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## **Nutritional-sensitive and sustainable agricultural development- An overview**

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### **Abstract**

Nutrition and Agriculture are interlinked with each other. Sustainable agricultural development is agricultural development that contributes to improving resource efficiency, strengthening resilience and securing social equity/responsibility of agriculture and food systems in order to ensure food security and nutrition for all, now and in the future. While poverty has always been associated with severe forms of acute under-nutrition, it is fact that poverty affects an individual's health throughout their lifetime. Low access to food and associated levels of malnutrition reduces an individual's intellectual capability, leading to lower learning levels and work capacity. Such a vicious cycle of poverty and malnutrition ultimately limits an individual's earning potential throughout a lifetime, increasing vulnerability to serious medical conditions and health inequities. This is one of the vital reasons of farmers' distress and suicides due to indebtedness. Agriculture is the backbone of Indian economy. One of the biggest challenges of nutritional sensitive agriculture and sustainable development is how to secure and provide plentiful, healthy and nutritious food for all. The present study tries to present an overview of the present status and suggests suitable policy initiatives.

**Key words:** Nutrition, Agriculture, Dietary pattern, Sustainable development

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## **Nutritional-sensitive and sustainable agricultural development- An overview**

### **Introduction**

Nutrition and Agriculture are interlinked with each other. Sustainable agricultural development is agricultural development that contributes to improving resource efficiency, strengthening resilience and securing social equity/responsibility of agriculture and food systems in order to ensure food security and nutrition for all, now and in the future. Importantly, Food and nutrition security and the progressive realization of the right to adequate food do not depend only on global availability of food but also on access, utilization and stability. Indeed, access to food, but also to productive assets, markets and services are all critical for, Food and nutrition security

Nutrition sensitive agriculture is a food based approach to agricultural development that put nutrient rich foods, dietary diversity, and food fortification at the heart of overcoming malnutrition and micronutrient deficiencies. The nutrition-sensitive agriculture stresses the multiple benefits derived from a variety of foods, knowing the nutritional value of food for health. The overall objective of nutrition sensitive agriculture is to promote healthy diets by better equipping food system to deliver safe, affordable and nutritious food to the people.

While the World Health Organization and the governments of different countries consider food and nutritional security to be a basic human right, millions of people around the globe lack access to sufficient safe and nutritious food. The Scaling Up Nutrition movement aimed at improving food and nutritional security rates across the globe have been launched at national and international level by various institutions, but malnutrition, in combination with under-nutrition, overweight, and obesity, continues to exacerbate health inequities throughout the world.

Inadequate nutrition has been described as “a scourge in our world”(Department for International Development 2011). Failing to receive the recommended amount and type of nutrients, inadequate health care, and disabling environments can all lead to undernourishment and/or obesity both of which have serious, deleterious effects on health and development.

While poverty has always been associated with severe forms of acute under-nutrition, it is fact that poverty affects an individual's health throughout their lifetime. More than two-thirds of the one billion people living in extreme poverty are hungry every day (Chen and Ravallion 2008, FAO, AGN 2012). Billions of people are now five times more likely to die before turning five years of age due to extreme hunger (Peña and Bacallao 2002, UNICEF 2013). Low access to food and associated levels of malnutrition reduces an individual's intellectual capability, leading to lower learning levels and work capacity. Such a vicious cycle of poverty and malnutrition ultimately limits an individual's earning potential throughout a lifetime, increasing vulnerability to serious medical conditions and health inequities. Overweight and obesity disproportionately impact (Low and Middle Income Countries) LMICs, nations which require greater productivity and a healthy workforce. Estimates indicate individuals lose 10% of their potential lifetime earnings, while countries lose 2-3% of their GDP due to under-nutrition (World Bank 2006).

During Green Revolution in the country and thereafter, the emphasis was to enhance production and productivity of the food grains. Many schemes related to enhancement of food grains were launched during different five year plans. The policies were mainly farm-centric and not farmer-centric. This is one of the vital reasons of farmers' distress and suicides due to indebtedness. Agriculture is the backbone of Indian economy. The growth of this sector has strong linkage with other sectors and has striking effect on poverty and unemployment. It has also been pointed out that per capita income in agriculture sector was just one third of the per capita income in the country thereby creating huge income disparity between primary agriculture vis-à-vis other sectors of the economy. The gap has been continuously widened showing alarming unrest among the farming community across the different states (**Sarial, 2016**). As per NSSO 70<sup>th</sup> round data 53 per cent of farm households earn income lesser than poverty level income and 52 per cent of the farmers were reported under indebtedness. Most of them were marginal farmers and agricultural labourers. There is absence of efficient supply chain and value realization of agricultural produces. The ups and downs in prices during low harvest and good harvest keep the cultivators almost in same state of income.

In India 21.92 percent population was reported below poverty line. As per the recent report, 2018 of 'Future Development' blog of the World bank's Brookings Institute, India is home of about 11.1 percent of the extreme poor in the world and this figure is reducing. But it still ranked 2<sup>nd</sup>

after Nigeria, having largest population of extreme poor in the world. In the Global Hunger Index, 2016, India has been ranked 97<sup>th</sup> among the 118 countries surveyed. This report does not provide disaggregated data on prevalence of malnutrition in rural, tribal and backward areas. However, as per the report of National Family Health Survey 2015-16 conducted by Ministry of Health and Family Welfare, 35.7 percent children under 5 year of age were underweight, 38.4% were stunted and 58.4% were found anemic. Further, 22.9% women (15-49 years of age) had chronic energy deficiency and 53 were anemic. In rural areas 35.3 percent children less than 5 years of age were underweight 41.2 percent were stunted and 59.4 were anemic. Also as per report 26.7 percent women (15-49 years of age) had chronic deficiency and 54.2% were anemic.

### **Performance of Agriculture in India**

Agricultural production in India, over the last few years has been given in Table 1 below. A perusal of Table 1 revealed that during last five year production of different commodities has significantly increased and India has got self-sufficiency in different food grains production. Despite population growth of 1.127% in 2017 as per World Bank report, India produced sufficient food item to feed the ever-growing population. Due to improper management of food supply in the country, India is facing malnutrition problem.

**Table 1: Agricultural production in India**

(Million tonnes)

<b>Crop</b>	<b>2012-13</b>	<b>2013-14</b>	<b>2014-15</b>	<b>2015-16</b>	<b>2016-17</b>
Total cereals	238.79	245.79	234.87	235.22	251.98
Total pulses	18.34	19.25	17.15	16.35	23.13
Foodgrains	257.13	265.04	252.02	251.57	275.11
Oil seeds	30.94	32.75	27.51	25.25	31.28
Fruits	81.29	88.98	89.52	90.18	92.85
Vegetables	162.19	162.90	166.57	169.07	175.01

Source: Different issues Agricultural Statistics, GoI.

Per capita availability of the different food items has been presented in Table 2. Perusal of the table revealed that per capita availability of different food items is available in the country as comparable to recommended dietary allowance (RDA). The distribution of foods both within the

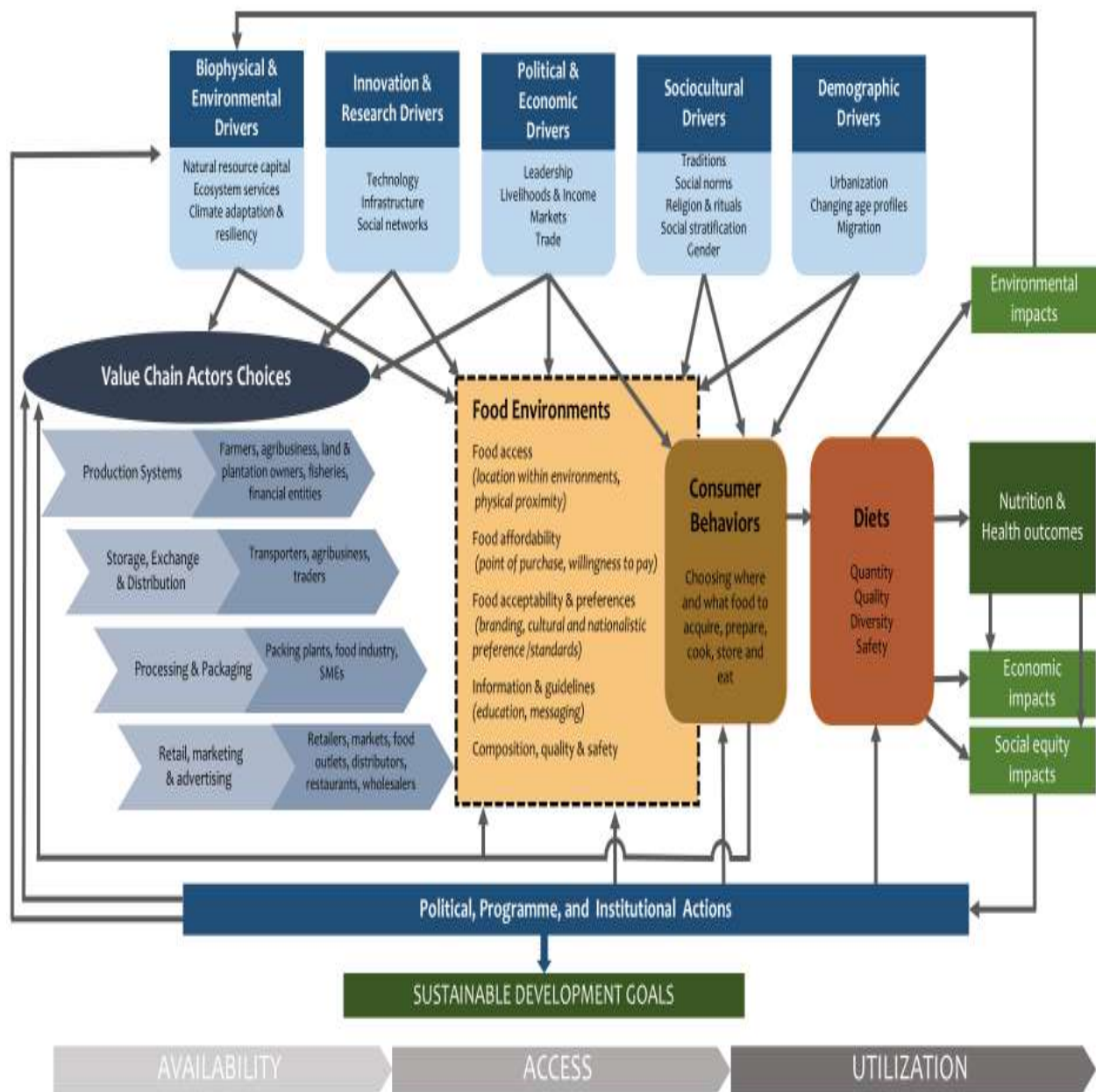
community and family may be unfavorable to some vulnerable groups due low income and purchasing power.

**Table 2: Agricultural Production and per capita availability of food items in India**

Population of India in 2016-17 (million) (Projected figure)	1268.00
Rice production in India in 2016-17 (thousand tonnes)	109700.00
Per capita availability of rice (gms/person/day)	183.00
Wheat production in India in 2016-17(thousand tonnes)	98150.00
Per capita availability of wheat (gms/person/day)	182.70
Cereals production in India in 2016-17 (thousand tones)	251980.00
Per capita availability of cereals (gms/person/day)	434.00
Pulse production in India in 2016-17 (thousand tones)	23130.00
Per capita availability of pulses (gms/person/day)	54.70
Food grains production in India in 2016-17(thousand tones)	275110.00
Per capita availability of food grains (gms/person/day)	488.7
Fruits production in 2016-17 (thousand tonnes)	92846.00
Vegetables production in 2016-17 (thousand tonnes)	175007.90
Per capita availability of fruits (gms/person/day)	200.60
Per capita availability of vegetables (gms/person/day)	378.13

## Frameworks

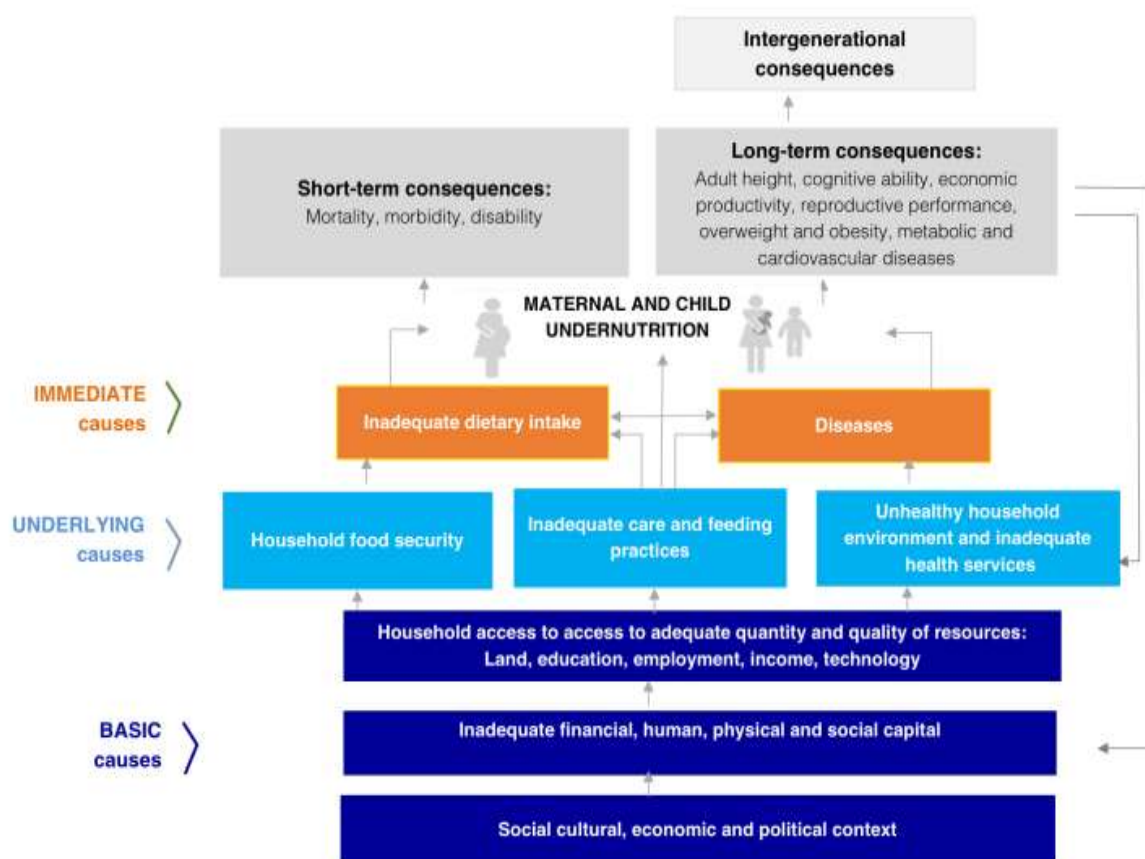
The FAO's 1996 World Food Summit (WFS) categorized food security as a state of being: "All people at all times have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life". According to this definition nutrition is an essential part of food security, food security itself is only one aspect of achieving optimal nutrition. To achieve robust nutrition outcomes, both the quality and quantity of food is essential. However, optimal healthcare, improved hygiene and sanitation, and adequate childcare practices are all integral components to achieving sufficient nutrition.



**Fig.1: Food Systems Framework** (UNHLPE 2017, provided by Fanzo)

A larger food system model often frames the multiple and related components of food security. This framework combines food system *activities* – producing, storing, processing, packaging, trading and consuming food – with food security *outcomes* – the nine elements of food access, including stability, utilization, and availability (Fig. 1). The model also arranges the impacts of global environmental change on food systems and social welfare outcomes

Policymakers from multiple disciplines and sectors must work together to make demonstrable impacts on nutrition outcomes. The UNICEF causal framework for nutrition effectively demonstrates the importance of such varied sectors, including: agriculture and food, health, education, environment, water and sanitation, and women's empowerment (Fig.2). Beyond modeling, implementation of full-scale multi-sectoral responses to address the intersecting components of food security is challenging. Sufficient resources rarely exist to fund and oversee the many interventions needed to secure adequate nutrition for everyone.



**Fig. 2: UNICEF Causal Framework of Malnutrition (UNICEF, 2013)**

## Major challenges

One of the biggest challenges of nutritional sensitive agriculture and sustainable development is how to secure and provide plentiful, healthy and nutritious food for all. The concern related to the quality of food supply reflects environmentally sustainable and safe policies which are



Inextricable, while addressing the multiple burdens of under-nutrition, overweight, obesity, and micronutrient deficiencies. The goal of most food security policies focuses on ensuring the world is producing and consuming enough calories to reduce hunger and ensure survival. A goal often overlooked is adequate nutrition for well-being and development.

The process of framing policies to safeguard food supply is riddled with uncertainties and complexities. The key issues to be addressed include: 1) making societal decisions and defining values about food security that impact nutrition outcomes, and 2) evaluating the trade-offs between environmental sustainability and meeting individual dietary and nutritional needs. Such complex issues are debatable in broader perspectives of the nutrition on national and global basis.

Individuals, households, and communities face many challenges in achieving and maintaining food security. Certain country- and cultural-specific determinants that can impact nutritional status include socioeconomic status, social norms, and behavior choices. Several global factors deserve closer examination, as building resiliency in communities is essential to ensure families are able to withstand shocks stemming from food and health systems bottlenecks. Challenges listed and discussed in-depth below are serious threats but simultaneously opportunities, requiring careful consideration for food and nutrition security.

### **Erratic climate change:**

The world is experiencing climate change and variability and with that, increased severity and frequency of natural disasters. Both floods and droughts will continue to occur but with less predictability and more difficulty, as the variability of climate systems increase (Hansen *et al.*, 2007). These changes are likely to have the greatest impact on the agricultural output of many low-resource regions, reducing yields of crops, soil fertility, and forest and animal productivity, which may result in lower income, reduced climate resiliency, and subsequently, decreased access to sufficient, nutrient dense foods, impairing the nutritional status of many low-income communities (Mason *et. al.*, 2010). It is estimated that there will be that a world with a medium-high climate change will have an additional 25.2 million malnourished children than one without climate change (Phalkey *et. al.*, 2015 )

**High and fluctuating food prices:**

Global food prices have greatly fluctuated. This instability has created further social unrest and conflict in and between low resource countries and low and middle income countries (LMICs). Increase in food prices results from reduced crop yields, land grabs, and shifting agriculture policies, or what is known as “food for fuel”(Hendrix 2016). The consequences of increased food prices affected strongly to the poorest communities and female-headed households. Increases in food costs force people to reduce the quantity and nutrient quality of the food they purchase. Such a tradeoff between nutrition and budgets disproportionately influences those who are in need of nutrient-dense foods, such as young children, and pregnant or lactating women.

**Urbanization and population pressure:**

The world has undergone major economic and demographic transitions, disrupting patterns of fertility, mortality, and disease. Parallel to these changes is the “nutrition transition,” or shifts in the structure of individual diet, physical activity and body composition. Urbanization is one of the main drivers of nutrition transition. Many families are leaving behind their rural livelihoods by moving to urban areas. Expansion in population within urban area will put pressure on both global resources and the food system, changing where people work and how they live on a daily basis.

From 1950 to 2050, the population of cities is forecasted to double, increasing from 30% to an estimated 66% (United Nations; 2014). Increased urbanization may displace arable, agricultural land throughout the world. While Africa and Asia remain predominantly rural with just under half of their population living in urban areas, researchers expect this to grow to 56% and 64%, respectively, as both continents are urbanizing faster than other regions of the world (United Nations; 2014). Only three nations like India, China and Nigeria will account for the 37% of the projected growth of the world’s urban population up to 2050 (United Nations; 2014).

Urbanization has both positive and negative effects on both the supply and demand of food across the world, disrupting the intricate relationship that exists between urban consumers and rural producers. Urban demand will increasingly dictate food producers’ growing choices, as well as the trading, processing, distributing, and marketing of food. Urban people will

increasingly demand greater access to a greater diversity of foods, such as meat, dairy, and convenient, highly-processed foods (Popkin, *et. al.*, 1999). Supply side metrics, such as economic growth, regulatory liberalization, and global trade, will change the way food is produced, processed, and sold (e.g. mega supermarkets), creating new markets for rural producers.

Currently, one-third of urban population lives in poorly constructed shantytowns (Eisenstein 2016). Limited access to social services, safe and nutritious food, and poor public health infrastructure leave shantytown populations at high risk for both communicable and non-communicable diseases (Crisp 2012).

Changes to living conditions production of quality food, types of food consumers will demand, sustainability of food grown are the main delicate factors. The nutrition outcomes of highly vulnerable populations may decline with the proper planning, infrastructure, and health and social services. We must change food system networks to not only feed the growing population, but to ensure access to food in an equitable way regardless of geopolitical boundaries.

### **Diversity in dietary pattern:**

A fast changes in diet and physical activity patterns are occurring globally, paralleled by major demographic and socioeconomic changes. Rising consumer income, changing lifestyles, and shifting preferences all contribute to changing demands for specific foods. Most people now consume more vegetable oils, sugar-sweetened beverages, and ultra-processed and fast foods. Such dietary changes reflect shifts in the globalized food system, including food value chains with more fast-food outlets, takeaway and packaged foods, and advertising of unhealthy foods on mass media platforms. Together with a decrease in exercise rates, dietary shifts have contributed to rising global levels of obesity and higher rates of health inequities. Diet choices are directly related to the morbidity and mortality.

To improve food and nutrition security for individuals, households or communities, multi-sectoral approaches are essential (World Bank 2012). However, effectively engaging organizations and individuals across diverse and distinct sectors has proven to be difficult. At minimum, three key systems must collaborate with one another i.e. agriculture, health, and

water. All the three has capability of improving nutrition access for both functionality and effectiveness (Field JO 1987). The interactions between health, nutrition, water and agriculture are mutual and intersecting, with both positive and negative effects (Hawkes and Ruel, 2006, Burchi, 2011). Thus the main challenge is to understand how food, health and water systems can work at both the national and international policy levels, with changes to system approaches implemented on the ground

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