II DETERMINANTS OF FOOD SECURITY

Food used to be called a basic human need along with water, peace, shelter, education and primary healthcare. It has also been called a prerequisite for health. Food security is now listed among the social determinants of health. It is clearly a determinant of a lot of things – life, health, dignity, civil society, progress, justice and sustainable developpement.

II.1. DIMENSIONS OF FOOD SECURITY

Four dimensions of food security have been identified according to the definition (FAO, 2008).

1) **Availability** of food produced locally and imported from abroad.

2) **Accessibility**. The food can reach the consumer (transportation infrastructure) and the latter has enough money for purchase. To such physical and economic accessibility is added socio-cultural access to ensure that the food is culturally acceptable and that social protection nets exist to help the less fortunate.

3) **Utilization**. The individual must be able to eat adequate amounts both in quantity and quality in order to live a healthy and full life to realize his or her potential. Food and water must be safe and clean, and thus adequate water and sanitation are also involved at this level. A person must also be physically healthy to be able to digest and utilize the food consumed.

4) The fourth domain of **Stability**, deals with the ability of the nation/ community/(household) person to withstand shocks to the food chain system whether caused by natural disasters (climate, earthquakes) or those that are man-made (wars, economic crises). Thus, it may be seen that food security exists at a number of levels. Availability - National; Accessibility – Household; Utilization – Individual; Stability – may be considered as a time dimension that affects all the levels. All four of these dimensions must be intact for full food security.

More recent developments emphasize the importance of **sustainability**, which may be considered as the long-term time (fifth) dimension to food security. Sustainability involves indicators at a supra-national/regional level of ecology, biodiversity and climate change, as well as socio-cultural and economic factors. These will affect the food security of future generations.

II.2. LINKING FOOD SECURITY TO SUSTAINABILITY

The notion of Sustainable diets links sustainability with food security to ensure holistic sustainable food systems, as can be seen from their respective definitions. Sustainable diets are defined as ones that "are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe and healthy; while optimizing natural and human resources" (FAO, 2012). While "a sustainable food system "is a food system that ensures Food Security and Nutrition (FSN) for all in such a way that the economic, social and environmental bases to generate FSN for future generations are not compromised".

It has been internationally agreed that climate change is a threat to the sustainability of food security. However, the activities involved in food systems, account for some 20%–30% of all human-associated greenhouse gas (GHG) emissions, and, as such, contribute to climate change. There might be a trade-off relationship between decreasing humanassociated GHG and guaranteeing food security under current prevailing food system. Therefore, a systematic and integrated approach is needed, to meeting the short- and long-term requirements of FSN, meanwhile, to mitigating the negative environmental impact due to GHG from the activities involved in food system itself. Though what sustainable food systems actually look like is still unclear, our understanding is constantly evolving.

II.3. Understanding of Food Security From Pillars to Pathways

Food security is best considered as a causal, linked pathway from production to consumption, through distribution to processing, recognized in a number of domains, rather than as four "pillars".

In the 2009 World Summit definition on Food Security, the Summit used for the first time the phrase "four pillars of food security", representing the four dimensions, namely, availability, accessibility, utilization and stability, of food security. However, the visualization of pillars gives a rather misleading representation of the concept since the four dimensions are surely interrelated and interdependent, rather than static and separate. Pillars give no illustration of the linkage between the dimensions of food security.

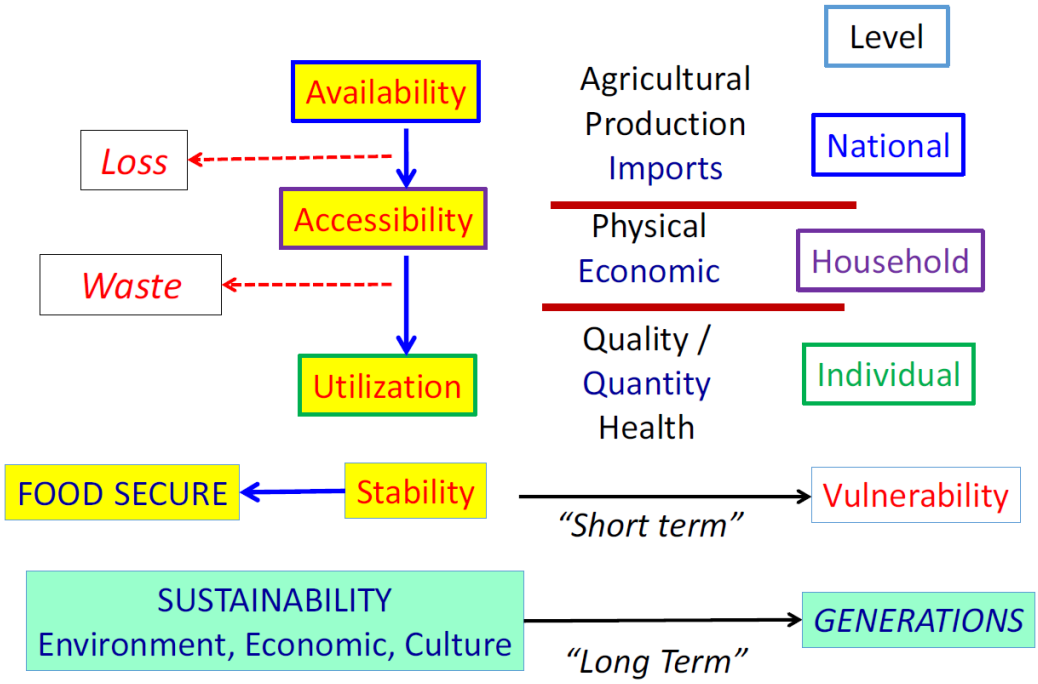

Figure 2. The pathway of the dimension of Food Security (Berry et al., 2015)

The weighting of the four dimensions is another problem faced by the visualization of four pillars, which directs to an impression of average weighting of 25% for each of the four dimensions. However, not all the elements in food security are of equal importance as implied by the pillar analogy. Their weightings are context and country specific. For example, in many developing countries, accessibility depends on the transport infrastructure which may limit the physical access to food; while in developed countries, economic access is the main barrier for food security. A scenario after a natural disaster, e.g., an earthquake, the availability, accessibility, utilization and stability are all major problems. In these different contexts, the weights of four dimensions should definitely not be equal.

Instead of pillars, a better analogy using a pathway to describe the relations among four dimensions of food security. This analog was used by The State of Food Insecurity in the World 2013, to show the links from food production (availability) to household (accessibility) to individual (utilization).

Accessibility contains physical (transport, infrastructure) and economic means (food purchasing power). It also involves socio-cultural access and preferences and its health effects and, with them the importance of social protection.

Stability thus emphasized the importance of bringing a time dimension, albeit short term, to food security. Apart from one-way pathways, the food security may also be considered circular, as there is a feedback loop from utilization to availability since human capital depends on optimal nutritional state for the workforce in agriculture and in all sectors of production.

These concepts are summarized in Fig. 2. An important insight from this figure is the importance of food losses (from agriculture, post-harvest and distribution) and food waste (from processing and consumption in the household and community). Worldwide these may amount to one-third of the food available and is an obvious target for improving food security. Reducing these amounts is a major challenge for securing world food availability in the future. From a systemic view obesity may also be considered a type of food waste.