policies then were geared towards food production and food self-sufficiency as countries were still coping with the aftermath of the war. Eventually, other issues aside from food availability like accessibility, utilization, nutrition, and stability began to surface.

The term "food security" became more widely used after the World Food Summit came up with an official definition. Since then, food security has appeared in national laws, such as the Agriculture and Fisheries Modernization Act (AFMA) of 1997. AFMA is the blueprint for crafting agricultural development policies since the time of then-President Fidel Ramos. Section 2 of AFMA reads as follows "[t]he State shall promote food security, including sufficiency in our staple food, namely rice and white corn" (AFMA 1997). AFMA identifies food security as one of its objectives, to wit: "to ensure the accessibility, availability, and stable supply of food to all at all times" (AFMA 1997, Section 3).

Based on The Economist Intelligence Unit's 2021 Global Food Security Index (GFSI), the Philippines ranked 64th out of 113 countries in terms of its four dimensions of food security (EIU 2021a). The performance of the country in terms of the different dimensions and indicators of food security needs to be carefully examined.

This book chapter aims to evaluate the progress of AFMA implementation to date, assess prospects towards completing its Food Security objective, and frame policy recommendations accordingly. The specific objectives of the study are as follows:

i) To review available literature and data for assessing AFMA objective 3: To ensure the accessibility, availability and stable supply of food at all times;

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This paper is part of a forthcoming book called "How Modern is Philippine Agriculture? The Agriculture and Fisheries Modernization Act (AFMA) after a Quarter Century."

ii) To develop a Theory of Change (TOC) which will serve as a framework for evaluation of AFMA objective 3, tracing linkages from AFMA interventions to outcomes and impacts;
iii) To apply the TOC in evaluating the extent to which food has been made accessible, affordable, and stable, using evidence and indicators reviewed under Study Objective i);
iv) To provide plausible explanations for the pace and magnitude of improvement in food security, including the role of AFMA-mandated interventions;
v) To identify benchmark for determining prospects for achieving accessible, affordable, and stable supply of food, and assess prospects for attaining this benchmark; and
vi) To draw out implications for government and other key stakeholders of agriculture and fisheries sector.

2. Background

2.1. The evolving concept of food security

Food Availability. The modern concept of food security has evolved throughout the years from 1970s to present. In 1970s, the food security concept was first defined at the World Food Conference where food supply (both availability and price) at the international and national levels was the main concern (FAO 2006). At the time, the world was facing worsening hunger[2] levels and soaring food prices (HLPE 2020).[3]

Food Accessibility. Despite increasing levels of food availability, famines continued. The literature on food security shed light on other dimensions apart from availability (HLPE 2020). In 1980s, accessibility and temporal dynamics dimensions (chronic vs. transient food security) were added to the food security concept (FAO 2006). People's ability to access food is determined by the overall "economic conditions, employment and livelihood availability, and ownership of assets" (HLPE 2020, p.6). During the same decade, the Food and Agriculture Organization (FAO) considered both food supply and food demand in analyzing food security at more disaggregated levels (individual, household, regional, national, and international levels) (FAO 2006).

Food Utilization, Nutrition, and Stability. The delegates of the World Food Summit (1996) defined food security using a multidimensional lens—accessibility, availability, food use, and stability—while incorporating concepts of vulnerability and risk management. Nutritional aspect was incorporated under the utilization dimension. Moreover, the delegates in the said Summit adopted the "Right to Adequate Food" and direction of analysis has since geared towards a more rights-based approach (FAO 2006).

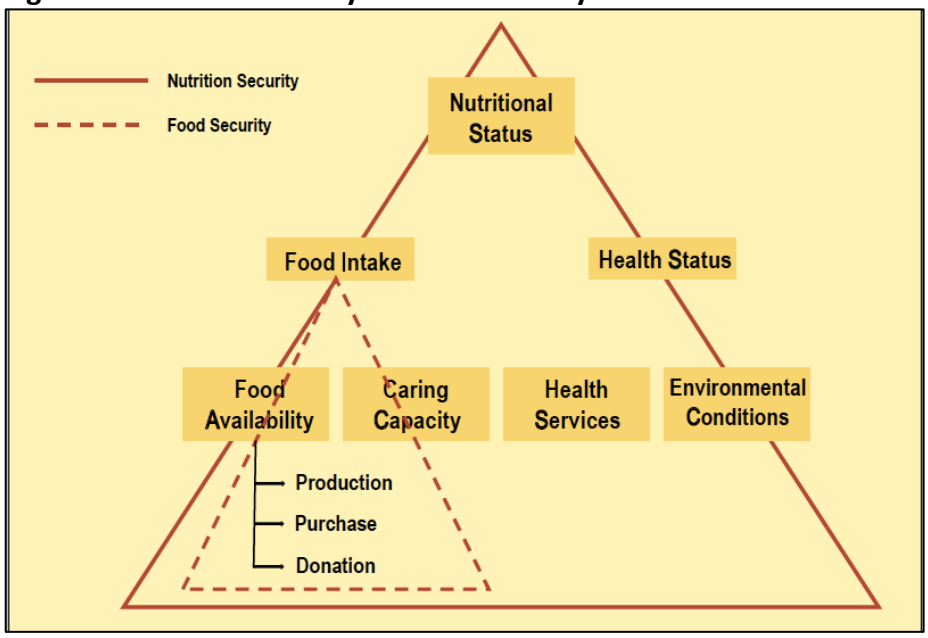
The definition of food security that is most widely used came from the FAO's State of Food Insecurity Report (2001), to wit:

> "Food security exists when all people, at all times, have physical, social, and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life" (HLPE 2020, p.7).

[2] FAO defines hunger as "a condition in which people do not get enough food to provide the nutrients for fully productive, active and healthy lives."
[3] HLPE refers to High Level Panel of Experts on Food Security and Nutrition (https://www.fao.org/3/ca9731en/ca9731en.pdf)

Food security contributes to the partial attainment of nutrition security. **Figure 1** shows that nutrition security is a broader goal than food security, which is concerned with both food intake and health status. When people are able to access food that is affordable, nutritious, and with adequate and stable supply, their nutritional status improves. This plays a part in bringing down the prevalence rates of various markers of malnutrition such as stunting, wasting, undernutrition and obesity. The gains from the achievement of food security need to be complemented with other health-related interventions (e.g. micronutrient supplementation, promotion of healthy lifestyle).

Figure 1. Nutrition security vs. Food security



Source of image: Gross et al. 2000 as cited in Chiang and Capina (2018)

In 2000, the world leaders came together in the United Nations headquarters in New York to adopt a set of goals (e.g. reduce extreme poverty) to be achieved by 2015. The goals were later called the Millennium Development Goals (MDGs). Hunger was lodged together with the extreme poverty in MDG 1. Nutrition, on the other hand, cuts across different goals such as MDG1 (Eradicate extreme poverty and hunger), MDG 4 (Reduce Child Mortality), and MDG 5 (Improve Maternal Health).

FAO started considering food security and nutrition at the same time through its Food Security and Nutrition Analysis Unit when they developed the Integrated Food Security Phase Classification (IPC) in 2004 (IPC 2022). The IPC aimed to provide decisionmakers with "rigorous, evidence- and consensus-based analysis of food insecurity and acute malnutrition situations, to inform emergency response as well as medium- to long-term policy and programming" (European Commission n.d.). The IPC was originally developed for Somalia, but it eventually grew into a global partnership with 30 countries in Latin America, Africa, and Asia (European Commission n.d.).

IPC (2022) identifies three scales, namely, Acute Food Insecurity, Chronic Food Insecurity, and Acute Malnutrition. Acute Food Insecurity scale "classifies food insecurity found at a specific point in time and of a severity that threatens lives or livelihoods, or both, regardless of the causes, context or duration (p.3)", while Chronic Food Insecurity is "food insecurity that persists over time mainly due to structural causes, including intra-annual seasonal food

insecurity (p.4)". Lastly, Acute Malnutrition scale "focuses on identifying areas with a high proportion of acutely malnourished children that require urgent action (p.5)", which can be observed by looking at the thinness of individuals or the presence of oedema[4].

The distinction among the three scales was done given the different severity levels, and the corresponding approaches and interventions needed to address each scale. For example, the Acute Food Insecurity has five phases, which are No (household classification)/Minimal (area classification) (Phase 1), Stressed (Phase 2), Crisis (Phase 3), Emergency (Phase 4), and Catastrophe (household classification)/Famine Like; (area classification) (Phase 5). Annex 1 provides a complete list and description of the phases per scale and the corresponding pertinent urgent actions (IPC 2022).

In 2015, the MDGs were replaced with a new set of global targets called the Sustainable Development Goals (SDGs). The SDGs has 17 goals and one of which is Goal 2 that aims to "End hunger, achieve food security and improved nutrition and promote sustainable agriculture." Hunger and nutrition are taken together as one of the many developmental goals. Under SDG 2, the following are the indicators used:

- Food price volatility index (2000-2014)
- Agriculture, value added per worker (1991-2017)
- Prevalence of undernourished (2001-2017)
- Prevalence of stunting (1987 -2015, incomplete series)
- Prevalence of overweight in children aged 2-4 (1990-2016, incomplete series)
- Prevalence of wasting, weight for height (1987-2015, incomplete series)
- Plant breeds for which sufficient genetic resources are stored (1995-2018, incomplete series)

In recent years, the analysis of food security has incorporated more concepts including sustainability of the environment and resilience to external shocks. The Economist Intelligence Unit annually releases a ranking of 113 countries based on a composite index called the Global Food Security Index (GFSI) that carefully consider issues on food affordability, availability, quality and safety, and natural resources and resilience.

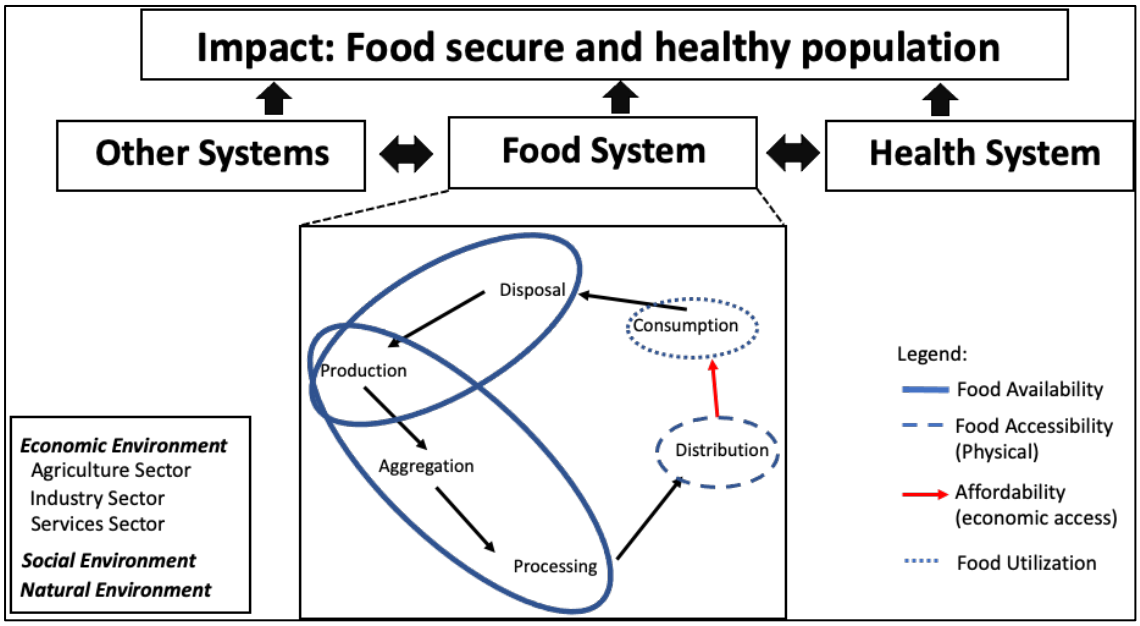
2.2. Food System Framework

The traditional approach was focused on production of food, i.e. development of programs that would increase food supply. Although the said approach is important in certain areas where supply of food may be scarce (e.g. Sub-Saharan Africa), other situations may require a different approach. In the recent decade, FAO has started adopting a systems view approach that utilizes systems thinking and recognizes the different interactions and feedback loops (FAO 2018) between and among actors, sub-systems, systems, and environments.

FAO defines "food system" as a system that encompasses an entire range of actors involved in the value chain, from the production, aggregation, processing, distribution, consumption and disposal of food products. This system is embedded within the economic (agriculture, industry and services sectors), societal, and natural environments (FAO 2018). It is composed of sub-systems (e.g. farming system, waste management system, input supply system) and interacts with other key systems (e.g. energy system, trade system, health system) (see **Figure 2**).

[4] Oedema is "a build-up of fluid in the body which causes the affected tissue to become swollen." https://www.nidirect.gov.uk/conditions/oedema#:~:text=Oedema%20is%20a%20build%2Dup,doesn't%20clear%20by%20itself.

Figure 2. Food System Framework



Source: Author's own work, adapted from FAO (2018)

The three basic sectors of the economy, namely, agriculture, industry, and services, are necessary in meeting the required food demand of consumers. The agriculture sector produces goods that feed into the industry and services sectors. The food manufacturing subsector (under the industry sector) absorbs agricultural products, which are usually in raw form or semi-processed, that will be converted into processed form (e.g. canned goods). The services sector, specifically the wholesale and retail trade subsector and the accommodation and food service activities subsectors, source food products from the agricultural sector (e.g. fresh produce) and industry sectors (processed food), which will ultimately be sold to consumers.

One example of feedback loop is how demand influences production through consumer preferences (FAO 2013) (e.g. demand for plant-based diet). Another loop is when after reaching disposal stage, the actor goes back to production stage. The idea is to collect or treat food waste and return valuable organic and mineral compounds back to agriculture, and then production starts again (McConVille et al. 2015).

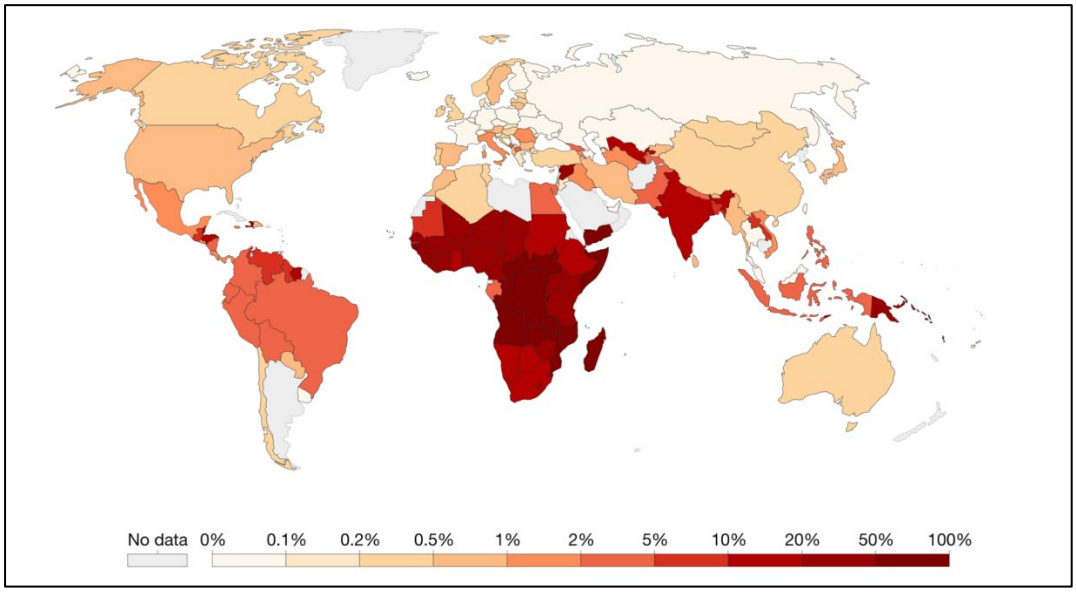
2.3. Economic Environment of Food Security

This paper shall focus its discussion on the economic environment of food security. Other chapters of the book shall touch upon other environments (social and natural) in the broader context of agricultural development.

2.3.1. Economic development, Poverty, and Food security

Rapid economic growth is considered as the main driver of various countries (mostly Asian countries) to solve their problems like poverty and food insecurity (World Bank 1993 as cited in Timmer 2004). **Figure 3** shows the share of population in extreme poverty in 2019 across the world. High-income countries have lower poverty rates as opposed to low-income countries (e.g. Africa) (World Bank 2019).

Figure 3. Share of population in extreme poverty, 2019



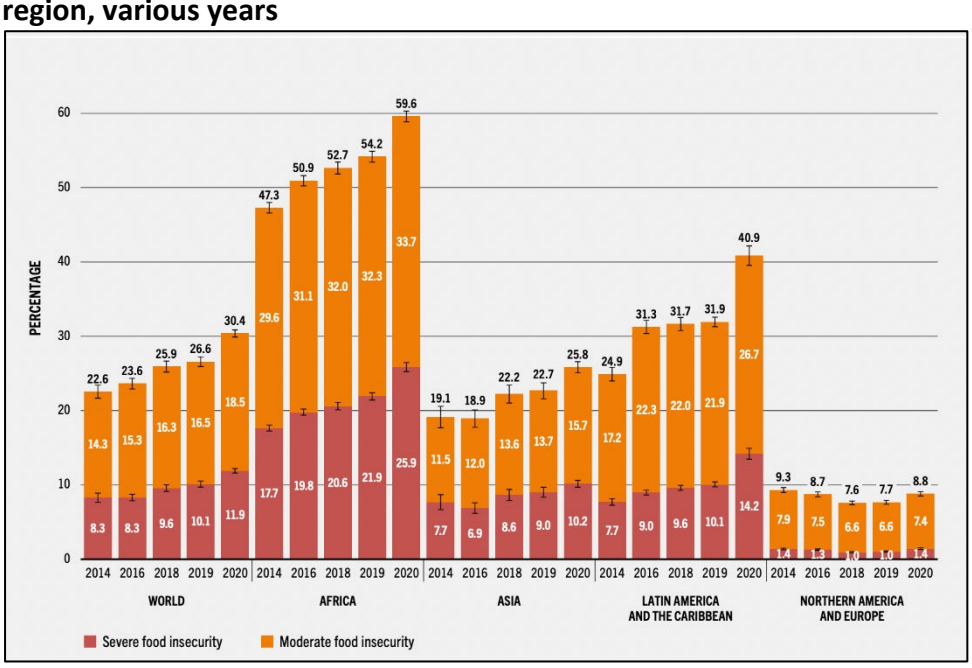
Source of image: World Bank PovcalNet (https://ourworldindata.org/extreme-poverty)
Note: Figures relate to household income or consumption per person, measured in international $ (in 2011 PPP prices (to account for price differences across countries and inflation over time.

Rich and poor countries both battle food security but their experiences vary in terms of dimension and extent of the problem. High-income countries like the US have an advanced food distribution system that makes food prices low (Akbari et al. 2022). With the financial, human, and technological resources available in rich countries, they are able to "prevent or alleviate catastrophes, social or natural" (Timmer 2004, p.3) that could trigger food price hikes or shortages. Moreover, consumers in rich countries respond to such steep food price increases by relying on their buffer of nonfood expenditures (Timmer 2004). On the other hand, low-income populations suffer disproportionately from economic slowdowns and downturns or other shocks because they utilize a big chunk of their income to purchase food (FAO et al. 2021a).

Based on **Figure 4**, a third of the world's population is either moderately[5] or severely[6] food insecure in 2020. Even before the pandemic hit the world, the trend of food insecurity across countries has been increasing. Poorer regions like Africa have more than half of its population suffering from food insecurity, with around one-fifth already suffering from severe food insecurity pre-pandemic. On the other hand, richer regions like the Northern America and Europe were able to maintain a smaller percentage of around 10 percent throughout the years.

[5] Moderate food insecurity is based on the Food Insecurity Experience Scale and it refers to "a lack of consistent access to food, which diminishes dietary quality, disrupts normal eating patterns, and can have negative consequences for nutrition, health and well-being" (FAO et al. 2021a, p.192).
[6] Severe food insecurity is the "level of severity of food insecurity at which people have likely run out of food, experienced hunger and, at the most extreme, gone for days without eating, putting their health and well-being at grave risk, based on the Food Insecurity Experience Scale" (FAO et al. 2021a, p.193).

Figure 4. Percentage of population affected by moderate or severe food insecurity, by region, various years



Source of image: FAO et al. 2021a.

In terms of affordability of a healthy diet, **Table *1*** shows that a staggering 90 percent of people living in low-income countries are unable to afford a healthy diet which costs USD 4.06 per person per day. This is strikingly high in terms of number of people at 463 million as opposed to 15.8 million for high income countries (which corresponds to 1.4 percent only) (FAO et al. 2021a).

The cost of a healthy diet is cheapest in high-income countries at USD 3.64 per person per day in 2019. The increase in cost from 2017 was countered by rising income, thus the number of people unable to afford it actually decreased by 9.9 percent compared with the number in 2017 (FAO et al. 2021a).

Table 1. Cost of a healthy diet and Percent of population unable to afford a healthy diet in 2019

	Cost of a healthy diet in 2019		People unable to afford a healthy diet in 2019		
	Cost (USD per person per day)	Change between 2017 and 2019 (percent)	Percent	Total number (millions)	Change between 2017 and 2019 (percent)
Low-income	4.06	5.4	87.6	463	4.8
Lower-middle-income	4.49	14.3	69.5	1,953.2	-1.4
Upper-middle-income	4.20	5.7	21.1	568.5	-2
High-income	3.64	6.6	1.4	15.8	-9.9

Source: FAO et al. (2021a)

Table 2 shows the health implication of being food insecure. In Africa, the prevalence of undernourishment is one in five people is undernourished. The trend was decreasing from 2005 to 2015, but it started going up again starting in 2016. In Asia, the prevalence rate was at 13.9 percent in 2005 and it went down to 7.9 percent before the pandemic. Unsurprisingly, the prevalence of undernourishment in Northern America and Europe is maintained at a level below 2.5 percent. However, the obesity problem has been worsening in this region (See Figure 5).

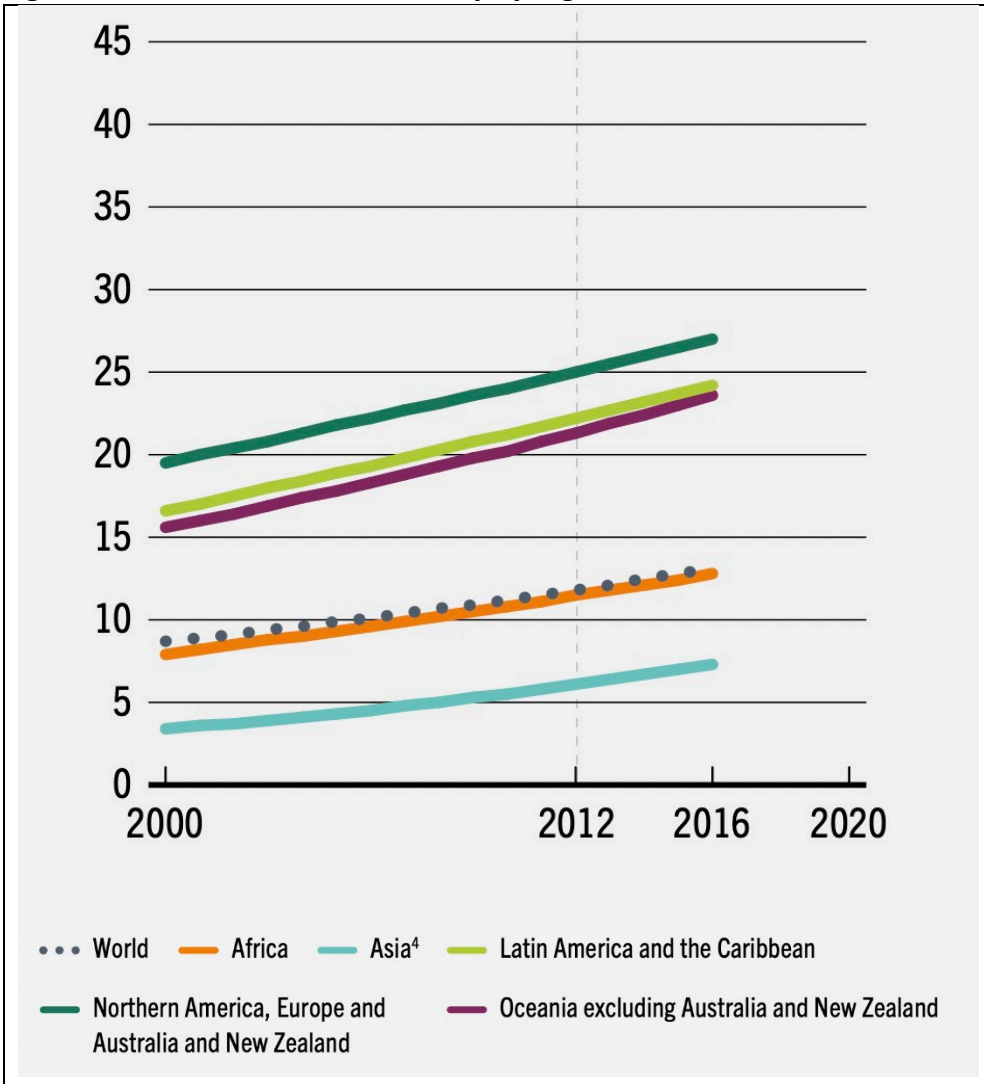
Hawkes et al. (2012) hypothesized that the market liberalization in 1980s made food (in general) more affordable meaning it covers both nutritious and non-nutritious food (FAO 2013). The increasing trend in obesity among adults is said to be correlated with country income level (FAO et al. 2021a). Amidst growing income and increasing food affordability, people do not necessarily choose healthy diets. Thus, policymakers focusing on food and nutrition security should look at other factors such as convenience and responsiveness of people to nutrition education (FAO 2013).

Table 2. Number of undernourished people (in millions) and prevalence rate of undernourishment (%), by region, 2005-2020

	2005	2010	2015	2016	2017	2018	2019	2020*
World	810.7	636.8	615.1	619.6	615.0	633.4	650.3	768.0
	12.4%	*9.2%*	*8.3%*	*8.3%*	*8.1%*	*8.3%*	*8.4%*	*9.9%*
Africa	195.0	187.4	199.7	212.0	212.3	227.1	253.3	281.6
	21.3%	*18.0%*	*16.9%*	*17.5%*	*17.1%*	*17.8%*	*18.0%*	*21.0%*
Asia	553.6	400.1	369.9	356.1	352.1	354.6	361.3	418.0
	13.9%	*9.5%*	*8.3%*	*8.0%*	*7.8%*	*7.8%*	*7.9%*	*9.0%*
Latin America and the Caribbean	51.9	40.7	36.4	42.9	42.2	43.7	45.9	59.7
	9.3%	*6.9%*	*5.8%*	*6.8%*	*6.6%*	*6.8%*	*7.1%*	*9.1%*
Oceania	2.3	1.9	2.4	2.5	2.6	2.6	2.6	2.7
	6.9%	*5.3%*	*6.1%*	*6.2%*	*6.3%*	*6.2%*	*6.2%*	*6.2%*
Northern America and Europe	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
	<2.5%	*<2.5%*	*<2.5%*	*<2.5%*	*<2.5%*	*<2.5%*	*<2.5%*	*<2.5%*

Note: *Projected values based on the middle of the projected range; n.r. = not reported, as prevalence is less than 2.5 percent.
Source: FAO et al. 2021a

Figure 5. Prevalence of adult obesity by region,%, 2000-2020



Source of image: Lifted from FAO et al. 2021a (p. 34)

Short-term interventions such as income transfers in the form of direct government subsidies or price policy support benefit only a small segment of the population. These support mechanisms do not increase the welfare of a much broader part of the population. Lipton (2004) argues that countries should strive to achieve higher economic productivity for better living standards and be able to sustain it in the long run. Looking at the context of food security, the poor's food intake and nutritional well-being should be prioritized in the short term, but the ultimate goal should be the eradication of poverty in the long run (Lipton 2004 as cited in Timmer 2004, p.11).

Timmer (2004) agreed with Lipton's point and noted that governments should create a "facilitative environment" to allow households to achieve food security on their own by implementing macro-level policies. He further pointed out that micro-level or direct household interventions, on the other hand, are difficult to implement due to project-related issues, (e.g. definition, project design, management).

2.3.2. Rural economy, Agriculture sector, and Food security

Achieving economic growth does not necessarily guarantee solving persistent food insecurity and malnutrition. Haddad et al. (2003) found that despite a 2.5 percent annual growth in per capita income sustained for 20 years (which is equivalent to a total of 65 percent increase in income), the prevalence of underweight children in developing countries would only be reduced by 27 percent (as cited in FAO 2013). Policymakers need to understand the characteristics of the food insecure. They are mostly poor, who are living in rural areas, and are engaged in agricultural activities. FAO (2021) estimated that 80 percent of the extreme poor are in the rural areas. Their economic conditions limit their chances to overcome the hunger, food insecurity, and malnutrition (FAO 2021).

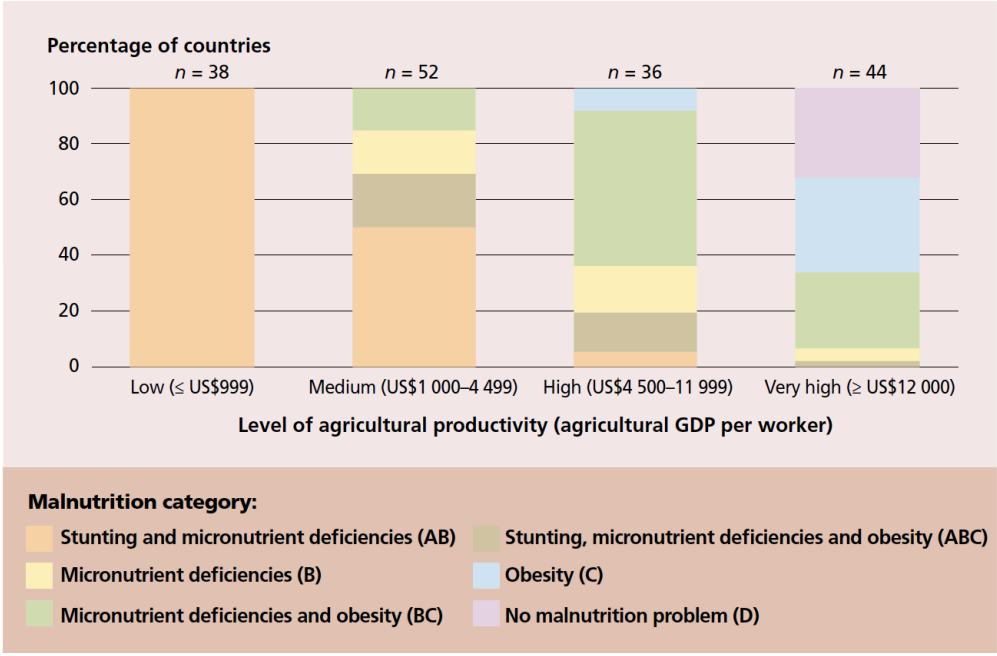
Implementing food policies that could promote productivity in the rural economy is one strategy towards the attainment of food security and alleviation of poverty. By simply aiming for overall development of the country, the poor are left to fend for themselves. Rather, policies and other interventions should address the structural inequalities to enable them to access opportunities to help themselves get out of poverty (FAO 2021). For example, the transformation of the agri-food systems in rural areas is seen as a great opportunity to link poor smallholders with the food value chains, especially in the Southeast Asian region. This integration may be facilitated by public-private-producer partnerships (PPPPs) to help smallholders access productive resources (e.g. capital and technology) and access viable markets (FAO 2021).

By encouraging growth in the agriculture sector, food access, diet diversity, and nutrition could improve. Among the three economic sectors, the growth in the agriculture sector is felt more by the poor, which is the case in most of Asian countries (Timmer 2004). For example, in India, sustained agricultural growth has been instrumental in lowering malnutrition among children during the period of the rapid adoption of Green Revolution technologies from 1960s until early 1990s (Heady 2011 as cited in FAO 2013).

Agricultural productivity does not only lead to higher incomes and lower poverty rates, but also tend to benefit all consumers. For instance, higher agricultural productivity makes food more available and accessible through lower food prices. Consumers are also able to purchase nutrient-dense foods like meat, milk, fruits, and vegetables because staple foods would be taking smaller share of their available household budget (FAO 2013).

Figure 6 shows the relationship between the level of agricultural productivity and the level of malnutrition (FAO 2013, p.22). As the level of agricultural productivity increases, there tends to be higher opportunities for people to satisfy their micronutrient needs by diversifying their diets (FAO 2013). However, other factors are also at play in effectively translating higher income into better nutritional outcomes among young children, which are parental education, women's social status, and access to health care and clean water (FAO 2013).

Figure 6. Share of countries in each malnutrition category, by level of agricultural productivity



Note: n refers to the number of countries per agricultural productivity level; Agricultural productivity is computed by dividing agricultural GDP (in 2010 measured in current USD) by the population economically active in agriculture.
Source of image: Lifted from FAO (2013, p.22)

However, as the economic structure of a country changes, i.e. becoming less dependent on the agriculture sector, the potential impact on food insecurity and malnutrition of the improvements in the agriculture sector shrinks as well (FAO 2013).

2.3.3. Food Supply and Price Stabilizing Measures

Timmer (2004) identified a third component to finally solving food insecurity in addition to rapid economic growth and reducing poverty through rural economic growth. It is the stabilization of price (Timmer 2004). The stability of both food demand and food supply would be reflected on the affordability of food. Whenever there are demand or supply shocks, the price a certain good tends to fluctuate. In the case of staple goods (which are considered as necessary goods), they tend to have inelastic demand, which means that demand for such type of goods is not much affected by any price change (either increase or decrease). On the other hand, nutritious foods (such as fruits and vegetables) tend to have elastic demand. This means that a price change would result to a big change in the demand of nutritious foods.

Before discussing the ways on how to achieve stability, it is crucial to understand the reason why stabilization is an important factor to attain food security, especially for the poor.

Price changes significantly affect household dietary diversity. When there is a food crisis and food prices start to soar, households try to maintain their consumption level of staple foods at the expense of more nutrition-dense foods (FAO 2013). For instance, Indonesians had to reduce their non-staple food consumption when the Asian financial crisis occurred that led prices of staples to increase steeply. The lower diet diversity had adversely impacted on their nutritional status (Block et al. 2004 as cited in FAO 2013). Likewise, Bouis et al. (2011) found that

Bangladeshis would reduce staple food consumption by only 15 percent if its price would increase by 50 percent, while non-staple consumption would be disproportionately decreased way more if the price is increased by 50 percent as well (as cited in FAO 2013).

Sharp increase in the price of rice is certainly bad for the poor (Timmer 2004), who allot a big chunk of their food expenditures on staples alone. Consequently, governments recognize the untoward impact of rice price increases on the poor and so they try to keep its price stable in their domestic markets (Timmer 2004).

Aside from consumers, farmers also prefer stable prices. Price increase per se is not bad. The problem stems from the uncertainty of price levels in the future and the rate of change in the price. When prices are stable and predictable, farmers are incentivized to respond to high price levels by investing more resources onto their production (World Bank 2012 as cited in Zorya et al. 2015). In the long run, smallholder farmers are also able to benefit from high level of food prices because this encourages investments in agricultural research and other productive agricultural techniques thereby stimulating food production further (Gillson and Busch 2015). When farmers raise their production level, food prices would tend to fall. Thus, when there is uncertainty in price changes, farmers are unable to respond accordingly, thereby causing food prices to remain at high levels (World Bank 2012 as cited in Zorya et al. 2015).

Trade policies and market-driven risk management instruments are among the many ways to manage the volatility of food prices. According to Anderson and Roumasset (1996), governments should not adopt market-distorting policies to ensure price stability (as cited in Timmer 2004). Gillson and Busch (2015) also believe that open and predictable trade policy environment and less government involvement in marketing boost food supply in the medium term.

Open and predictable trade policy environment. Price volatility could come from local market or from the international market. Whenever price volatility is greater in local markets than that in international markets, Zorya et al. (2015) argue that countries could pursue stronger integration with the international/regional markets to control the local price volatility. Timmer (2004) and Dawe (2009) noted that "large, sustained deviation of domestic prices from world prices in either direction leads to substantially suboptimal food security outcomes and slows the rate of economic growth" (as cited in Zorya et al. 2015, p.66).

To create an open and predictable policy environment, there are two pre-requisites. These are 1) improvements in trade facilitation, and 2) efficient transportation and logistics infrastructure. As described by Gillson and Busch (2015), food trade should be based on the following (p. 111):

1. "harmonized and easy-to-satisfy border procedures that reflect the capacities of farmers and traders;
2. information on rules and regulations that are easily available and well known; and
3. clear notification procedures for new rules and regulations that allow traders, other governments, and agencies to contest proposed changes and give producers time to adjust."

Especially in developing countries, traders have to contend with a number of fees and documentary requirements that often result in long delays in moving food consignments across borders. This inefficiency in trade flow poses serious repercussions for perishable items like

food products. Any delay in moving these items entails costs that will be shouldered by traders and would eventually be passed on to consumers (Gillson and Busch 2015).

Apart from trade facilitation, transportation and logistics are critical elements in maintaining efficiency in goods trading, especially food. However, the state of transport and logistics in many developing countries is poor and this is reflected in the cost of moving the goods. Based on Organization for Economic Co-operation and Development (OECD) benchmark, transport and logistics costs should only be around 9 percent of total costs, but the share goes up to 48 percent in Nicaragua (for importing corn from US) and 40 percent in Honduras (for importing wheat) (Arvis et al. 2012 as cited in Gillson and Busch 2015). According to Arvis et al. (2010), investments to improve the transport infrastructure have been proven to be effective in reducing consumer prices (e.g. in Nepal) (as cited in Gillson and Busch 2015).

Market-driven risk management instruments. Food price risks can be managed through warehouse receipts system or weather-insurance index, among other market-driven risk management instruments. These entail limited costs to trade and fiscal space, while ensuring guaranteed supply of food amidst potential domestic supply shocks (Gillson and Busch 2015).

Warehouse receipt systems "allow farmers to deposit a certain quantity of a commodity into a private warehouse where it can be pooled with other commodities of a similar, specified quality" (World Bank 2005 as cited in Gillson and Busch 2015, p. 113). A receipt is issued to the farmer as proof of ownership and the location of the item. The receipt is considered as a negotiable instrument that the farmer may use to sell or to use as collateral for a loan. This system allows farmers to have 1) improved access to formal credit, 2) protection against very low sale prices, and 3) safe storage for their product (Gillson and Busch 2015). In the Philippines, Briones and Tolin (2016) recommended the pilot testing of the warehouse receipt system to improve the efficiency in marketing rice and corn in the Philippines and the corresponding legislative reforms to implement this system.

Weather-indexed insurance, on the other hand, is a "type of financial derivative written against deviations in average rainfall or temperature indices constructed from data measured at weather stations" (Gillson and Busch 2015, p.113). This helps farmers mitigate the effects of climate shocks such as excessively hot and dry conditions, or extreme cold that could inevitably raise the prices of their agricultural commodities. This has been piloted in several developing countries like the Philippines, India, Malawi, Mexico, Mongolia, Tanzania, and Thailand (UN 2007 as cited in Llanto and Badiola 2010). It has also been found that this instrument is affordable to poor farmers without the need for subsidies (Llanto and Badiola 2010).

2.3.4. Determinants of household-level food security in the Philippines

There have been several studies looking at the determinants of food security among Filipino households. In 1970s, a study by Herrera (1976) used a household survey data concerning rural households in Laguna, Philippines. Herrera found that diet quality was positively correlated with 1) income, 2) wealth, 3) mother's education, and 4) whether the mother prepares food. On the contrary, diet quality is negatively affected by 1) household size, 2) employment of the mother, and 3) distance from the town center (as cited in Evenson et al. 1980 and Roa 2007).

Another study by Valenzuela (1978) run a regression and found that the mother's education and the time spent for food preparation increase nutrient intake (as cited in Evenson et al. 1980 and Roa 2007).

Still during the 1970s, Popkin and Hart (1975) tried to see how a mother's labor force participation affected her child's health and nutritional status. Using a study of two rural areas in the Philippines, it was found that the mother's labor market employment increases household income and food expenditures. However, as the mother joins the labor market, her children's health and nutritional status suffer (as cited in Roa 2007).

Tan and Tecsons's study (1974) on the determinants of nutritional status found that education was not significant and income was a limited indicator of nutritional level. The implication drawn was that nutrition education was either lacking or being ineffective (as cited in Roa 2007).

Intrahousehold dynamics were further investigated to check the nutrient distribution among the different household members. Senauer et al. (1988) assessed the impact of a food subsidy program on the allocation of food in the household. The findings show that there was inequity in the distribution of nutrients. For instance, the husband's wage rate has positive effect on his and his wife's share of calorie intake, but adversely affects their children's share. On the other hand, the wife's wage rate has a positive relationship with her and her children's share, while it negatively affects her husband's share (as cited in Roa 2007).

Bouis and Peña (1997) did not see significant differences in food and nutrient distribution by sex or by age which indicates equitable distribution (as cited in Roa 2007).

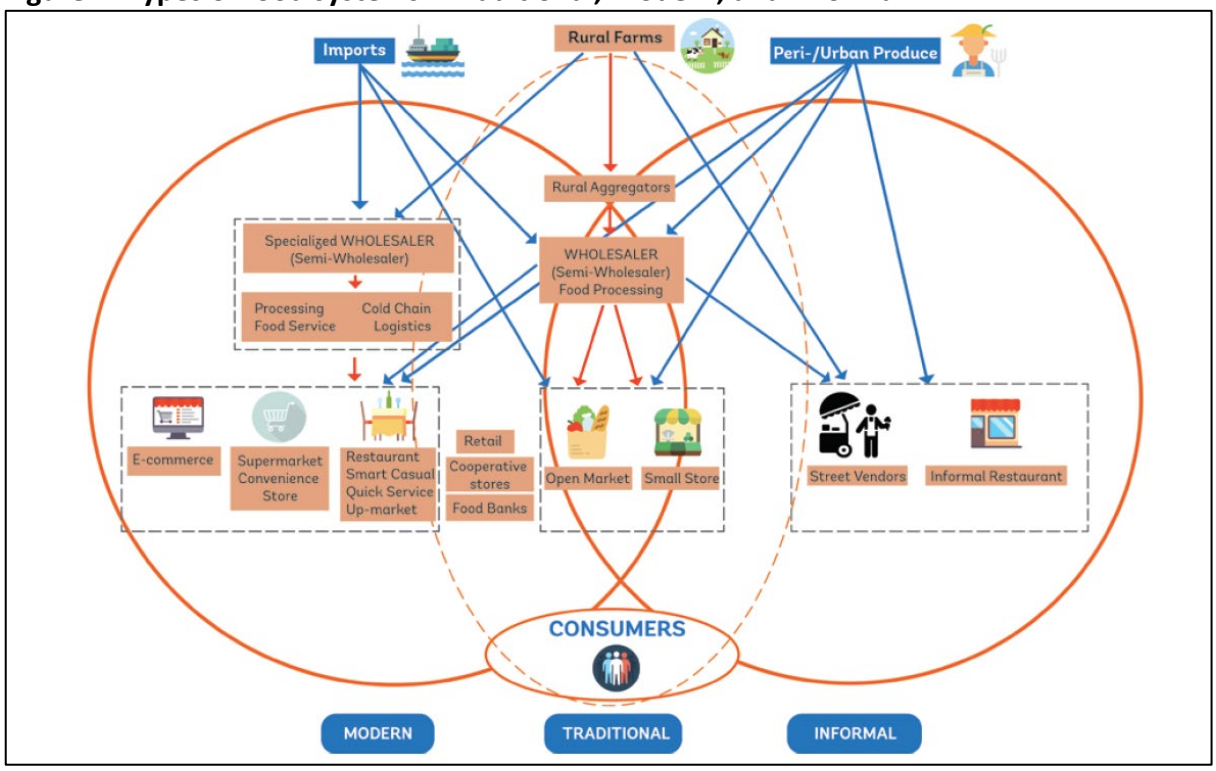
Another interesting study is by Rola et al. (2002) wherein they saw a positive and significant correlation between value of food consumed at home and several factors, such as land holding, mean education of parents, household size, and real non-farm income. Two types of villages were compared. One village has bigger production area and was producing its own food, while another had less. The findings show that a village can be food secure even if it does not produce its own food. What is more important is that the households in that village have the purchasing capacity to buy food from the market (as cited in Roa 2007).

Food security indicators are more meaningful to be used as poverty measures rather than income-based indicators (e.g. average per capita income) as these also reflect intra-household factors (Huddleston 1990 as cited in Roa 2007, p. 279)

2.4. Types of Food systems: Traditional, Informal, and Modern

This subsection discusses the different types of food system, namely, traditional, informal, and modern food systems. **Figure 7** provides a visual representation of how each food system works. As countries become more economically developed, their whole food system also transforms to accommodate various changes such as urbanization, new consumer preferences, among others. The transformation affects the whole system from food production, distribution, marketing, retail, and consumption (Reardon and Timmer 2012 as cited in FAO 2013). Thus, food systems "play a major role in shaping healthy diets" (FAO 2013, p. 25).

Figure 7. Types of food systems—Traditional, Modern, and Informal



Source of image: Tefft et al. (2017)

Although food systems could replace one type with another, there are cases wherein different food system types coexist at the same time. Gomez and Ricketts (2012) observed that modern supply chains could coexist with traditional food system like wet markets (as cited in FAO 2013). Low-income countries tend to be dominated by traditional food systems. In the case of middle-income countries, they have a mixed set of food systems which include traditional, informal, and modern food systems. On the other hand, high-income countries are mostly modern, but sometimes traditional food system starts to re-emerge to cater the needs of consumers for local, seasonal, and artisanal products (FAO 2013).

The ***traditional food system*** involves urban wholesale markets that are linked with rural-based assemblers, aggregators, and other traders. Food processing is more decentralized compared with other manufacturing and is located in areas near their raw materials. They could have the potential to boost backward and forward linkages with farm and nonfarm sectors, thereby alleviating poverty in certain areas (Tefft et al. 2017).

Smallholders and small rural traders living in agriculture-heavy towns and small cities would usually sell their products to secondary wholesale markets, where they are able to link with transporters and traders. These transporters and traders would then sell to large urban markets. The bigger wholesalers cater to wider variety of consumers and they are operated by public or private entities who manage the marketplace and collect fees. Their sources are regional wholesalers, farmers' cooperatives, smallholders, contracted producers, among others (Tefft et al. 2017).

More typically, consumers buy fresh produce, like fruits and vegetables, and fresh and frozen meat, in open or wet markets, which are usually managed by the local government or a public-private company. Open markets are usually the most accessible market for consumers who

want to buy fresh goods at a reasonably low price. Products are usually unpackaged and thus more open for quality inspection and tasting of interested buyers. However, open markets also tend to be congested, poorly maintained, and tend to have unappealing product presentation (Tefft et al. 2017).

Another common food retailers are small family-run businesses, wherein family labour is utilized and they operate on low inventories (Tefft et al. 2017). Due to their convenient location, consumers prefer to buy from them as they are also flexible on payment terms (e.g. cash, sales on credit), and even on quantity/packaging (e.g. 1 piece of egg or 1 tray). In some areas where electricity supply is unstable, small retailers are unable to sell frozen goods (Tefft et al. 2017).

The ***informal food system*** involves small volume and cash-based transactions in rural or urban areas. The food products are typically sourced from open or wet markets or wholesale markets that are part of the traditional system and they cater predominantly to the urban poor (Tefft et al. 2017). The traditional food system covers only up to the sale of fresh or processed food, but not cooked meals. The informal food system by contrast involves street vendors and informal restaurants.

In 2016, the prevalence of food insecurity among developing regions is 29 percent for rural areas while it is 30 percent in urban areas. Among developed regions, prevalence of food insecurity is higher in rural areas at 10.3 percent, while it is 9.6 percent in urban areas (Tefft et al. 2017).

Those who depend on informal food system often live in areas where transportation systems are poor and inadequate, if not completely absent. The main considerations of the urban poor are ease and cost of bringing home the food from supermarkets, lack of refrigeration and storage, cost of electricity, cost of gas for cooking, and lack of time for food preparation (Tefft et al. 2017).

Informal street food vendors operate in open-air and makeshift structures rent-free in many cases. They are usually rural migrants and have attained lower level of education. This type of work is often viewed as a nuisance and a safety hazard. With the lack of access to clean water, drainage, sanitation, and proper waste collection, customers tend to seek the most trustworthy food vendors (Tefft et al. 2017).

In many cities around the world, food banks and soup kitchens exist to counter food wastage by distributing food to those in need. These are often operated by civil society organizations or faith-based organizations. Unused fresh produce are being collected from grocery stores, farms, or manufacturers. In France, a law was passed in 2016 that mandates supermarkets to donate food approaching their expiration date (Tefft et al. 2017).

Some governments implement food programs that aim to subsidize food being sold in stores operated by the government itself or by cooperatives. In India, the National Food Security Act of 2013 enables a segment of India's urban population to access up to five kilograms of subsidized food grain (Tefft et al. 2017).

Processed foods are made from cheaper ingredients and have longer shelf lives. These are also easier to store and transport as opposed to fresh produce (Tefft et al. 2017).

Those consumers who spend a considerable share of their budget on food are more vulnerable to price volatility (Tefft et al. 2017).

Modern food systems are characterized as having the following: 1) more efficient wholesale system; 2) food safety system; 3) capital-intensive food processing; 4) integrated cold chains; 5) food service firms; 6) state-of-the-art logistics; 7) private branding, labelling and packaging; 8) modern retail and restaurants; and 9) Global integration, among others (Tefft et al. 2017, p.30).

Wholesalers under a modern food system are usually larger and utilize supply contracts with commercial producers. Food importers and those along short or long domestic supply chains are also among the sources of food of wholesalers. Modern retailers, which generally cater to middle- and high-income consumers, are able to respond to demands related to health and wellness, social impact, animal welfare, among others. Food service businesses are being supported by specialized wholesalers, third party logistics firms, to help in improving their business efficiencies (Tefft et al. 2017).

Modern food processing played an important role in enhancing food availability and safety and reducing food waste and loss. Processed foods, which have undergone freezing, pasteurization, vacuum-sealing, or drying techniques, are being purchased more and more by consumers in Asia and Africa (Tefft et al. 2017). Processing firms under a modern food system are importers of various ingredients to produce food products and they also have direct link with modern retail.

Modern retail involves innovations in supply chain management and in logistics. Modern retailers usually target the high-income consumers living in large cities first before going to middle- to low-middle income classes, then to smaller towns and cities. Traditional retailers are pushed to adopt changes in their format (e.g. from having over-the-counter format to self-service format, or adding services like cutting of vegetables) as a response to the mushrooming of modern retailers in their area that are known for comfort, hygiene, and additional services (Tefft et al. 2017).

In 2017, grocery e-commerce has been successful in China (at USD 41 billion) and United Kingdom (at USD 15 billion). Its potential for growth was evident as early as 2017 (Tefft et al. 2017).

Urban food service and restaurant are increasingly expanding as urban consumers prefer to eat meals away from home. There are quick-service or fast-food restaurants, food stalls or kiosks, and conventional casual, and up-market restaurants. The ingredients and nonfood products used by these restaurants could be sourced from abroad or from domestic suppliers (Tefft et al. 2017).

Apart from convenience or price, a number of middle- and higher-income consumers nowadays are also concerned about “new values and aspirations” that affect their purchase behavior. Among the issues that they are most concerned with are food safety, health and wellness, sustainability, animal welfare, or equity matters. Modern retailers have responded to this growing demand. For instance, some products are produced without certain ingredients (e.g. trans fat), and are being relabeled to highlight product safety or indicate support for local producers. Products that are non-GMO, natural or organic are now becoming more available to cater to the growing demand for more nutritious foods (Tefft et al. 2017).

2.5. Food security dimensions and their indicators

Since different organizations tend to use different dimensions of food security, it is important to establish the dimensions to be utilized in the analysis of this paper (see **Figure 8**). The following table shows the selected dimensions and the corresponding concepts and indicators. Unfortunately, not all of the listed concepts have available indicators (see **Table 3**).

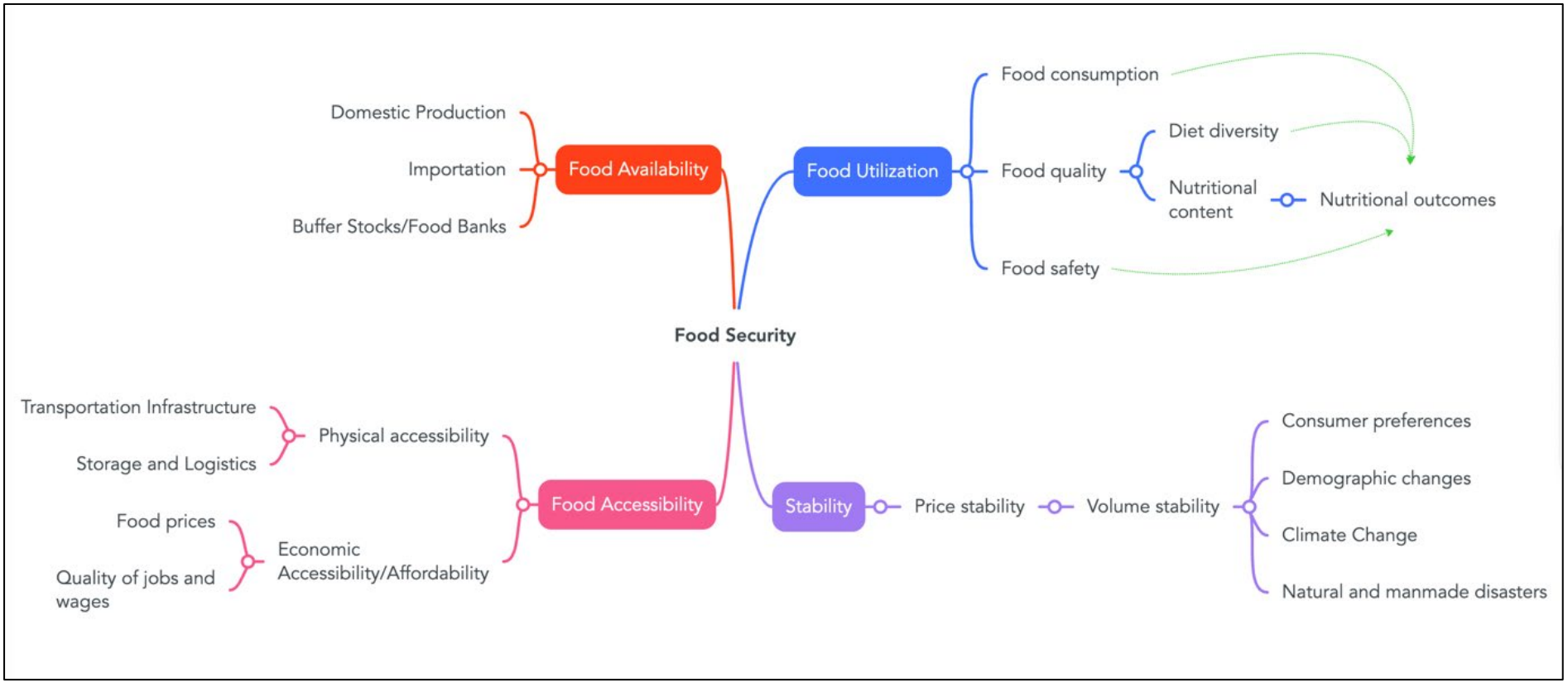
Table 3. Indicators and data sources by subdimensions

Dimension	Subdimensions	Indicator	Data Source
Overall		Global Food Security Index	The Economist Intelligence Unit
Food Availability	Domestic Production	Food available per capita (1990-2019)	PhilFSIS
		Food production index (1990-2019)	PhilFSIS
	Trade	Import dependency ratio (1990-2019)	PhilFSIS
	Food Aid	***Not applicable***	
	Food Loss		
Food Accessibility	Physical Access	Farm-to-Market Road length	The Economist Intelligence Unit
	Economic Access	Consumer price index (1994-2019)	PhilFSIS
		Share of households unable to afford a nutrient-adequate diet (2015)	WFP Fill the Nutrient Gap
		Cost of recommended diet	World Bank Study
Food Utilization	Consumption	Ratio of Food Expenditure to Total Family Expenditure (1991-2015, incomplete series)	PhilFSIS
		Daily per capita calories supply of selected agri commodities (2009-2018)	PSA Agri Indicators System
		Daily per capita protein supply of selected agri commodities (2009-2018)	PSA Agri Indicators System

		Daily per capita fat supply of selected agri commodities (2009-2018)	PSA Agri Indicators System
		Hunger Incidence	PSA APIS
		Share of food secure households (HFIAS)	FNRI
		Food Consumption Score	FNRI
	Food Quality	Diet Diversity Score Food Groups	FNRI
		Diet Diversity	The Economist Intelligence Unit
		Nutrition Prevalence of undernourished	 FNRI
		Prevalence of stunting	FNRI
		Prevalence of overweight in children	FNRI
		Prevalence of wasting, weight for height	FNRI
	Food Safety	Share of Population with electricity access (ability to store food safely)	World Bank
		Share of Population with access to safe drinking water	World Bank
		Access to WASH services	

Source: Author's own work

Figure 8. Mapping of food security dimensions and subdimensions



Source: Author's own work

3. Measuring Food Security in the Philippines

3.1. Food and Nutrition Research Institute (FNRI).

The FNRI, which is under the Department of Science and Technology, has been the main source of food security-related and nutrition statistics (FNRI 2015). It led the first national nutrition survey in 1978, which has been conducted every 5 years since then (Roa 2007). Over the years, the FNRI has adopted various tools to measure the status of food security among Filipino households, which are the Radimer/Cornell Tool and the Household Food Insecurity Access Scale (HFIAS) (FNRI 2015). Table 4 describes the conditions being assessed by the HFIAS.

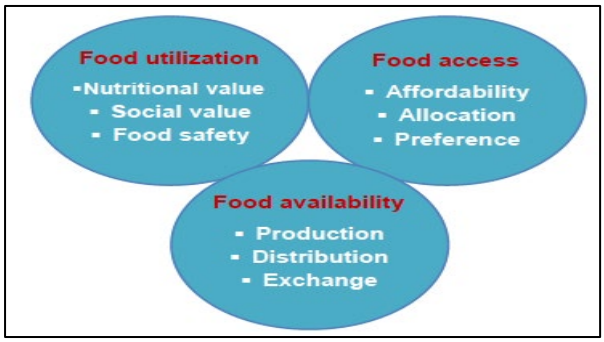
Table 4. Household Food Insecurity Access Scale (HFIAS)

Situation(s) experienced in the past month	Frequency			
	Never	Rarely (1-2x)	Sometimes (3-10x)	Often (>10x)
1.Worry about food	FS	FS	ML	ML
2.Unable to eat preferred foods	FS	ML	ML	ML
3.Eat just a few kinds of foods	FS	ML	MD	MD
4.Eat foods they really do not want to eat	FS	ML	MD	MD
5.Eat a smaller meal	FS	MD	MD	SV
6.Eat fewer meals in a day	FS	MD	MD	SV
7.No food of any kind in the household	FS	SV	SV	SV
8. Go to sleep hungry	FS	SV	SV	SV
9.Go a whole day and night without eating	FS	SV	SV	SV

Note: FS-Food Secure; ML-Mild Insecurity; MD-Moderate Insecurity; SV-Severe Insecurity
Source: FNRI National Nutrition Survey

The FNRI follows the following diagram (see Figure 9), which has three dimensions—Food Availability, Food Access, and Food Utilization. Production, distribution, and exchange are under the Food Availability dimension. With regard to the Food Access dimension, concepts about affordability, allocation, and preference are considered. Under Food Utilization dimension, the important aspects being considered are nutritional value, social value, and food safety (FNRI 2013).

Figure 9. FNRI Food Security Diagram



Source of image: FNRI, 2013 Food Security Survey. Adapted from Ingram (2011)

3.2. Philippine Food Security Information System (PhilFSIS)

PhilFSIS was a joint project of Bureau of Agricultural Statistics (which is now subsumed under PSA) and the FAO, which was formally launched in 2012. There were 10 commodities covered by the PhilFSIS monitoring, namely, rice, corn, sweet potato, banana (saba), cassava, pork, chicken, chicken egg, bangus, and tilapia. Below are the three dimensions of PhilFSIS and their corresponding indicators (PSA n.d.a):

A. Food Availability
    1. Food available per capita (1990-2019) [last update: June 10, 2021]
    2. Food production index (1990-2019) [last update: June 10, 2021]
    3. Monthly cereals stock index (1990-2020) [last update: June 10, 2021]
    4. Cropping intensity index (rice and corn, 1990-2020) [last update: June 10, 2021]
    5. Import dependency ratio (1990-2019) [last update: June 10, 2021]
B. Food Accessibility (Consumer price index [1994-2019]) [last update: June 10, 2021]
C. Food Utilization (Ratio of Food Expenditure to Total Family Expenditure [1991-2015, incomplete series]) [last update: June 10, 2021]

Based on the primer on PhilFSIS, it was designed to be "an information system containing relevant, organized, timely, and accessible data related to food security." The following are the seven reports that were supposed to be published under PhilFSIS (PSA 2017a):

A. Status of Food Security in the Philippines (which provides an in-depth analysis of the state of food security in the country)
B. Situation and Outlook (which describes the current trend, medium-term expectations on food security
C. Early Warning (which monitors threats to food security and viable mitigation strategies
D. Vulnerability Assessment (which gauges implications of internal and external factors to food security
E. Gender Analysis (which describes current gender situation in relation to food security)
F. Price and Market Watch (which maps the price and market situation for selected commodities in the country)

G. Crop Calendar (which provides information on sowing/planting and harvesting periods of selected PhilFSIS commodities.

3.3. Agricultural Indicators System (AIS) Publication

The PSA publishes annually the Agricultural Indicators System (AIS), which is prepared by its Agricultural Accounts Division. The AIS is one of the statistical indicators maintained by the PSA. It contains several modules. One of which is the Food Consumption and Nutrition Publication. The following indicators are available in the said publication (PSA n.d.b):

A. Daily per capita calories supply of selected agricultural commodities (2009-2018)
B. Daily per capita protein supply of selected agricultural commodities (2009-2018)
C. Daily per capita fat supply of selected agricultural commodities (2009-2018)

Even if the PhilFSIS itself had been discontinued, some of its indicators are still maintained in other AIS publications like the Food Availability and Sufficiency (2016-2020).

3.4. Annual Poverty Indicator Survey (APIS)

The PSA annually collects information on hunger incidence among Filipino households using the APIS (PSA 2011).

3.5. Integrated Food Security Phase Classification (IPC)

It was in 2009 when the IPC was first modeled in the Philippines through the efforts of the NNC with the participation of the UN World Food Programme and funding from the European Commission. The IPC is not meant to replace other methods of measuring and analyzing the different dimensions of food security. It is there to "promote a common food security analysis language and currency that allows comparability across time and space, and across countries and regions" (NNC 2014).

The IPC version 1 was modeled to classify four municipalities in the Province of Lanao del Norte (NNC 2014). In 2012, the IPC acute analysis was adopted. Representatives from various government agencies who were involved as IPC analysts were trained to come up with assessment reports on acute food insecurity classification. In 2015, another series of capacity building activities were conducted for the analysts regarding the use of the chronic food insecurity analysis protocol (Flores et al. 2016). To aid the IPC Chronic Food Security analysis, a web-based application called the IPC Information Support System (ISS) is being utilized by the analysts. The ISS is able to create, store, disseminate IPC analysis and information by digitizing the IPC tools (Flores et al. 2016).

4. Government Policies and Interventions

4.1. Post-World War II

As early as 1930s, there had been various nutritional research efforts and government nutrition programs in the Philippines even while under the American rule. The work of Dr. Francisco O. Santos, who is known as the Father of Nutrition in the Philippines, centered on how to improve

the nutrition and diet in the country. He headed the Nutrition Section of the National Research Council. Moreover, the College of Agriculture at Los Baños was also developed with the guidance from US institutions to build its capacity in research, extension, and education. Consequently, the country had acquired valuable knowledge and skills in agriculture and nutrition such as the identification of nutrient content of foods (Engel and Arnold 1979).

When the second world war broke in late 1930s, research work and other programs had to be stopped. Before the World War II officially ended, there had been discussions on how to deal with post-war relief (e.g. to address food and agricultural problems). In 1945, the Food and Agriculture Organization of the United Nations was established (Rasmussen and Porter 1981).

In 1947, the Institute of Nutrition (now known as the Food and Nutrition Research Institute) was established under Office of the President. It was then transferred to the Department of Health in 1950s. After several years, it was placed under the auspices of the National Science Development Board (predecessor of Department of Science and Technology) (FNRI n.d.a).

When World War II ended in mid-1940s, world population started growing at unprecedented levels, which is more commonly known as "baby boom." Around 1960s, the world started to feel concerned about the adequacy of food to support a fast-growing population (Engel and Arnold 1979).

In 1966, the United Nations General Assembly's International Covenant on Economic, Social and Cultural Rights (ICESCR), to which the Philippines is a signatory. The Philippines ratified the same on 1974 (UN 1966a). The right to adequate food is articulated under Article 11 item 1., to wit: "The States Parties to the present Covenant recognize the right of everyone to an adequate standard of living for himself and his family, including *adequate food* [emphasis added], clothing and housing, and to the continuous improvement of living conditions. The States Parties will take appropriate steps to ensure the realization of this right, recognizing to this effect the essential importance of international co-operation based on free consent." Item 2 under Article 11 further recognizes the right of everyone to be free from hunger (UN 1966b).

In 1970s, then-President Ferdinand Marcos signed the Administrative Order No. 230 (S. 1970) to create the Philippine National Committee on Freedom from Hunger Campaign, in support of FAO's world-wide Campaign for Freedom from Hunger. During the same decade, the National Food and Agriculture Council did researches about household food purchases and its relationship with the level of household income. The findings from such research efforts were used by nutritionists. This started a more collaborative work between nutritionists and economists (Engel and Arnold 1979).

Around this time, the USAID started their maternal child health program that targeted malnourished children. The nutribun, which was a bread snack food that was formulated with nutrients, were given to approximately 200,000 elementary school students from 1970-1971, which totals to 30 million pieces of nutribuns distributed. It was continued after a few years and was even used as emergency food for disaster victims (Engel and Arnold 1979).

Although the text "food security" is not found in the 1987 Constitution of the Philippines, the essence of it is enshrined in Article II, Section 9, wherein it is expressed that "[t]he State shall promote a just and dynamic social order that will ensure the prosperity and independence of the nation and free the people from poverty through policies that provide adequate social services, promote full employment, a rising standard of living, and an improved quality of life

for all." Furthermore, under Article II, Section 11, it is declared that "[t]he State values the dignity of every human person and guarantees full respect for human rights." It is also stipulated that "The State shall defend…the right of children to assistance, including proper care and nutrition…" (Article XV, Section 3, item 2).

Understandably, government policies were leaning towards food sufficiency. This is reflected in the financial allocation to support programs (including research and development) for staples like rice and corn. However, Roa (2007) argue that the "bias in favor of calories [,] disfavor other nutrients" (p.38). She further noted that the self-sufficiency stance taken by the government has resulted in grave inefficiencies in the agriculture sector (e.g. rice is grown in areas where other crops could have been more viable).

In 2006, the World Food Summit defined the term food security. The term "food security" only became part of the Philippine's national agenda after the rice crisis in 1995, which was due to crop damages by Typhoon Rosing (Cabanilla 2002). Since then, food security has been included in government laws, policies, and programs, such as the Agriculture and Fishery Modernization Act (1997), the Governors' Food Security Covenant (1999), and Pricing and Buffer Stock Policy (Cabanilla 2002); Sagip Saka Act (2019), DA's Food Security Development Policy (2020), Inter-Agency Task Force on Zero Hunger (2020), and Senate Bill No. 2126 S. 2021.

4.2. Agriculture and Fisheries Modernization Act (AFMA)

One of the main objectives of the Agriculture and Fisheries Modernization Act (1997) is to attain food security. On Section 4, food security is defined as "the policy objective, plan and strategy of meeting the food requirements of the present and future generations of Filipinos in substantial quantity, ensuring the availability and affordability of food to all, either through local production, or importation, or both based on the country's existing and potential resources endowment and related production advantages and consistent with the overall national development objectives and policies. However, sufficiency in rice and white corn should be pursued."

AFMA triggered the legislation of other laws. Examples are the following (Barrios et al. 2015): Fisheries Code (1998), Agri-Agra Reform Credit Act (2009), Climate Change Act (2009), Philippine Technology Transfer Act (2009), Organic Agriculture Act (2010), and Agricultural and Fisheries Mechanization Act or AFMech (2013).

Unfortunately, the Philippine agriculture continues to have a lackluster performance despite the enactment of AFMA. Various reasons were identified including the lack of financial support and the misallocation of the meager resources available for the implementation of AFMA-related projects (SEPO 2009). As for unattained goal of food security, the law itself, in addition to the implementation and financial constraints, has some weaknesses that need to be clarified and could be strengthened with additional laws.

AFMA provides a general direction for toward achieving food security, but a clear and specific action plan is lacking. There is an attempt to improve the efficiency of food systems, which will ensure better food availability, accessibility, and affordability. AFMA stated that horizontal and vertical integration, consolidation, and expansion shall be encouraged. Moreover, it mentioned enhancing of profits and income of small farmers and fisherfolks

through the promotion of high-value crops, value-adding processing, agribusiness activities and agro-industrialization.

It recognized the need for traditional or new products to undergo further processing to ascend the value-added ladder. In Rule 40.6.8., there is the promotion of appropriate product standards and quality management. Chapter 7 titled Product Standardization and Consumer Safety presents the need to establish a Bureau of Agriculture and Fisheries Product Standards. To be able to comply with the strict standards of the formal market, certain food safety and sanitation guidelines need to be followed such as Good Agriculture Practices and HACCP. Other systems might need to be tapped to be able to achieve this goal, especially for food-related processing. Clean water, sanitation, and refrigeration are among the basic requirements for food safety. Assistance to raise the awareness of farmer and fisherfolk cooperatives and associations and to help them apply for certifications and product registrations was not specifically mentioned in AFMA.

Food security is confused with the concept of food self-sufficiency. These are two different concepts that need to be clarified. The food availability dimension of food security does not limit the source of food to local production only. It also includes food coming from imports. So long as stability in supply, access, and affordability of nutritious food at all times is ensured, there should be some flexibility in accepting food from diverse sources.

The right balance of dependence in domestic or in international food markets as well as the ease of shifting food sources should be seriously considered in drafting food policies. Threats to food security like global supply disruptions due to political issues, natural disasters, among other threats are legitimate reasons why countries opt to build their capacity to produce their own food. Taking the case of Singapore, where only 1 percent of their land is available for food production and more than 90 percent of its food are imported from abroad (Lim 2021), it still ranks 2nd in the 2021 GFSI ranking among Asia Pacific countries (EIU 2021). Despite achieving food security at present, the Singapore government is taking serious steps to proactively plan their country's long-term food security. They call their approach as the "Three Food Baskets" wherein they plan to diversify food sources, grow food locally, and grow food overseas (Lim 2021).

The quality and nutritional aspect of food were not explicitly stated in the law, but was later mentioned in the IRR. The availability, affordability, and stability dimensions of food security were explicitly stated in the law as part of the declaration of principles. The nutrition dimension is covered under Section 14, wherein among the goals of food security, apart from ensuring availability and affordability of rice and other staple food, includes the reduction of the incidence of malnutrition in the country.

In the Implementing Rules and Regulations of AFMA, the definition of food security (Section 4) was revised as follows "…the policy objective, plan and strategy of meeting the food requirements of the present and future generations of Filipinos in substantial quantity, safety and nutritional quality that meet desirable dietary requirements, ensuring the availability and affordability of food to all…"

However, despite the inclusion of food quality and nutrition in the definition of food security, the type of diet to be pursued was not clear (See Section 3.1.2 for the three types of diet). Also, nutritional outcomes such as stunting and wasting were not identified as food security outcome indicators.

Agriculture and Fisheries Modernization Plan (AFMP) is not targeted to be cascaded at the barangay level, only up to the municipal level. In Section 13 of AFMA, it was stated that the DA in consultation with farmers and fisherfolk, the private sector, NGOs, POs, and other government agencies, shall formulate and implement comprehensive Agriculture and Fisheries Modernization Plan. The local AFMP was identified to be at the municipal, provincial, and regional levels. Per Barrios et al. (2015), the capacities developed were not adequately transferred to stakeholders, especially at the barangay level.

Period covered by AFMPs was too short and there was a gap. The first AFMP covered only four years, that is from 2001 to 2004. The second AFMP was for 2011-2017. The third and latest AFMP covers 2018 to 2023. As identified in Section 7.4, there should be short-term, medium-term, and long-term goals. A long-term plan or framework is essential in ensuring that there is a reliable and efficient food system that could withstand either supply shocks or demand shocks. Ample time for preparation is necessary to make substantial changes in the coordination design and budget structure.

Monitoring and Evaluation system, information network and inventories were part of AFMA but did not came to full fruition. A Program Benefit Monitoring and Evaluation System (PBMES) was supposedly developed under Section 18 of AFMA. It was envisioned to be used to assess the effectivity of AFMP. PBMES includes building an inventory of beneficiaries and their status. There was a Project Monitoring and Evaluation Division, but it was only concerned with the outputs related to the AFMP. There was no clear link between the outputs and the outcomes as envisaged by the law (Barrios et al. 2015).

Furthermore, Chapter 5 of AFMA was about Information and Marketing Service, specifically setting up a National Information Network (NIN), which was meant to provide "timely, accurate, and responsive business information and efficient trading services, which will link them to profitable markets for their products" (Section 38). The NIN shall provide the following: supply data, demand data, price and price trends, product standards, directory of stakeholders, research information and technology, international, regional, and local market forecasts, and resource accounting data (Section 42). The design and operationalization of the NIN was completed according to the rapid appraisal of AFMA (Barrios et al. 2015), however, the actual procurement of IT equipment did not materialize due to budget constraints. To be fair, the same report said that the DA developed AFMIS (http://afmis.da.gov.ph), which is a web-based system containing national and local market information system (Barrios et al. 2015).

Under Rule 40.6.1, the Agribusiness and Marketing Assistance System (AMAS) shall be responsible for the inventory and assessment of the utilization levels of all post-harvest facilities, including storage, transport, materials handling, communication, laboratory and ancillary facilities owned by the National Food Authority, Food Terminal Incorporated, Philippine Fisheries Development Authority as well as idle assets acquired by government controlled financial institutions, banks, and other government entities. Per Barrios et al. (2015), since the National Marketing Assistance Program (NMAP) was not established, the utilization of information derived from this inventory of postharvest facilities was not optimized.

There seems to be some gaps in linking the Chapter on Other Infrastructure with the Chapter on Strategic Agriculture and Fisheries Development Zones (SAFDZs). The DA shall coordinate with the different government agencies, such as the DPWH, DOTC (now DOTr and

DICT), DTI and LGUs, to address the infrastructure requirements and shall use the following prioritization criteria: 1) Agro-industrial potential of the area, 2) socio-economic contributions of the investments in the area, 3) absence of public investment in the area, and 4) presence of agrarian reform beneficiaries and other small farmers and fisherfolk in the area.

SAFDZs were not mentioned under fishports, seaports, and airports, farm-to-market roads, research and technology infrastructure, post-harvest facilities. The only reference to SAFDZ made under the Other Infrastructure Chapter are as follows:

- Rule 47.3: "The integrated development plans for the *SAFDZ* [emphasis added] shall include the prioritized agricultural and fishery infrastructure and support services including funding requirements."
- Rule 53.1 (Rural Energy): "The Department [of Agriculture] shall establish mechanism of cooperation, information-sharing and consultation with the DOE,…such that an adequate supply of electricity, particularly that generated by non-conventional means, is provided in support of *SAFDZ* [emphasis added] and agro-industrial activities…"
- Rule 54.1 (Communications Infrastructure): "The Department… shall establish mechanisms of cooperation… with DOTC… to ensure that adequate telecommunications facilities are provided in support of *SAFDZs* [emphasis added] and agro-industrial activities..."

4.3. Post-AFMA initiatives

Then-President Joseph Estrada initiated a national Food Security Program that called for the active participation of LGUs. Consequently, a Food Security Covenant was signed by provincial governors in 1999 (Cabanilla 2002). In the same year, Executive Order No. 86 was signed to create the National Council on Food (NCFS), Councils on Food Security for the provinces, independent component cities (ICC), and highly urbanized cities (HUC). In accordance with the NCFS, every province/ICC/HUC shall formulate and implement a Provincial/City Food Security Action Plan (Cabanilla 2002).

In 2019, the Republic Act No. 11321 (Section 2) also known as the *Sagip Saka* Act was passed into law, which aims to "achieve sustainable modern agriculture and food security by helping the agricultural and fishing communities to reach their full potential, increasing farmers' amd fishermen's incomes, and bridging gaps through public-private partnerships, thereby improving their quality of life." It recognizes and shall be made consistent with other existing laws, such as the AFMA, and the Micro, Small, and Medium Enterprises Development Plan.

Some of the abovementioned weaknesses of AFMA are articulated in Sagip Saka. Examples are identified below:

- Section 3, 3.1.b.3: "The Program shall utilize existing tools, approaches and innovations in identifying priority agricultural and fishery products, partners and/or beneficiaries considering the criteria on suitability, market potential, impact on the poor, and number of beneficiaries and growers using the Commodity Prioritization Tool designed under the Philippine Rural Development Projects (PRDP)."
- Section 3, 3.1.c.2.a.ii. "The commodity value chains will be selected based on the priority agricultural and fishery products or commodities of the provinces, regions, and at the national level."

The National Nutrition Council (NNC), created in 1974 as the highest policymaking and coordinating body on nutrition, formulates national food and nutrition policies and strategies and serve as the policy, coordinating and advisory body of food, nutrition, and health concerns, and to coordinate hunger mitigation and malnutrition prevention program to achieve relevant Millennium Development Goals. In particular, the NNC Secretariat is expected to recommend a comprehensive food and nutrition policy, initiate the formulation and develop measures to improve implementation of the Philippine Plan fof Action for Nutrition (PPAN), monitor and evaluate PPAN, among others (NNC n.d.a). In 2007, the NNC was also given oversight functions for the Accelerated Hunger Mitigation Program (AHMP). AHMP was initiated by then President Gloria Macapagal-Arroyo to address the worsening case of hunger in the country. Among the programs under AHMP were Food for School Program (Department of Health [DOH]), *Tindahan Natin* (NFA), *Gulayan ng Masa*[7] (Department of Agriculture [DA]), and Barangay Food Terminal (DA). As for the demand side, there were food for work programs (Department of Public Works and Highways [DPWH]), among others (Mapa et al. 2016).

Box 1. Philippine Plan for Nutrition (PPAN) programs 2017-2022

There are two types of programs in the Philippine Plan for Nutrition (PPAN), namely, nutrition-specific and nutrition-sensitive. Nutrition-specific programs refer to those that "were planned and designed to produce nutritional outcomes." Examples of which are national dietary supplementation program, micronutrient supplementation, mandatory food fortification, overweight and obesity management and prevention programs, among others. On the other hand, the nutrition-sensitive programs are development projects that were: i) "tweaked to produce nutritional outcomes"; ii) "tweaked by targeting households with undernourished children or nutritionally-vulnerable groups or targeting areas with high levels of malnutrition"; or iii) "being a channel to deliver nutrition-specific interventions." Some examples of nutrition-sensitive programs are farm-to-market roads, *Gulayan sa Paaralan,* public works infrastructure, and *Sagana at Ligtas na Tubig sa Lahat (SALINTUBIG)* and other programs on water, sanitation, and hygiene (PPAN 2017-2022).

Source: Lifted in full from NNC (2021a)

4.4. Inter-agency Task Force on Zero Hunger

In January 2020, the President signed Executive Order No. 101 to create an Inter-Agency Task Force on Zero Hunger (IATF-ZH), which is chaired by the Cabinet Secretary with Secretaries of DA and of DSWD as Vice Chairpersons. The management structure of IATF-ZH is shown in Figure 10. Per EO 101, Section 2, the IATF-ZH is tasked to do the following:

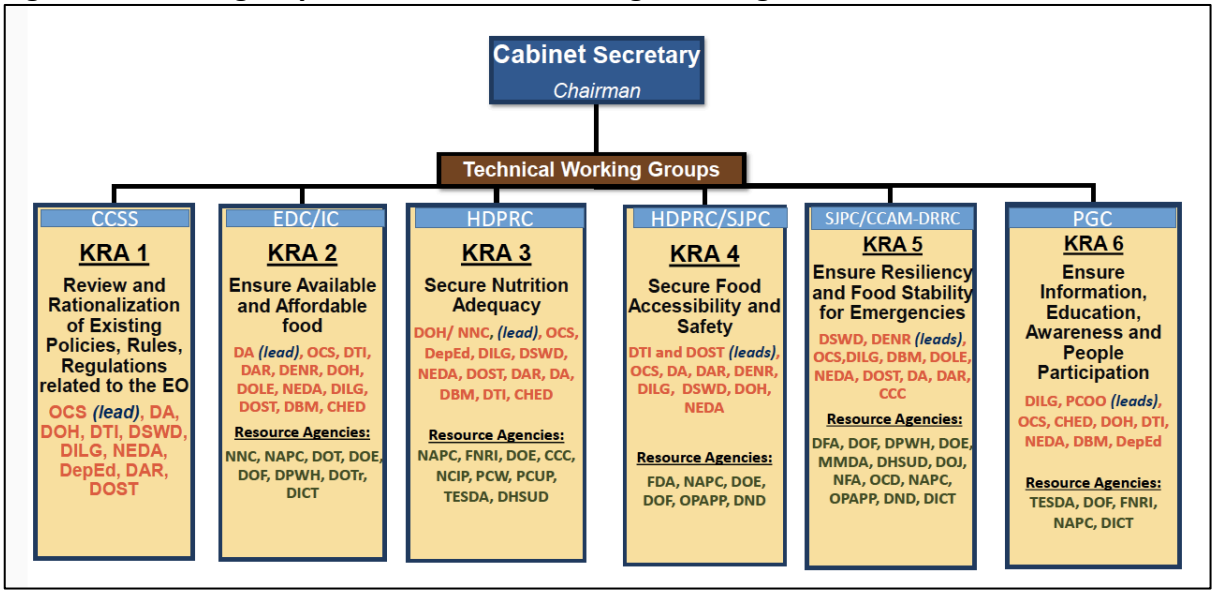
- Formulate a National Food Policy (NFP), which shall outline national priorities based on a comprehensive understanding of the problem of hunger and related issues, and shall provide a roadmap for achieving zero hunger, taking into consideration existing laws and issuances, as well as international law and treaty obligations. The NFP shall include initiatives for ending hunger, achieving food security, improving nutrition, and promoting sustainable agriculture.
- Coordinate and rationalize the efforts of concerned government agencies…
- Monitor and evaluate, through the identification of key performance indicators, the government's progress
- Create technical working groups from among its member-agencies

[7] A backyard vegetable-growing project for the poor

- Prepare and submit to the President annual reports on the state of hunger, food security, nutrition, and agricultural production in the country.

The IATF-ZH had efforts to enhance partnership against hunger and poverty. They had a KUMAIN (Kasapatan at Ugnayan ng Mamamayan sa Akmang Pagkain at Nutrisyon) webinar series to enhance awareness and to elicit active collaboration among different government agencies, private sector, civil society groups, and development partners.

Figure 10. Inter-Agency Task Force on Zero Hunger Management Structure



Source of image: IATF-ZN presentation to the 6th National Conference of Nutrition Action Officers Webinar Series: NAOs: PPANalo sa New Normal (October 1, 2020)

The private sector participates in the Pilipinas Kontra Gutom (PKG) campaign, which is a multi-sectoral movement composed of big corporations, such as Coca-Cola Philippines, Dole Philippines, J&J Philippines, McDonald's, Metrobank, and San Miguel Corporation. They committed to give out meals, and infant kits to the needy. Other companies like Lazada Philippines and Unilever, and the foundation Gawad Kalinga, also participate in the campaign (Cudis 2021). As of February 2021, the PKG campaign is joined by around 70 partners from private companies, non-profit groups, and other organizations (Kabagani 2021).

4.5. Current efforts of DA

The Department of Agriculture has put in place policies that follow a "New Thinking" that has eight paradigms to modernize the sector and improve the welfare of farmers and fisherfolks. The eight paradigms are 1) agricultural modernization, 2) industrialization, 3) export promotion, 4) farm consolidation, 5) roadmap development, 6) infrastructure development, 7) securing budget and investments, and 8) legislative support. The DA also identified 18 key strategies to achieve the eight paradigms (DA n.d.).

Among the many programs of DA is the KADIWA ni Ani at Kita Program, which was launched in 2019. It is a program that ensures the availability of food products through various market systems. It sells major agricultural goods at reasonably low prices to help poor Filipino households while at the same time marketing the products of local farmers. As of July 10, 2021,

the overall sales under the Program amounted to PHP8.96 billion, a fraction of the aggregate food expenditure (already at Php 2.5 trillion back in 2018) (OP-PMS 2021, p.137).

Box 2. Achievement of KADIWA ni Ani at Kita (Katuwang sa Diwa at Gawa) as of July 10, 2021

1. KADIWA ni Ani at Kita Retail Selling: 513 days of retail selling at different areas, with PhP140.19 million worth of sold agri-fishery products

2. KADIWA ni Ani at Kita on Wheels: Sold PhP104.97 million worth of goods to 1,068 Barangays, 1,113 communities within Metro Manila, and 2,217 Petron/Unioil partnerships

3. KADIWA ni Ani at Kita Online: Sold PhP19.94 million wholesale fruits and vegetables to various Agribusiness Development Centers and LGUs

4. KADIWA IsDA on the Go: Sold 117.18 MTs of fish amounting to PhP20.97 million

5. eKADIWA ni Ani at Kita: PhP369,518.38 total accumulated sales by KADIWA Partners

6. KADIWA ni Ani at Kita with RestoPH (Farmers Produce Program): PhP31.83 million sold at SM Malls, Megaworld, Ayala Malls, and Robinson's

7. KADIWA DisKwento Caravan: Ran 1,311 DisKwento Caravans, benefitting 631,275 households

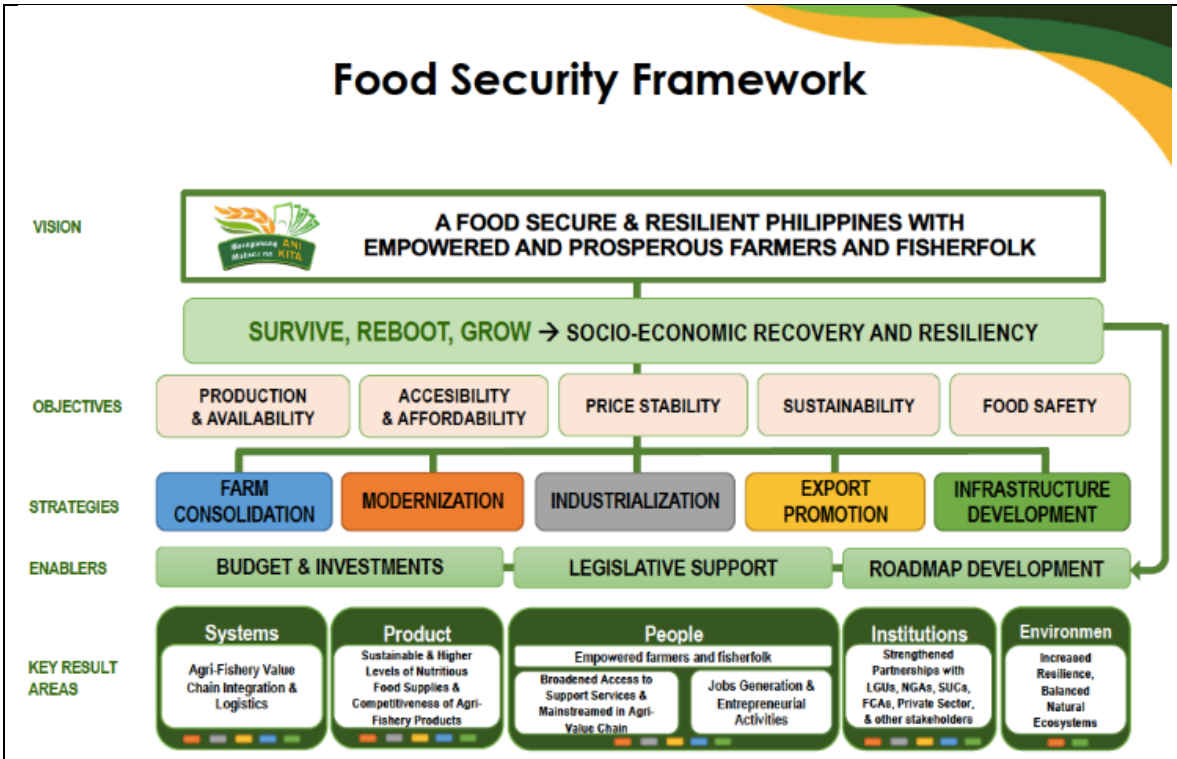
8. KADIWA Express: Delivered agricultural products worth PhP7.84 billion to major demand centers

Source: Lifted in full from OP-PMS (2021) "The President's Final Report to the People (2016-2021)" (p. 137).

Box 3. Pandemic response of DA and DOST

DA:

An Interagency Task Force for Management of Emerging Infectious Diseases was formed to respond to the demands in the agriculture sector under the "new normal". Part of this task force is the DA, which came up with a Food Security Development Framework. It provides an overall vision and goals for the sector for the short-term, which is to have a food secure and resilient country with empowered and prosperous farmers and fisherfolks. Five objectives of food production were identified namely, availability, accessibility, affordability, price stability, and food safety (DA 2020).



DOST:

In addition to the DA, the DOST also had efforts for post-COVID-19 recovery. Through its GALING PCAARRD Kontra Covid-19 program, DOST took an active role in addressing sustainability issues of food supply. DOST had activities such as home, school, and community gardening, urban gardening, seedling/planting materials production and distribution, community-based bamboo shoot production and product development, community-based tablea production, among others (Arayata 2020).

4.6. Senate Bill No. 2126 filed by Senator Risa Hontiveros

Senate Bill No. 2126, otherwise known as an act "Ensuring Zero Hunger for all Filipinos" was filed by Senator Risa Hontiveros in 2021 and still pending for Senate's deliberations. The bill cites that the Philippines has gaps in domestic legislation such as a legal framework governing the right to adequate food (RTAF).[8] Moreover, the bill envisions to reduce hunger by 2030, which is consistent with the country's commitment to the Sustainable Development Goals of the United Nations. A Commission on the Right to Adequate Food is proposed to be created for policymaking and coordination. It shall formulate a National Food Policy that will implement "programs of action to eradicate hunger, achieve food security, improve nutrition, and promote sustainable agriculture." (Senate Bill 2126, Section 7).

[8] In 2019, Pres. Duterte signed the Magna Carta of the Poor, wherein the right to adequate food of the poor was stipulated (Sec. 4a). https://www.officialgazette.gov.ph/downloads/2019/04apr/20190412-RA-11291-RRD.pdf

5. Trends and Issues per Dimension

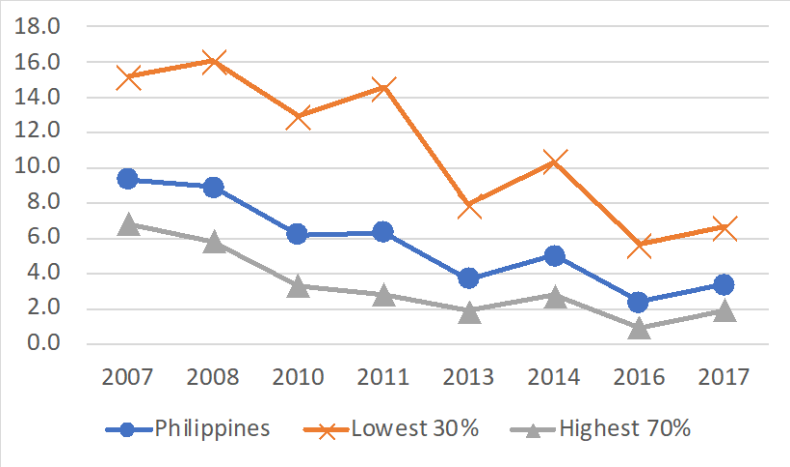
5.1. Food Utilization Dimension

Based on PhilFSIS, the Food Utilization dimension refers to the "ability of the human body to ingest and metabolize food through adequate diet, clean water, good sanitation and health care to reach a state of nutritional well-being where all physiological needs are met" (PSA n.d.a). From such definition, this paper identifies three subdimensions, namely, food consumption, food quality, and food safety.

5.1.1. Food consumption: Hunger and malnutrition

Hunger incidence sharply declined in the past decade. Official statistics from PSA on hunger incidence among Filipino households show that there was an abrupt downward trend from 2007 to 2016, i.e. from 10 percent to 4 percent. However, it should be noted that there was an uptick around 2017 (See **Figure 11**). Moreover, the drop in hunger incidence is more striking among the poorest 30 percent of the population, from around 15 percent to about 6 percent, for the same period.

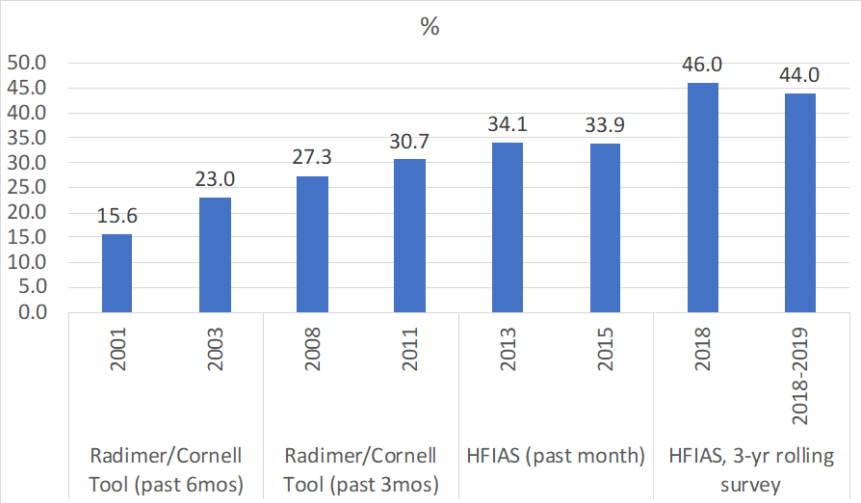
Figure 11. Families who experienced hunger in the three months preceding the survey, in %, by income level, 2007-2017



Source of basic data: PSA APIS various years

In terms of the percentage of food secure households based on FNRI's assessment tools, it appears to follow the same improving trend for the said period (see **Figure 12**). Nevertheless, it is important to note that due to the adjustments made by FNRI in methods and in definitions, the following figures are not readily comparable. From 2001 to 2003, FNRI used Radimer/Cornell Tool with a past six-month reference period. The same tool was used from 2008 to 2011 but the reference period was changed to the past three months. From 2013 to 2015, the tool used was the HFIAS, which was already described in an earlier section, and the reference period was the past month. The FNRI then adopted a three-year rolling survey starting in 2018. Both the Radimer/Cornell Tool and the HFIAS are concerned with the measurement of households' access to food. Even though comparison across different years may not be reliable, the refinements in the methods of measuring food security is a valuable development. This means that the more recent figures are able to capture food security better than the older methods.

Figure 12. Percentage of food secure households in the Philippines, 2001-2019



Note: FNRI used different tools and reference period in measuring food security among households.
Source of basic data: FNRI's National Nutrition Survey, various years

Box 4. Food insecurity statistics during the pandemic

The FNRI did a rapid nutrition assessment survey (RNAS) during the pandemic, which was conducted from November 3 to December 3, 2020. A total of 5,717 households responded to the survey that involved a multi-stage clustering design. The survey areas were clusters of low-, medium-, and high-risk COVID-19 infection. Based on the results of the RNAS, 62.1 percent of the households experienced moderate or severe food insecurity. It was found that those living in low- and medium-risk experienced food insecurity much worse than those living in high-risk areas. High-risk areas are located in highly urbanized cities; thus food availability and accessibility were much easier due to donations from private sector or LGUs. During the first three months of the lockdown, where quarantine measures were at the strictest, food insecurity was highest. For example, around 70 percent of the household respondents experienced worrying about food in April 2020.

More than half (56.3%) of the households reported difficulties in food accessibility due to the following:

- No more money to buy food (22.1%);
- No/limited public transportation (21.6%);
- No money due to loss of job (19.5%);
- Limited food stores in the area (10.8%); and
- Elderly (no other members to buy food) (5.1%)

The top two coping strategies of these families were purchasing food on credit (72%) and borrowing food from other family, neighbors, and friends (66%).

The impact of food security was greater for households with children, and those with pregnant women as opposed to those without such members.

Around 70 percent reported that they received cash assistance, while 97 percent said that they received food assistance. Only 12.5 percent of the households said that they received assistance for food production from the government.

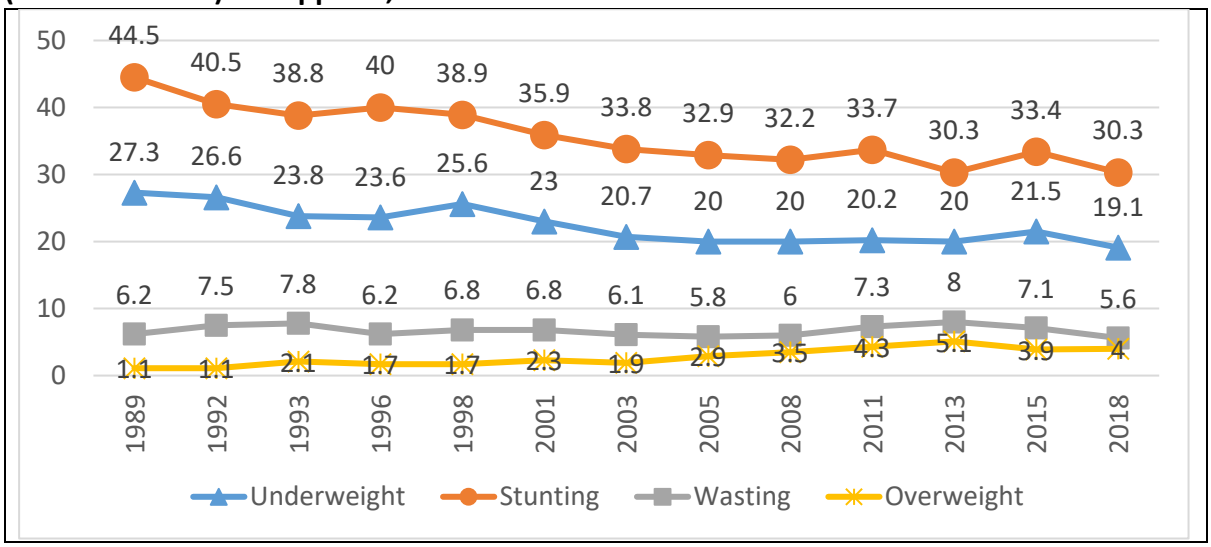
Source: FNRI (n.d.b)

Do lower hunger incidence rates translate to better nutritional outcomes?

Depending on which marker of malnutrition and on which age group, the extent to which lower hunger incidence translates to better nutrition outcomes varies. Malnutrition situation of children improved from 1990s to mid-2000s, but progress has been slow since the past decade. Prevalence of overweight/obesity among children and adults is worsening. This phenomenon wherein undernutrition coexists with overnutrition is called the "double burden of malnutrition." Several developing countries including the Philippines are experiencing this phenomenon.

Among Filipino children below five years old, prevalence of stunting and underweight remains to be high although significant reduction has been made since 1990s (See **Figure 13**). In 2018, one out of three Filipino children below the age of five is stunted, while one out of five is underweight. Other forms of malnutrition, which are wasting and overweight, have much lower prevalence rates, but their upward trend albeit small is still worrisome. This age group deserves the utmost attention of policymakers as there is only a small window of opportunity to make long-lasting impact on children's potential cognitive and overall health as they become adults. Failure to act quickly has irreversible, or, worst, fatal consequences.

Figure 13. Trends in the prevalence of malnutrition among children, less than 5.0 years old (0 to 59 months): Philippines, 1989-2018

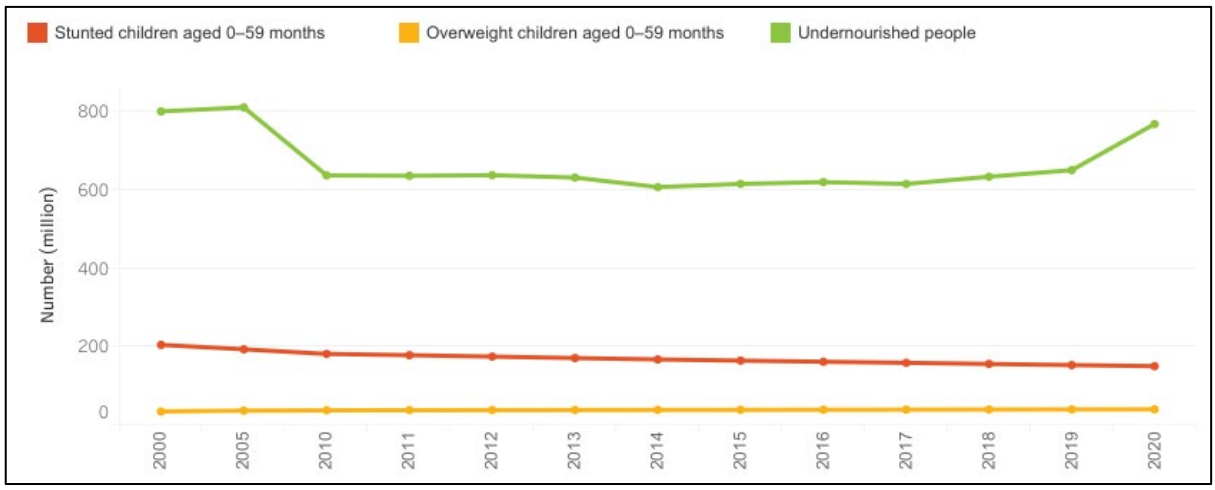


Source of basic data: FNRI, NNS (various years)

The seemingly considerable downward trend experienced by the country, however, is minimal when compared with other Association of Southeast Asian Nations (ASEAN) countries. According to Ulep (2021), the Philippines' decline in stunting prevalence from 2000-2018 was at a dismal rate of 0-1 percent, while well-performing ASEAN countries like Viet Nam had a 5-6 percent annual decline.[9] On a global scale, the number (in millions) of children aged 0-59 months who are stunted is decreasing, albeit slowly, while the overweight trend appears constant (see **Figure 14**).

[9] Ulep's discussion paper looks at the chronic malnutrition problem from the health systems view and recommends that "the delivery of health and nutrition interventions should be comprehensive, converged, and continuous to be effective" (Ulep 2021, p. 9).

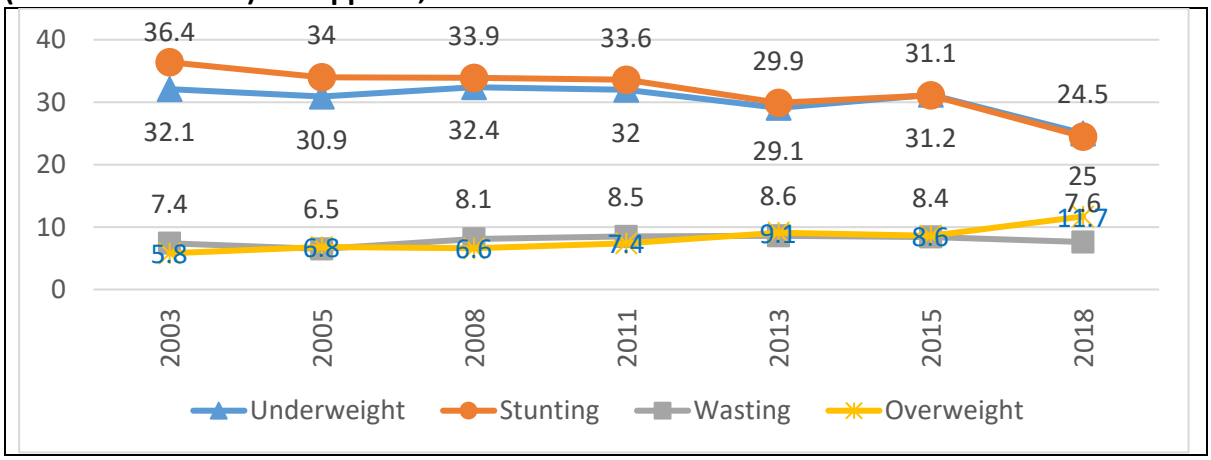
Figure 14. Global trends in undernourishment, malnutrition and child stunting, in millions, 2000-2020



Source of image: ADB (2021a)

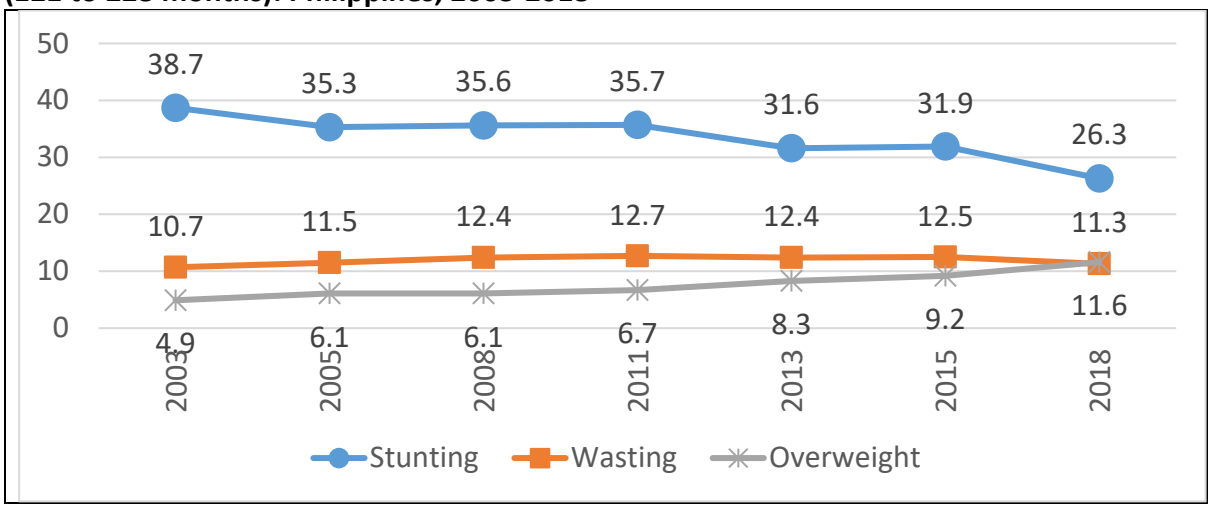
Among children aged 5-10 and 10-19, stunting prevalence is also high at around 25 percent in 2018 (See Figures 15 and 16). Moreover, prevalence of overweight and of wasting are alarmingly high both at 10-11 percent in 2018.

Figure 15. Trends in the prevalence of malnutrition among children, 5.08 to 10.0 years old (61 to 120 months): Philippines, 2003-2018



Source of basic data: FNRI (2018)

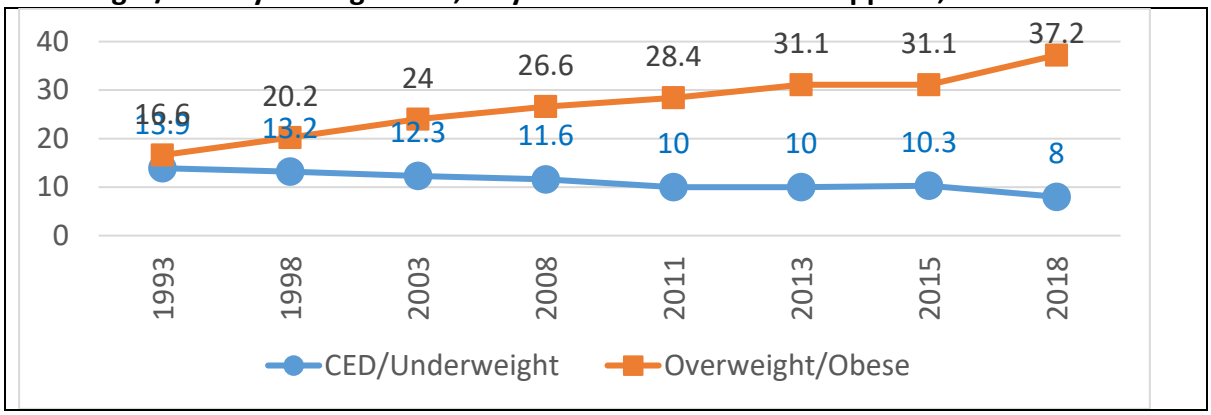
Figure 16. Trends in the prevalence of malnutrition among children, 10.08 to 19.0 years old (121 to 228 months): Philippines, 2003-2018



Source of basic data: FNRI, NNS (various years)

The obesity problem is much worse among the adults (aged 20 years and above), which is at almost 40 percent in 2018 with steep rising trend based on FNRI data (See **Figure 17**). In 2017, the World Health Organization (WHO) estimated that 1.9 billion people have overweight or obesity problem, while 1 in 12 people are suffering from diabetes. Within a span of two decades, non-communicable diseases like diabetes would cost the global economy by USD 47 trillion in lost earnings and health bills. This situation pushes more people into poverty (IFPRI 2017).

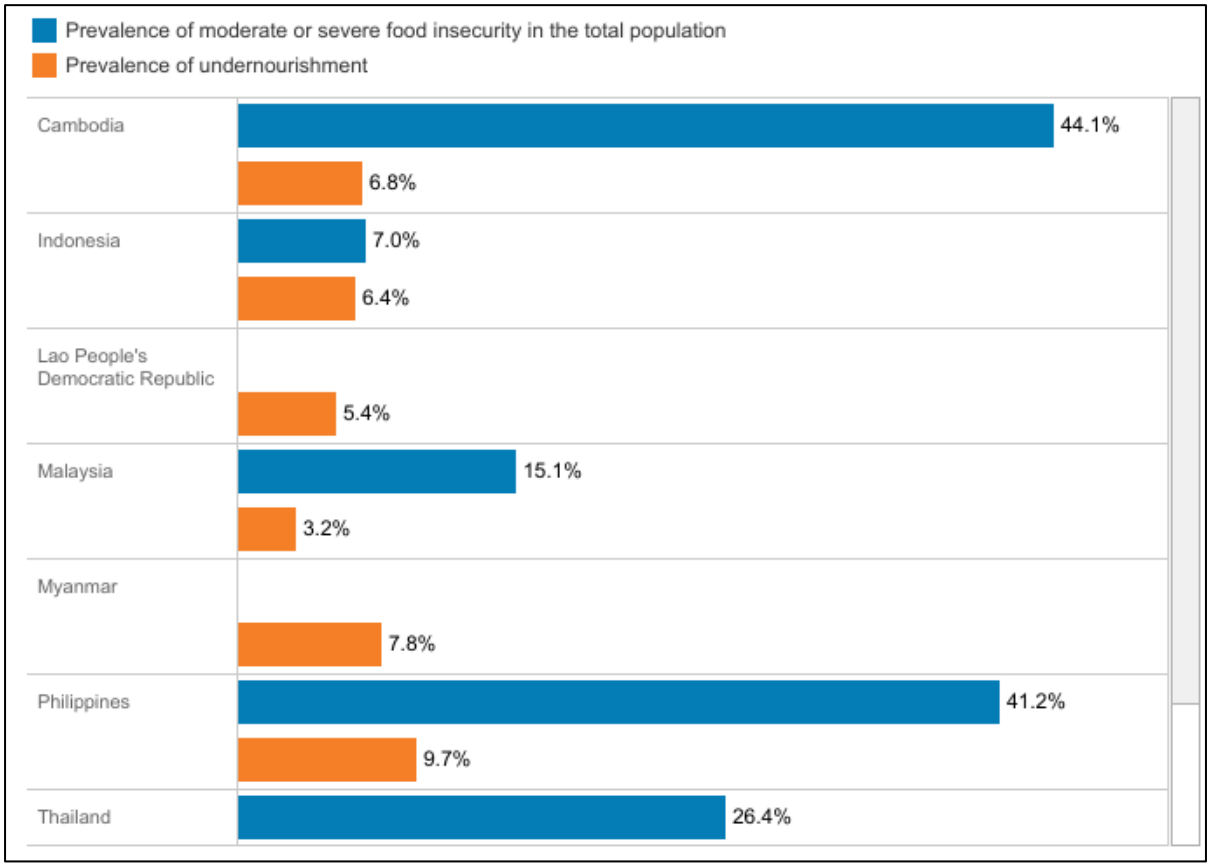
Figure 17. Trends in the prevalence of chronic energy deficiency (CED) and overweight/obesity among adults, 20 years old and above: Philippines, 1993-2018



Source of basic data: FNRI, NNS (various years)

In most recent years (from 2017 to 2019), the average prevalence rate of food insecurity (moderate or severe) among Filipinos is 41.2 percent (see **Figure 18**). For the same period, the prevalence of undernourishment is 9.7 percent. **Figure 18** also shows that other ASEAN countries (except Cambodia) were faring much better as opposed to the Philippines based on these two indicators. Globally, the number of undernourished people had plateaued until 2017. However, there is an uptick starting in 2018 up to 2020. According to FAO (2021), the East and Central Asian regions are likely to achieve their SDG 2030 targets, but not South and Southeast Asian economies if efforts will not be ramped up.

Figure 18. Prevalence of Food Insecurity and Undernourishment, %



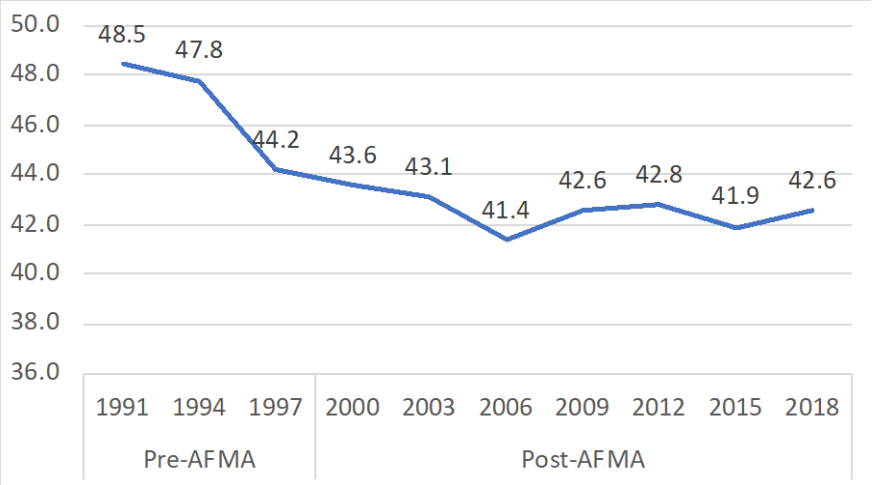
Source of image: ADB (2021b)

There are many reasons for the depressing state of nutrition of Filipinos and they could be traced to either food intake or health status as discussed earlier. For the purposes of this paper, succeeding sections will delve more into the food intake pathway toward nutrition security.

How much food is consumed by Filipino households? The available statistics on food consumption describes either food expenditures or nutrient equivalent of food intake.

The share of food expenses to total household expenditure declined from around 50 percent in 1990s to 43 percent in 2018. The key indicator of PhilFSIS for the food utilization dimension is the **Share of Food Expenditure to Total Family Expenditure**, which is obtained from PSA FIES available for various years. Based on **Figure 19** below, food expenditure to total family expenditure share has been decreasing from 1991 to 2006. However, there seems to be a slight upward trend from 2009 to 2018. As the share of food expenditure in total family expenditure decreases, larger amount of household resources could be spent on non-food expenditure items, such as education, health, durables, among others.

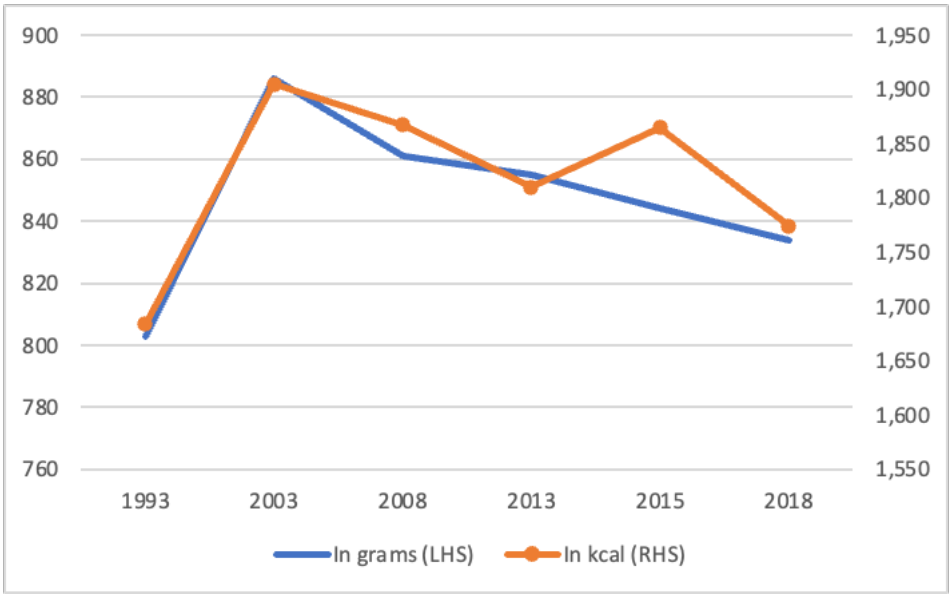
Figure 19. Share of Food Expenditure to Total Family Expenditure, in %, 1991-2018



Source of basic data: PSA OpenStat (PhilFSiS); 2018 data from PSA AIS Food Availability and Sufficiency Publication (PSA 2020a)

From early 1990s to early 2000s, food intake appears to be increasing despite a decreasing food expenditure shares. However, from early 2000s to 2018, the mean per capita food and energy intake of Filipinos is on a downward trend while the share of food in total expenditures is slightly going up (See **Figure 20**).

Figure 20. Trends in mean one-day per capita food and energy intake: Philippines, 1993-2018

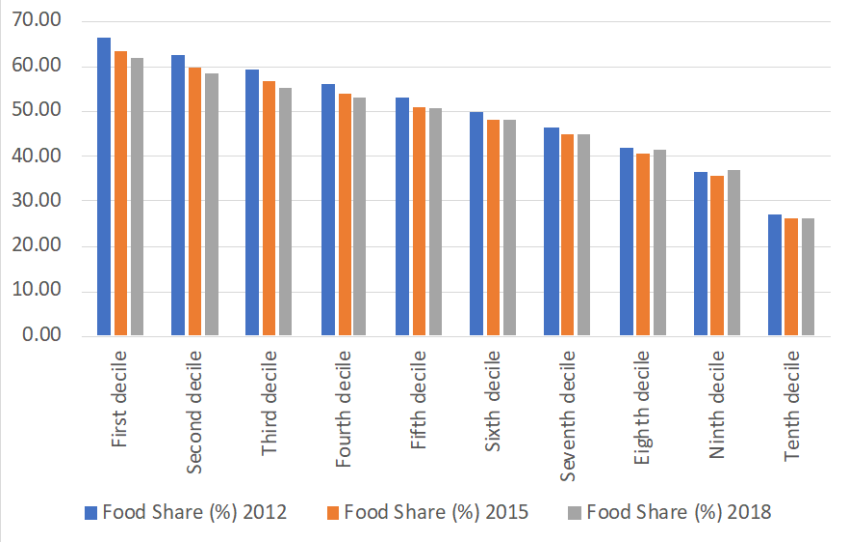


Source of basic data: FNRI NNS (2018)

Richer deciles spend smaller percentage of their total household expenditures on food as opposed to poorer deciles. In 2012, the poorest decile (first decile) spent 65 percent of their total household expenses on food, while the richest (tenth) decile spent less than 30 percent. For all deciles (except eighth and ninth deciles), the percentage share of food expenditure to total expenditure declined in 2015 and 2018 (See **Figure 21**).

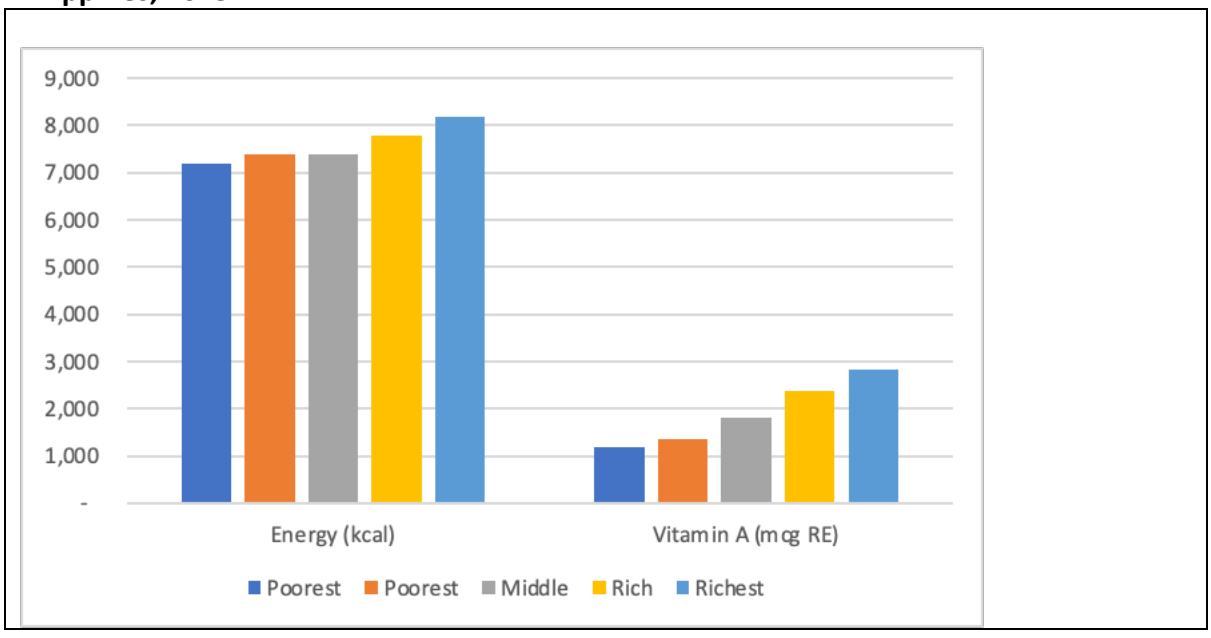
In terms of number of households meeting the per capita energy and nutrient intake requirements, **Figure 22** shows that as household income increases, their energy and nutrient intake also increases with the exception of Vitamin C and Calcium (FNRI 2015).

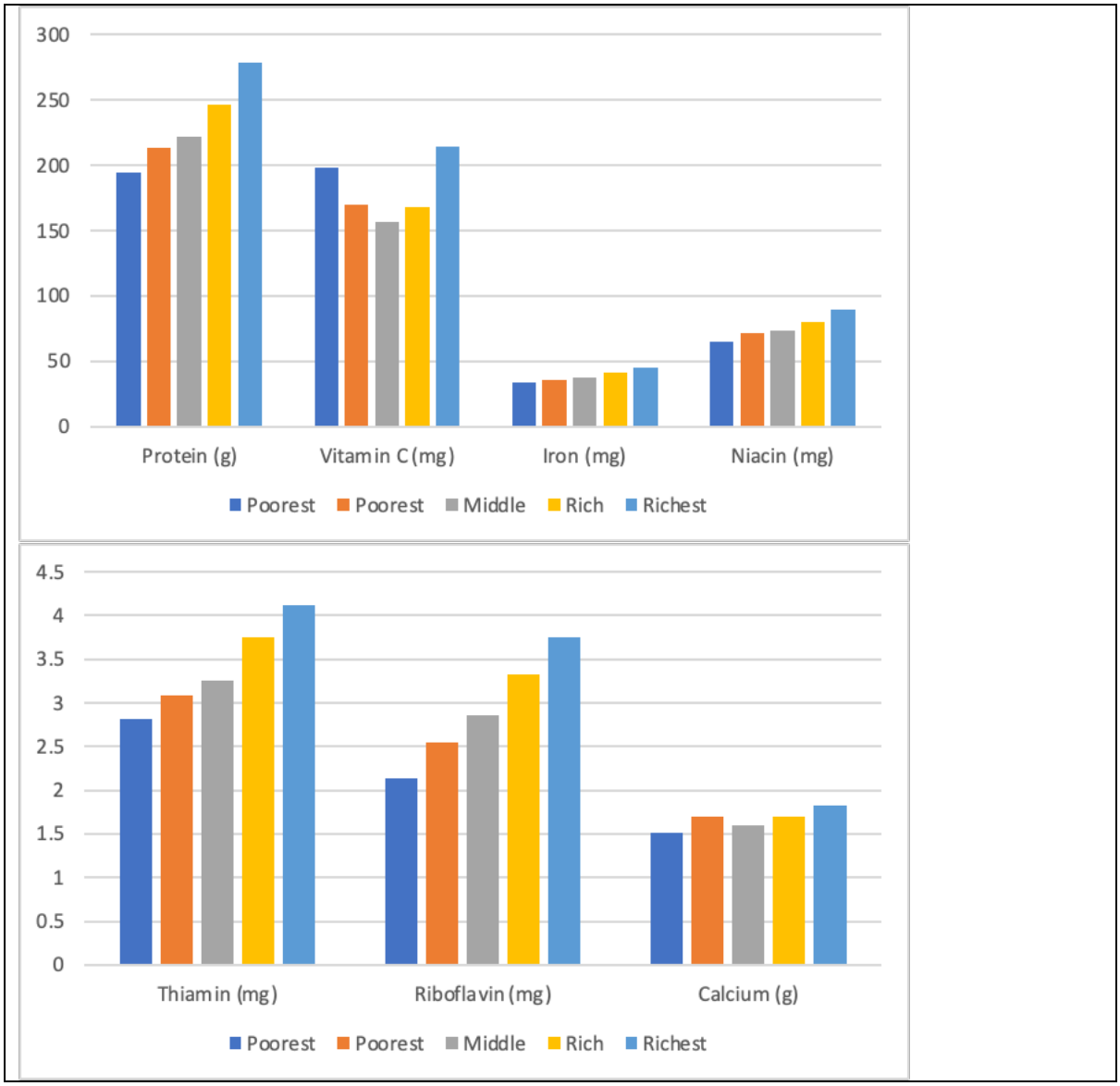
Figure 21. Share of Food Expenditure to Total Family Expenditure, by decile, in %



Source of basic data: PSA FIES

Figure 22. Proportion of households with per capita energy and nutrient intake meeting 100 percent energy and Estimated Average Requirements for nutrients by wealth quintile: Philippines, 2015.

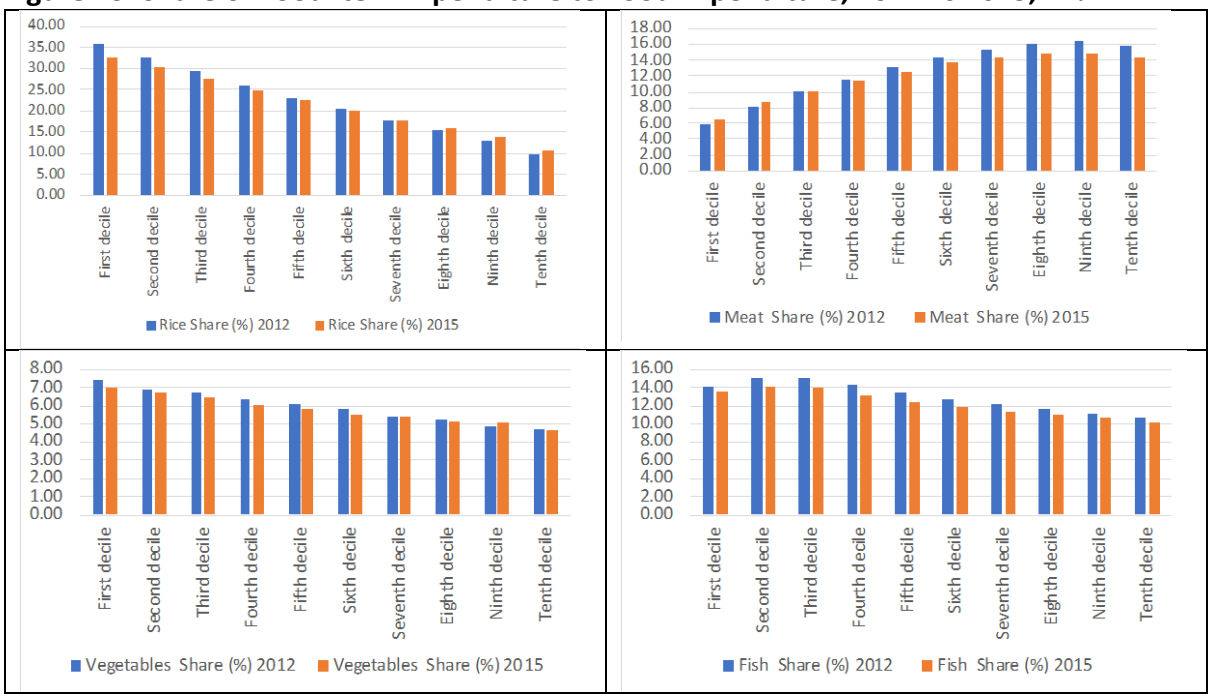




Source of basic data: FNRI (2015a)

Rice, which is a staple food, accounts for the largest share in total food expenditure among the poor deciles. Poorest decile spent one-third (35%) of their food expenditures on rice alone in 2012 (See **Figure 23**). Moreover, around 15 percent was spent on fish, 7.5 percent on vegetables, and only 6 percent on meat. On the other hand, the richest decile spent 16 percent on meat, 11 percent on fish, 10 percent on rice, 5.5 percent on vegetables. This suggests that poorer households spend more on energy-giving food than protein-rich food. The same pattern is observed for 2015 expenditures.

Figure 23. Share of Food Item Expenditure to Food Expenditure, 2012 vs 2015, in %



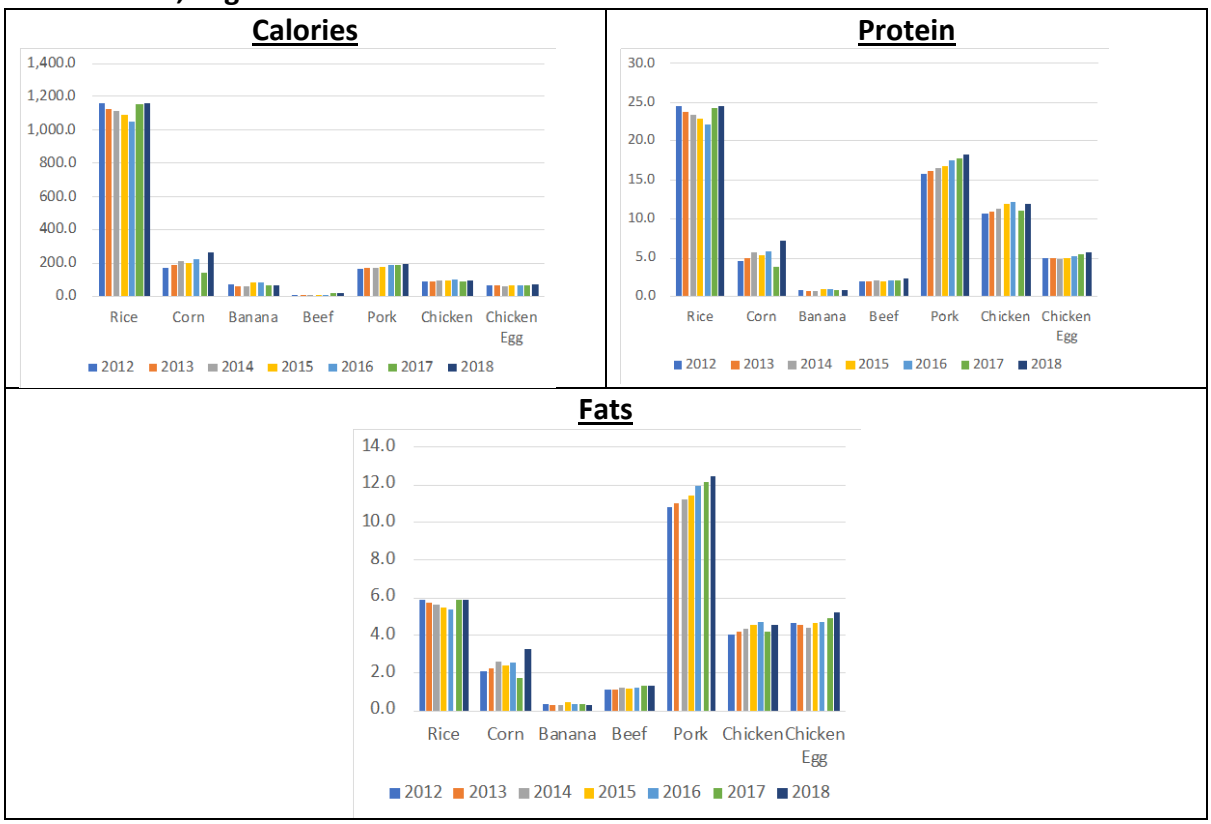
Source of basic data: PSA FIES (2015 and 2018)

Rice has been the main source of daily per capita calorie and protein supply of Filipinos. The PSA (in collaboration with FAO) monitors the calorie, protein, and fat supply of selected food items on a per day per capita basis (AIS Food Consumption and Nutrition). **Figure 24** shows that in terms of calories, rice has been the top source. In 2018, rice provided 1,192 grams of calories per day per person. Other sources of calories are corn at 267.66 grams per day per person and pork at 192.48 grams per day per person.

In terms of protein supply, rice remained as the top source at 24.41 grams per day per person in 2018. It is followed by pork at 18.32 grams per day per person and chicken (dressed) at 11.95 grams per day per person. Although not shown in the table, fishery products as represented by tuna, tilapia, and roundscad provided 1.24, 0.82, and 0.31 grams of protein per day per person, respectively.

In 2018, the largest source of fats was pork at 12.45 grams per day per person. Other sources of daily per capita fats were rice, chicken egg, and chicken (dressed) at 5.86 grams, 5.28 grams, and 4.58 grams.

Figure 24. Daily per capita calories, protein, and fats supply of selected agricultural commodities, in grams



Source of basic data: PSA (various years)

To recapitulate, hunger incidence rates and stunting prevalence rates had been going down while food and energy intakes were increasing (1990s-2000s). However, from 2000s up to present, food consumption and nutritional outcomes appear to be getting worse.

5.1.2. Food/Diet quality

Do Filipinos consume the right kind of food for them to be in a healthy state? To answer this question, it is important to note first that there are three levels of diet according to FAO et al. (2020). The first one is an **energy sufficient diet**, which provides all the necessary calories for energy balance to do one's work. Only the basic starchy staple within a given country is usually consumed to achieve this. In the case of the Philippines, the starchy staple is rice. The next level of diet is **nutrient adequate diet**, which provides the appropriate level and balanced mix of macro- and micronutrients in addition to adequate calories. The highest level of diet is the **healthy diet**. A healthy diet ensures that adequate calories and nutrients are provided and that they come from several food groups. This diet intends to help in the prevention of malnutrition and other diet-related non-communicable diseases (e.g. diabetes). Generally, healthy diets follow the proportions below (FAO et al. 2020, p. 41):

- Less than 30% of total energy intake from fats (shift from saturated to unsaturated)
- Less than 10% of total energy intake from free sugars
- Consumption of at least 400 grams of fruits and vegetables per day
- Not more than 5 grams per day of iodized salt.

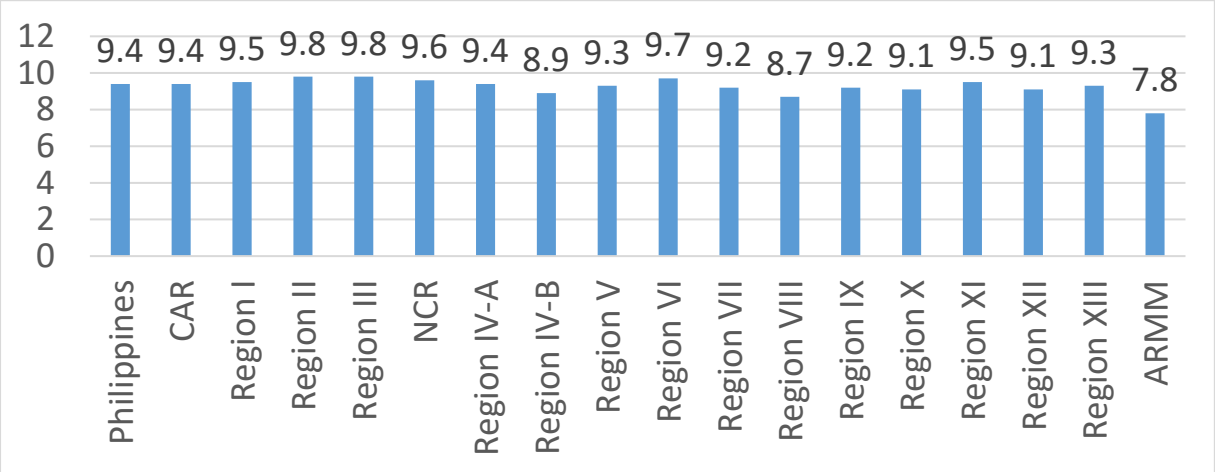
What food do Filipino households typically consume?

The three most consumed food groups by Filipino households are 1) cereals, 2) vegetables, and 3) spices, condiments, and beverages. The FNRI uses the dietary diversity score of households as proxy for food access and quality. A point is given for every food group that is consumed by the household for the past seven days, with 12 as the perfect score. The following are the twelve (12) food groups and the corresponding proportion of households consuming the said food group in 2015:

1. Cereals (99.7%)
2. White tubers and roots (48.4%)
3. Vegetables (97.9%)
4. Fruits (81.2%)
5. Meat, fresh and processed (78.8%)
6. Eggs (80.6%)
7. Fish and other seafood (90.8%)
8. Legumes, nuts, and seeds (39.7%)
9. Milk and milk products (50.9%)
10. Oils and fats (90.4%)
11. Sweets (81.3%)
12. Spices, condiments, and beverages (95.8%)

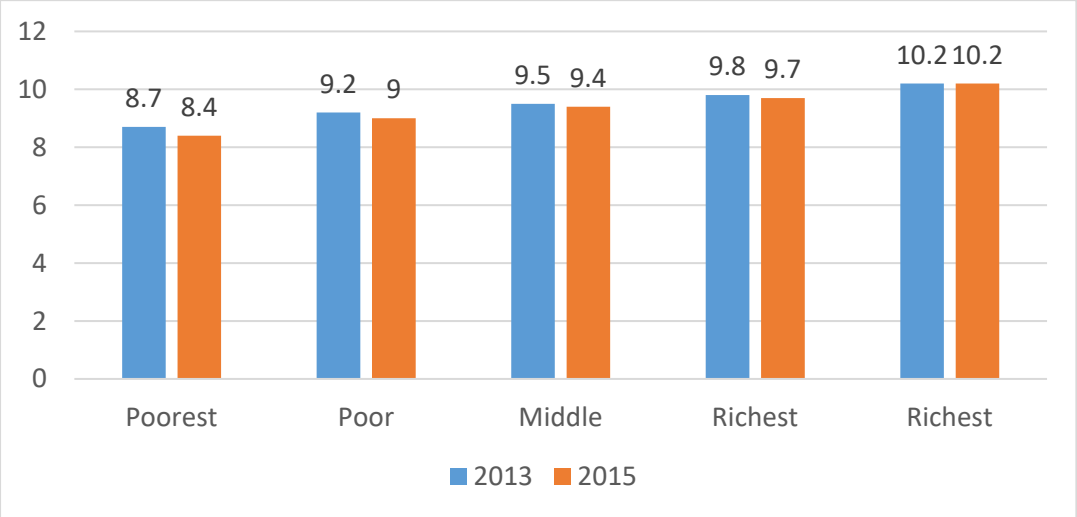
On average, Filipino households consumed around nine food groups (with mean dietary diversity score of 9.4) in 2015. The level of diet diversity varies by location and by income level. **Figure 25** shows that those households with most diverse diet were living in Regions II and III (9.8 score), while those with least diverse diet were residing in ARMM region (7.8 score). In terms of level of income, the richest quintile has the highest diversity score as expected (around 10 food groups), while the poorest quintile has the least score (around 8 food groups) (see **Figure 26**).

Figure 25. Mean dietary diversity score by region, 2015



Source of basic data: FNRI (2015a)

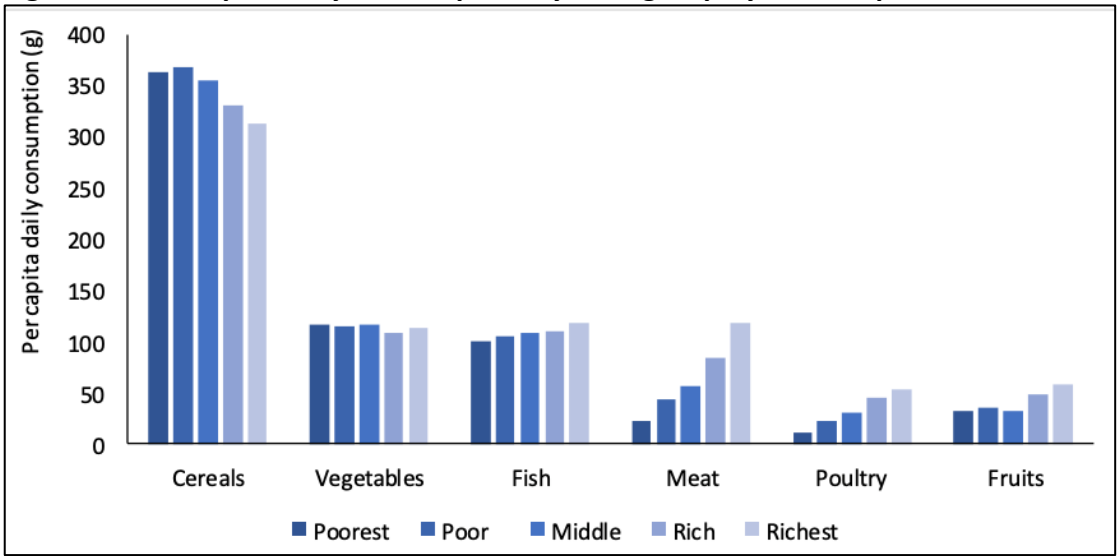
Figure 26. Mean diet diversity score of households by wealth quintile, 2013 and 2015



Source of basic data: FNRI (2013 and 2015)

A typical Filipino diet at the household level is a combination of rice, vegetables, and fish diet. Based on FNRI's data on food intake weight in 2015, the total food intake was 3,400 grams. Of which, 36 percent is rice, 15 percent comes from vegetables, and 12 percent from fish (NNS 2015, dietary survey). Compared to the recommended proportion by food group based on *Pinggang Pinoy*, the average food intake of Filipinos is high in cereals and tubers, but low in fruits and vegetables (WFP 2018). **Figure 27** shows that per capita daily consumption of cereals tends to decrease as income level increases. On the other hand, meat consumption greatly increases as income also increases. For fish, there is also a positive correlation between income and daily consumption, but the variation is smaller than in meat. Across all income levels, fruits had been consistently consumed way less than the other food groups.

Figure 27. Per capita daily consumption by food group by wealth quintile, 2015



Source of image: WFP 2018. Fill the Nutrient Gap/ NNS 2015

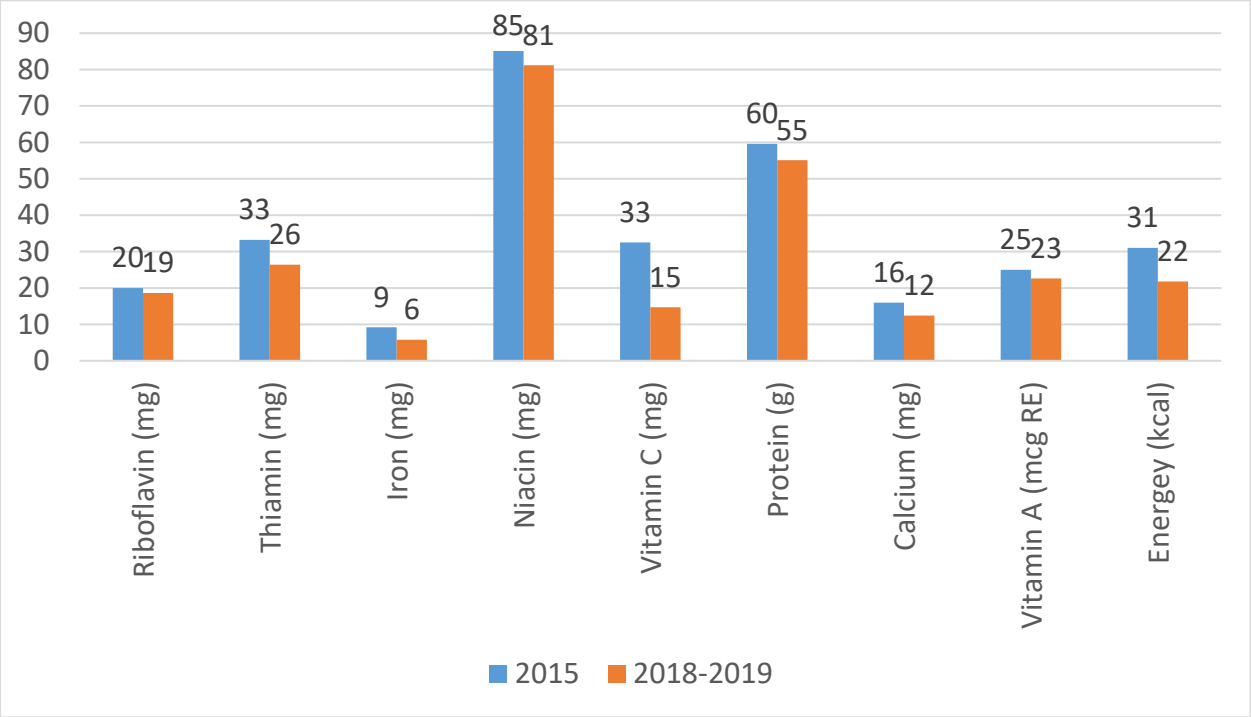
As discussed earlier, agriculture households are among the poorest. Only 22 percent among skilled agricultural, forestry, and fishery workers were food secure in 2015. They have lower dietary diversity and lower share of protein and fruit consumption (Mbuya et al. 2021).

Are the foods being consumed by Filipinos adequate to meet the recommended energy and nutrient levels?

In terms of energy and nutrient requirements, only a small proportion of Filipino households are able to meet them, except for niacin and protein. As shown in **Figure 28**, despite being heavy on starchy food (i.e. rice), only 30 percent of Filipino households were able to meet 100% of the recommended energy intake (REI)[10] in 2015. This share even got smaller (22%) based on 2018-2019 data of FNRI (PSA n.d.c). Roa (2007) reported that the inadequacy in energy and micro-nutrients intake had already been observed since 1978, which was found based on the first nutrition survey in the country.

On an individual level, the top five food sources of the total energy intake in the Philippines among adults aged 19 to 59 are rice (54.5%), lean pork (3.2%), 3-in-1 coffee (2.7%), cooking oil (2%), and pork belly (2%) using FNRI ENNS 2018 data (FNRI 2020). Angeles-Agdeppa et al. (2021) explain that rice is considered nutritionally undesirable and prolonged consumption of rice-based diets could lead to vitamin and iron deficiencies.

Figure 28. Proportion of households meeting 100% energy recommendation and estimated average requirement of nutrients, 2015 and 2018-2019



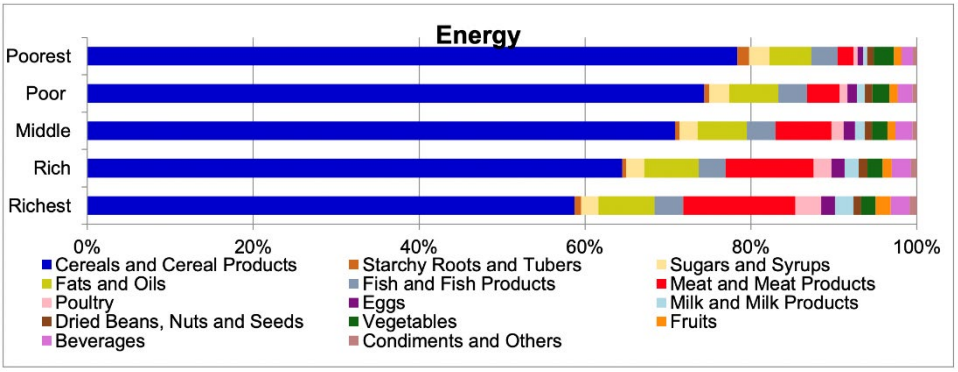
Source of basic data: FNRI (ENNS 2018-2019)

Annex 2 lists down the Recommended Energy Intakes per day by life stage/age group. For adults, depending on sex and age group, energy intake per day should be around 2,000 kcal. Thus, for a household of five members, the estimated total energy intake should be around 10,000 kcal per day. However, the mean intake in 2015 was 7,597 kcal per day (FNRI Dietary Survey 2015). Among the poorest quintile, 29.3 percent of the households met 100% REI with a mean intake of 7,182 kcal, while it was 34.7 percent among the richest quintile with a mean intake of 8,191 kcal.

[10] REI is defined in the Philippine Dietary Reference Intakes (2015) as the level of intake of energy that is "considered adequate for the maintenance of health and well-being of healthy persons in the population."

Cereals and cereal products contributed 70 percent of energy intake (FNRI Dietary Survey 2015). Poorest quintile got 78.4 percent of their energy intake from Cereals and Cereal products (5,628 kcal) and 5.6 percent from Fish, Meat, and Poultry (400kcal). On the other hand, the Richest quintile got 58.7 percent of their energy intake from Cereals and Cereal products (4,809 kcal) and 20.1 percent from Fish, Meat, and Poultry (1,647 kcal) (see **Figure *29***).

Figure 29. Percent contribution of food groups to energy intake by wealth quintile: Philippines, 2015

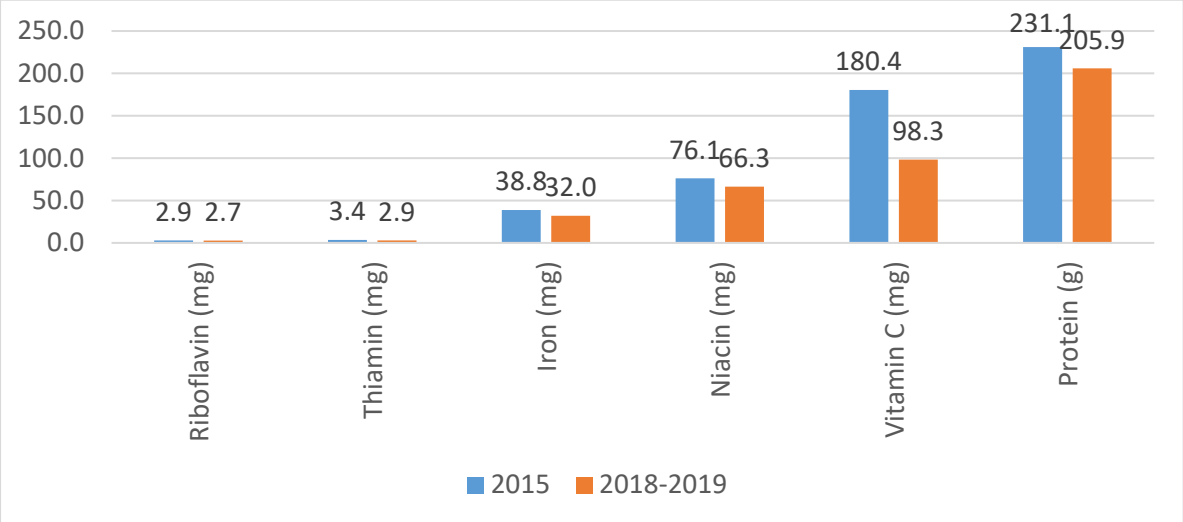


Source of image: FNRI (2015, p.70)

Based on the most recent data, the estimated average requirements for Riboflavin, Thiamin, Iron, Vitamin C, Calcium, and Vitamin A were met only by a small proportion of households ranging from 6 percent to 26 percent. Much bigger proportion of households were able to meet Niacin and Protein requirements at 81 percent and 55 percent, respectively.

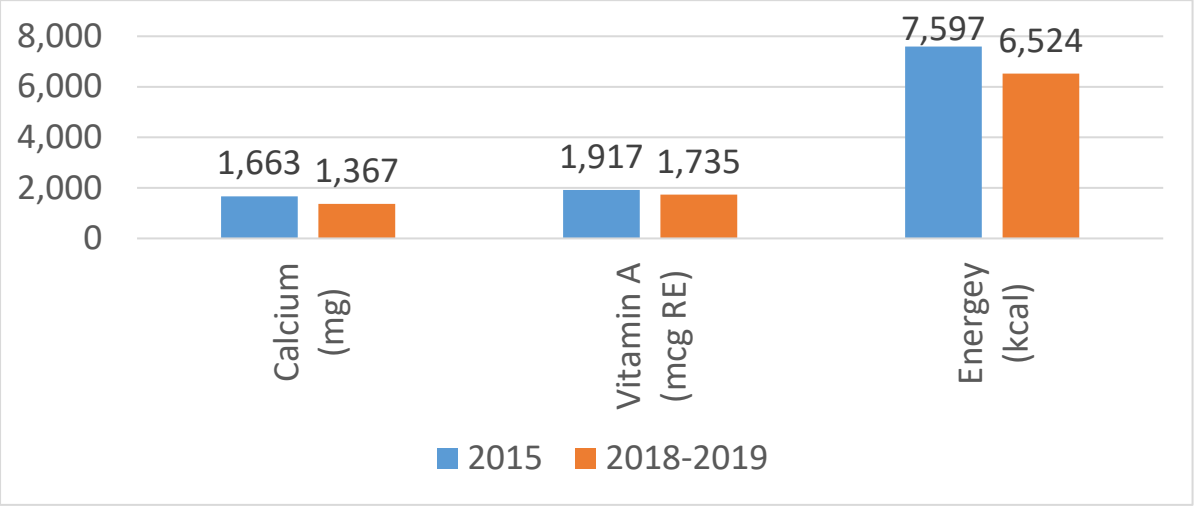
Comparing the level of nutrient intake in 2015 and in 2018-2019, it seems that the problem of macro- and micronutrient deficiency is becoming worse. Figures 30 and 31 clearly show the decrease in energy and nutrient intake from 2015 to 2018-2019.

Figure 30. Mean intake of nutrients, 2015 and 2018-2019



Source of basic data: FNRI, ENNS 2018-2019

Figure 31. Mean intake of energy and other nutrients, 2015 and 2018-2019



Source of basic data: FNRI, ENNS 2018-2019

What is the correlation between diet quality and nutritional outcomes like stunting and wasting?

There is large correlation between protein-rich food and stunting due to meat and milk consumption, and not fish and eggs. In addition, fruit consumption is associated with lower probabilities of poor nutritional outcomes (e.g. child wasting). However, the study finds that vegetable consumption has no statistically significant relation with nutritional outcomes among children (Mbuya et al. 2021).

Plausible explanations for the inadequate nutrient intake of Filipino households will be further discussed under the food affordability dimension.

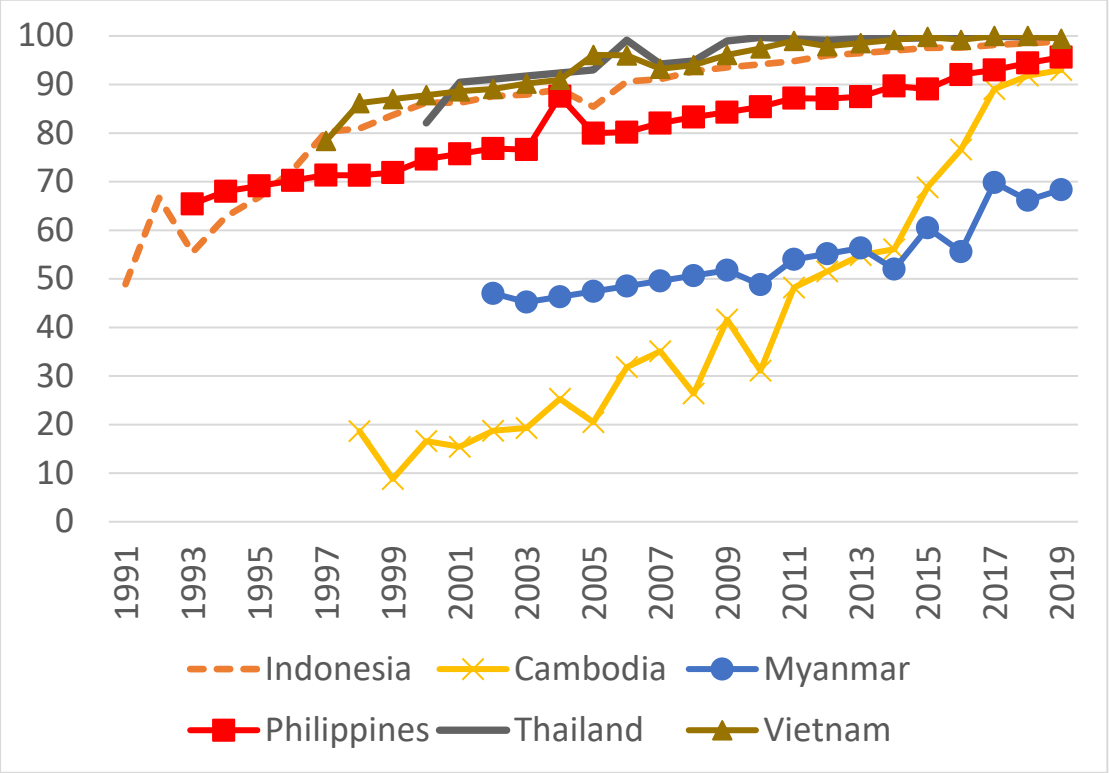
5.1.3. Food safety

Food safety is an essential element to achieve both food and nutrition security. In East and Southeast Asia, there is a rising concern on exposure of people to food safety hazards (e.g. foodborne illness) due rapid urbanization and changing consumer preferences. More food consumers now prefer processed foods or eating outside their home. Investments on crucial infrastructures to improve access to potable water and sanitation are important to be able to comply with food safety regulations and avoid cross-contamination in food supply chains (World Bank 2020).

An alarming number of 8-9 million cases of foodborne illness is recorded in the Philippines each year, which results in 3,000 to 4,000 deaths. The corresponding productivity loss due to such illness is equivalent to USD 1.5 billion (World Bank 2020). Azanza et al. (2019), as cited in a World Bank study (2020), found that the main culprit for foodborne illness outbreaks in the country is meat or meat-based dishes. The reasons for this are the proliferation of unregistered businesses supplying “hot meat” or meat with compromised quality, illegal slaughterhouses, and disruptions in the supply chain of meat. Aside from meat, fish and seafood dishes also commonly cause illnesses due to presence of toxins or the lack of access to potable water, cold storage facilities, or as simple as clean ice (World Bank 2020).

Cold storage or refrigeration facilities run on electricity, thus one of the usual indicators for food safety is access to electricity. In the Philippines, the share of the population with electricity access increased from 65 percent in early 1990s to around 96 percent in 2019 (see Figure 32). Thailand and Viet Nam are close to 100 percent at 99.9 percent and 99.4 percent, respectively. The share in Indonesia was 98.85 percent in 2019. The rate of improvement in Cambodia in recent years is commendable (World Bank 2022).

Figure 32. Share of Population with electricity access (ability to store food safely)

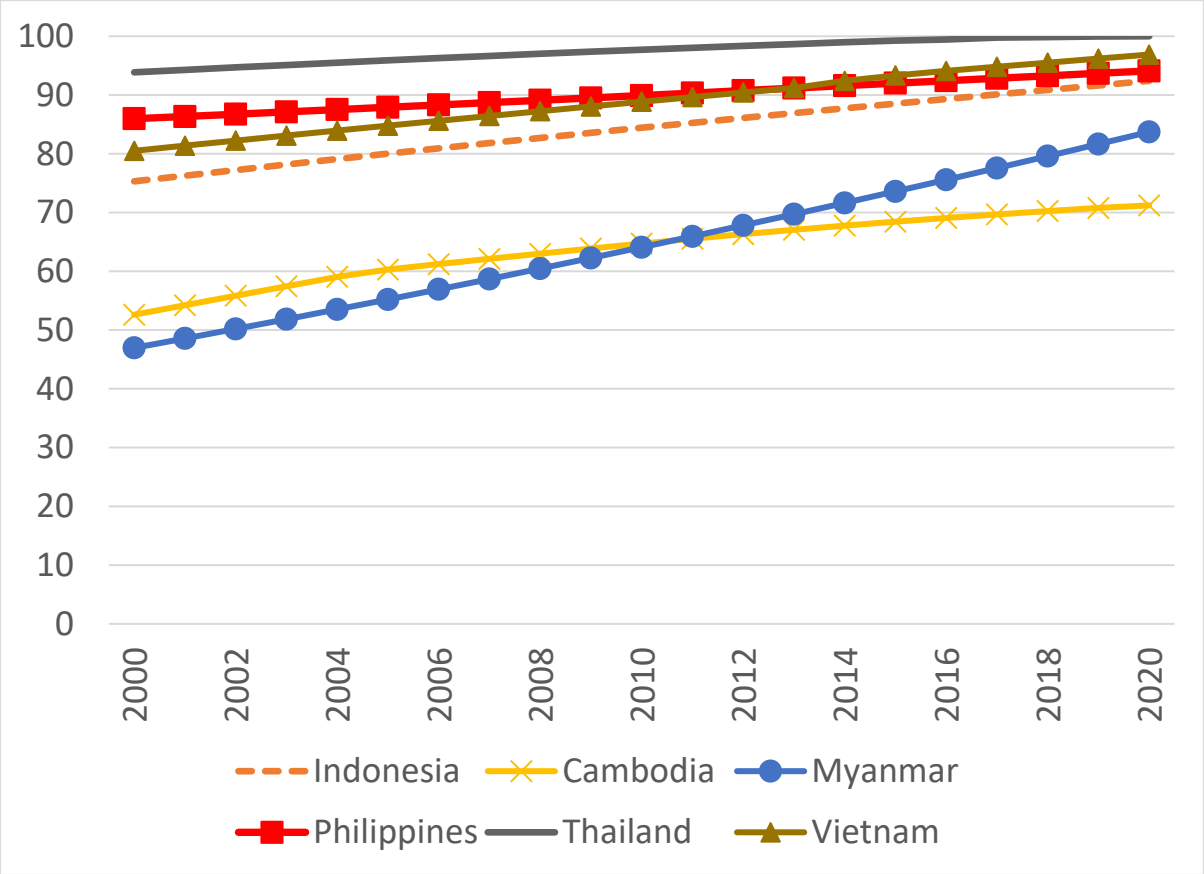


Source of basic data: World Bank (2022)

In terms of owning a refrigerator/freezer, 45.7 percent of households reported that they have a refrigerator/freezer (APIS 2020b). In 2019, the share was slightly higher at 46.3 percent (PSA 2019). In 2008, only 38.9 percent has a refrigerator/freezer. The variation by income stratum was huge. Among the lowest 30 percent in terms of income level, only nine percent has a refrigerator/freezer, while it was 52 percent among the highest 70 percent (PSA 2008). This poses a huge limitation on the poor households' capacity to store food safely.

As mentioned above, potable water is important in ensuring food safety across the whole food supply chain. In the Philippines, the share of the population with access to safe drinking water is 94 percent in 2020, which is an improvement from 86 percent in 2000 (see **Figure 33**). The percentage change in the Philippines is small at 9 percent because the country started at a relatively high base. The percentage increase in Indonesia and in Viet Nam are 23 percent and 20 percent, respectively. The increase is much larger for Myanmar at 78 percent increase because it started at a low base of 47 percent share of population in 2000 (World Bank 2022).

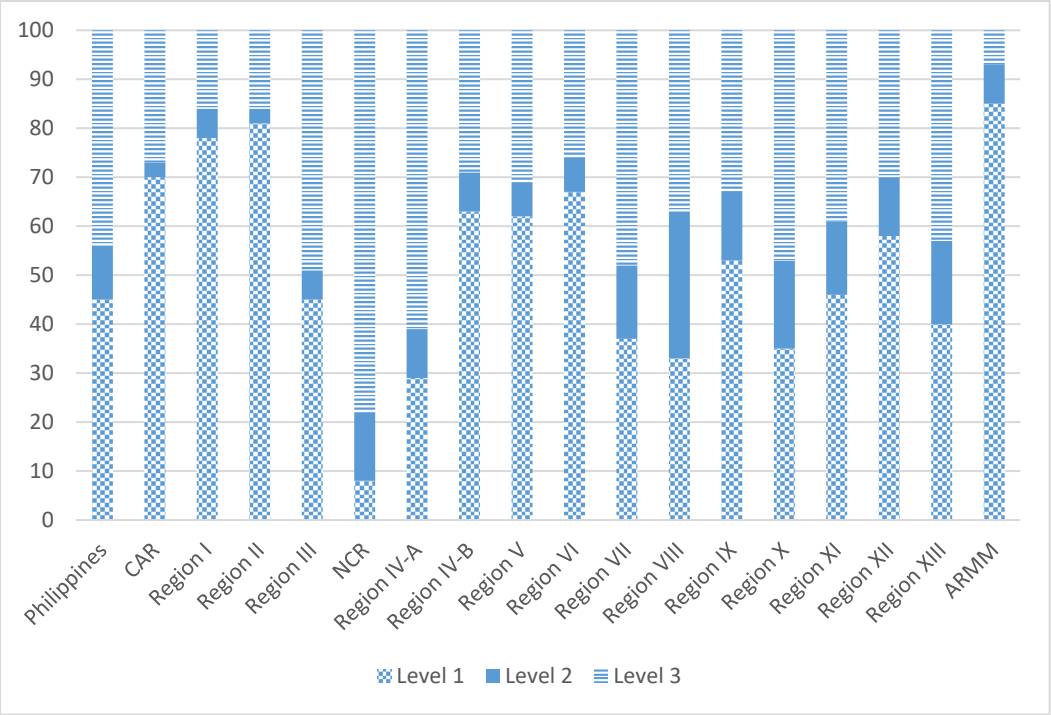
Figure 33. Share of Population with access to safe drinking water



Source of basic data: World Bank (2022)

In terms of water service delivery, there are three levels, namely, Level 1 (Point Source), Level 2 (Communal faucet), and Level 3 (Waterworks system). Level 1 does not have a distribution system. Level 2 is a piped system with adequate treatment facility but faucets are communal/public. The highest level is Level 3 which involves a piped system with adequate treatment facility and individual household taps. Level 3 water service delivery is enjoyed by less than half (44%) of the households in the country in 2015. Still a big majority is at Level 1 (45%), while Level 2 serves 11 percent of the households. **Figure 34** shows the regional situation. Only NCR and Region IV-A (CALABARZON) have more than 50 percent of households with Level 3 water system. The region with the largest share of households that are still at Level 1 is ARMM (Velasco et al. 2020).

Figure 34. Share of households by level of water service delivery, by region, %, 2015



Source of basic data: Velasco et al. (2020)

In terms of service level of drinking water, in 2020, 93.9 percent of households have basic service level, which means that they obtain their drinking water from an improved source and that collection time is not more than 30 minutes for a round trip including queueing (PSA 2021a).[11] The share was slightly lower in 2019, which was at 92.5 percent (PSA 2020c).

5.2. Food Accessibility Dimension—Affordability

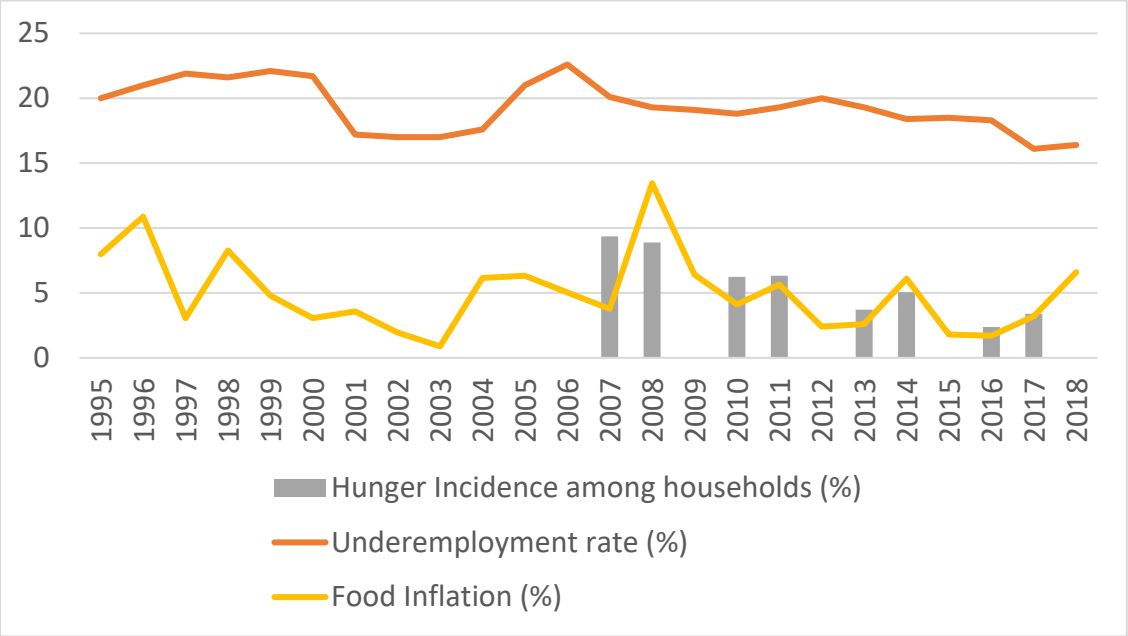
Why are people consuming inadequate volume of healthy food? The most significant factor is the economic accessibility or also called affordability of nutritious food (World Bank 2020). Affordability is a relative concept because it depends on the level of the price of the food itself, the price of related goods (e.g. inputs, non-food items), and the capacity of the consumers to purchase the food item (i.e. their income level). For example, in a high-income country, the price of food may be higher when compared to low-income country (i.e. available type of food and quality may vary), but food could still be considered affordable if the residents in the same country are receiving high paychecks that enable to purchase adequate food with much financial ease. However, as discussed in Section 2.3.1., food prices are actually lower in high-income countries due to the efficiency of their food distribution system.

Food affordability, as reflected in food price levels and quality of jobs, affects future level of hunger incidence. Based on a study by Mapa et al. (2016), food prices and quality of jobs (as proxied by underemployment) are determinants of hunger incidence. They utilized the quarterly survey data on hunger from the Social Weather Station and applied an econometric model based on vector autoregression. They found that a one-time increase in food prices can

[11] Improved sources are those that have the potential to deliver safe water by nature of their design and construction. These include piped supplies (such as households with tap water in their dwelling, yard or plot; or public standposts) and non-piped supplies (such as boreholes, protected wells and springs, rainwater and packaged or delivered water)

lead to increases in hunger incidence that will last for five quarters, while a one-time increase in underemployment can lead to increases in hunger incidence for two quarters. **Figure 35** shows the historical trend of underemployment rate and food inflation rate from 1995 to 2018. Moreover, the hunger incidence for various years based on PSA APIS are also shown.

Figure 35. Hunger incidence, underemployment rate, and food inflation, %, 1995-2018



Sources of basic data: Food inflation and underemployment rate data are obtained from PSA Openstat, while the data on hunger Incidence among households came from various PSA APIS publications.

Due to unaffordability, many Filipino households are unable to consume nutrient-adequate diets leading to poor health status. Poorest households suffer food insecurity the most as evidenced by low diet quality and high incidence of malnutrition. **Table 5** shows that poorest households do not meet the recommended level of intake of meat and pulses, vegetables, and milk and milk products. The gap is much larger among poorest 40 percent than that of the richest 40 percent.

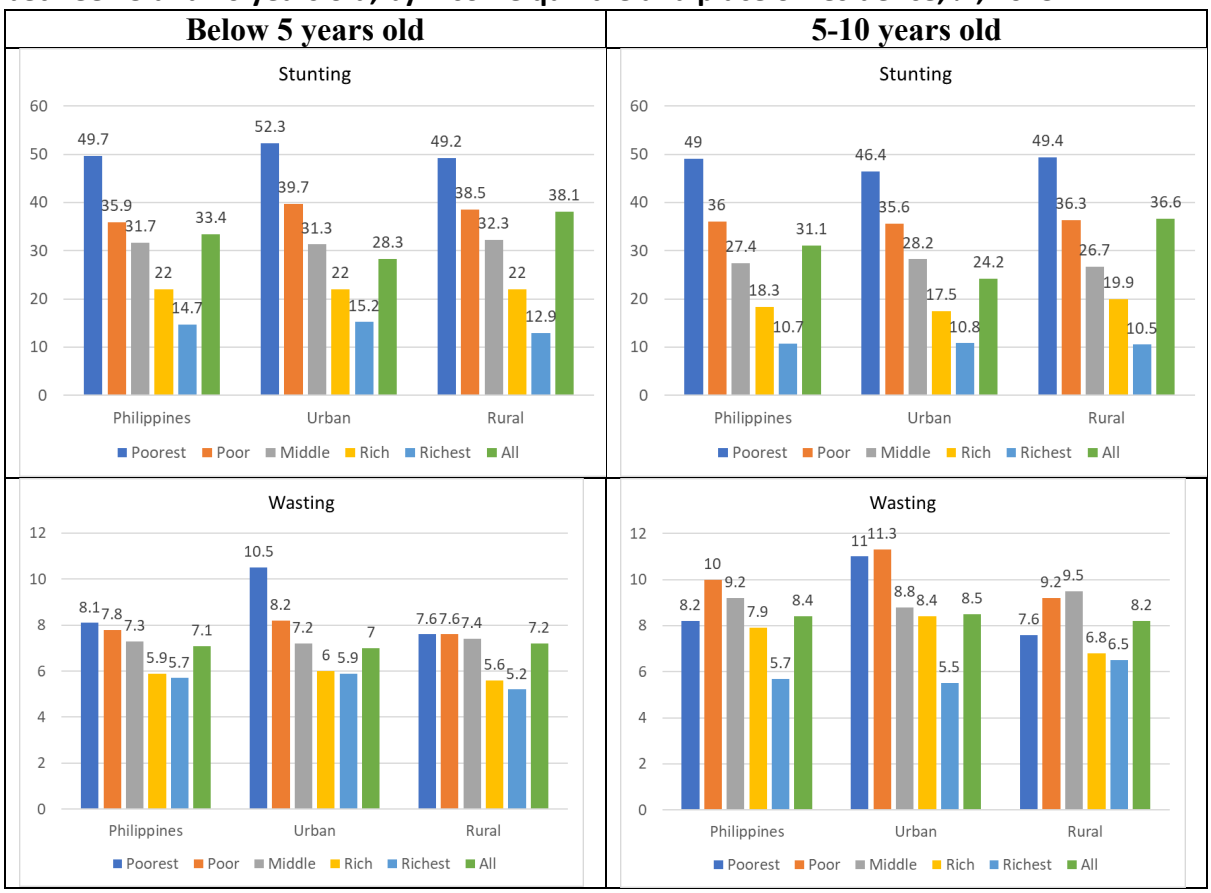
Table 5. Level of compliance to recommended amount of food, by food group, income level, and place of residence, %, 2015

	Starchy staples	Meat and pulses	Vegetables	Milk and milk products	Eggs
All Filipino households	59% more than recommended	21% less than recommended	78% fewer than recommended	67% less than recommended	88% less than recommended
Poorest 40%		48% less than recommended	82% less than recommended	82% less than recommended	88% less than recommended
Richest 40%		7% less than recommended	74% less than recommended	52% less than recommended	87% less than recommended
Rural household	67% more than recommended	30% less than recommended			
Urban households	49% more than recommended	10% less than recommended			

Source: World Bank 2021 (Mbuya et al.)

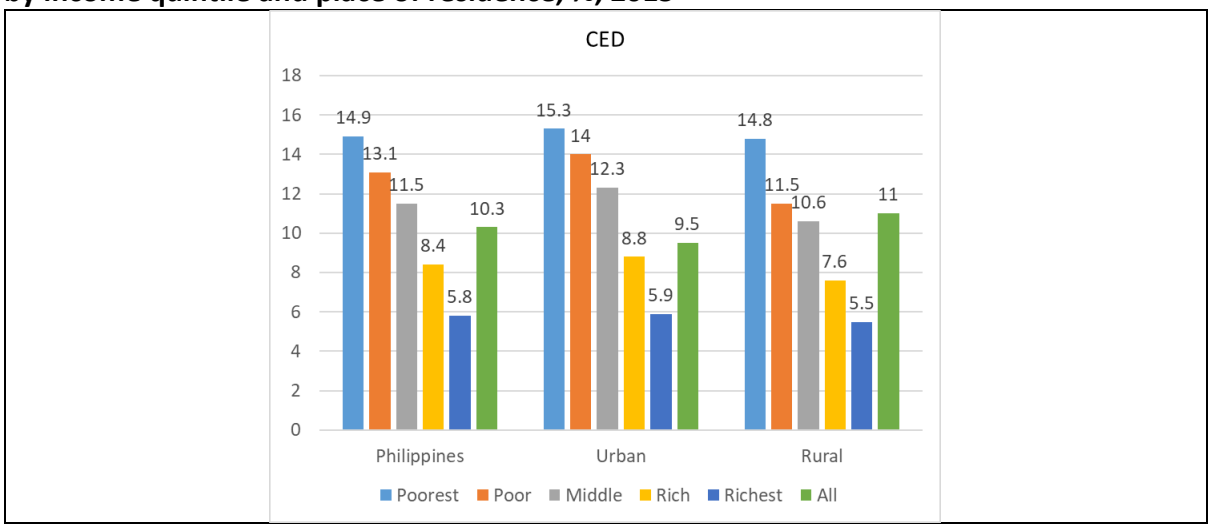
In terms of the effects on the nutritional outcomes, the poorest quintile bears the brunt of poor diet. **Figure 36** shows that the prevalence of stunting is almost 50 percent among the poorest quintile of Filipino children for both age groups, while it is 10-15 percent for the richest quintile. The difference between poorest and richest quintiles in terms of wasting prevalence is smaller, but the same trend exists, i.e. poorest quintile suffers more. On **Figure 37**, it is shown that the prevalence of chronic energy deficiency or underweight among adults increases as income goes down. CED prevalence among poorest quintile is at 15 percent, while the richest quintile only has 6 percent only.

Figure 36. Prevalence of stunting and wasting among Filipino children below 5 and between 5 and 10 years old, by income quintile and place of residence, %, 2015



Source of basic data: FNRI (2015b), Anthropometric Survey

Figure 37. Prevalence of chronic energy deficiency (CED) among adults (20 years and up), by income quintile and place of residence, %, 2015



Source of data: FNRI 2015, Anthropometric Survey

As discussed in earlier section, food expenses comprise a considerable portion of total household expenditures of Filipinos. At this point, it is not yet clear if the share of food expenses is high because 1) food prices are expensive relative to non-food expenditure items (e.g. durables, education, housing, electricity), or 2) household income is low relative to food prices.

How much is a nutrient-adequate diet?

Among the three types of diet, the energy-sufficient diet is the cheapest at USD 0.79. Nutrient adequate and healthy diets cost three times and five times higher than energy-sufficient diet, respectively (see **Table 6**). Compared to world averages, the cost of energy sufficient (USD 0.88) and healthy diet (USD 3.97) is higher in Asia, while nutrient-adequate diet (USD 2.18) is lower in Asia.

Table 6. Cost per person per day of the three reference diets, in USD, by region, 2017

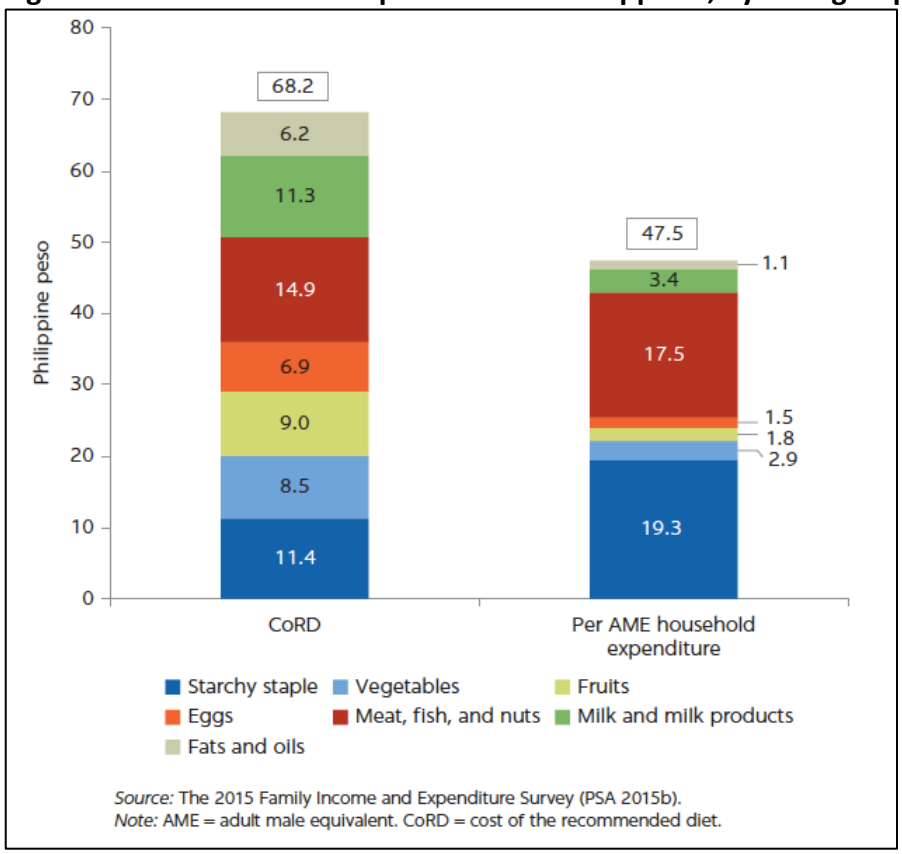
	Energy sufficient diet	Nutrient adequate diet	Healthy diet
World	0.79	2.33	3.75
Africa	0.73	2.15	3.87
Asia	0.88	2.18	3.97
Latin America and the Caribbean	1.06	2.83	3.98
Oceania	0.55	2.07	3.06
Northern America and Europe	0.54	2.29	3.21

Source: FAO et al. (2020)

Calorically-adequate diet is more affordable to Filipino households than nutrient-adequate diet. In 2015, Filipino households were only able to afford calorically-adequate diet (World Bank 2020). **Figure 38** shows that starchy staples dominated the total food expenses of

households per adult male equivalent per day in 2015. The cost of a nutritious diet, which is also called the "cost of recommended diet" or CoRD, is the minimum cost of meeting the recommended and culturally acceptable dietary needs of Filipinos. Based on CoRD, the largest share of food expenses should be on meat, fish, and nuts, followed by starchy staple and milk and milk products. A considerable amount should also be spent on vegetables, fruits, and eggs. Unfortunately, aside from not following the recommended expense proportions per food group, the level of household food spending of PHP 47.5 per adult per day is way below the CoRD, which was at PHP 68.2 per adult per day. This accounts for a 30 percent gap between CoRD and household's actual food spending (Mbuya et al. 2021). This gap varies per region ranging from less than 20 percent (Region III-Central Luzon) to 58 percent (Region II-Cagayan Valley) (Mbuya et al. 2021).

Figure 38. CoRD and food expenses in the Philippines, by food group, in PHP, 2015



Source of image: Mbuya et al. 2021

Based on the calculation of price per gram of each food group[12] by Mbuya et al. (2021), the cheapest food group is vegetables (such as camote tops and okra) at PHP 0.028 per edible gram, which is followed by rice and other starchy food like bread and noodles at PHP 0.035 per edible gram, and fruits at PHP 0.06 per gram. Fish, meat, and poultry are at PHP 0.109 per gram, fats and oils at PHP 0.177 per gram, and eggs at PHP 0.138 per gram. The most expensive food group is milk and milk products at PHP 0.32 per gram.

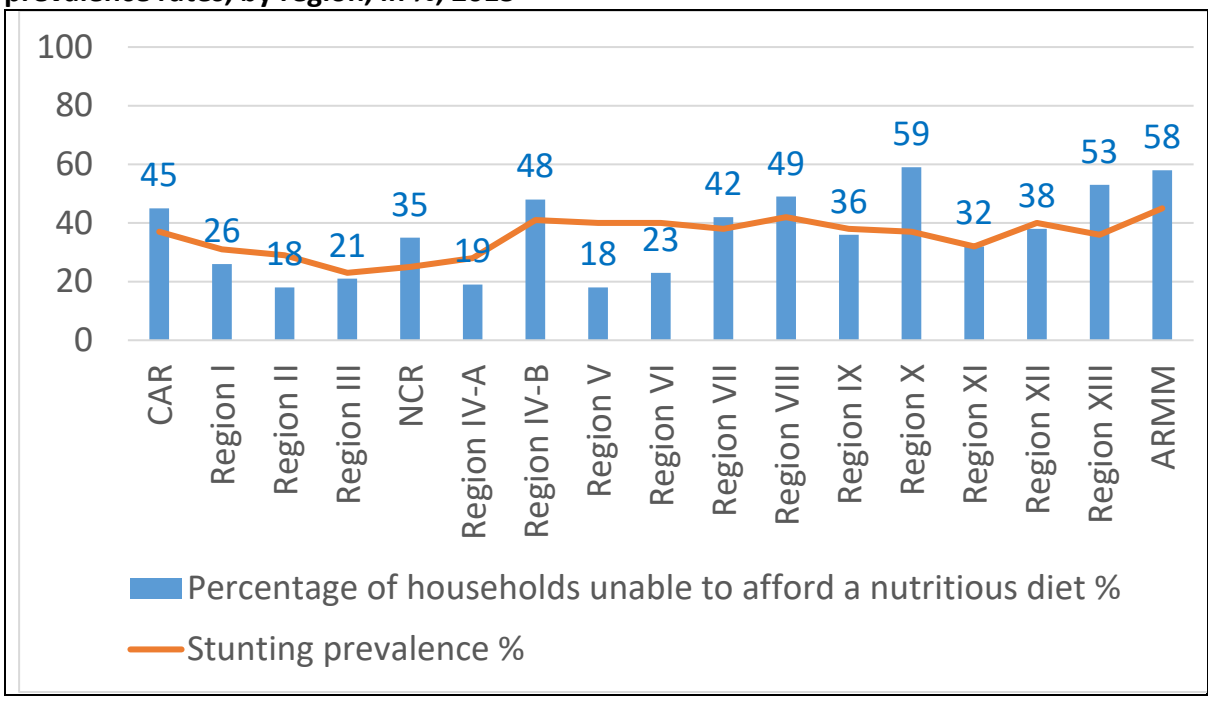
One out of three Filipino households cannot afford a nutrient-adequate diet. The WFP released a study in 2018 which also determined the price of a nutritious diet using FIES 2015 data for a typical five-person household. Based on their calculation, a nutrient-adequate diet

[12] Using FIES 2015 data

would cost PHP 206 per day (in 2015 PHP terms) and 30 percent of Filipino households are unable to afford it, based on a comparison of this cost and the minimum wage of the region..[13] For an energy-only diet, the cost would be PHP 108 per day and only three percent of the households cannot afford it.

Regional disparities in nutritious food affordability are apparent in **Figure 39**. Region X (Northern Mindanao) has an alarmingly high percentage (59%) of households that cannot afford a nutrition-adequate diet. It was followed by ARMM and Region XIII-Caraga at 58 percent and 53 percent, respectively.

Figure 39. Share of households unable to afford a nutrient-adequate diet and stunting prevalence rates, by region, in %, 2015



Source of data: WFP (2018).

Notable difference in the measurement of gap between cost of nutritious diet and household's financial capacity to purchase it can be noted between the study of Mbuya et al. (2021) and the WFP (2018). Apart from calculating the per capita cost, the Mbuya et. Al (2021) study used the adult male equivalent in determining the nutrient requirements. For the WFP (2018) study, the model of five household members includes a breastfed child (12-23 months old), a child (6-7 years old), an adolescent girl (14-15 years old), a lactating woman, and an adult man.

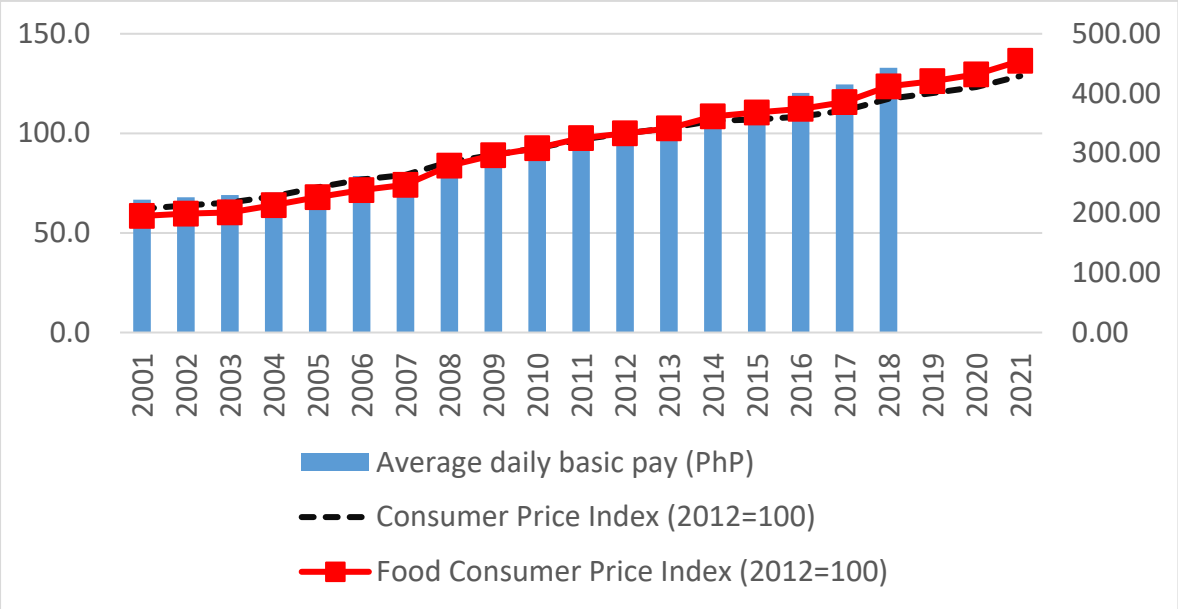
There is a strong correlation between stunting prevalence and non-affordability of a nutrient-adequate diet. The regions with large share of households that cannot afford a nutritious diet also suffer from very high stunting prevalence (WFP 2018) (refer to **Figure 39**).

[13] The WFP analyzed data using the Cost of the Diet (CotD) software. The CotD software "uses linear programming to understand the extent to which poverty, food availability and prices may affect the ability of people to meet their nutrient needs" (WFP 2018, p. 4). The data on food prices and availability were based on the 2015 NN, while data on household food expenditures were based on the 2015 FIES of the PSA.

Is food becoming more expensive?

Over the past two decades, the trend of food consumer price index (CPI) follows the movement of overall CPI. CPI is an "indicator of the change in the average retail prices of a fixed basket of goods and services commonly purchased by households relative to a base year" (PSA n.d.d). Food price index appears to increase as fast as overall CPI, which indicates that food as a commodity group is not getting more expensive (See **Figure 40**).

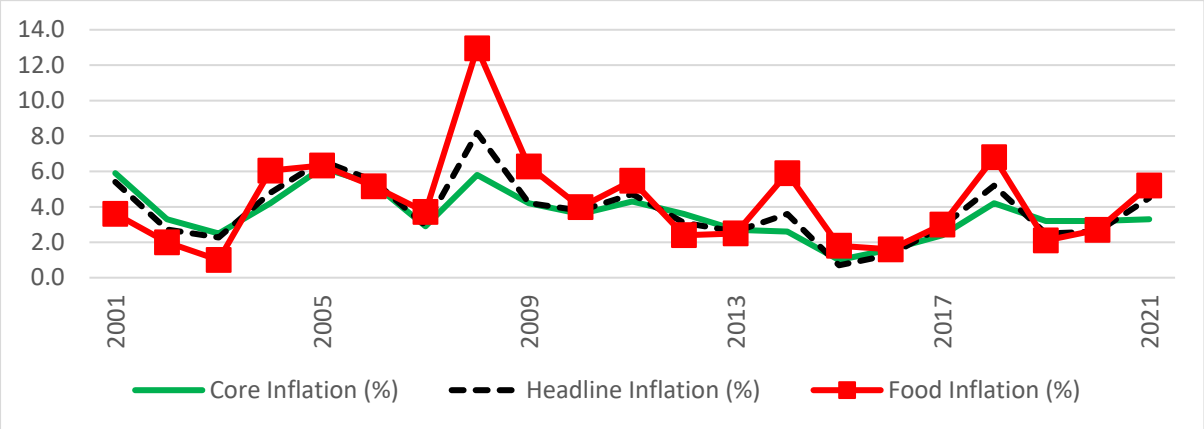
Figure 40. Average daily basic pay (PHP), CPI (%), and Food CPI (%), 2001-2021



Source of data: BSP (various years), average daily basic pay from PSA
Note: Refer to the right-hand axis for the average daily basic pay (PHP)

This can be further observed by inspecting the rate of inflation over the same period. Inflation gives an indication of the annual rate of change of the CPI, whether it accelerates or decelerates. Based on **Figure 41**, food inflation follows the same trend as the headline and core inflation, which appears to be stable over time. Headline inflation refers to inflation of all items, including food and non-alcoholic beverages commodity group, housing, water, electricity, gas and other fuels commodity group, transport commodity group, among others. Core inflation, on the other hand, reflects the long-term behavior of inflation excluding food and energy items, which are usually showing short-term volatility.

Figure 41. Food, Headline, and Core Inflation, %, 2001-2021

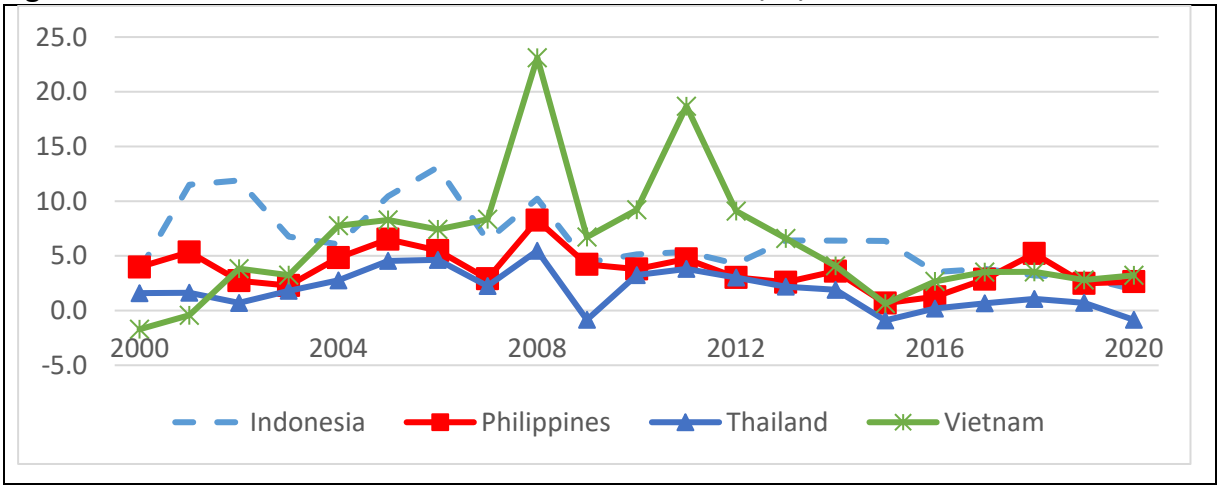


Source of basic data: BSP (various years)

Inflation rate in the Philippines for the past two decades had been stable compared with its ASEAN neighbors. As shown in **Figure 42**, Viet Nam and Indonesia appear to have more erratic price movements than the Philippines.

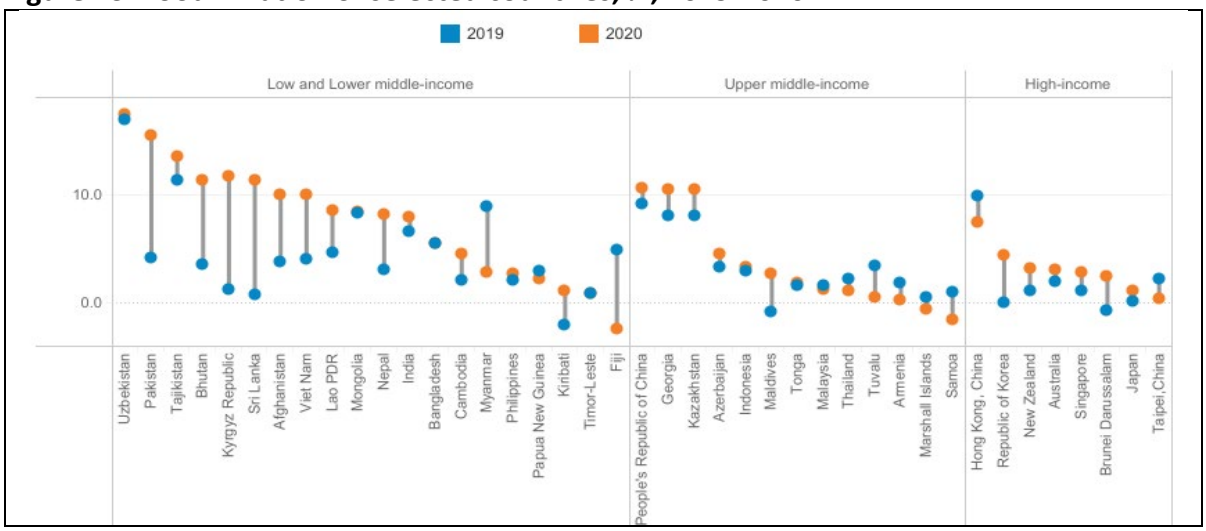
In terms of food inflation in 2019 and in 2020 (COVID pandemic), most economies in the Asia and the Pacific region had positive food CPI growth. The rise in food prices was mainly a result of disruptions in the supply chain of food and of rising shipping costs. These are conflated by other factors such as currency depreciation, catastrophic weather disturbances, and spread of diseases (e.g. African swine fever). Notably, changes in food inflation rate among upper middle-income countries and high-income countries is smaller compared with low and lower middle-income countries. The Philippines experienced slower food price increase as opposed to other countries belonging to the low and lower middle-income category (see **Figure 43**) (ADB 2021b).

Figure 42. Headline inflation of selected ASEAN countries, %, 2000-2020



Source of basic data: World Bank (2022)

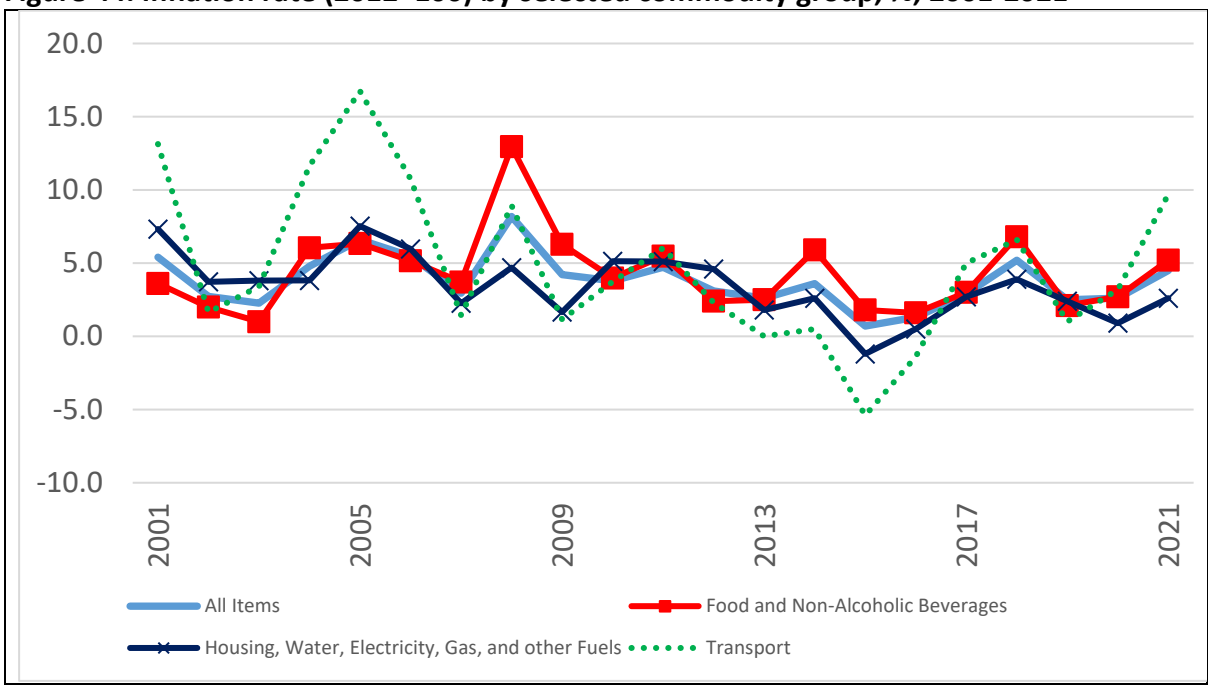
Figure 43. Food Inflation of selected countries, %, 2019-2020



Source of image: ADB (2021)

Relative to other commodity groups, food inflation appears to be more stable than transport inflation, and less stable than housing, water, electricity, gas, and other fuels. The average inflation rate of food commodity group from 2001-2021 is 4.3 percent, transport commodity group is 4.8 percent, and housing, water, electricity, gas, and fuels commodity group is at 3.4 percent. The headline inflation is 3.8 percent (see **Figure 44**).

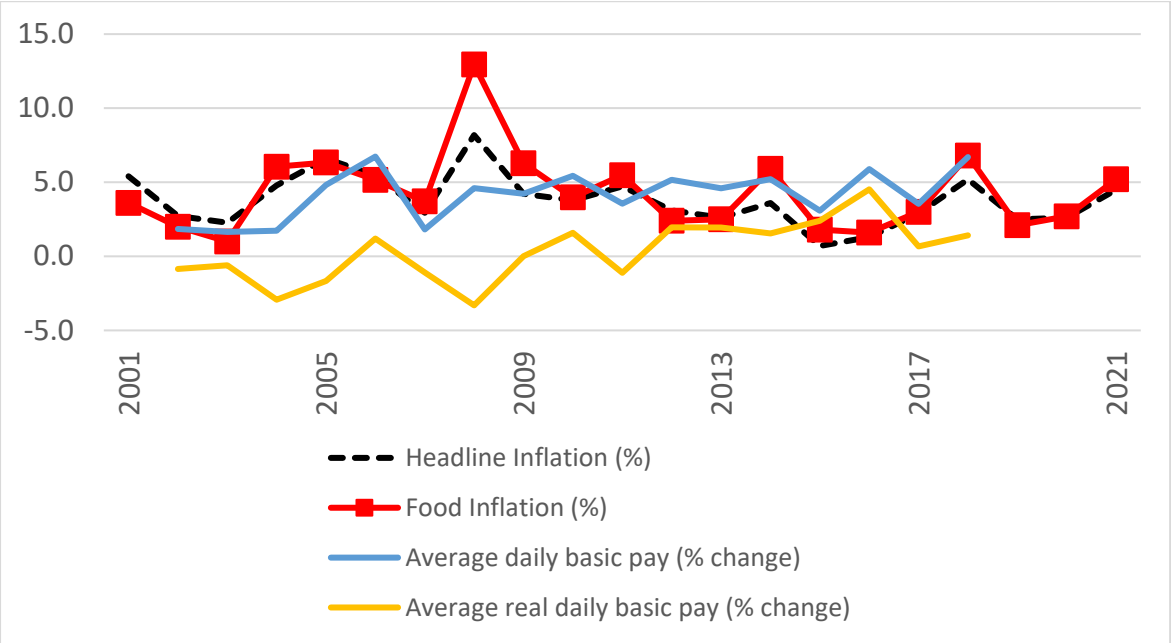
Figure 44. Inflation rate (2012=100) by selected commodity group, %, 2001-2021



Source of basic data: BSP (various years)

Nominal wages and CPI are rising at the same rate. **Figure 45** shows that the rate of change of both nominal wages and CPI are stable at an average annual growth rate of around four percent. The annual rate of change of real wages is slower at 0.34 percent on average.

Figure 45. Rate of change of real and nominal average daily basic pay (%), CPI (%), and Food CPI (%), 2001-2021



Source of data: Inflation data from BSP and Daily basic pay from PSA OpenStat.

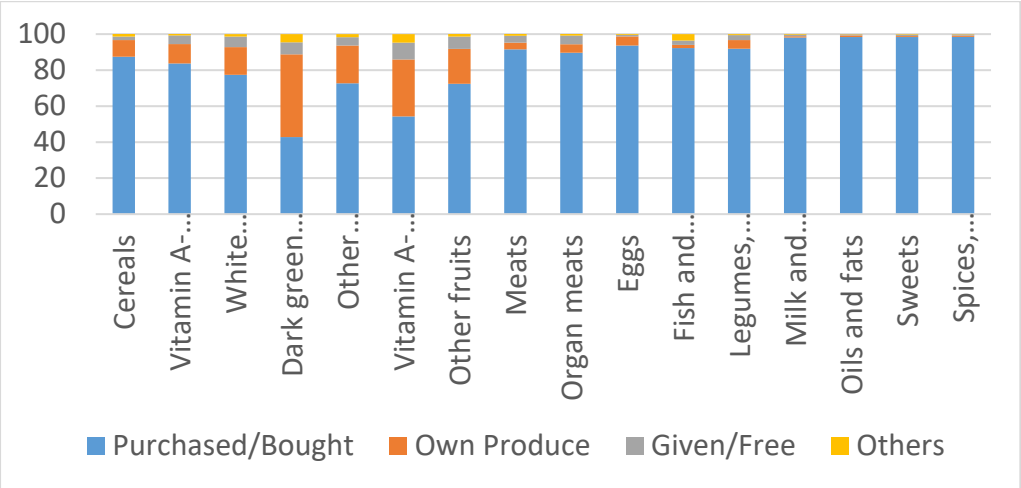
5.3. Food Accessibility Dimension--Physical

In addition to economic access, physical accessibility also dictates what types of food become available for consumers (IFPRI 2017). In urban areas, since food system is more modern, convenience stores, supermarkets, hypermarkets, fast-food restaurants, and other restaurants are catering to the needs of consumers. Meanwhile, the urban poor (especially in Asia and Africa) still rely on fresh/wet markets (IFPRI 2017).

How do Filipinos access food?

Filipino households buy most of the food commodities from local markets, groceries, or stores. **Figure 46** shows that, based on the 2015 FNRI data, most of the food commodities are being purchased/bought from local markets, groceries, or stores. Fruits and vegetables are the only food groups with relatively large share of households producing them for their own consumption. Forty-six percent of the food group "Dark green leafy vegetables" is taken mainly from own production.

Figure 46. Percent distribution of households by source of foods consumed: Philippines, 2015



Source: FNRI 2015

What are the indicators for physical accessibility of food?

The Economist Intelligence Unit uses an indicator called Agricultural Infrastructure, which is a composite indicator that covers four types of infrastructure: 1) crop storage infrastructure, 2) road infrastructure, 3) air, port and rail infrastructure, and 4) irrigation infrastructure. **Table 7** shows that the country scores lower than its ASEAN neighbors.

Table 7. Country scores by agricultural infrastructure sub-indicators (2019)

Country	Crop storage facilities	Road Infrastructure	Air, port, and rail infrastructure	Irrigation infrastructure	Agricultural Infrastructure
Philippines	0	25	25	30.4	21.9
Indonesia	100	25	50	21.6	44.8
Viet Nam	100	25	42.5	75.6	55.3
Thailand	0	50	42.5	58	40.9
Singapore	0	100	100	0	58.8
World Average Score	**83.2**	**46**	**50.3**	**19.9**	**47.7**

Source: The Economist Intelligence Unit, GFSI 2019

The geography of the Philippines being an archipelagic country necessitates a reliable and adequate infrastructure system to ensure the physical accessibility of food, which may be produced from anywhere in the country or from countries abroad. Domestic trade statistics capture the flow of commodities through air, water, and rail transport system in terms of volume and value of trade. However, the PSA compiles domestic trade data on air and water transport systems only (PSA 2021b). Based on 2019 and 2020 data, Food and Live Animals accounted for around 25 percent of the total volume and of the total value of all commodities traded. Almost all (99 percent) of the commodities are traded via the water transport system. The value of Food and Live Animals traded by water was PHP 138 billion in 2020, while only PHP 72.7 million was traded via air.

High transport cost due to poor or inadequate transport/logistics infrastructure contributes to high food prices, especially of raw produce. Mindanao is known for its fertile and favorable climate conditions making it suitable for food production. In 2016, Mindanao transported 75 percent of the total volume of Food and Live Animal commodities to Visayas, and 23 percent to Luzon (PSA 2017b). A decade-old study by Llanto et al. (2012) identified the issues faced by Mindanao-based agricultural traders with regard to transport and logistics infrastructure. The agricultural traders complained about the high cost of transporting goods to other main islands. This inadvertently increased the retail price of the products being traded. The paper pointed to the poor condition and inefficiencies of both the road and seaport networks in the country as the reasons for high cost of transport (Llanto 2012).

Fruits, meat, and other high value commodities often require proper handling and temperature-controlled trucks to avoid food wastage and spoilage. In most cases, smallholders or small-scale producers do not have access to such specialized transportation and logistics services. Only big players are able to consolidate huge volume of produce and thereby take advantage of cheaper unit transport and handling cost due to economies of scale. These are often organized and vertically integrated with global market (World Bank 2020). The inadequate logistics is among the factors hindering the horticulture value chain from growing (World Bank 2020).

Both rural and urban consumers are adversely affected by poor infrastructure. Communities in far-flung areas remain isolated and plagued with poverty and malnutrition in the absence of rural infrastructure. Without adequate transportation infrastructure, producers are unable to access inputs, and are unable to sell their harvest to markets. Aside from transport infrastructure, energy infrastructure (i.e. electrification), which is crucial in reducing postharvest losses along the value chains (IFPRI 2017) and in storing highly perishable and frozen products like fruits and vegetables, meat, and fish, is also problematic in rural areas. While the national average for electricity access rate was around 90 percent in 2016, rural areas only had access rate of 85% (Taniguchi 2019). In Mindanao, the access rate was way below at 77 percent (Taniguchi 2019). The problems in transporting and storing food contribute to food insecurity in rural areas. In 2015, the share of food secure households living in rural areas was only 28 percent as opposed to the national average of 34 percent (FNRI 2015).

Urban consumers also suffer from the lack of or poor state of infrastructure as it greatly contributes to the high cost of food, which mainly come from rural areas. Nutritious food is more expensive in urban areas than in rural areas. Urban consumers pay a premium of 10 percent for nutrient-adequate food. A much worse scenario is that Metro Manila consumers pay a premium of 69 percent (World Bank 2020). Only 40 percent of the urban households are food secure in 2015 (FNRI 2015).

As shown in **Figure 36**, prevalence of stunting among children aged 10 years and below is higher among those residing in rural areas (36-38%) than in urban areas (24-28%). However, the difference is minimal in terms of wasting prevalence. The prevalence of CED among adults is also higher among rural residents (see **Figure 37**).

Farm-to-market roads

With regard to physical accessibility, one of the important infrastructures linking farms and markets is the road infrastructure. **Table 8** shows the accomplishment of DA (and DPWH) in terms of completed farm-to-market (FMR) projects. A total of 2,884 kilometers of FMRs was completed from 2016 to May 2021. The total amount spent for the said accomplishment was

PHP 30 billion. However, when compared with the actual backlog of 13,000 kilometers (as of January 2019, per former Agriculture Secretary Piñol), the level of accomplishment seems unimpressive. It is important to note, however, that the DA had already anticipated that the FMR target length would not be attained given the low budget allocated for such infrastructure projects.

Table 8. Farm-to-market roads completion level and costs as of 2021

Region	Completed FMR (in kms)	Amount of FMR project (in PHP billion)	Average project cost per km (in PHP million)
CAR	129.27	1.33	10.29
Region I	318.86	2.50	7.84
Region II	204.45	1.84	9.00
Region III	331.00	3.04	9.18
Region IV-A	350.70	2.50	7.13
Region IV-B	106.71	1.08	10.12
Region V	196.13	2.30	11.73
Region VI	209.76	2.55	12.16
Region VII	164.95	1.69	10.25
Region VIII	109.94	1.42	12.92
Region IX	127.67	1.56	12.22
Region X	122.18	1.78	14.57
Region XI	174.10	2.34	13.44
Region XII	202.10	2.27	11.23
Region XIII	113.00	1.51	13.36
BARMM	12.32	0.17	13.72
Total	2,873.14	29.88	10.40

Note: Discrepancy in totals may be due to rounding off. Average project cost per km column was computed by the author.
Source of data: Lifted from Figure 1.9. Farm-to-Market Roads of the "The President's Final Report to the People (2016-2021)".

Logistics infrastructure

According to a World Bank (2020) study, the Philippines lags behind its ASEAN neighbors in terms of logistics system. **Table 9** presents three logistics effectiveness indicators, in which the

Philippines' performance was lackluster, namely Logistics Performance Index ranking, Liner Shipping Connectivity Index, and Trading Across Borders Ranking.

Table 9. Logistics performance by selected indicators, ASEAN countries, various years

Indicators of logistics effectiveness	Thailand	Indonesia	Philippines	Viet Nam
*Logistics Performance Index Ranking (2018)	32/160	46/160	60/160	39/160
Liner Shipping Connectivity Index (2017)	41.0	40.9	25.0	65.61
*Trading Across Borders Ranking (2020)	62/190	116/190	113/190	104/190

Source: World Bank and UNCTAD as cited in World Bank (2020)
*Note: The higher the number, the worse the performance.

5.4. Food Availability Dimension

Where do Filipinos source their food?

Most Filipinos buy their food from the market. As mentioned in Section 3.3, Filipinos buy most of their food from the market, while some households source fruits and vegetables from their own production. Even rice producers themselves are net buyers of rice, which means that the volume of rice they purchase from markets is greater than the volume of rice they consume from their own production. Based on 2015 FIES, 11 percent of households were rice-producing households[14]. Among the rice-producing households, 30 percent are net buyers of rice, while 70 percent of households were net sellers of rice (Mbuya et al. 2021).

Where do the fresh food products in markets come from?

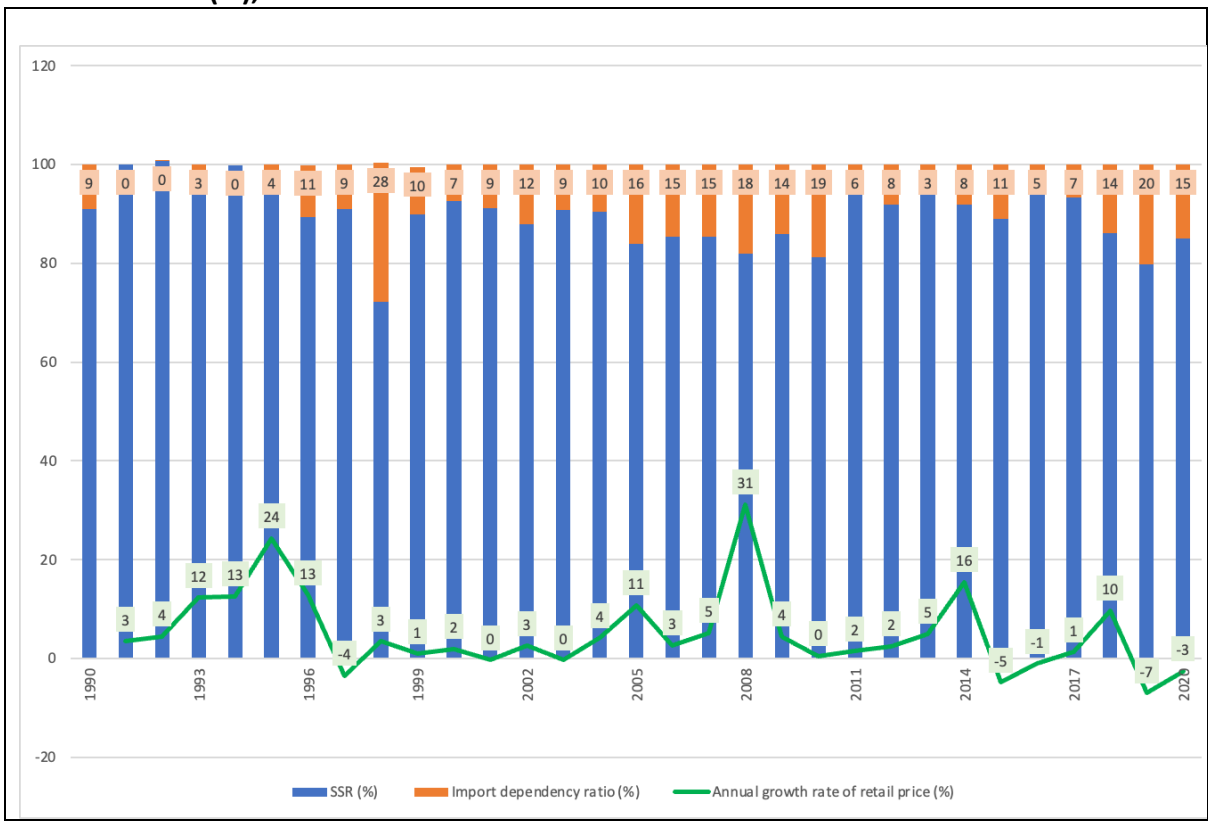
Many of the fresh food products have been largely produced domestically. There are two main food supply sources, namely, domestic production and imports. In war- or calamity-stricken areas, food aid is also another source of food supply. Thus, the obvious indicators of food availability are self-sufficiency ratios (SSR) and import dependency ratios (IDR). SSR gives an indication of the magnitude of production against domestic utilization (which is the summation of local production and imports less exports).[15] A ratio greater than 100 percent means that local production is more than enough to support domestic requirements while a ratio less than 100 indicates inadequacy local production. The flip side of the coin is the import dependency ratio, which indicates the reliance on importation.

Figures47 and 48 show the SSR and IDR of selected commodities at the national level. Rice has an SSR of 90 percent for the past three decades, while SSR of corn is at 95 percent. Almost 100 percent of fruits and vegetables are sourced locally. Banana, which is an export crop, has an SSR of 143 percent, which indicates that volume of locally produced banana is more than adequate for domestic use. In terms of beef production, domestic share is down from 80 percent in the past to 70 percent in the recent decade. The share of domestic supply of pork and of dressed chicken also shrank from 98 percent to around 90 percent in the recent

[14] This includes those households whose main activity for any household member is not rice production.
[15] https://openstat.psa.gov.ph/Metadata/2E5FSSR0

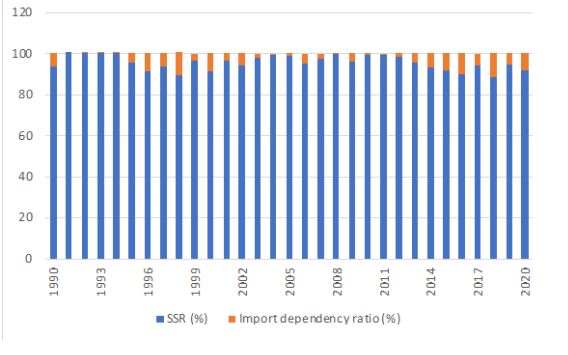
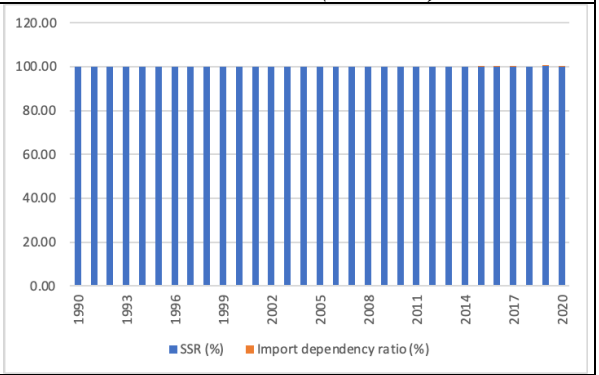
decade. As for roundscad, there has been an abrupt change in source in the past two years, from an average of less than 1 percent imports to 21 percent in 2019 and 11 percent in 2020. Share of imports of tuna also doubled in the recent decade at 20 percent from 10 percent for the period 1990-2010 (PSA OpenStat 2022).

Figure 47. Rice: Self-sufficiency Ratio, Import Dependency Ratios, and Annual Growth Rate of Retail Prices (%), 1990-2020



Source of basic data: PSA OpenStat (2022)

Figure 48. Selected Agricultural Commodities: Self-sufficiency and Import Dependency Ratios (%), 1990-2020

Corn	*Sweet Potato (Camote)*
	
Cabbage	*Tomato*

Source of basic data: PSA OpenStat (2022)
Note: Self-sufficiency ratio = Production / [Production + Imports – Exports] * 100;
Import dependency ratio = Imports / [Production + Imports – Exports] * 100

For products with import controls, governments may increase volume of imports as a price stabilizing measure when demand cannot be met by local production (IFPRI 2017). For instance, when a crop produced by domestic farmers is low in a particular season due to pest

infestation or a natural calamity, price of said crop is expected to increase if the market is not injected with additional supply from buffer stocks or from imports. In the Philippines, before the enactment of the Rice Tariffication Law (RTL), rice used to be under the list of sensitive products with quantitative restriction policy on imports.

Mbuya et al. (2021) cited that in July 2018, Filipinos paid PHP43 per 1 kilogram of rice available in supermarkets, while the same volume only cost PHP21 in Viet Nam. Moreover, their study stated that farmgate prices have fallen much farther than consumer prices when Republic Act No. 11203, more commonly known as the Rice Tariffication Law was approved in 2019.

Does the country have adequate food supply?

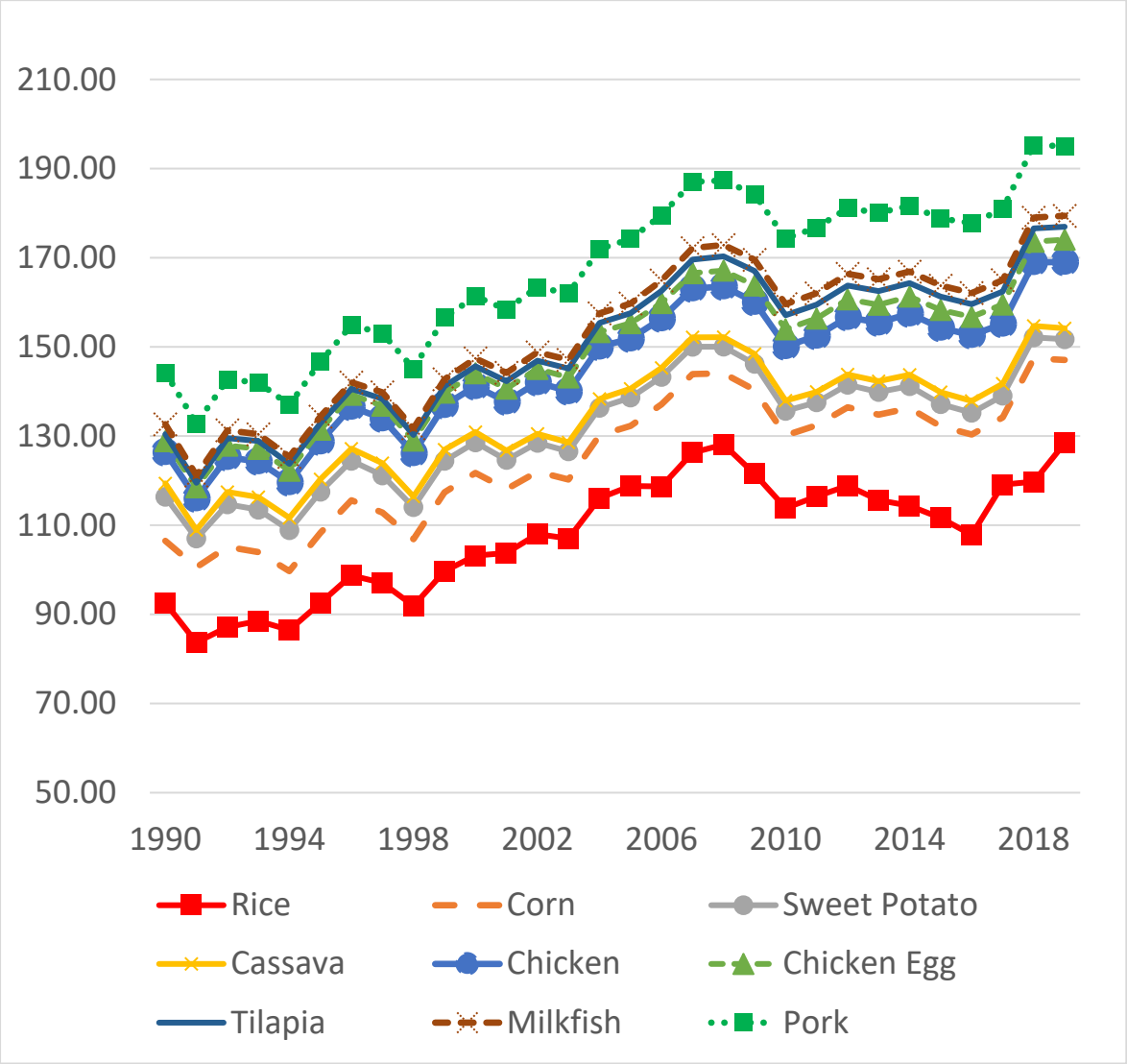
The volume of food available per capita has been increasing. General indication of adequacy can be given by SSR and IDR, but there is another measure called the **food available per capita (kg per year)**, which is calculated as follows:

Food available per capita = Net food disposable / Population

The volume of food commodity available in its unprocessed form for human consumption (called the Net Food Disposable or NFD) is divided by each member of the population. The NFD is computed by taking the difference between the Net Supply Disposable and the sum of "use" parameters (which are feeds, seeds, waste, processed for food use, and processed for non-food use). The Net Supply Disposable is calculated by subtracting the Exports and Ending Inventory from the Gross Supply (which is the total of Beginning Stock, Domestic Production, and Imports).

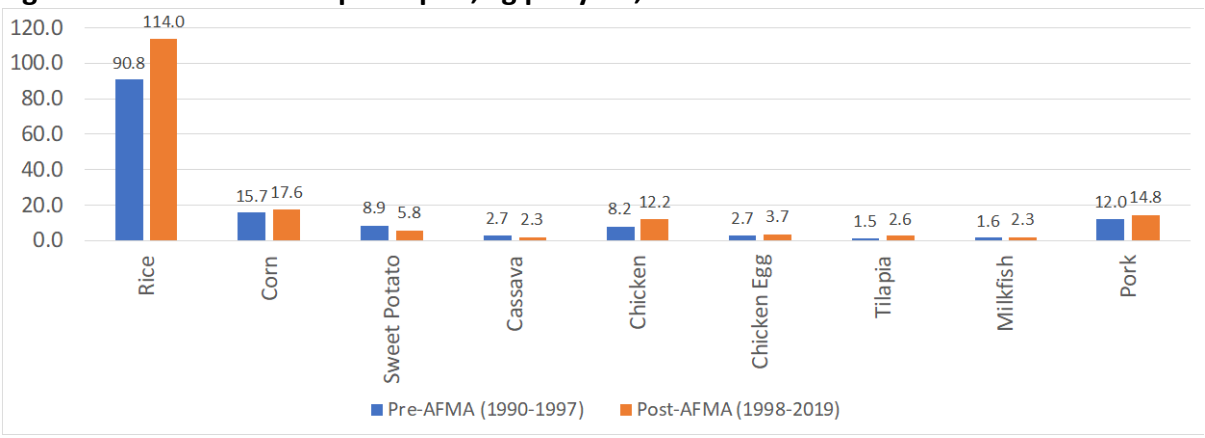
Based on Figure 49, the selected commodities appear to be following the same upward trend from 1990 to 2019. Rice has the least available volume per capita, while pork has the highest available volume per capita. If averaged over pre- and post-AFMA period (see Figure 50), rice, corn, chicken, chicken egg, tilapia, and pork increased in volume. However, the trend is opposite for sweet potato and cassava when pre- and post-AFMA periods are being compared.

Figure 49. Food available per capita, kg per year, 1990-2019



Source of basic data: PSA OpenStat (various years)

Figure 50. Food available per capita, kg per year, Pre-AFMA vs. Post-AFMA



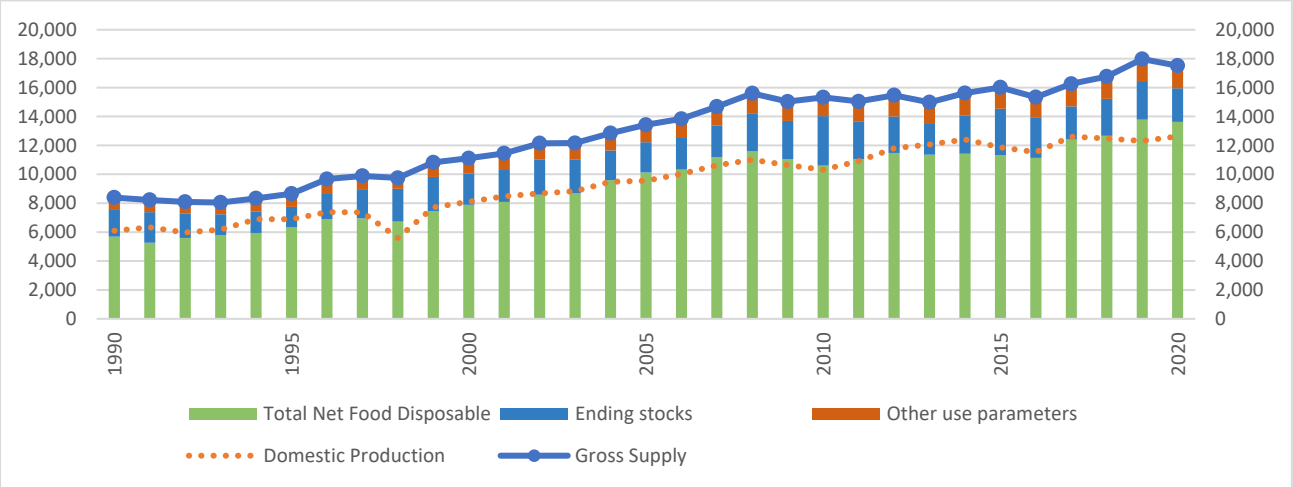
Source of basic data: PSA OpenStat (various years)

Comparing the daily per capita supply of calories from the aggregated food products[16] with the FNRI actual consumption level (i.e. mean one-day per capita energy intake) gives an indication of adequacy in terms of the energy. In 2000, the daily per capita supply of energy (calorie) was 2,445 kcal, while the actual consumption was 1,684 kcal. In 2015, energy supply was 2,390 kcal, while actual consumption was 1,865 kcal. From this simple comparison, food energy supply is adequate.

The case of rice

With increasing population, the country's demand for rice has also increased. From around 6 million metric tons in 1990 to almost 14 million metric tons in 2020 (see **Figure 51**). As cited in earlier graph, the demand (NFD) is mostly supported by local production at an average of 90 percent SSR. Other uses of rice such for seeds, processing, feeds and wastes are incorporated in the total utilization volume of rice. Should there be gaps in domestic production and utilization level, other supply sources are imports and stocks.

Figure 51. Rice: Supply vs. Demand, in thousand metric tons, 1990-2020

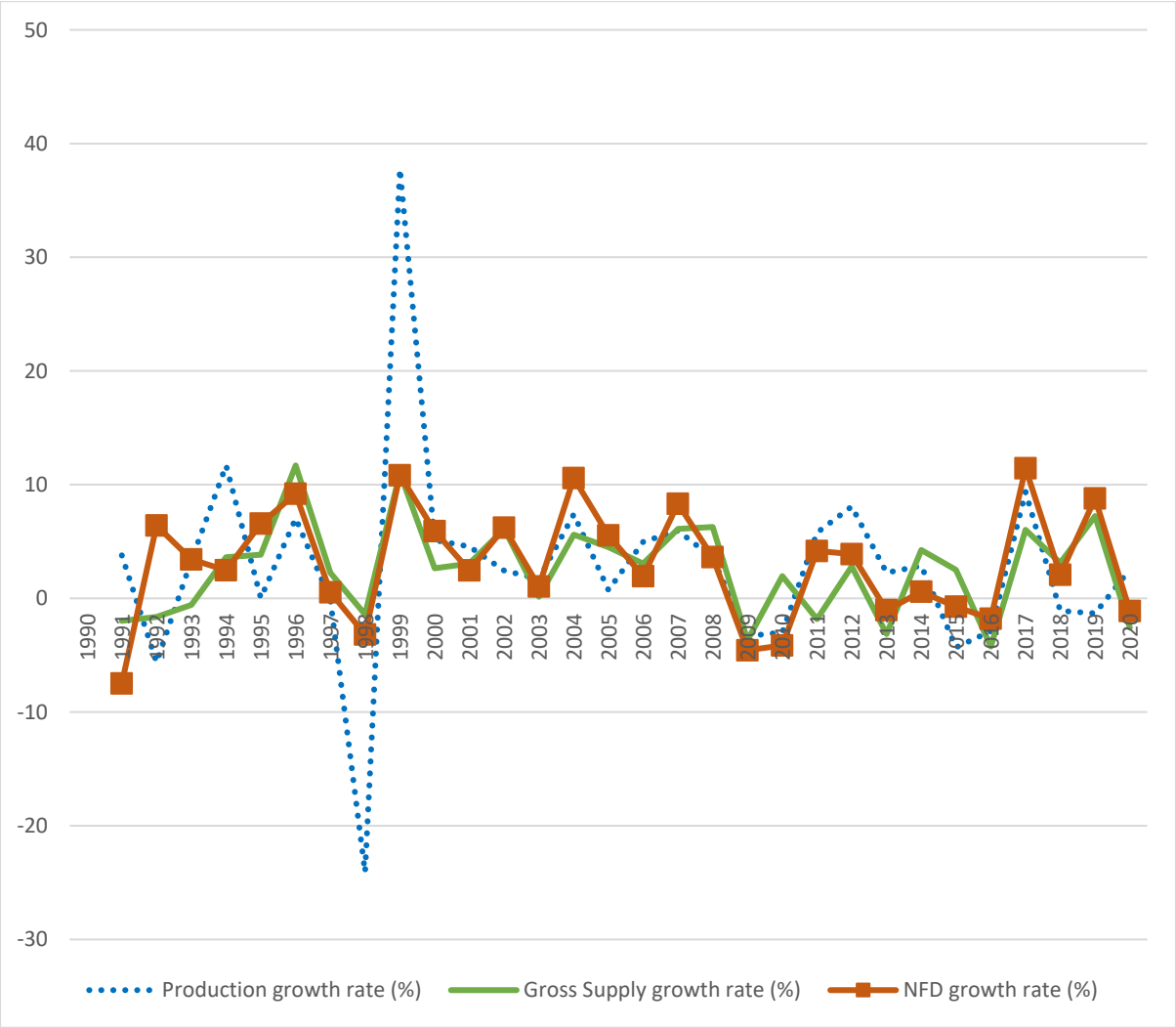


Source of basic data: PSA OpenStat (2022)

Domestic production of rice grew by 2.88 percent annually during pre-AFMA years (i.e. 1990-1997), while it slightly slowed down to 2.83 percent annually from 1998 to 2020 (see **Figure 52**). Rice demand, on the other hand, grew by 3.02 percent during pre-AFMA period and 3.08 percent during post-AFMA period. This shows that domestic demand (NFD) has been growing faster than local production, which inevitably contributes to the widening supply gap.

[16] Data obtained from PSA's Food Balance Sheet

Figure 52. Rice: Production growth rate, Gross supply gross rate, and NFD growth rate, in %, 1990-2020

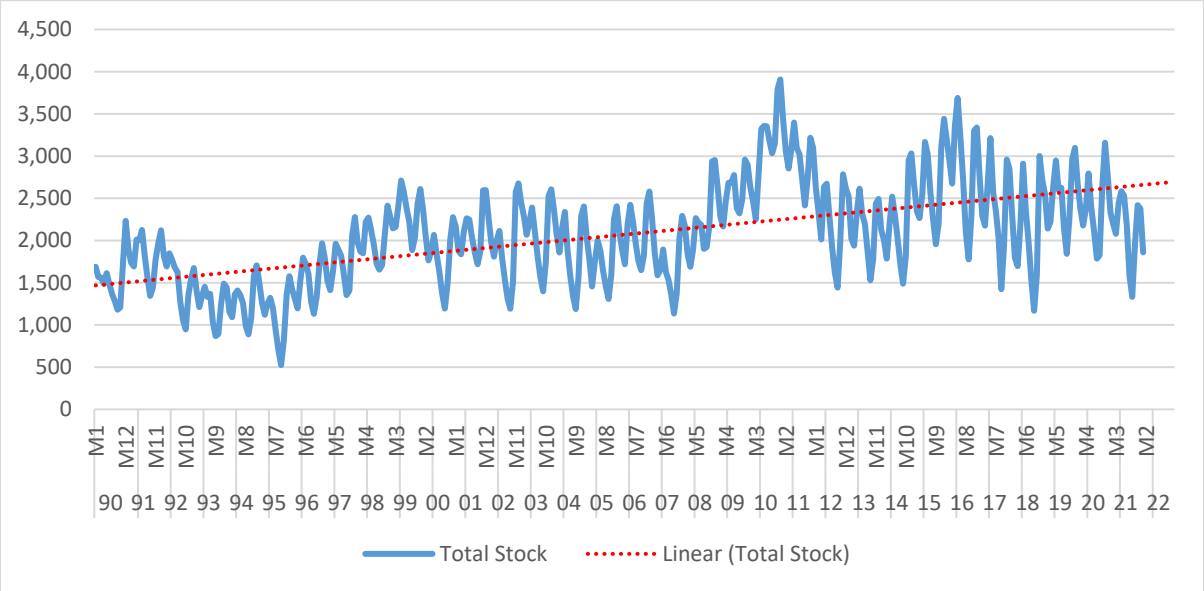


Source of basic data: PSA OpenStat (2022)

In the Philippines, the National Food Authority (NFA) used to regulate rice supply and prices to ensure food security. However, with the enactment of the RTL in 2019, the NFA's role was refocused on the "acquisition, maintenance, and distribution of rice buffer stocks" (NFA n.d.). **Figure 53** shows that the volume of monthly total rice stocks, which is the stock supply stored for future use, has gone up from an average of 1.5 million metric tons in 1990 to 2.2 million metric tons monthly average in 2021.[17] More than half of the stocks are from farming and non-farming households, which is followed by commercial stocks then NFA stocks (See **Figure 54**).

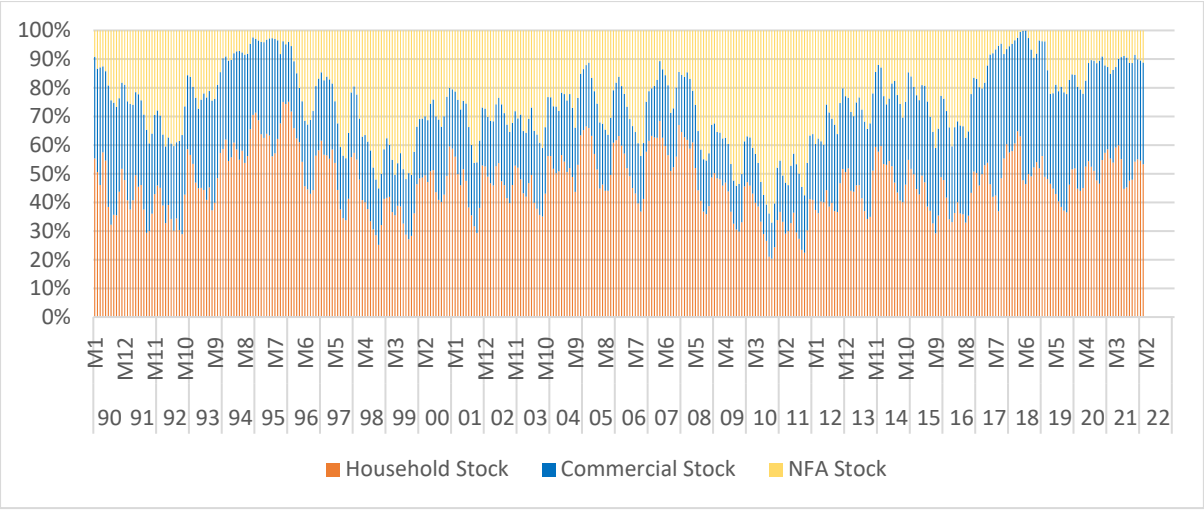
[17] https://openstat.psa.gov.ph/Metadata/2E4ECNV0

Figure 53. Rice: Monthly total stocks of rice in thousand metric tons, 1990-2022



Source of basic data: PSA OpenStat (2022)

Figure 54. Monthly Stock Inventory of Rice, by type, %



Source of basic data: PSA OpenStat (2022)

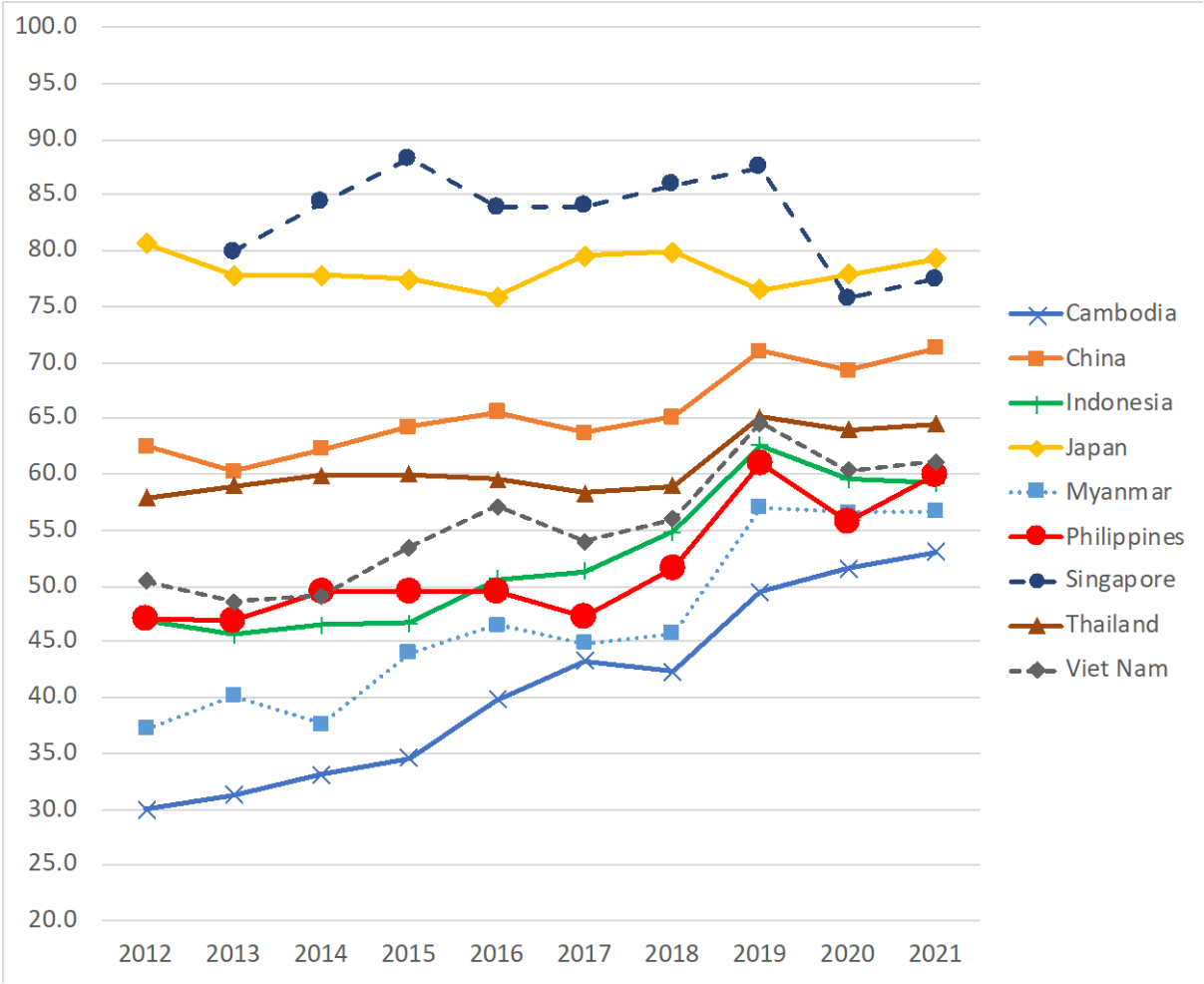
5.5. Overall Food Security Status

Having dissected the four different dimensions of food security, what is then the overall status of food security in the country? There are two ways of assessing the overall status. One way is by looking at an index (e.g. GFSI) that incorporates all dimensions, while the other way is by looking at the ultimate impact indicators of food security, which is nutritional outcomes (e.g. SDG indicators).

The Philippines ranks 64th out of 113 countries on the latest GFSI. The Economist Intelligence Unit released 2021 Global Food Security Index (GFSI) and the Philippines is at 64th place. Our ASEAN neighbors, Viet Nam and Indonesia, were at 61st and 69th place, respectively. It seems that the country was able to bounce back from its lower ranking in 2020. The Philippines ranked 73rd, while Viet Nam and Indonesia ranked 63rd and 67th, respectively, based on the 2020 GFSI. In 2019 (pre-pandemic), the Philippines ranked 64th, while Viet Nam

and Indonesia were at 54th and 62nd place (EIU n.d.). In terms of the overall GFSI score, many of the selected Asian countries shown in **Figure 55** have improved over the past decade, which includes the Philippines.

Figure 55. Overall GFSI score of selected Asian countries, from 2012 to 2021



Note: Singapore was included in the list of countries being assessed starting 2013.
Source: The Economist (various years)

The performance tracker[18] of Sustainable Development Goals shows that the country has achieved some indicators under SDG 2, while challenges remain for other target indicators.
There are five targets under the SDG 2 "End hunger, achieve food security and improved nutrition and promote sustainable agriculture," which are listed below.

- Target 2.1: Universal access to safe and nutritious food;
- Target 2.2: End all forms of malnutrition;
- Target 2.3: Double the productivity and incomes of small-scale food producers;
- Target 2.4: Sustainable food production and resilient agricultural practices; and
- Target 2.5: Maintain genetic diversity in food production.

[18] See dashboard at https://dashboards.sdgindex.org/static/profiles/pdfs/SDR-2021-philippines.pdf

Among the eight indicators, three are already achieved, namely, the prevalence of obesity among adults, Human Trophic Level, and cereal yield. Based on the Sustainable Development Report (SDR) 2021, the Philippines is moderately improving in achieving SDG 2. However, when scrutinized, the available data for each indicator are outdated. **Table 10** shows the value, year, rating, and trend for each of the indicators under SDG 2. The prevalence of stunting and wasting in children under 5 years of age are both stagnating. The prevalence of undernourishment is moderately improving (Sachs et al. 2021).

Table 10. Value, rating, and trend by SDG 2 indicator

Indicator	Value	Year	Rating	Trend
Prevalence of undernourishment (%)	14.5	2018	Significant challenges	Moderately improving
Prevalence of stunting in children under 5 years of age (%)	30.3	2018	Major challenges	Stagnating
Prevalence of wasting in children under 5 years of age (%)	5.6	2018	Challenges remain	Stagnating
Prevalence of obesity, BMI greater than or equal to 30 (% of adult population)	6.4	2016	SDG achieved	On track or maintaining SDG achievement
Human Trophic Level (best 2-3 worst)	2.2	2017	SDG achieved	On track or maintaining SDG achievement
Cereal yield (tonnes per hectare of harvested land)	3.7	2018	SDG achieved	On track or maintaining SDG achievement
Sustainable Nitrogen Management Index (best 0-1.41 worst)	0.8	2015	Major challenges	Decreasing
Exports of hazardous pesticides (tonnes per million population)	11.2	2018	Challenges remain	Information unavailable

Source: Sachs et al. (2021)

6. Conclusions

Based on The Economist's 2021 Global Food Security Index (GFSI), the Philippines ranked 64th out of 113 countries in terms of its four dimensions of food security. Food and nutrition had long been an important concern of countries in the world. After the World War II ended, the world still had to contend with population explosion, hunger, and poverty. The Philippines, just like other countries in the world, was actively searching for solutions through the conduct of research and the implementation of various agricultural programs and nutrition programs aimed at increasing food production and fighting the widespread malnutrition, especially among Filipino children. The policy bias back then was towards increasing food production and being food self-sufficient. This was understandably the case since countries were still coping with the aftermath of the war. Eventually, other issues aside from food availability like accessibility, utilization, nutrition, and stability began to surface.

In 1996, the delegates of the World Food Summit defined "food security" which made the term popular. Since then, food security has been included in government laws, policies, and programs, such as the Agriculture and Fishery Modernization Act (1997). After 25 years of AFMA, the food security goal is yet to be achieved. Even the country's performance in achieving SDG 2 reflects that there have been some improvements, but significant and major challenges still remain. However, it is worth noting that DA and other government agencies, which are tasked to develop the agriculture sector and ensure food security and nutrition, have made significant strides toward this goal, albeit falling short.

On the food utilization dimension, hunger incidence trend has been going down prior to the pandemic. Malnutrition situation of children improved from 1990s to mid-2000s, but progress has been slow since the past decade. Prevalence of overweight/obesity among children and adults is worsening. In terms of diet quality, compared to the recommended proportion by food group based on *Pinggang Pinoy*, the average food intake of Filipinos is high in cereals and tubers, but low in fruits and vegetables. Despite being heavy on starchy food (i.e. rice), only 30 percent of Filipino households were able to meet the recommended level of energy in 2015.

On the food affordability (also called, economic accessibility) dimension, it was found that many Filipino households are unable to consume nutrient-adequate diets due to its unaffordability. Poorest households suffer food insecurity the most as evidenced by their low diet quality and high incidence of malnutrition. Using 2015 data, a World Bank study found that one out of three Filipino households cannot afford a nutrient-adequate diet. Moreover, regional disparities in nutritious food affordability are evident. Food group (not individual food items) appears to have a stable trend over time. The Philippines' headline inflation rate over the years and food inflation rate during the pandemic are less erratic compared with its neighbors in ASEAN. This is great feat considering that affordability is among the most important dimensions food security, especially in times of crisis.

On the physical accessibility of food, the country scores lower than its ASEAN neighbors in terms of agricultural infrastructure (including logistics system). Although the share of the population with electricity access increased from 65 percent in early 1990s to around 96 percent in 2019, some of our neighbors in ASEAN have almost 100 percent access rate. Around 3,000-km farm-to-market roads were completed under the Duterte administration. However, the backlog is 13,000-km, which was not attained due to the lack of financial resources. High transport costs due to poor or inadequate transport/logistics infrastructure contribute to

unaffordability of food, especially of raw produce, which adversely affects both rural and urban consumers.

On the food availability dimension, most Filipino consumers source their food products from the markets. The volume of food available per capita has been increasing (i.e. taking into account both locally produced and imported food). The fresh or semi-processed food products available on the market are largely produced domestically (especially selected vegetables and fruits, which have almost 100 percent SSR). As for beef, pork, and tuna, import shares have been growing in recent years. In the case of rice, domestic demand (NFD) has been growing faster than local production, which inevitably contributes to the widening supply gap.

The Department of Agriculture has adopted a promising set of key strategies to achieve their vision of "[a] food-secure Philippines with prosperous farmers and fisherfolk." Furthermore, the Sagip Saka Act, Philippine Rural Development Program, and the IATF-ZH efforts are among the commendable improvements in terms of overall direction and strategy. A number of policy recommendations for the incoming administration's consideration are identified in the next section.

7. Ways forward

To sustain the developments and further steer the country toward the attainment of food and nutrition security, the following policy recommendations may be considered by the government and other stakeholders:

7.1. Approach

Policies toward food and nutrition security should adopt a systems approach. The Food System must interact with other systems to achieve food and nutrition security, such as, but not limited to, the Education system, Social protection system, Water and sanitation system, and Health system. The systems approach entails coherence in policies and interventions and the understanding that the shared vision across systems extends across policy domains and organizational boundaries (FAO et al. 2020).

Food-related policy planning is scarcely included in nutrition policy planning. A systems approach is not mentioned in the Philippine Development Plan 2017-2022. The PDP considers food security and nutrition as cross-cutting issues. No concrete strategies or interventions toward the attainment of food security and nutrition were mentioned in the whole document. Food is mentioned under Chapter 8 Expanding Economic Opportunities in Agriculture, Forestry, and Fisheries, while nutrition is under Chapter 10 Accelerating Human Capital Development (NEDA 2017).

The PPAN mentions a list of nutrition-specific and nutrition-sensitive project, as well as the agencies involved per project which encompasses systems other than nutrition itself (e.g. health system, water system) (NNC 2021b). For example, there are SALINTUBIG and other programs on water, sanitation and hygiene, farm-to-market roads, among others. However, nutrition-sensitive programs are not being developed toward a unified goal of food and nutrition security. Rather, they are independent programs of other agencies that will only be "tweaked" to help produce the desirable nutritional outcomes. There should be clear impact pathways from these nutrition-sensitive programs to food and nutrition security outcomes and impacts.

7.2. Strategic Plan

There must be a strategic plan that outlines the vision of the stakeholders. Instead of developing a national strategic plan for nutrition only and a separate plan for food security only, there should be an integrated strategic plan wherein both food security and nutrition security are considered. The plan may be called the Food and Nutrition Security Plan (FNSP). The FNSP should contain the comprehensive objectives, key performance indicators, and major initiatives and projects of different stakeholders.

The following key result areas identified by the IATF-ZH could be used as a starting point or reference in identifying the comprehensive objectives:

- KRA 1: Review and Rationalization of Existing Policies, Rules, Regulations related to the E.O. 101;
- KRA 2: Ensure Available and Affordable Food;
- KRA 3: Secure Nutrition Adequacy;
- KRA 4: Secure Food Accessibility and Safety;
- KRA 5: Ensure Resiliency and Food Stability for Emergencies; and
- KRA 6: Ensure Information, Education, Awareness, and People Participation

The KRAs help define the respective roles of different agencies, level the expectations among stakeholders, and ultimately align their efforts. As the strategic plan for food and nutrition security is being developed, it becomes apparent that the food and nutrition security is too big a goal for the Department of Agriculture, which usually takes the lead role in tackling food security. A number of government agencies (e.g. DOH, DAR, DTI, DOST) play significant roles in attaining the twin goals of food security and nutrition security. The IATF-ZH has already identified a list of key government agencies and the lead agency per KRA (See Figure 48).

Traditionally, food supply through increased production is under the responsibility of the DA. With regard to nutrient content of food and related health concerns, the FNRI of the DOST takes charge. The DOH tackles all health matters. Policy making, coordination, and implementation had been difficult since there are different agencies working on food and nutrition security. Efforts are duplicated at times despite limited fiscal space (Roa 2007).

Moreover, key performance indicators (KPIs) per KRA per agency should be identified and agreed upon. The KPIs are clear measures of success of agencies/organizations within a specified period. It is important that agencies will not only identify output-level indicators, but outcome and impact indicators as well.

The creation of the ***Commission on the Right to Adequate Food*** as proposed by Sen. Hontiveros would be an effort to institutionalize the initiatives of the IATF-ZH, such as its structure (KRAs) and network with private and civil society sectors. It is important to obtain the commitment and support of high-ranking officials of these identified government agencies. This entails coordination, not just at the implementation stage, but more so at the planning stage, wherein projects and programs are proposed and get financed. It would be much better if government agencies find a way to seamlessly coordinate their work without burdening them with additional ad hoc committee/technical working group work.

7.3. Action plan

A strategic plan needs to have an accompanying action plan that lays out the specific tasks to be done by individual agencies at a specified time. A clear set of monitoring and evaluation indicators are crucial in measuring the success of the individual action plans, and the overall strategic plan.

Currently, the NNC, which already includes some food-related policies, should explicitly incorporate the food security dimensions in its planning and implementation of national and local action plans.

Various lessons can be learned from the implementation of the PPAN. One of the greatest lessons is to focus efforts of capacity building at the barangay level because cascading process of plans has been slow at the barangay level. Moreover, human resource structures need to be revisited (IPA 2019). One good reference for lessons is the NNC's Compendium of Actions on Nutrition in 2018 that contains lessons from 11 local government units which were successful in implementing their nutrition programs.

Action plans should be data-driven, and this requires a modern monitoring and evaluation system. Part of a working and effective monitoring and evaluation system is a reliable information system. The information system will have a database or repository of data showing agency-level progress, output indicators, outcome indicators (e.g. income level, food price levels), and impact indicators (e.g. stunting prevalence). Ideally, it is a web-based database that offers real-time data and is accessible to various government agencies for policy and other decisionmaking.

An example of a modern monitoring system is FAO's "Global Information and Early Warning System on Food Agriculture" or GIEWS, which monitors the food security status of countries. It was established as a response to the food crisis that happened in early 1970s (FAO 2022). It is suggested that a national-level early warning system be established that has quick/real-time data fetching, processing, and dissemination, for policymakers and other stakeholders' use.

AFMA only had an early warning system on "developments and trends in international food safety and nutrition standards and codes of practice" (Rule 63.1.4 of AFMA). The proposed early warning system may be embedded in a Philippine food and nutrition security monitoring system. Whenever there are shocks or triggers in the system, either internationally or domestically, a clear plan of action should be readily released for appropriate implementers' prompt review and implementation. Based on the website of PhilFSIS, it had an embedded early warning system, but unfortunately it has already been discontinued.

7.4. Prioritization of interventions

Interventions need to be categorized by urgency and spatially. Financial and human resources are limited, which means that all planned programs and projects cannot be implemented all at the same time for the whole of the country. Consequently, it is crucial to do careful planning to decide which segment/s of the population and which area/s need the interventions soonest.

In the short-term, policymakers would have to deal with existing level of resources, constraints, and opportunities. As for the medium-term, feasible changes in the approach, allocation of

limited resources, or structure of institutions to improve coordination could be done. The long-term policies could deal with more substantial changes that would entail huge investments (Roa 2007).

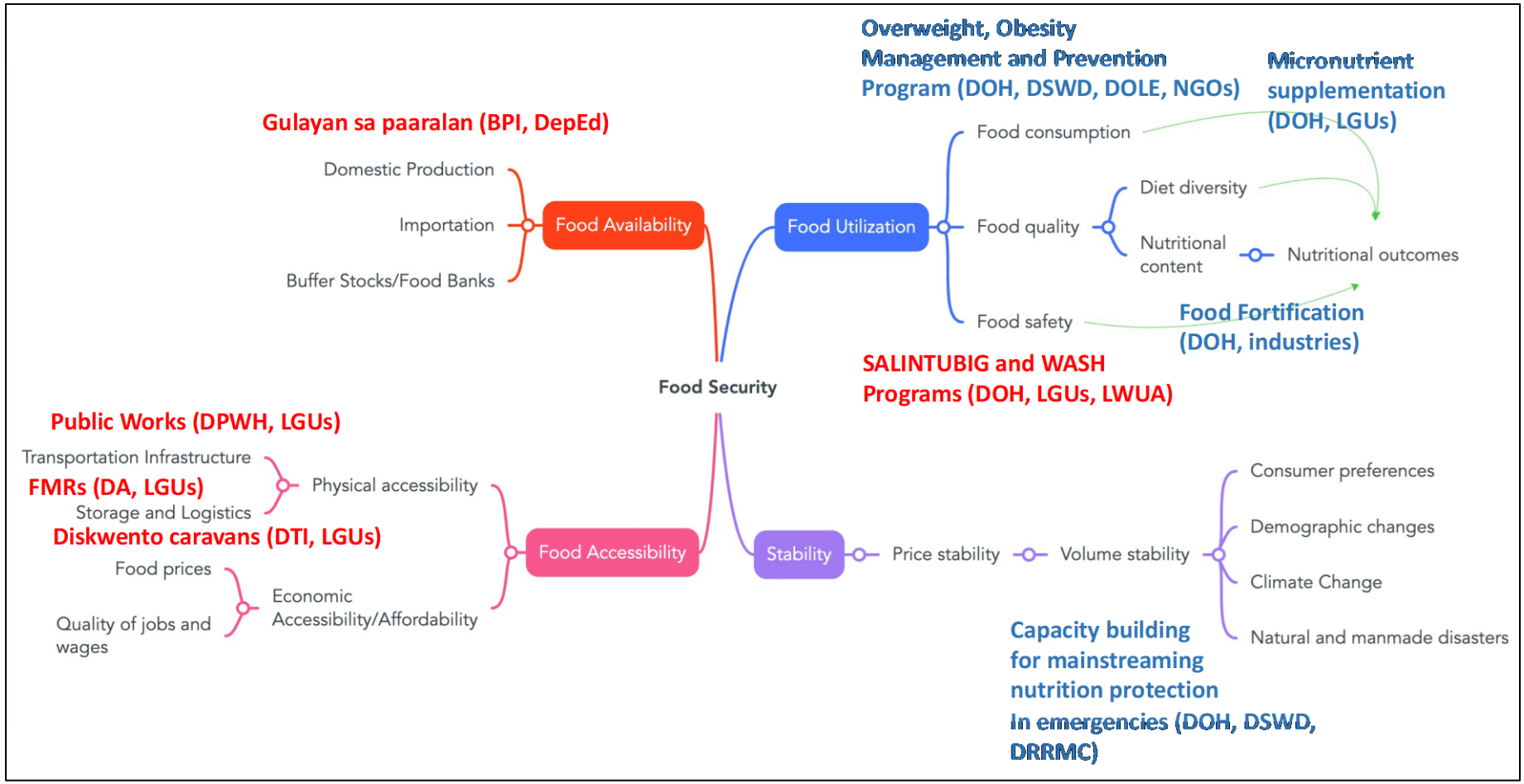
For immediate implementation: ***Children and lactating women living in poorest areas need to be prioritized for immediate implementation of appropriate interventions (i.e. within two years)***. As described above, there are lifelong and irreversible impact on children if malnutrition persists among children and their mothers (pregnant or lactating), especially among the poorest quintile of Filipino households. References for area targeting could include the IPC food security classification of the provinces in the country as well as the PPAN-identified focus areas. In fact, the NNC Governing Board released a resolution in 2019, which orders the adoption of the IPC and the Local Nutrition Early Warning System for food and nutrition security as one of the food security assessment tools in aid of PPAN and related sectoral plans (NNC 2019).

The experiences in PPAN implementation are valuable in planning better interventions and implementation strategies (e.g. targeting of priority areas). **Figure 56** shows some of the PPAN interventions and they are mapped out by food security dimension that they affect. PPAN lists ten nutrition-sensitive programs, which are 1) Farm-to-market roads and child nutrition (DA, LGUs); 2) Target Actions to Reduce Poverty and Generate Economic Transformation (TARGET) and child nutrition (DA, LGUs); 3) Coconut Rehabilitation Program (PCA); 4) *Gulayan sa Paaralan* (BPI, DepED); 5) *Diskwento* caravans in depressed areas (DTI, LGUs); 6) Family development sessions for child and family nutrition project (DSWD, LGUs); 7) Mainstreaming nutrition in sustainable livelihood (DSWD, LGUs); 8) Public works infrastructure and child nutrition (DPWH, LGUs); 9) Adolescent Health and Nutrition Development (DOH, LGUs); and 10) *Sagana at Ligtas na Tubig sa Lahat* (SALINTUBIG) and other programs on water, sanitation and hygiene (DOH, DILG, LWUA).

A package of intervention needs to be developed where there could be nutrition-specific and/or nutrition-sensitive interventions, whichever are more appropriate to the needs of the targeted beneficiaries. For example, coupled with sanitation, health, and nutrition services, social protection programs could also be offered to vulnerable children, pregnant, and lactating mothers, to increase their access to nutrient-adequate diet.

Apart from looking at household-level food security, policymakers should look further into the intra-household nutrient distribution to be able to come up with more effective solutions (Senauer et al. 1988, as cited in Roa 2007).

Figure 56. PPAN interventions mapped out by food security dimension



Note: Interventions in red font are nutrition-sensitive interventions, while those in blue font are nutrition-specific interventions based on PPAN.
Source: Author's own work

For medium-term implementation: ***Medium-term goals (3-5 years) would include improving nutrient-content and shelf life of food products through food technology, and raising the public's awareness on healthy diet.***

Projects on fortification should be continued in the short term as this is a way of improving nutrient intake of Filipino households (Mbuya et al. 2018). FAO et al. (2021b) pointed out that fortification and biofortification are cost-effective measures to solve micronutrient deficiencies while ensuring increase in food supply. In the Philippines, the Food and Drug Authority under the Department of Health is the lead implementing agency of RA 8976, more commonly known as the Philippine Food Fortification Act, which was signed in 2000 but was implemented starting 2004. It requires the mandatory fortification of food staples, and voluntary fortification of processed foods or food products (RA 8976). The NNC conducts a periodic review of the micronutrients being added to food. Among the challenges that need to be addressed are the need for rapid test kits for nutrient presence detection on food items, and a more aggressive promotion activities for fortified food products (NNC n.d.b).

Especially during the pandemic, the DOST-FNRI and the other DOST institutes were actively promoting and implementing their programs to aid in the worsening food insecurity that time. Some of their projects include education of the public regarding home and community-based gardening, and urban gardening, malnutrition reduction program, and other food technology programs.[19]

Despite the availability and accessibility of food, nutritional outcomes remain at dismal levels sometimes due to lack of nutrition education (Tan 1974 as cited in Roa 2007). Government should tap the public media and the civil society organizations for wider reach and more effective promotion of initiatives affecting nutritional status and health, such as extensive and intensive health and nutrition education in rural areas, reproductive health, social marketing for indigenous nutrient-rich foods, intensification of home gardening, among others (Roa 2007).

Interestingly, in the Philippines, only 56 percent of adults read product labels. Among those who read product labels, 75 percent looked for expiration dates, while only 20 percent looked at nutritional facts (FNRI 2018 Facts and Figures p. 286). Majority (63%) of the poorest quintile do not read product labels, while only 33 percent among the richest quintile do not read labels.

Annex 3 identifies the elements of best practices to protect children from the harmful impact of food marketing. Since children are easily influenced by various marketing techniques of food companies, it is important to raise the awareness of consumers to avoid falling into the trap of poor dietary choices. In Chile, for example, the exposure of children (from pre-school to adolescents) to advertisements on restricted food was limited through the law of food labeling and advertising. This has caused sales of restricted food in school grounds to considerably decrease.

For long-term implementation: ***In the longer term (6 years and beyond), affordability not just of calorically-adequate, or nutrient-adequate diet, but of healthy diet should be pursued.*** There should be improvements in the efficiency of the food system to enhance food production and accessibility, which would ultimately be reflected on cheaper food prices. Another pathway

[19] https://www.dost.gov.ph/knowledge-resources/news/72-2021-news/2207-more-food-insecure-families-during-covid-19-pandemic-dost-fnri-survey-reveals.html

to increase food affordability is through the increase in incomes of households against prices of other commodities.

Pathway 1: Efficiency of Food Systems

1.a. Through Strengthening Value Chains and Linkage between Rural and Urban Areas

By strengthening food value chains, that is linking together rural and urban actors of a food system, there are greater opportunities to achieve food security and nutrition. Producers in the rural areas are able to serve the food needs of urban consumers. While inputs produced in urban areas are utilized by rural producers. Annex 4 lists the activities for enhancing rural-urban linkages and the expected benefits to urban and rural residents.

The seamless flow of goods and services between rural and urban areas depends on the existence and quality of physical infrastructures (such as roads, processing facilities, information and communications technologies). Apart from physical infrastructures, financial infrastructures (e.g. credit facilities) to enable smallholders to purchase inputs are also necessary. On the contrary, when value chains are either broken or weak, the products being produced may not cater to the quantity and quality requirements of consumers (IFPRI 2017). Moreover, these products may not have the price points acceptable or affordable to consumers.

Policies to foster stronger links between urban and rural areas transcend boundaries. Thus, coordination between local governments are necessary. Both urban and rural policymakers often limit their responses or solutions to their areas of influence. Urban policymakers tend to rely on urban agriculture even though this is inadequate in reversing urban food insecurity. Likewise, rural policymakers may fail to see the potential of increasing and diversifying incomes of rural households by allowing workers to work in urban areas. Another important aspect that needs coordination between and among urban and rural governments is land use planning. Productive agricultural land areas may be eaten away by urban sprawl (IFPRI 2017).

In the IFPRI study (2017), ***the proposition is to take advantage of the geographic middle, that refers to small town and middle-sized cities.*** They can serve as intermediary nodes that will provide markets, as well as other nonfarm livelihood opportunities, for rural producers.

Box 1. Three case studies cited in IFPRI 2017 that demonstrate the impact of strong urban-rural linkages

The first case is the improved transportation and communications infrastructure and enhanced connection with agricultural service suppliers in Nhat, Viet Nam. Nonfarm livelihood opportunities from handicraft making, trade and services and wage labor increased the incomes of farming households. This higher income served as investments for farm diversification, i.e. from subsistence production of staples to high-value production of fruits and vegetables (IFPRI 2017).

The second case is Ethiopia's focus on small towns as it implements urban development projects like rural access roads, telecommunications access, and market infrastructures. These small towns were found to account for 50 percent of agricultural input purchases, while up to 75 percent of agricultural products sales, thereby inducing improvements in household welfare (IFPRI 2017).

The third case is the integration of Ghana's food production with the global value chain and its impact on urban development. As the cocoa value chain expanded from eastern regions to western parts of Ghana, there was also a boost in the economic activities in urban areas. Wealth was seen to be created in rural sectors, but this wealth is then being spent in urban-based businesses (IFPRI 2017).

Source: IFPRI (2017)

Since the AFMA had some elements lacking, current efforts of the government to pursue a value chain approach in rural development (e.g. PRDP) and strengthen the link of small farmers and fisherfolk with markets (e.g. Sagip Saka) are promising and commendable. However, more coordination still needs to be done across the different agencies as mentioned in earlier text.

1.b. Through Less Protectionist Trade Policy

As a net importer, the country can benefit from pursuing a more open trade policy regime. One benefit is increasing the variety of imported food products and food sources available for consumers at a more reasonable price. By being able to source food at the cheapest price, this enables the country to build its buffer stocks of important food commodities. Sanitary and phytosanitary measures can still be implemented without restricting trade flows. To ensure food safety and quality, the country should upgrade its system, personnel, and equipment to implement food safety regulations expeditiously and effectively.

Another advantage would be the strengthening of link of domestic value chains with global markets thereby creating global value chains. Being able to market domestically-produced products with higher value incentivizes local producers to further invest resources for production expansion. As these value chains become more efficient, food prices tend to go down as well. The government can still support local producers but only through less distortionary type of farm support.

1.c. Through Adopting New Technology and Innovation

There is a need to invest in and take advantage of data, technology, and innovation. The role of the government is to enable the development of the ICT infrastructure to be able to build the monitoring and evaluation system described above. Apart from building the monitoring system, there are various technological innovations that the government and private institutions could explore for the development of the agriculture, food and nutrition system. Technology and innovation encompass all stages of food system, that is from production, postharvest, up to distribution and consumption.

At the production stage, agricultural R&D could further improve productivity of staples and other crops. A doubling of rice yields, for instance, could reduce the number of food insecure households by 38 percent. Increasing the volume of production lowers food prices (FAO 2013) In addition to increasing yield, R&D should also pursue further biofortification efforts of staple food crops and other important crops. Annex 5 provides a list of staple food crops under the biofortification program of various countries.

Other innovations include improvement on the environmental impact of the agriculture and food sector (e.g. by reducing the use of harmful products and methods), cutting food loss

through brokering digital apps, and new forms of food (e.g. edible insects industry, alternative protein, and plant-based meats) (GFSI Report 2019). Some examples are identified below:

- Artificial intelligence, earth monitoring and imaging are helpful in generating early warning systems. In the Philippines, Diwata-1 satellite was launched in 2016 for forecasting and weather monitoring and for predicting extreme weather events. A second satellite called Diwata-2 was launched in 2018 to monitor changes in vegetation and for damage assessments during time of disasters (GFSI Report 2019). Further use of satellite images captured by Diwata-1 and Diwata-2 should be promoted among government policymakers. Moreover, artificial intelligence (AI) has been instrumental for recent improvements in weather/sub-seasonal forecast modeling. Conventional weather models usually provide reliable predictions up to seven days only. On the other hand, climate forecasting models provide predictions for the long term, usually decades. With the use of AI, reliable weather forecasts for up to a month's period have become possible. By being able to accurately predict weather using data analytics and early warning, potential loss and damage in property and in life would be reduced. Both consumers and producers would be shielded from price spikes if weather disturbances could be anticipated and people would be given enough window of opportunity to prepare and respond accordingly (GFSI Report 2019). This set of technologies deal with the food availability and affordability dimensions.
- Food-brokering apps help in cutting food loss by setting a platform for consumers who are looking for cheap food and food products that are still within their shelf-life, but would otherwise be tossed as waste due to market supply and demand mismatches. Karma and Too Good to Go are two examples of food-brokering apps. Karma was founded in Sweden, but has been launched in various countries such as Denmark, France, the UK, and the US (GFSI Report 2019). This deals with the food availability dimension.
- The application of blockchain technology in agriculture sector has been gaining some traction. It is being utilized now by global brands, such as Barilla and Walmart, in collaboration with IBM to enhance their supply chain traceability. Blockchain is also being used to track fish and spot illegal fishing, wood supply traceability, and for livestock traceability in various countries. This deals with the food safety/utilization dimension. Another useful application of blockchain is on the monitoring of financial instruments like green bonds, "which are created to find projects with positive environmental impact but require rigorous tracking and verification" (GFSI Report 2019, p. 20). This application deals with the food availability dimension.

Pathway 2: Income of consumers

To improve food affordability at the demand side, interventions that help in raising the number of and the quality of jobs available in all sectors of the economy should be targeted among the poor to poorest quintiles. Particular attention should be given to workers and agricultural business operators (including own account farmers) in the agriculture sector, where poverty incidence rate is 31.6 percent among farmers and 26.2 percent among fisherfolks in

2018. These figures are strikingly high as opposed to the poverty incidence rate among the general population, which is at 16.7 percent.

Increasing farm income could be done by enhancing the productivity of the food crops/commodities already being produced by the farmer/fisherfolk, or by introducing new type of food crops, commodity, or product with higher value. From producing only food crops, cash crops or non-food crops could also be promoted. However, rather than merely substituting one type of crop with another, policymakers should consider the complementation of food crops and cash crops since agricultural households would need to produce food not just for income, but also for their own consumption. As an example, banana (a food crop) could be intercropped with abaca (non-food/cash crop) (Roa 2007).

As pointed out in the literature, productivity in the agriculture sector creates a ripple effect. The first round of benefits from productivity growth are enjoyed by farmers through higher incomes and better own-household food consumption. The next round of benefits shall be enjoyed by farm workers' households, who shall be hired by farm owners as they increase their production investments in the form of additional labor and other farm inputs (Hayami et al., 1978; David and Otsuka, 1994 as cited in FAO 2013, p.2).

Pathway 3: Prices of related, essential goods and services

Another pathway to manage affordability is to manage the prices of other goods and services to increase the buying capacity of households. Electricity and water utility rates, for example, need to be low enough so that majority, if not all, Filipino households could afford to pay them. Aside from allowing them to spend money on food items (under food accessibility dimension), access to these basic needs is crucial for them to ensure food safety (e.g. electricity for refrigeration, water for washing and cooking) (under the food utilization dimension) and to cut food loss and wastage (under food availability dimension).

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Annex 1. IPC categories

Acute Food Insecurity (AFI)

Phase name and description	Phase 1 None/Minimal	Phase 2 Stressed	Phase 3 Crisis	Phase 4 Emergency	Phase 5 Catastrophe/ Famine
	Households are able to meet essential food and non-food needs without engaging in atypical and unsustainable strategies to access food and income.	Households have minimally adequate food consumption but are unable to afford some essential non-food expenditures without engaging in stress-coping strategies.	Households either: • Have food consumption gaps that are reflected by high or above-usual acute malnutrition; or • Are marginally able to meet minimum food needs but only by depleting essential livelihood assets or through crisis-coping strategies.	Households either: • Have large food consumption gaps which are reflected in very high acute malnutrition and excess mortality; or • Are able to mitigate large food consumption gaps but only by employing emergency livelihood strategies and asset liquidation.	Households have an extreme lack of food and/or other basic needs even after full employment of coping strategies. Starvation, death, destitution and extremely critical acute malnutrition levels are evident. (For Famine Classification, an area needs to have extreme critical levels of acute malnutrition and mortality.)
Priority response objectives	Action required to build resilience and for disaster risk reduction	Action required for disaster risk reduction and to protect livelihoods	**Urgent action required to:** → Protect livelihoods and reduce food consumption gaps	Save lives and livelihoods	Revert/prevent widespread death and total collapse of livelihoods

Chronic Food Insecurity (CFI)

Chronic food insecurity level name and description	Level 1 No/Minimal Chronic Food Insecurity	Level 2 Mild Chronic Food Insecurity	Level 3 Moderate Chronic Food Insecurity	Level 4 Severe Chronic Food Insecurity
	In a common year, households are continuously able to access and consume a diet of acceptable quantity and quality for an active and healthy life. household livelihoods are sustainable and resilient to shocks. households are not likely to have stunted children.	In a common year, households are able to access a diet of adequate quantity but do not always consume a diet of adequate quality. household livelihoods are borderline sustainable, and resilience to shocks is limited. households are not likely to have stunted children.	In a common year, households have ongoing mild deficits in food quantity and/or seasonal food quantity deficits for 2 to 4 months of the year, and consistently do not consume a diet of adequate quality. household livelihoods are marginally sustainable, and their resilience to shocks is very limited. households are likely to have moderately stunted children.	In a common year, households have seasonal deficits in quantity of food for more than 4 months of the year and consistently do not consume a diet of adequate quality. household livelihoods are very marginal and are not resilient. households are likely to have severely stunted children.
Key Implications for response planning[1]	Monitor the food security situation, invest in disaster risk reduction, and reinforce livelihoods as needed.	Monitor the food security situation, invest in disaster risk reduction, and protect and strengthen livelihoods as needed. Address underlying factors to increase the quality of food consumption.	**Urgent Action Required to:** → Address underlying factors to increase the quality and quantity of food consumption and decrease chronic malnutrition. Consider safety net programmes as needed.	Implement safety net programmes to improve the quality and quantity of food consumption. Implement complementary programmes to address underlying factors to substantially decrease food insecurity and chronic malnutrition.

Acute Malnutrition (AMN)

Phase name and description	Phase 1 Acceptable	Phase 2 Alert	Phase 3 Serious	Phase 4 Critical	Phase 5 Extremely Critical
	Less than 5% of children are acutely malnourished.	5-9.9% of children are acutely malnourished..	10-14.9% of children are acutely malnourished.	15-29.9% of children are acutely malnourished. The mortality and morbidity levels are elevated or increasing. Individual food consumption is likely to be compromised.	30% or more children are acutely malnourished. Widespread morbidity and/or very large individual food consumption gaps are likely evident.
	The situation is progressively deteriorating, with increasing levels of acute malnutrition. Morbidity levels and/or individual food consumption gaps are likely to increase with increasing levels of acute malnutrition.				
Priority response objective to decrease acute malnutrition and to prevent related mortality.[2]	Maintain the low prevalence of acute malnutrition.	Strengthen existing response capacity and resilience. Address contributing factors to acute malnutrition. Monitor conditions and plan response as required.	**Urgently reduce acute malnutrition levels through** → Scaling up of treatment and prevention of affected populations.	Significant scale-up and intensification of treatment and protection activities to reach additional population affected.	Addressing widespread acute malnutrition and disease epidemics by all means.

Source of images: IPC (2022, pp. 3-5)

Annex 2. Recommended Energy Intakes per day, by life stage/age group

Life stage/age group	Weight (kg)		Energy (kcal)	
	M	**F**	**M**	**F**
Infants, mo				
0-5	6.5	6.0	620	560
6-11	9.0	8.0	720	630
Children, y				
1-2	12.0	11.5	1,000	920
3-5	17.5	17.0	1,350	1,260
6-9	23.0	22.5	1,600	1,470
10-12	33.0	36.0	2,060	1,980
13-15	48.5	46.0	2,700	2,170
16-18	59.0	51.5	3,010	2,280
Adults, y				
19-29	60.5	52.5	2,530	1,930
30-49	60.5	52.5	2,420	1,870
50-59	60.5	52.5	2,420	1,870
60-69	60.5	52.5	2,140	1,610
>=70	60.5	52.5	1,960	1,540
Pregnant				+300*
Lactating				+500

Abbreviations: M-Male, F-Female

Note: *For 2nd and 3rd trimesters only

Source: Lifted in full from FNRI (2018)

Annex 3. Elements of best practice to protect children from the harmful impact of food marketing

Element of best practice		Country examples
Legislation covering all relevant foods	Infants and young children: complementary foods covered.	**Brazil**: Legislation covers any complementary foods for young children up to 36 months.
	Marketing of foods to children: robust, transparent nutrition criteria used to define foods high in fats, sugars and/or salt (HFSS).	**Chile**: The law defines "high" levels for calories, saturated fat, total sugars and sodium in foods and beverages. **Turkey**: Nutrient criteria are closely aligned with WHO European regional nutrient profile model used to define HFSS foods.
Protection for all children from birth to 18 years	Infants and young children: covers children up to 36 months.	**Philippines**: The law extends to products marketed or labelled as being suitable for infants and children up to 36 months.
	Marketing of foods to children: covers children up to 18 years.	**Turkey**: Broadcast regulations are intended to protect all children up to 18 years.
All forms of marketing are regulated (media channels and promotional techniques)	Infants and young children: covers children up to 36 months.	**Philippines**: Prohibition of advertising, provision of samples or gifts, point-of-sale promotions, with robust provisions to keep industry at arm's length from health workers/facilities, and strict rules on product labelling, as well as the use of cartoons.
	Marketing of foods to children: covers children up to 18 years.	**Chile**: Wide scope covering: television advertising; use of cartoons and toys; sale and promotion of food in schools (including sponsorship or educational resources); product labelling.
Robust monitoring and enforcement, with meaningful sanctions	Infants and young children.	**India**: A monitoring mechanism, in place from the outset, authorizes consumer organizations to report violations, which the authorities are obliged to investigate.
	Marketing of foods to children.	**Turkey**: Baseline study conducted in 2017 (WHO and Ministry of Health) to monitor digital food marketing to children. **Chile**: Enforcement is well coordinated by the Ministry of Health, and implemented by regional health authorities.

Source of image: Lifted from FAO et al. 2021b (p. 106)

Annex 4. Strengthening rural-urban linkages to improve food systems

Activities for enhancing rural-urban linkages	Benefits to food systems and residents in	
	Rural Areas	Urban Areas
Investing in rural feeder roads and cooled transportation	Connects smallholders to input and output markets, generates employment, improves incomes and value-added, and diversifies food production and diets	Improves availability and accessibility of staples, high-value foods, and other agricultural products, and generates nonfarm employment and incomes
Establishing processing centers and storage facilities	Increases value-added of agricultural products and incomes, spurs employment, and reduces food losses	Improves availability of diverse foods and increases incomes
Using information and communications technologies (such as mobile phones) to link farmers to processors, retailers, and consumers	Improves market participation, incomes, and livelihoods of smallholders	Improves availability of diverse foods
Facilitating in-country movement of people while providing assistance to people who move to cities	Allows rural workers to mitigate income risk through migrant work and remittances, improving income and livelihoods	Improves food security and nutrition through social safety nets and rural-to-urban food and cash transfers
Improving coordination and planning between rural and urban areas, especially as related to food and agriculture	Opens labor opportunities and markets for smallholders	Helps manage land use and reduces food insecurity and malnutrition
Leveraging small- and medium-sized cities as key nodes to link smallholders to big cities	Allows for growth in scale of markets (such as processing, cold storage) and improves access to input, output, and credit markets and can dynamize employment generation	Increases food access, consistency, and quality and dynamizes employment generation

Source: IFPRI 2017

Annex 5. Biofortification of staple food crops*

Biofortified Crop	Micronutrient	Country of first release	Agronomic trait	Year released
Rice	Iron, zinc	Bangladesh, India	Disease and pest resistance, cold and submerge tolerance	2013
Sweet potato	Provitamin A	Mozambique, Uganda	Disease resistance, drought tolerance, acid soil tolerance	2007
Cassava	Provitamin A	Democratic Republic of the Congo, Rwanda	Disease resistance	2011
Maize	Provitamin A	Zambia	Disease resistance, drought tolerance	2012

Note: *Implemented by HarvestPlus programme;
Source: FAO 2013 (p.35)