

# Food Security: Planning for Our Collective Future

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**Abstract:** Food security is defined when all people, at all times, have physical, social and economic access to a sufficient quantity of safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (FAO 2008). While broadly considered to have four key dimensions: food availability, food access, food utilisation and food stability, two new dimensions have recently been added: sustainability and agency. Looking at food security within Indonesia, this paper will explore some of the internal and external factors impacting food security and propose how, at multiple levels, a holistic food system planning approach can address many of the problems.

## 1 Introduction

By 2045, the population of Indonesia is anticipated to reach 324 million: an increase of 54.42 million from 2020 [1] or the equivalent of almost 6,000 additional mouths to feed every day. However, while population growth is projected to increase by just 0.67% per annum, recent studies suggest that food production will need to increase by between 60 to 70% [2]. The growing disconnect between the trajectory of population growth and the demand for food is the result of demographic shifts, for as the global population becomes richer, diets shift from coarse grains and tubers to meat, dairy products, vegetable oils and fresh fruit and vegetables [3]. Furthermore, for the first time in history, the majority of people now reside in an urban environment [4,5], with a commensurate increase in the demand for processed convenience food and the greater consumption of meals away from home [6].

With increasing urbanisation, arising from both urban migration and natural population increase, poverty, food insecurity and malnutrition are shifting from a rural problem to an urban problem [7]. In Indonesia today, 23 million people are unable to meet their daily dietary requirements, 10% of the population live below the national poverty rate and 31% of children under 5 are stunted [8].

As poor households spend scarce resources to buy more affordable, calorie-dense, micronutrient-poor food with high levels of fat, sugar and salt, the incidence of malnutrition and obesity are increasing, often within the same household [7]. In Indonesia today, one in three adults, one in five children aged 5-12, and one in seven adolescents aged 13-18 are overweight or obese [9]. Obesity can have serious consequences for child development, including the early onset of diabetes and high blood pressure, and overweight and obese

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children are at greater risk of developing non-communicable diseases such as heart disease, stroke and certain types of cancer. Today, six of the top eleven diseases affecting mankind are diet related [5], with The Lancet Commission [10] finding that unhealthy diets are the largest global burden of disease and pose a greater risk to morbidity and mortality than unsafe sex, alcohol, drug and tobacco use combined.

## 2 Food security

Food security exists when all people, at all times, have physical and economic access to a sufficient quantity of safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life [11].

Food security is generally evaluated under four pillars: food availability, food accessibility, food utilisation and food stability. Food availability addresses the “supply side” and is determined by the level of food production, stock levels and net trade [11]. Agriculture and food security are economically and politically important to Indonesia. In 2012, agriculture accounted for 14% of gross domestic product (GDP) and 35% of employment [12]. In that same year, the Government of Indonesia (GoI) introduced a new food law that sought to strengthen food sovereignty. Self-sufficiency targets were established for five commodities: rice, maize, soybeans, sugar and beef.

In pursuing its objectives, the GoI provides significant price support and fertiliser subsidies to primary producers [12]. Furthermore, through the Rice for the Poor (RASKIN) programme, rice, the main staple, is distributed at subsidised prices to impoverished households. As a consequence, the domestic price for rice is significantly higher than the prevailing international price, which has a significant negative impact on the ability of many Indonesian households to buy food [13]. In addition, with rice farmers receiving prices well above the world price, there is little incentive to diversify into higher value crops or more nutritious crops such as fruit and vegetables [14].

The procurement, storage and subsequent supply and distribution of rice within Indonesia is coordinated through the State Logistics Agency (BULOG) Public Corporation, a state-owned enterprise [13]. The role of BULOG is to: secure the price of rice at the producer and consumer levels; manage the GoI reserves of rice; provide and distribute rice to lower income households; and to implement rice imports in accordance with the need [14].

Indonesia is a leading producer of palm oil and a major global producer of rubber, copra, cocoa and coffee [13]. With agricultural exports valued at USD 33,224 million and imports at USD 14,186 million, the balance of trade is positive [15]. However, a closer examination of the figures reveals the importance of palm oil exports to the economy (Table 1).

**Table 1.** Imports and exports of food products from/to Indonesia

	<b>Fresh produce</b>	<b>Cereals</b>	<b>Meat</b>	<b>Drinks</b>	<b>Fats/oils</b>	<b>Dairy</b>	<b>Sugar</b>	<b>Other</b>
Exports	1491	884	16	93	20397	56	308	5200
Imports	2742	3499	737	98	194	1098	2299	3243

Despite government efforts to encourage self-sufficiency in rice, Indonesia continues to import rice. The primary reason for this is to overcome seasonal variations in productivity due to both declining rainfall and warmer temperatures [16]. However, Indonesia is also a significant importer of wheat and barley, for Bogasari, the largest flour mill in the world, is located in Indonesia.

Imports of meat are 46.1 times larger than the value of exports, and not surprisingly, within a hot tropical country, imports of dairy products are 19.6 times larger than the value

of exports. As Indonesia continues to enforce restrictive trade measures to support government efforts to achieve food self-sufficiency, these restrictions have caused shortages for some commodities and further exacerbated the high prices for other commodities [13].

Food access fundamentally talks about food prices, household incomes and expenditure, and the marketing and distribution of food [11]. Within Indonesia, the average household spends 44% of its income on food [17]. However, in rural areas where household income is generally lower, it is not unusual for households to spend more than 60% of their household income on food [15].

Poverty is highly correlated with food insecurity [16]. Despite improvements in recent years, around 9.8% of the population - or 26.4 million people - live below the national poverty line. Poverty and high food prices - in relation to household income - is the major challenge the GoI faces in its efforts to increase access to food [12]. For those households on low incomes, as the domestic price for rice is higher than the price in the international market, this may limit the amount of money households have to spend on food.

Two key factors impacting the price of food are the availability (or supply) of food and the increased demand, which is usually associated with religious or cultural festivals. In Indonesia, seasonal variations in productivity, occasioned by prolonged drought, flooding or typhoons, other natural events such as volcanic eruptions or tsunamis, pest and disease outbreaks, pandemics and conflict - such as that currently experienced in the Ukraine - can dramatically reduce the amount of food that is available, thereby leading to higher food prices. However, food prices may also increase as a result of other pressures in the macro economy, for as input costs increase, so also does the cost of food. In Indonesia today, food price inflation, while falling, is still around 4.17% [18].

The food and beverage market in Indonesia is currently valued at around USD 101.3 billion, the largest in South-East Asia [19]. While traditional wet markets are the major outlet for the distribution of food in Indonesia, the modern retail sector is growing in importance, especially in urban areas. In 2020, because of their closer proximity to consumers and the wide assortment of product offered, convenience stores have become the most popular retail outlet in Indonesia. Conversely, both supermarkets and hypermarkets are facing more intense competition, not only from convenience stores, but also from e-commerce operators.

Food utilisation describes not only the nutritional value of the food, but also food preparation and feeding practices, the diversity of diet and the intra-household distribution of food [11]. By international standards, the nutritional status of Indonesians is low. On average, in 2018, the daily calorie consumption was only 2,165 kcal per capita [16]. Carbohydrates (rice) dominate the calorie intake for most Indonesians, often accounting for more than 65% of the total calorie intake - well above the recommended figure of 50%.

The consumption of fish, meat, dairy, and fresh fruit and vegetables is highly dependent on household income. Fish is the most important source of protein in the Indonesian diet, with the consumption of meat among the lowest in South-East Asia [16]. Fruit and vegetable consumption is also well below the recommended threshold, with only 4.6% of the population aged 5 years or older meeting recommended dietary guidelines.

Household income is also the key factor impacting the demand for ready-to-eat or ready-to-heat (prepared) meals. In Indonesia, the share of expenditure on prepared food has risen from 25.9% in 2013 to 35.9% percent in 2019 [16].

The utilization of food is also highly dependent on non-food components. To make the best use of the food available, households must have access to clean water and sanitation [11]. Currently, around 68.9 million people - or 26.3% of the population - do not have adequate access to safe and sustainable water [16].

Access to safe food is a basic human necessity and is essential for food and nutrition security [13]. Unfortunately, foodborne diseases in Indonesia continue to be of concern. The estimated impact of food poisoning to the economy of Indonesia was approximately USD 78

million in 2013 [20]. Food control in Indonesia is carried out at multiple levels, from the central government, regional governments at the provincial level, and local governments at the district/city level. While Indonesia has recently introduced a national food control system, based on FAO and WHO guidelines, according to the Ministry of Health, most cases of food poisoning arise from eating contaminated food purchased from catering services (28%) or food prepared in the home (28%).

Under the heading of food utilisation, it is also important to consider the social acceptability of food [11]. In 2023, approximately 87% of the Indonesian population (229 million) were Muslim [15]. The consumption of halal food is a religious obligation for all practicing Muslims [21]. Food safety, quality standards, ethical considerations, transparency, consumer trust and legal protections are all covered by halal food regulations. Halal certification not only provides an assurance to consumers that certified food products meet established halal standards, but certification also enables consumers to adhere to Islamic dietary guidelines.

Food stability is about being food secure at all times [11]. Even though a household may have an adequate food intake today, food insecurity can be transitory with short term shocks such as a change in employment status, or a rise in food prices – either as the result of a reduction in supply or increased demand during religious festivals – limiting access to food. Adverse weather conditions, political instability, or economic factors will all impact food security status. Unfortunately, Indonesia is prone to a variety of climate induced disasters such as floods, droughts, typhoons and forest fires [16]. Climate change impacts include changing rainfall patterns, the increased frequency and intensity of extreme weather events, higher temperatures, and rising sea levels that lead to seawater intrusion and the salinization of both soils and aquifers.

For this reason, in 2020, the High Level Panel of Experts extended the definition of food security to include two new variables: sustainability and agency [22]. Sustainability refers to the long-term ability of our food systems to provide food security and nutrition in a way that does not compromise the economic, social and environmental bases that generate food security and nutrition for future generations. The inclusion of sustainability as a dimension of food security recognises the impact that food production systems are having on climate change, how climate change is impacting food production, the degradation of natural resources, and the growing social and economic inequality.

The Sustainable Agriculture Initiative defines sustainable agriculture as the efficient production of safe, high quality agricultural products, in a way that protects and improves the natural environment, the social and economic conditions of farmers, their employees and local communities, and safeguards the health and welfare of all farmed species [23].

Drawing largely on the work of Elkington (1994), the definition encapsulates what business describes today as the triple bottom line: people, planet, profit [24]. The people dimension considers the positive and negative impact an organization has on its most important stakeholders: employees, families, customers, suppliers, communities, and any other person influencing or being affected by the organization. Under this dimension, a firm pursuing sustainability will not use child labour, it will remunerate its workers fairly, maintain a safe work environment, provide reasonable working hours, and not otherwise engage in exploiting its labour force or a community. Planet considers the positive and negative impacts an organization has on its natural environment. This includes reducing its carbon footprint, carefully managing the consumption of energy and non-renewables, minimising pollution, and avoiding ecologically destructive practices. Profit considers the positive and negative impact an organization has on the local, national, and international economy. This includes generating employment, innovation, wealth creation and the payment of taxes.

It is widely acknowledged that food production is the largest cause of global environmental change [27]. Agriculture occupies about 40% of the land available and utilizes as much as 70% of the world's fresh water. With the conversion of natural ecosystems to croplands and pastures and the overuse and misuse of chemicals, agriculture is the leading cause of deforestation, land use change and the loss of biodiversity. Furthermore, and seldom realised, the production, distribution, processing and consumption of food is responsible for up to 30% of global greenhouse gas emissions.

While contributing directly to climate change, agriculture and food production is also directly impacted by a changing climate [27]. Garnaut [25] concluded that climate change is likely to affect agricultural production through changes in water availability, water quality and temperature. While an increase in carbon dioxide concentration may increase the rate of photosynthesis in some plants, the positive impacts of carbon fertilisation are more likely to be restricted by higher temperatures and lower rainfall. Further reductions in productivity are anticipated to arise from the more frequent occurrences of severe weather events including droughts and flooding, and the emergence of new pests and diseases [7]. In Indonesia, changes in rainfall patterns have adversely impacted both the planting season and the harvest period for rice, with more infrequent and/or more intense rainfall causing flooding and/or drought [16]. ADB [27] anticipate that climate change could result in a 9 - 25% reduction in productivity at the farm level.

Over the past two decades, Indonesia has experienced a significant increase in urbanization. By 2015, more than half of the population (53% or 136 million people) lived in urban areas [16]. Urbanization not only results in the loss of prime agricultural land to residential and commercial uses, but the migration of people from rural to urban areas also presents challenges. Like most other developing countries in the world, not only is the number of farmers in Indonesia declining, but those who remain in rural areas are also getting older. In countries like Indonesia, where mechanization is limited, age has a negative impact on productivity, where older farmers are less productive than younger ones.

However, not only is productivity declining, but the economic viability of most farming households is also declining. With input prices for seed, fertilisers, chemicals and fuel rising more rapidly than output prices, the standard of living for most farming households is declining. Today, in Indonesia, on-farm activities contribute only 47% of the household income, with smallholder farmers supplementing their on-farm income from non-agricultural sources and cash transfers from family members [28].

Agency refers to the capacity of individuals or groups to make their own decisions about what foods they eat, what foods they produce, how that food is produced, processed and distributed, and their ability to engage in processes that shape food system policies and governance [22]. Government has an important role to play in providing the institutional context and in developing public policies that enable the exercise of agency, by supporting democratic, inclusive and participatory processes and institutions. Governments have a duty, an obligation and a responsibility to respect, protect and fulfil human rights, including the right to food, under international law. As a consequence, most governments are embarking upon the development of comprehensive food security plans at a regional, national, provincial and even local government level.

### **3 Implementing food security plans**

At a regional level, the ASEAN Integrated Food Security Framework [29] aims to ensure long-term food security and nutrition within the region by: sustaining and increasing food production among the ASEAN Member States; reducing postharvest losses; promoting conducive markets and trade for agriculture commodities and inputs; ensuring food stability

and affordability; ensuring food safety, quality and nutrition; and operationalizing regional food emergency relief arrangements.

At a national level, the Food Law of 2012 shapes Indonesia's current agricultural policy [30]. The Food Law sets out the principles of food self-reliance and food sovereignty in approaching food security. The law stipulates that domestic food demand may be fulfilled by imports only where local food production is insufficient. The Law confirms the objectives of the Strategic Plan of the Ministry of Agriculture 2020-24 to: achieve self-sufficiency in the production of rice, maize, soybeans, sugar and beef; ensure food prices are affordable for consumers; diversify production and consumption away from carbohydrates towards more meat and fresh fruit and vegetables; raise the competitiveness of agricultural production and value-added processing; increase the availability of raw materials; and improve the welfare of farmers through higher incomes [27].

Following an initiative by the President in 2020, Indonesia is seeking to improve food security through the development of a government led food estate programme [30]. In 2020, the programme covered an area of 30,000 hectares in two districts of Central Kalimantan, where designated farmland was to be used to produce national stocks of both rice and maize. In case of emergency, these stocks were to be distributed domestically, with any excess to be exported. The programme aims to cover 165,000 hectares by 2024.

In 2021, under Presidential Regulation Number 66 of 2021, Indonesia established the National Food Agency (NFA). This replaced the former Food Security Agency (DKP) under the Ministry of Agriculture [30]. The key roles of the NFA are to: stabilize food prices for nine staple commodities at the producer and consumer levels; maintain food availability across time and regions; implement food import policies; achieve food and nutrition security for all; and ensure food safety. The NFA consolidates and co-ordinates competencies under the Ministry of Trade, the Ministry of Agriculture, the Ministry of State-Owned Enterprises (SOEs), and the BULOG Public Corporation.

In the wake of the United Nations Food Systems Summit in 2021, the GoI has now decreed that all governments at a national, provincial and district/city level are required to develop a food security and nutrition action plan every five years [31]. Within Indonesia, this is encouraging more cities to join the Milan Urban Food Policy Pact. Currently, 12 Indonesian cities are signatories to the Pact, including Bandung, Bogor, Denpasar, Makassar, Semarang, and Surakarta [32].

The Milan Urban Food Policy Pact is an international agreement of city mayors ratified in 2015 [32]. It is composed of a preamble and a Framework for Action listing 37 recommended actions, clustered into six categories to: ensure an enabling environment for effective action [governance]; promote sustainable diets and nutrition; enhance social and economic equity; promote and strengthen urban and peri-urban food production; address impediments in the supply and distribution of food; and minimise food waste.

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