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# **FOOD SECURITY AND THE ROLE OF PLANNERS. CASE STUDIES: INDIA, CHINA, AND THE GAMBIA.**



**Working Paper II**  
**Food Security and the Role of Planners.**  
**Case studies: India, China, and the Gambia.**

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# FOOD SECURITY AND THE ROLE OF PLANNERS

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## **Abstract:**

This paper highlights the meaning of food security by considering its access, availability, stability, and utilization aspects. The Food and Agricultural Organization (FAO) method; household income expenditure survey; Individual dietary intake, and anthropometry are the various methods known to be used in measuring food security. The high food security gap has been seen in India and China as well as The Gambia with progressive efforts been taken.

The challenges of food insecurity have been linked with all the facets of life and the role of planners today; set a key role of freezing and managing resources, land for agricultural purposes, planning regions based on old and new models and providing infrastructural development to enhance effective production of food to ensure people of all social status have access to food secured. To achieve these goals, many important innovative ideas are set forward to enhance sustainable food security at the local and national levels. Moreover, considering a good plan and innovative approach to ensure food security in an event of any form of a pandemic that may arise in the future.

**Keywords:** Food security, dietary intake, role of planner, accessibility, availability, stability, utilization, COVID-19, Nutrition.

## **Introduction**

According to international estimations, more than a billion people are living under one dollar per day and it showed how extreme their poverty level is. It is also estimated that over 800 million people lack access to sufficient aliments and nutritious food. The people affected include the unemployed and under-employed; low-income earners, mental illness and / or addiction; the elderly, the homeless, and single parents; Australians and people from non-English speaking backgrounds (Book & Smith, 2001; VicHealth, 2005, 2011).

According to Food and Agricultural Organization (FAO), about 36 countries were in a serious situation of food insecurity in 2006, including 25 countries from Africa, and followed by 11 Asians, and the remaining from other continents. There has been an increase in the food crisis from 1980 with 15% per year to 30% per year in 2000 and onward, causing emergencies alert to mitigate the situation globally. Demand for assistance between states, and international intervention becomes the new norm to fight food insecurity. As civil conflicts, wars and climate change continue to rise for some decades in many parts of the world, food security is a great deal of work that needs to be tackled by the Government, stakeholders, and international actors.

The importance of Sustainable Development Goals (SDGs) sets to engage every person to involve in mitigating and to ensure sustainable food security by 2050, in which, urban and

regional planners today, have a big role to play to ensure a conducive and safer environment for all and promoting hunger-free society.

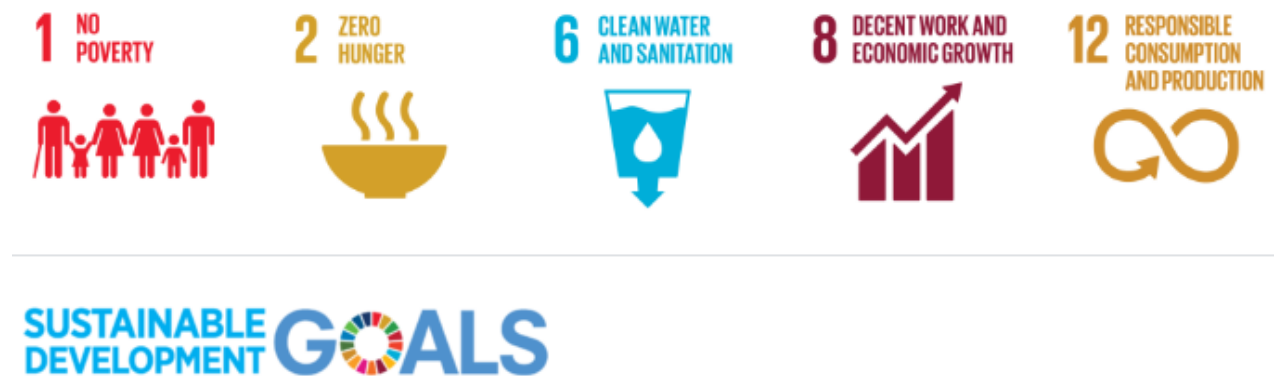


Fig 1. The SDGs goal link with Food Security and Nutrition (Source: CGIAR)

With the Global challenges on food security, countries have made a massive progressive in recent years. However, the Global Covid-19 pandemic happens to be a serious obstacle towards ending the big challenge of food security and poverty.

## Food security

Food has always been the most important necessity for human needs, and the quest to work or farm to fulfil the body requirements, especially to the poor. However, while some people meet their basic needs, others find it hard to enjoy the basic three meals a day. Having said this; What is Food Security? Food security is having access to food in a sufficient manner to be able to always meet your body requirements and for a healthy and stable life. International organisms, especially FAO, established four categories through which we can define food security:

*Food availability:* There needs to be a required availability of food with the estimated quality and quantities from domestic, imported, and export food products.

*Food access:* Access to appropriate and nutritious food is entitled to all provided with a given command of legal-political, economic, and social arrangements given the right to access a common resource (FAO 2006, Issue, p.1)

*Utilization:* Ensuring all processes are applied by considering sanitation, healthcare, nutritious, and adequate diet, and other practices to ensure food security.

*Stability:* Meet the demand and supply of people with the required dietary need and nutritious intakes to ensure a free hunger society all year round. Food should be available and accessible during seasonal changes, climatic effects, and other factors.

The objective of making food available, accessible, and affordable to all comes into play in the minds of policymakers and planners. How well can we fight food insecurity to reduce

malnutrition of both children and adults? The 2030 agenda for Sustainable Development Goals, recognized fighting towards ensuring food for all and eradicating all forms of malnutrition (SDG 2 Targets 2.1 and 2.2). After five years of assessing the progress of food security and nutrition into the 2030 agenda from decades ago, it has declined. Realizing that, we are only nine years ahead to meet the hunger and food insecurity eradication plans established by the international community, much work needs to be done to fight food insecurity at the local, national, and global levels.

## **CASE STUDIES**

### **India**

According to the United Nations, 4 out of 10 children in India are under chronic under-nutrition with nearly 940 million undernourished. India is Rank 97th under the Global Hunger Index (GHI) with 25% child mortality, child stunting, child wasting, and under malnourished of the total hungry population (International Food Policy Research Institute [IFPRI] 2012). Despite having large food security and other poverty alleviation schemes, there are still gaps to fill. The rise in overweight and obesity in children and adolescents with other health consequences is constantly increasing.

With the introduction of mid-day meals, basic food is offered to over 120 million school children to end hunger and undernourished. The *Anganwadi System* assists lactating mothers and pregnant women with ration, and subsidized grains for the poor. This results in a positive increase in food security in India. The United Nations in collaboration with the government has taken actions towards improving agriculture and livelihood to banish poverty. It has been so far on the level of change made in the agricultural sector and is among the leading exporter of agricultural food in the world.

### **China**

Due to food shortage, China faces food insecurity and malnutrition but, yet realized growth in its social and economic gains. According to the Report on Chinese Residents Chronic Disease and Nutrition published by The Chinese National Health and Family Planning Commission on 30 June 2015, showed a reduction of under-malnutrition status in adults with body mass index below 18.5kg /m<sup>2</sup> which represents 8.5 percent in 2002 and 6 percent in 2012; it symbolizes a positive reduction for children below 6 years from 16.3 percent in 2002 to 8.1 in 2015. This indicates progress in the approach and decision of the Chinese government in fighting food insecurity.

Therefore, an estimated population of 9 billion will require additional food by the agricultural system by 2050 to meet food security (Fischer et al., 2005; Smith and Gregory, 2013).

### **The Gambia**

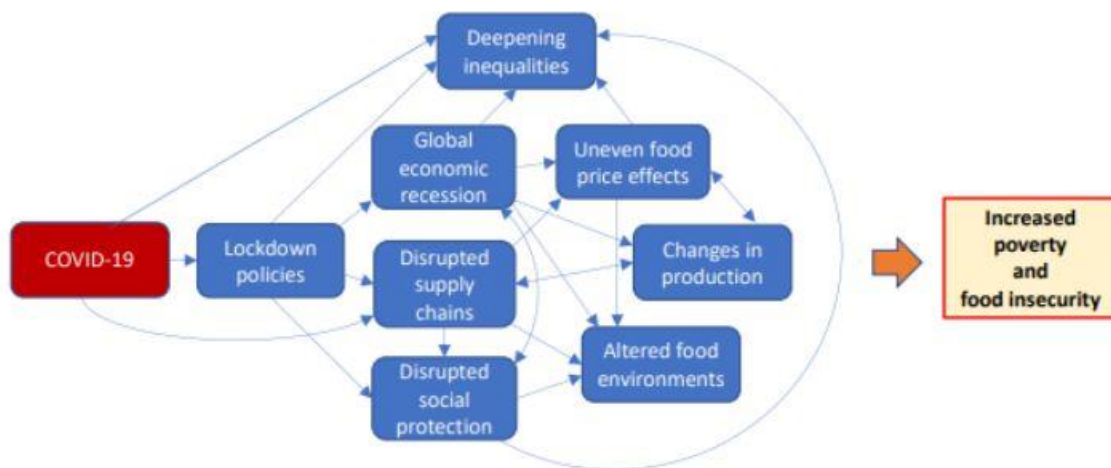
The Gambia is one of the smallest countries in mainland Africa with a population of about 1.8 million (GBOS, 2013); has been heavily affected by food deficiency, meeting only 10% of the food consumption needs. Reports have shown that Gambia food import was 33.2% in 2019 (World Data Atlas 2021), and has decreased from 2000-2019, according to the assessment made by FAO in 2012.

The Gambia highly depends upon outside food importation, and the local staple food is rice. More than 600 hectares of rice farmland was affected by pest plants, and two-third of the population are under food insecurity. This posed a great concern to ending hunger and alleviating poverty in such a developing country with a GDP of 1.66 billion US Dollars in 2018, (Plecher H, 2021). This has really threatened the lives of the poor, especially in the rural poor villages who depend mainly on farming and livestock production for survival. However, the recent outcome has been positive as World Food Programme helps the Gambia in monitoring food and market prices during the pandemic period since July 2020. As it stands, it is reported by Cadre Hamonise in March 2020, that there is a drop from 25% to 20% in the proportion of families with poor consumption pattern, and the price of staple food is at stability, resulting to increase in the stability of food security.

### **Impact of Covid-19 on Food security**

The Covid-19 pandemic came at a crucial stage in our lives and seriously endangering the lives of millions globally. With all our socioeconomic activities shut down during the beginning of the covid-19 to curb the spread of the virus, food security has become the core challenge as millions lost their jobs; most farming activities stopped, and the situation worsened day by day with the increased economic crisis. Where food needs to access, seems to be difficult as most countries banned flights from entering their territory and travel restrictions continue in many parts of the world, both internal and beyond. And the poor people continue to be the most vulnerable to the situation. Due to the high degree of uncertainty, the worst effect is yet to come (Ghebreyesus, 2020; Khorsandi, 2020). An estimate of 83 to 132 million people will experience food insecurity due to Covid -19 pandemic (FAO et al, 2020).

The disruption of the food supply chain has affected the food and nutrition and likely threats of continuation of low production and productivity if it continues. There has been widespread information about the dumped and wasted foods due to inaccessibility to reach marketplaces or consumers (Yaffe Bellany and Corkery, 2020). It is also reported that labourer illness due to Covid-19 forced food processing facilities to shut down for safety reasons (CFS 2020; Stewart et al, 2020).



**Fig 2. The Dynamics of COVID-19 threats on food security (Source: HLPE.2020).**

In most countries, food security has widened the gap of inequalities due to covid-19 and affected the right to healthcare, access to food, nutrition, water, and security of the people (Ashford et al, 2020). The price of local food becomes extremely high, and the dynamics of pandemic became challenging to those countries that highly depend on food import (Espitia et al, 2020).

The global economic recession has strained most governments to provide ways to ensure social protection to people affected by the crisis by taking measures to contain the spread of the virus (FAO and WFP, 2020).

## **Global Response to Covid-19 on Food Security**

There are many contributions made by some organizations to help in the adaptation programs in ensuring food security and nutrition. Most of the International bodies like the World Health Organization, United Nations, United Nations Development Programme, World Food Programme, and many more engaged in series of webinars to create awareness about the dangers of COVID-19 and its impact on health. Furthermore, webinars were done to help guide competent authorities, food businesses, farmers, citizens, etc. about the food security and safety

An organization like Feed The Future adapted programs and partnerships to mitigate the impact of food insecurity through:

- By helping the government with smart policies.
- Empowering farmers and small businesses particularly those own by women.
- Helping small businesses with strong business models and serve customers safely.
- Ensuring the good flow of market chain and continuation and promoting cross border trade.
- Stabilizing the food price to allow farmers to gain benefits of their yield.



There have been policy response policies by the International Food Policy Research (IFPR) with its partner engaged in-country and regional programs and projects which 33 countries are part of to mitigate the impact of COVID-19.

**World Bank Support:** The World Bank's mission on a partner with government international bodies to support in the close monitor both employment, domestic food, supply chain, agriculture production. In April 2020, the Institute for Defence Analyses (IDA) provides 5.3 Billion U.S. Dollars to support food security according to the report released “Responding to the Emerging Food Crisis”.

a. **India:** The world Bank co-financed the National Rural Livelihood Mission by providing financial services to poor rural communities, restore fresh food, run a community kitchen, provide, and sanitizes masks, etc.

b. **Afghanistan:** Due to the disruption of the plants during the COVID-19 pandemic, the World Bank-supported Afghanistan with a project called Emergency Agriculture and Food Supply Projects (EATS), a grant fund of 100 million U.S. Dollars with the aim of enhancing the food supply chain and increase in food production to promote food security.

c. **Senegal:** The Senegalese government requested for 15 million U.S. Dollars to the IDA to boost their export value of crops, like dairy farming, horticultural products, reduce the mortality rate of the small ruminants, and enhancing resilience food security during the pandemic.

## Determining Food Security

Food security is paramount to determining nutrition security, and with the help of different level analysis factors from an individual, household, local, regional, national as well as global. Thus, the food security depends on these factors. The income level of the household plays an important role in linking both food security and health to ensure proper diet and preventive and curative health care of the people. The availability of food would be determined by the level of production, capacity, and ability to import and store nutritious foods all year round.

Methods for measuring food security

There are multiple methods used in assessing food security, and they are as follows:

### A) FAO method

The application of these methods gives a comparison of the required norms and consumption, depending on the sex, age, health status, and physical activity of the individual, an allowance between 200 and 2350 kcal in a day per person (FSIEWS, 2001). It requires a country to estimate per capita income using balance Sheets and energy intake variance of the expenditure and income survey of a household by applying:

- Total calories available in the year of interest.
- Total number of people living in the country in the year of interest.
- The coefficient of caloric intake in generating the energy intake curve.
- Cut-offs point of minimum per capita average caloric of the proportion of the population who fall under this category.

### Pros

- The frequent updates allow comparison and cross-examination of the national, regional, and global trends of food security.
- This method is quite inexpensive to undertake.
- It allows countries to generate and estimate their daily per capita caloric availability.



## **Cons**

- The method assumes that only those that consume above the minimum caloric intake indicate food security, when in fact most poor people consume excessive caloric which can pose a threat to their health like obesity.
- There is sometimes little control of the quality of data or standard in undertaking this method and can be difficult to understand.
- There can be numerous errors on the numerator and denominator during measurements.

## **B) Household income and expenditure survey**

This method is interesting as it involved interviewing respondents in their household with regards to information like amount of money spend on food and other importance with different time including week(s) or months (s) antecedent the survey. The following inputs such as 1) quantity of food bought and the cost of different food consumed within and outside the house, 2) food grown by members of the house for consumption, 3) food received as either gift or payment for services, work, goods, etc.

### **Pros**

- It helps in determining the consequences and risk of food security of the household through mapping them out from the local and national levels.
- It allowed an easy understanding of the dimension of food insecurity by collecting dietary quality data.
- Mostly used to evaluate the status of food and nutrition and other anti-poverty programs.

## **Cons**

- Difficulty to get a reliable estimation of food consumption outside the household
- There can be bias results in the periodicity of food acquisition.
- There can be an error in the conversion of caloric intake in households through assumptions.
- Different methods of data collection and estimated key parameters are used by different countries thereby making it hard to understand and make a comparison between countries or regions.
- It is also very expensive as it requires a multi-disciplinary team of people to produce valuable outcomes.

## **C) Individual dietary intake**

This can be measured through multiple methods which include: 1) 24 hours recall, food frequency questionnaires, and food records kept by an individual or by an observer according to Walter Willet. This requires a time interval frame to compare with dietary energy requirements to decide the proportion of the population lacking energy intakes requirement (FIVIMS, 2002). The available data on energy availability give estimates of micronutrition (Mason, 2002). These portion size estimations are to estimate the food group and the nutrient intakes, then appropriate and valid food composition and database are available (R. Perez - Escamilla et al, 2008).

### **Pros**

- Mapping can be done to determine the consequences of food security at both the local and national level and individual level as well.
- It does not only measure food availability but also measures direct consumption level as well.
- Different dietary intake methods can be used to understand and compare between the recent and the longer-term dietary intake patterns.
- It assesses both dietary quality and individual caloric intakes.

## **Cons**

- More scientific evidence is needed to estimate the nutrient deficiencies which rely on cut-off points.
- Lack of proper training of supervisors can create many measurement errors.
- There is a need for time off at least 30 minutes to apply the 24-hour recall.
- Required command of software in entering the 24 hour-recall data to convert food intake into nutrient intakes.
- The method of preparing a food composition database can affect components of nutrient bio availability.

### 1. D) Anthropometry

According to The National Institute for Occupational Safety and Health (NIOSH), anthropometry is considered as the science that defines physical measures of a person's size, form, and functional capacities. The positive effect of this method is that it is mostly used in a national survey and the indicators are well based on established cut-off points.

#### *Pros*

- Components such as weight and height measurements are well standardized in doing anthropometry.
- Mapping can be done to determine the consequences of malnutrition at local, national, and individual levels as well.

There is relatively strong evidence-based in comparing the cut-off point used in interpreting anthropometry and the adequacy of nutrient intakes.

#### *Cons*

- Understanding the interpretation of obesity and food security is hard.
- Unskilled people can perform measurement procedures using inexpensive equipment.
- Likelihood of high risk of food insecurity may occur.

## KEY CHALLENGES OF FOOD SECURITY

**I. Price of food:** The change in demand and quantity affects the pricing and this is determined by multiple factors like food preference, quality of the food, the income level of households, taxes, etc. People with limited income tend to buy bulky, poor quality food that has little nutritional value but an oversupply of energy, fats, and sugar to curb their hunger (Burns C, 2004). Therefore, the high cost of food products is a nightmare for most of the low-income earners and those under the poverty line. Societies that depend highly on imported goods from other countries face high pricing of food, and availability of food as well.

Due to the economic crisis, the world is facing today, ending food insecurity and nutrition seems to be a big issue to solve despite its progress in ending in recent years. When food products are not under control by the designated authorities pricing of food products escalates and most businesses use the opportunity to increase food price, during other unfavourable events or circumstances.

**ii. Availability of water:** the requirement of water for food production plays an important role in food availability and food security. The FAO and World Health Organization have highlighted that food processors and handlers in getting safe and clean water for the production and processing of food cannot be undermined. The WHO (2006b), Codex Alimentarius Commission (2003) with other international and authorities' bodies provides guidelines on the safety of water when handling food. As a primary means of food production, the availability of water for agricultural purposes is key in driving the high yield of production and availability of food.

Means of water for agriculture are through traditional wells, rivers, and springs to irrigate farmland in most rural or drought-prone areas. However, some of these infrastructures are lacking in many places to help boost the agricultural sector. Other technologies such as rainwater harvesting, and renewable water means are lacking to be introduced to manage and conserve water for both domestic and commercial usage in ensuring food security. The demand for water for agriculture against other uses continues to take its toll.

**iii. Land Use:** The allocation of land for different functions has a huge impact on food security. The growing population and urbanization in recent years contribute to the great demand for land. As cities are expanding due to demographic pressure, farmland is declining. If the land classification is not balanced to favour agricultural use, it becomes challenging to meet the demand for food. When a land distribution is poorly made, the space for agricultural production reduces and production becomes less. For example, most farmlands are sold to real estate companies who are mainly concerned with turning agricultural land for housing for profit gain with the detriment of the population living in food insecurity.

Land-use policies are particularly important in facilitating healthy built environments that include food supply and equitable access. There will always be gaps and a lack of consistency if food policy development approaches are fragmented (Department of Agriculture, Fisheries, and Forestry [DAFF], 2011).

**iv. Impact of climate change:** The climate event like flooding contributes to the vulnerability of agricultural land causing erosion and soil degradation. The other important aspect is the lack of enough rainfall to meet the agricultural farming demand which sometimes leads to low productivity or causes drought, and it gives a serious problem in fighting food security. The rise in sea level causes saline water to penetrate nearby farmland and settlement displacing people or worsening their conditions (Ravi 2008).

**V. Science and Technology:** One of the key challenges in providing adequate food security can be the lack in the use of techniques or advanced use of technological equipment for higher yield and efficient production. The lack of scientific research and integration of farming systems leads to low production in less developed regions. Lack of communication between farmers and scientists may lead to unsustainable food production. The lack of a proper mechanism to control pests and other diseases affecting crops or animals is crucial in the farming system.

Early Warning System technology about climate changes to alert farmers can be a great tool to prepare farmers and policymakers to prepare and find other mechanisms to adapt to the situation. The financial inability to purchase such technology can be very challenging to farmers as most are from the rural poor. The lack of application of remote sensing and GIS in agriculture functions in a region or nation impacts poorly, which contributes in the difficulty to maintain and ensure sustainable food security.

**vi. Lack of Education and Training:** food security is much more challenging when a farmer lacks proper knowledge or skills to raise cattle or cultivate. The rural people are primarily engaged in agricultural activities, and lack of basic education contributes to their inability to understand and engage in sustainable agriculture. Another important aspect is the lack of training by designated authorities to help farmers to apply new farming technologies and other important farming techniques that can contribute to production inefficiency.

The role of health workers in educating people about dietary intake and other health and safety food measures to combat malnutrition, obesity, etc., is key. However, some rural poor communities are not reached to benefit from this training.

**vii. Policy and Institutional Response:** The poor intervention of government from the local and national level, impacts the progress of food security creating a gap between the nourished and malnourished. Within the context of urban agriculture as a planning responsibility, the local government urban planners are ill-equipped, both in practice and a policy context, to implement initiatives (Thibert, 2012). Lack of programs and policies to support the farmers and alleviate poverty continues to be a constraint. Therefore, investing less in agriculture means producing less food. Lack of support from the international bodies on climate change response and other supports hinders food security.

**viii. Conflict:** the number of displaced people due to political instability and conflict is another challenging factor leading to food insecurity and lack of proper nutrition. From the past two decades, it is estimated 96.5 million to 112.1 million stunt children were affected by the conflicts in developing countries.

The climate and weather-related events also contribute to political instability. For example, in (Mawai, 2012), more than 300,000 people displaced, and over 160,000 fled for their lives to neighbouring countries such as Burkina Faso, Mauritania, and Niger. This was because of drought and political turmoil that took place and thousands of livestock diminished. This had led to the formation of the armed rebels who took advantage of the poor, innocent, and coercing and looting their goods, forcing the government to respond in conflict, and food insecurity continues to increase to date.

Since 2009 Boko Haram terrorist activities forced many displaced families and communities to face risks and over 2.3 million people were displaced internally and 15 million people under food insecurity at the height of insurgence among which 5.1 million people experienced severe food insecurity (FAO 2017). Over half a million children in the northern part of Nigeria are suffering from severe acute malnutrition due to the rising tension between the Boko Haram terrorist group and the national forces (WFP 2017). It is challenging to monitor the status of food insecurity in countries that are facing political instability and conflict.

## **Role of planners in enhancing food security**

The role of planning has taken another trend because of rapid urbanization and the industrial revolution in the 19th century. This had created a different dimension in the field of planning and the role of planners.

The complexity of growing cities had led to the dynamic role of planners to face the most challenging task in integrating all facets of Sustainable goals, especially in resources, climate change, and environmental concerns of life in both urban and regional development. Based on

these attributes, R. A. Walker, vividly argued that planning is not just a profession but an activity that requires numerous experts to engage in the government institutions whose role is to ensure a safe and conducive environment and shrinking the gap between the rich and the poor.

Sustainable issue globally has recognized the importance of planners in building great aspirations towards striving for responses in achieving food security. The main planners' role in ensuring food security is as follow:

### **Freezing of Agricultural, forest, and Plantation Land**

It is the role of the planner to ensure adequate land for food production by reserving forest, plantation, and agricultural areas to meet the demand and supply of food. The planner set policies and regulation to govern the interest of the population through land control. The planner set a required space for future stability in both the urban and regional settings. Securing land tenure to the poor enhance social stability and allows for productive land use through property rights. For example, In Malawi, the Community Based Rural Land Project was launched in 2004, and it provides access to secure land tenure to the poor in rural and in the year 2010, 15,000 poor families had access to land for their agricultural activities to help them fight poverty and food insecurity.

### **Provide infrastructure and Networking**

The system of linking the rural with the urban has great influence in ensuring food security. The planner is responsible for planning urban and regional space by designing land for transportation, markets, manufacturing industries, etc. The importance of good road networks system to allow better movement of food products from one place to the other, electricity supply, potable water, waste disposal facilities, good information and communication network facilities, storage facilities, allowing accessibility and availability of food. Infrastructures such as commercial markets or agro-processing markets help farmers to sell their yield at the right place, conducive for them with the right price.

### **Promote Agriculture allied Activities**

The allied industries depend mainly on the agriculture activities. The composition of poultry, mushroom cultivation, cattle raring, biogas production, piggery, diary, etc., envisage a stable food production. The allied activities serve as a source of income for those involve, and it enables them to live a stable and healthy life. Such activities promote entrepreneurship and employment opportunities to youths. It is not simply about eating what you grow and growing what you eat. The allied activities produce milk and meat from cattle's, and the animal faeces in turn add up to the fertility of the agricultural land for productive cultivation. The planner involvement in such activities is by allocating land and giving much more space for such activity and providing design guidelines and building regulation to enable a production and safety allied farming. For example, giving the design space guidelines for a piggery farm building that will allow free flow of air, material type and security aspect of the pigs or piglets. As a profession, the planner will be able ensure that such building codes and regulations are followed.

### **Strengthening food market**

It is instrumental to develop the food processing industry to enhance processing of food to meet the demand. It is the planner's role to plan, provide and determine the quality of infrastructure

that will test agricultural production. The planners will engage in deciding the standard spaces such as market ward, weighing place, space for loading of goods, access, tax office, waste disposal, sanitation, and other component units. The planner will harness the importance of food security by empowering a well-planned catchment market area that actively support or strengthening the market where both medium and large market are linked and co-exist effectively.

### **Prepare a plan Using Remote Sensing & GIS**

With the use of remote sensing and GIS, a planners' role is to prepare a map that identifies all water bodies, fertile lands for agriculture to analyse food security. The use of remote sensing and GIS will enable planners to monitor and analyse the land suitability for agriculture, and the relationship between water bodies condition, climate change forecast, topography, meteorological conditions, etc. The planner(s) links the relation of crop failure and the risk of food shortage for the communities. The GIS maps out food security by assessing the potential and the risk areas prone to a disaster like flooding, hurricane, etc., and vulnerable populations with the help of satellite imagery, and these are available to the public through the internet. All this requires a correct data to conduct such a survey, particularly with advanced techniques, methods, and models to ensure sustainable agriculture.

Another key importance a planner does is to provide spatial locations and demographic analysis of healthy and unhealthy communities with regards to food security.

### **Land reforms**

The ineffectiveness and unproductive way of the utilization of agricultural land leads to food insecurity. The planners' role is to undertake in the land reform process in initiating new methods of farming and changing land customs and laws, ownership to the landless especially the poor rural communities who primarily engage in agriculture to harness food security. The planner engaged in redeveloping projects food-related that are much proactive to promote food security.

### **Preserve water**

Water usage is a daily usage for domestic and non-domestic use. The lack of availability of water is crucial to people, crops, and livestock, and particularly food security. The implication of water on food security can be due to population growth and urbanization effects.

The planners should respond with a sustainable human settlement planning that conform well with food security. The priority in the distribution of water for different purposes is paramount to maintain and preserve water to fulfill the water supply-demand. The planner must accompany water bodies to prevent pollution and ensure that water is free from contamination, as it is used for cooking, drinking, food production, etc. Therefore, putting up restricted zone or areas around water bodies is key to protecting the water bodies and ensuring food security.

Secondly, provide space for recycling of water to avoid wastage of water. Thirdly, conducting surveys to know the daily quantity of water needed for every household, and the quantity supply of water needed and to supply it in an efficient and sustainable manner. Fourthly, to restrict the full exploitation of groundwater or other water bodies and preserve it for future generations. Provide sets of regulations and guidelines that promote water harvesting and other means of preservation and conservation of water to enhance food security. Finally, provide space for irrigation to boost agricultural production through an adequate water supply effort.

## **Conservation of Biodiversity**

The biodiversity connecting to the global climate change which upset the climate and the intensity of rainfall, humidity which directly affect the crops. It is the responsibility of the planners to protect and preserve sensitive biodiversity elements like water bodies, forest areas, wildlife, etc. to achieve sustainable food security. All this has an impact on the climate. The imposing of laws to prevent people from exploiting the natural environment must be promoted. The planners must protect the sensitive environment by providing buffer or limits to avoid encroachment of these resources, provide space for farming.

## **Conservation of Agricultural Heritage**

With the modern intervention of science and technology, the rate of growth, is faster, but the nutrition value and the taste of our ancestor, the same intensity of taste is missing in the present food. The planner's contribution toward food security is Creating a museum for showcasing the old traditional system of farming. This will allow people to respect and value old tradition. The modern children don't know how most of the goods are grown, wasting lot of food without knowing the value and not realizing that most people are without food. Showcasing in the agricultural museum will engage the present generation to respect the environment this agricultural value. The museum will showcase where the food is growing in a higher magnitude and where it is not, how the imbalances are there, and the simplest system of farming. This will go a long way in contributing to food security.

## **Creating an Information communication technology hub**

Establishing a hub in every village and create a platform that telecast the recent information about food, nutrition, health, agricultural information such as market price rainfall, etc., and other related aspects. The planners will provide space for these intelligence technological services to be available in an efficient and effective manner to enhance food security.

## **Regional Linkage**

During the preparation of regional planning, planners ensure that there is a regional balance between regions to keep each region economically viable and stable. The functionalities of each region should be known. The available resources, the climate conditions, economic activities, geography, demography, etc. in each region, to know the strength, weakness, opportunities, and threat of each region. These characteristics must be studied well by the regional planners to know where agricultural activities are suitable and how to ensure that continuous productivity of agriculture in that region serves the other region that is a non-agricultural region or has other functions. The planners plan and forecast the supply of agricultural products provide infrastructures to support the sector. The planners should ensure that there are intra and inter-regional linkages to allow interdependence and sustainable food security. Infrastructure and technology services like good roads connectivity, electricity, clean and safe water supply, etc., and social amenities like health care services, adequate housing, government offices, and many more. It is important for planners to decentralize opportunities in each region to support the economics, by increasing employment opportunities, uplifting peoples' standard of living. If people's standard of living is stable, they can easily afford to have three daily meals with proper nutrition value.



## Develop models for Land Use

The planners' role is to significantly develop models that are suitable for human settlement. The theories guide planners to plan a suitable location for farmers to aid them in their farming activities and mechanism for people to always access food. They take a reference based on these models to guide them in decision making during land allocation or planning. The following theories explore the relationship between farmland and market location.

**Bit Rent Theory:** this theory explains the pattern of agriculture land use. It was developed by Von Thunen and Alonso in 1783-1850. The theory mainly focuses on the pattern of distribution industrial, commercial, and residential with the agricultural activities based on the economics of location. In this theory, the farmer is term as the renter who bit an auction to rent different parcels of land in their hinterland. The optimization of resource with the location is vital to understand. Hence transportation cost will increase if distance increase.

Planners make effective use of this model to distribute land suitability for effecting such distribution pattern that work as a win-win situation to the farmer, industries, and households as they are both players in enhancing food security. Another role in ensuring food security under this model is by making land value affordable for farmers to rent land closer to the market where they can cultivate and sell their products to avoid high transportation cost. Because if land rent is higher the agricultural goods will also go higher as mention by Von Thunen.

The primary assumption of this theory, according to Von Thunen are as follow:

- 1 urban center where all goods are sold.
- No trade with outside centers.
- Surrounding hinterland used for agriculture production.
- No environment differentiation-flat and identical.
- Uniform transportation surface-movement cost increase equally with distance in all direction.

**Agriculture Location Theory:** This theory analyzes the land use pattern where agriculture location is affected by the marketplace. Von Thunen had two models for this theory which are: The farmers with better access to the center of the market should use intensive farming to produce high yield to be able to get a greater income, labor, fertilizer, etc.; The farmer's aim is to maximize profit and meet the demand of the market. This theory focuses on (i) distance from the city where dairy foods and gardens are close to the Urban market. He emphasizes that perishable and expensive heavy product to transport must be located close to the city, (ii) all building material like timber be located (iii) mixed farming commercial grains and orchards (v) extensive cattle ranching to be located farther. Transportation is cheap and cattle can walk to the city for butchering.

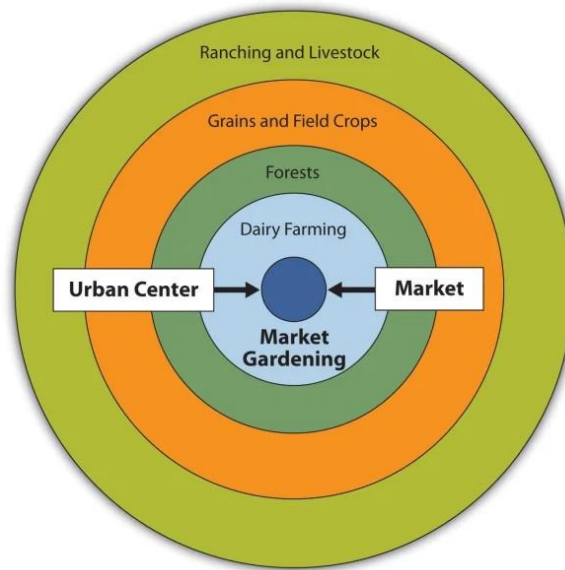


Fig3. Von Thunen Model of Agricultural Land Use  
<https://thegreenhorns.wordpress.com/author/greenhorns/>

## WAY FORWARD

1. Freezing land for food production to serve the people and mitigate food insecurity.
2. By providing education and training to farmers on the best farming practices and new available technologies for sustainable agriculture and food security. Building centres for research on rural areas to give opportunities and providing them with the entrepreneurship skills required to help them gain the benefit of farming.
3. Mitigating agricultural wasteland by using a mechanism to regenerate its fertile strength and giving it back to the farmers and establish a platform.
4. Establish a smart village: creating a village cluster with basic infrastructure service, like offices, market, etc., to serve surrounding villages as a model to gain access and benefit from it. Establishing a mechanism to update farmers on the trending market prices is key to farmer's finance. Provide means of understanding the weather forecasting and Early Warning System (EWS), and alert farmers on the future risks and consequences associated with the climate condition, and on how to adapt or react.
5. Promoting agriculture-allied activities by integrating both crops and livestock in small scale farming to ensure food security.
6. Government must engage Public health awareness on the proper dietary intake and provide various platforms and mediums to ensure nutritious security and healthy life.
7. Policies and programs that promote food security should reach out, especially to the rural and urban poor.

## Conclusion

Food security is paramount to determine our health and it is a necessity for every individual to acquire it to the fullest. Attending food security remains quite a challenging task to achieve from both the local and national levels especially for developing countries that are struggling to boost their social and economic status. With the challenges responsible for dragging SDGs target of ending hunger by 2050 is merely impossible, after the covid-19 pandemic that struck the entire globe to economic meltdown with imposed lockdown that stopped almost formal and informal activities.

On the other hand, many relief funds and other support mechanisms have been going on to support developing countries to assure food security and nutrition. Despite the challenges of food security in the past decades, countries like China, India, and The Gambia, seem to progress in reducing the percentage of food insecurity in a very progressive and positive way.

The role of planners is a challenging task but a very important role in ensuring not only a safe and conducive environment but also planning towards achieving food security through the freezing of land for the sustainable purpose by giving priority to agriculture and providing a design space for infrastructures like road, electricity, markets, etc. Food security can never be attained without the inclusion of both governments, private bodies, individuals, and international bodies. As each has a big role to play in ensuring food security and nutrition by 2050.

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