Inequity in Food Access – Not just an Educational Issue

Statement of Challenge

37.2 million Americans live in poverty (Census.gov. 2022.). These Americans, which comprise a quarter of the country, spend 25% of their disposable income on food (Friesland Campina Institute. 2019.). Demonstrating the food unaffordability for US families living below the poverty line, it is important to recognise the complex connection between the factors that contribute to poor dietary choices in low socioeconomic regions. Significant levels of food insecurity indicate the economic aspect of dietary quality for low-income families as shown in figure 1, whereas equity of food access that varies amongst differing socio-economic regions reveals the contribution of uncontrollable factors such as physical access to low-availability food products.

Therefore, nutritional knowledge of low socioeconomic regions and their discipline to follow dietary recommendations cannot completely solve issues relating to the inequality of access to healthier food items (FAO, 2001). To accompany the goal of measuring the equality of food access amongst different countries of varying socioeconomic conditions, it is also imperative to identify the equity of food security and abundance amongst household members of separate age groups and genders. Understanding the cultural norms and traditions that facilitate the inequality of food access for different individuals within the same household will enable the use of nutritional education as well as the transfer of specific products for each member according to their stage of physical development.

It is commonly understood that ameliorating the issues surrounding malnutrition, poor diet choices and the increasing rate of non-communicable chronic diseases in socioeconomically disadvantaged populations simply involves providing high-quality education on healthy-eating strategies to promote personal discipline. However, diet quality is affected by social, physical, geographical, financial and cognitive access to food (Adams, 2020). A 2011 cross-sectional study utilising multilevel models to analyse the connection of retail food stores and restaurants with San Paulo city neighbourhoods of varying socioeconomic status revealed the abundance of high-quality supermarkets in affluent sections of the city compared to the less affluent communities (Duran, A., et al, 2013). Thus, demonstrating the spatially patterned variation of nutrition access resulting from lower demand for such food products in households that cannot afford them.

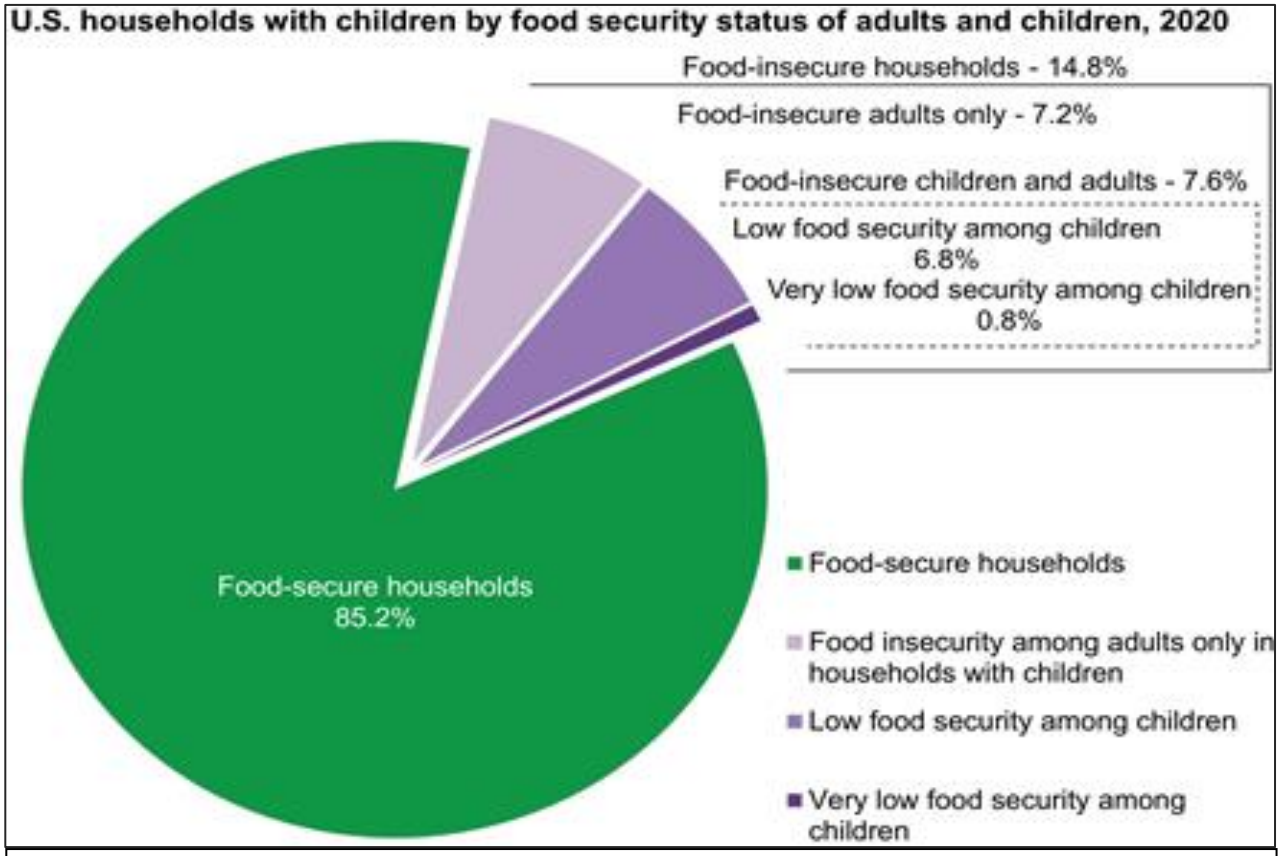

Figure 1: *Graphical representation of the economic disparity between food-secure households and food-insecure households in the U.S. during 2020, highlighting the differences in households comprising children (Economic Research Service. 2020.)*

Deep Dive

The challenge of resolving the energy-dense and low diet quality of low socioeconomic regions is contingent on identifying the specific factors contributing to the disparate access to healthy food amongst these locations. Accordingly, the local food environment has a significant role in influencing the rates of mortality and morbidity caused by low diet quality, specifically including factors of neighbourhood deprivation and poverty as illustrated in figure 1 to emphasise the varying influences upon diet (Walker, Keane and Burke, 2010).

Residential segregation with low socioeconomic status is commonly exposed to fewer pharmacies that often provide low-quality medical information, fewer supermarkets with affordable and nutritionally-dense foods and an abundance of convenience stores that stock legal substances and food products high in sugar, sodium and saturated fats (Amstislavski et al., 2012) (Yoon and Shon, 2020). A 2006 study investigated the access to fruit and vegetables in four communities with higher than state average poverty rates in Minnesota, in which two urban neighbourhoods sold food products with a 26% and 52% price increase than the Thrifty Food Plan's (TFP) market basket price (MBP) respectively, revealing the limited availability of affordable nutrient-dense foods in poorer

communities (Hendrickson, Smith and Eikenberry, 2006). Furthermore, the lack of affordable transportation to supermarkets limits nutrient-dense food access and therefore directs low-income households to shop at convenience stores in which a 2005 study emphasised that a quarter of food stamp households in the US had either moderate or no access to a supermarket (Rose and Richards, 2004).

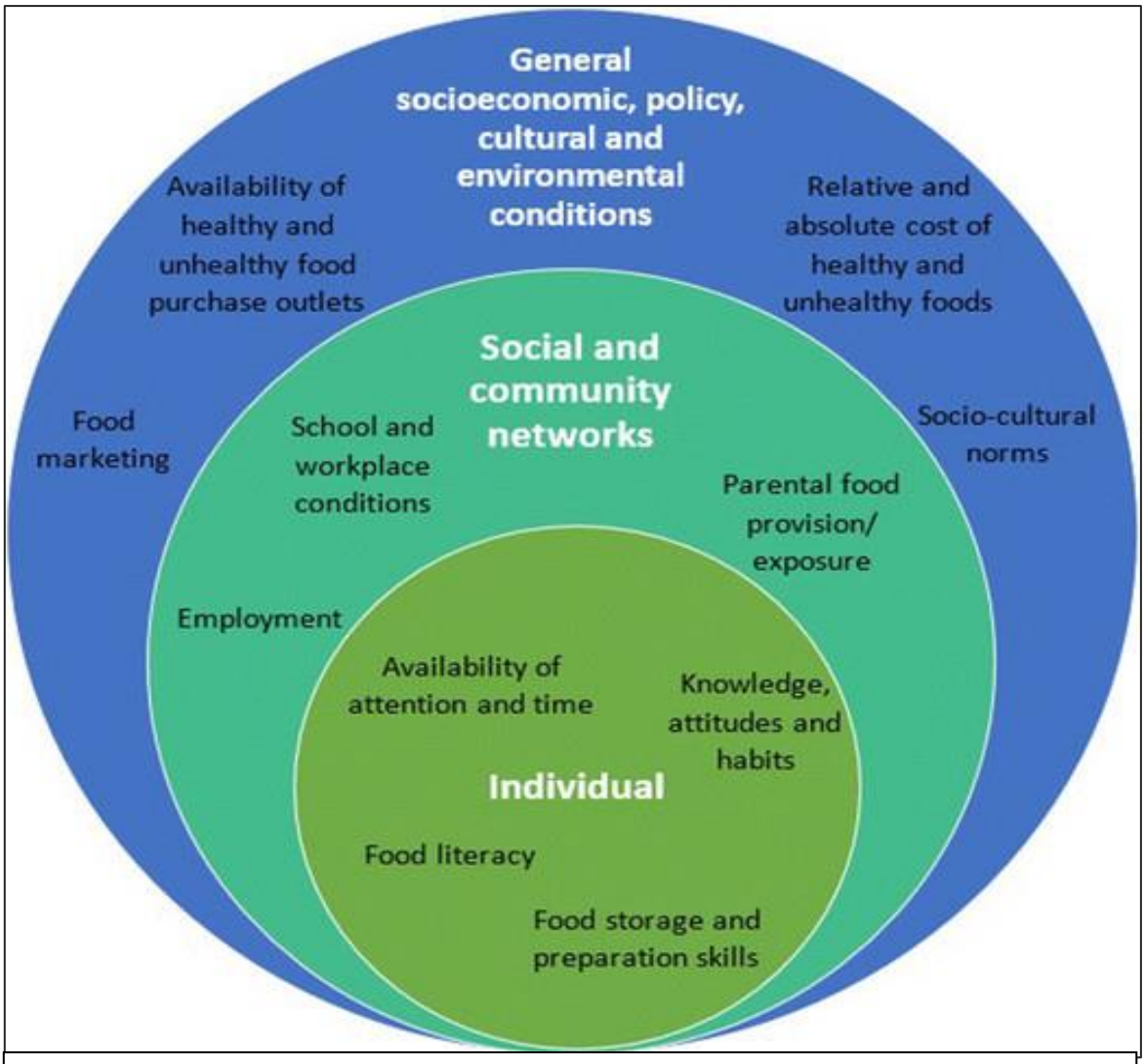

Figure 2: *Visual Representation of the individual, social, community, financial, cultural, environmental, and socioeconomic factors that contribute to inequity to food access (Peeters and Blake, 2016).*

Furthermore, minority neighbourhoods are often characterised by poor socioeconomic status. Factors influencing the low income of minority communities include racial residential segregation caused by historical inequalities that contribute to low-quality education in the local area, the disparity between native individuals and immigrants involved in family reunification, and finally differences in household family structures that affect the total gross income received (Iceland, 2019). Accordingly, a 2006 study conducted multivariate regression analyses to reveal the

availability of chain supermarkets in African American neighbourhoods and Hispanic neighbourhoods being 52% and 32% respectively of that in white neighbourhoods (Powell et al., 2007).

Ultimately, the discussed inequalities in accessing a healthier diet result in families purchasing food based on satiety value instead of nutritional value. High-perishable fruits and vegetables require expensive farming, cannot be purchased in bulk, cannot be mass-produced, and are unable to utilise government subsidies that extend shelf life such as high fructose corn syrup (ABC News. 2022). As a result, fresh food products are of higher value and low-income individuals are required to make financially conscious decisions that prompt diets high in saturated fat, refined carbohydrates, excessive sugar, sodium, and processed meats, contributing to malnutrition, cardiovascular disease risk and particular cancers.

A 1995 study conducted by the University of Connecticut revealed the high risk of diabetes, cardiovascular disease and cancer in low-income neighbourhoods of Philadelphia in which supermarkets were less abundant (Cotterill, R. and Franklin, A., 1995). Therefore, the discussed inequalities necessitate solutions to improving the nutritional quality of affordable foods, improving infrastructure to store high-perishable foods to increase shelf life, and increasing physical access to shopping facilities in low socioeconomic neighbourhoods (The Conversation. 2014).

Proposed Solution

Solving the recurring presence of non-communicable chronic diseases in low-socioeconomic communities is a task that cannot focus on only modifying the cost of all food items, but instead must prioritise producing bigger yields of nutrient-dense foods and preventing food deterioration through funding agricultural and scientific research. Specifically, more funding into the Consultative Group on International Agricultural Research (CGIAR), a non-profit organisation dedicated to increasing food security within developing countries, will allow more investments in growing nutrient-dense food products as opposed to high-yielding, affordable crops including rice, wheat, and corn (Kris-Etherton, P., et al 2020.). These food items fail to nourish low socioeconomic communities efficiently, as graphically illustrated in figure 3 in which it is outlined how these processed starches provide little nutritional value.

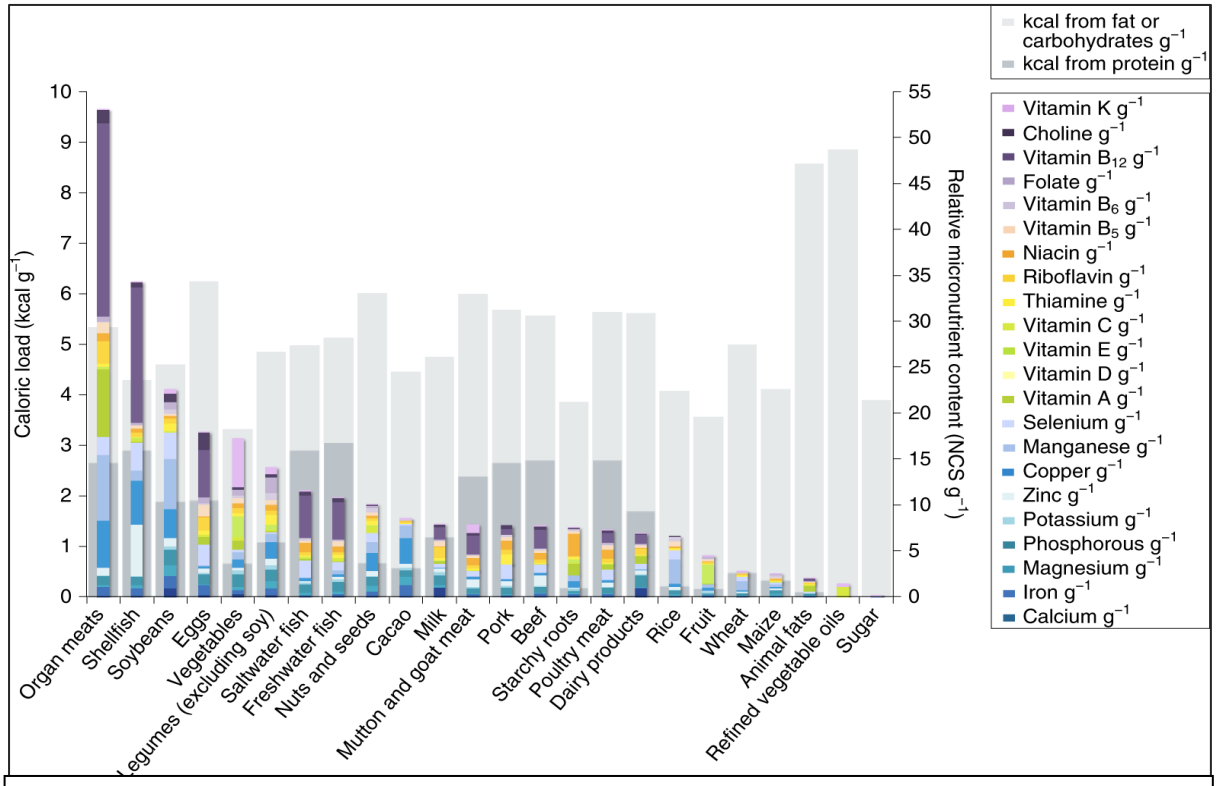

Figure 3: *Graphical Representation of the caloric load (kcal g^{-1}) and relative micronutrient content (NCS g^{-1}) of a list of different food products, highlighting the low nutritional value of high-yielding crops such as wheat, maize, and rice (Damerau, K., et al 2019).*

The 2020 Research and Innovation Strategy released by CGIAR reveals their goal of collaborating with partners and organisations to perform integrated systems research as well as 3-year Investment Plans that outline the particular targets, budgets and future activities to align with when resolving food poverty, as illustrated in the third tier labelled "initiatives" in figure 4. Such investments from global and national partners will fund scientific evidence, research into resolving climate damage to crops, and processes governing land protection from natural disasters, floods, droughts, and other factors influencing the crop yield of nutrient-dense food in farmland. Therefore, the solution lies within partnering with CGIAR to develop strong relationships with global, regional, and national investors, to fund safer and healthier preservatives by utilising nanotechnology to reduce particles to nanometric sizing. The submicron size will improve mechanical resistance involved in antimicrobial and antioxidant-rich substance gas barrier transport. Such antioxidant properties will enhance the clearance of free radicals involved in stimulating oxidation and food spoilage, therefore reducing the perishability of varying food products (Zambrano-Zaragoza et al., 2018). The widescale potential of this novel approach is illustrated in tier 4 labelled "action areas" in figure 4, demonstrating the steps before initiating genetic engineering. Funding for this novel strategy of decreasing food deterioration will reduce the use of harmful, energy-dense and carcinogenic

preservatives containing nitrosamines that interfere with thyroid function, endocrine function, and cause cardiovascular disease (Trasande et al., 2018).

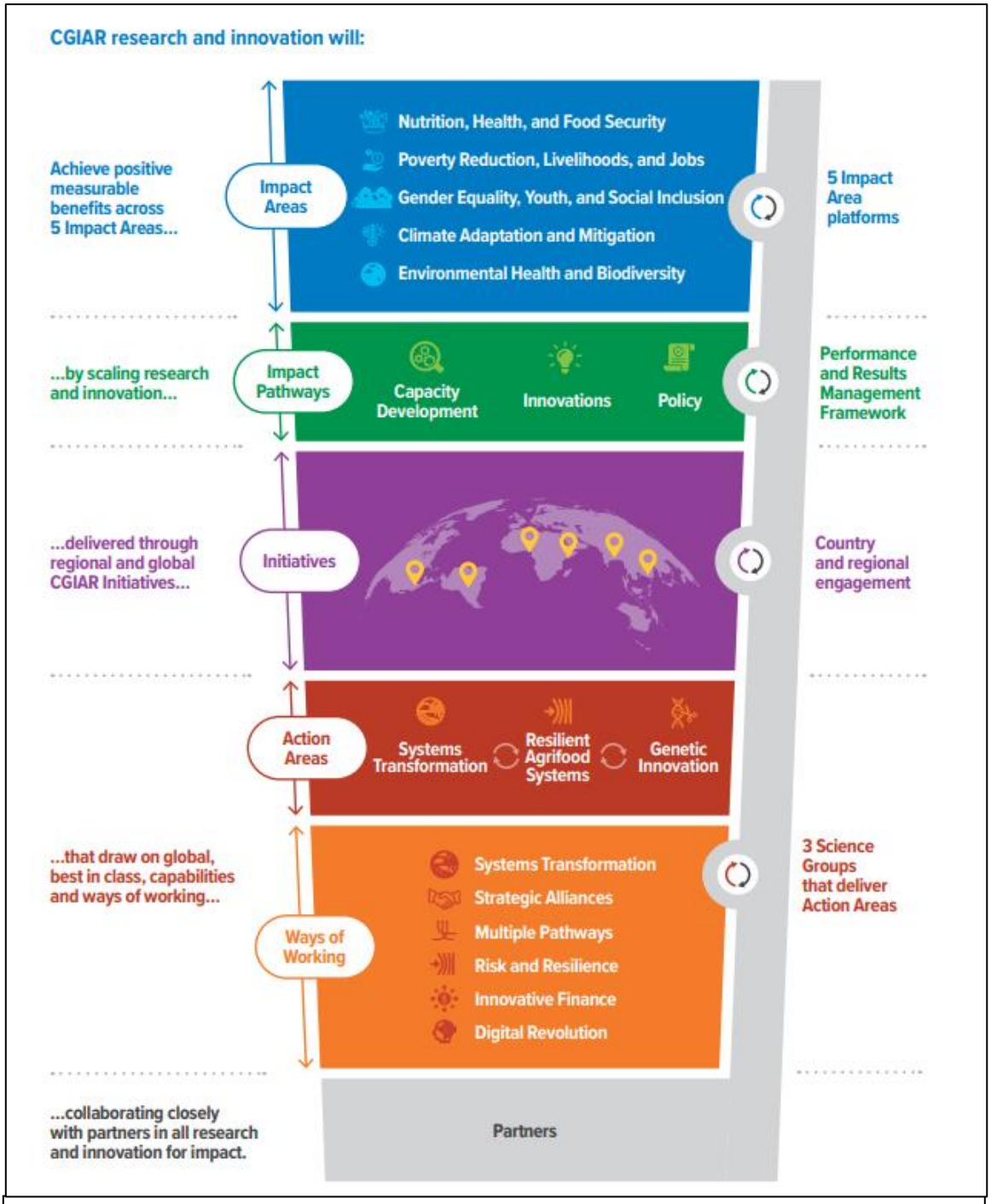

Figure 4: *The CGIAR 2030 Research and Innovation Strategy – Demonstrates the future approach to addressing food, land and water systems by collaborating with global, national and regional partners.*

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