

The Impact of United States' Food Systems on Nutrition and Childhood  
Development

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Abstract: This thesis will examine the United States current agricultural system and how it affects vulnerable populations of children. This study will discuss the importance of nutrition and how it affects the development of children. More specifically, it will examine how nutrition affects vulnerable populations such as children with special needs and those who live in marginalized areas. All developing children, especially vulnerable populations of them, need adequate nutrition to help them succeed as individuals. This will look at ways we can improve our agricultural system and transition to a more sustainable framework. Solutions are available and can be guided by the UN Sustainable Development Goals, which the public and private sector can follow.

Key Words: Environmental Studies, Childhood Development, Sustainable Agriculture, Agribusiness, Nutrition, Marginalized Communities

The nutritional role in human development is vital to strengthening the functions of the body and brain. Consumption of nutritious foods is key for developing children as it aids in their cognitive, physical, and language development. However, the nutritional value of foods are at risk due to the highly intensive practices within industrial agriculture. These practices threaten ecosystem health, such as biodiversity which supports diverse nutritious foods. The driving factors of industrial agriculture are the integrated efforts between the federal government and large agricultural corporations. Agricultural corporations are a commanding force in the agricultural sector which drives the consumption of unhealthy and processed foods. Unhealthy foods have become widely available and accessible to all communities. This is concerning for young children because quality nutrients are essential to their development. More specifically, for children in marginalized areas, including children who are developmentally disabled and/or live in impoverished areas. Children within these communities already face developmental challenges, therefore they need all of the resources to support their growth. It is essential that changes are implemented to support childhood development and these marginalized populations. This thesis examines the root causes and the solutions that are available to create impactful changes.

### Industrial Agriculture:

The current state of agriculture in the United States is known as industrial agriculture. Industrial agriculture is an intensive production of plants and animals to meet the high demands of food production nationally and globally. Industrialized processes - while accomplishing output - pose an array of problems for human and environmental health and long-term sustainability. The practices conducted today originate in the Industrial Revolution, which advanced technology

with the goals of performing tasks at a more efficient rate and increasing output while reducing costs. The outcome of this changed the ways in which agriculture is practiced.

The history of farming begins long before the Industrial Revolution. The Paleolithic Revolution was the initial starting point, and introduced horticulturalism and the domestication of plants. New tools such as the hoe were developed and this accelerated gardening. Domestication led to the development of “gardening societies” which spread to Europe and other parts of the world (Constance, 2019). Following this came the Neolithic Revolution, which introduced Pastoralism. This is the domestication of animals as livestock. Both of these domestications led to a food surplus that supported and advanced settlements. Early farms were small and had mixed farming systems, meaning “planting patterns that include two or more species interplanted together, fields that are planted in rotation of different crops, and crop-livestock integration on the farm,” (Neff, 2014). For example, Native Americans planted in a mixed pattern of corn, squash and beans. This allows for diversification of crops, and creates healthy soil fertility. The idea of these farming systems is to produce an abundance of crops, while maintaining biodiversity and soil fertility.

Advancements within domestication, such as manure fertilizers, field cultivation, and the plow in the 18th and 19th centuries led to the yield growth of crops (Constance, 2019). From this point, agricultural technology flourished and spread world-wide. In the United States, agriculture industrialized during the Civil War to meet the demands of wartime production. The US government implemented new policies and entities that revolutionized agricultural practices. For example, the United States Department of Agriculture was created in 1862 to implement modernized policies. Additionally, the Homestead Act of 1863 passed incentives to encourage immigrants to move to the West and become productive farmers (Constance, 2019). After the

Civil War, these policies focused more on intensifying and expanding practices as the population grew.

The Civil War coincided with the Industrial Revolution, which introduced technologies to strengthen food production to meet the needs of growing populations. The invention of steam-powered machines led to the evolution of agricultural machinery, such as the tractor. Tractors enabled the expansion of farms, and reduced the need for farmworkers. Chemification was generated during World War One. The use of chemicals, such as pesticides, were used as a tool of chemical warfare. However, agriculture faced a major transition after both world wars. The use of machinery and chemicals shifted from warfare usage to primarily agricultural tools.

Industrial agriculture progressed because of technologies, agribusinesses, and government subsidies as well as other government initiated policies that supported farms financially during and after World War II due to high demand in national and global markets and as a response to the period of the Great Depression. In 1938, the revised government policy known as the Agricultural Adjustment Act of 1936 permitted the government to subsidize companies that produced staple goods: corn, cotton, and wheat (Spittler, 2011). In the 1970s these programs shifted towards supporting corporatized agriculture as the Secretary of Agriculture Earl Butz focused on promoting larger and intensive farming rather than smaller farms. The subsidies authorized by the government factored into the great success of agribusinesses and decline of small farms. In 2008, the Department of Agriculture found that “large commercial farms, those with gross annual sales in excess of \$250,000 received 62% of all government payments while small rural farms each received only 19%” of those payments (Spittler, 2011). It’s clear the government’s intentions were to incentivize farms to convert to commercial farming. The absence of subsidies provided to small farms spawned the growth of

these agribusinesses that dominate today. The United States government is one of the key actors in progressing industrial agriculture and giving rise to agribusinesses. Through policy-making, agribusinesses have accumulated astronomical power domestically and globally.

#### Government as a Key Actor:

Policy refers to the institutional rules of the United States that provide structure for the functioning of the government and for citizens at the local, state, and federal government levels (Neff, 2014). To formulate a policy, there must be a problem to address that directly affects the public. Once the problem is acknowledged, the government actors can begin to set their agenda. Agenda setting is when the government decides what key issues will be focused on in the policy. It is influenced by government officials, interest groups, and the public (Puentes-Markides, 2007). Before the policy is implemented, interest groups and lobbyists can shape the policy itself. Interest groups can easily persuade government lawmakers to enact policies that benefit their values.

Interest groups mean they are an “association of individuals or organizations that, on the basis of one or more shared concerns, attempt to influence public policy in its favor by lobbying members of congress,” (Martini, 2012). Interest groups can sway the decisions that policymakers make. Interest groups “may directly or indirectly through consultants/lawyers seek to affect legislative action,” (Martini, 2012). Groups may be beneficial because they can provide valuable information on a problem with their data and research. For example, if a policy is introduced that focuses on climate change, it may be helpful for climate research interest groups to provide scientific evidence that will help policymakers decide what issues the policy specifically focuses on. A potential consequence of interest group influence is that their interventions can “lead to administrative bribery, political corruption, undue influence and state capture,” (Martini, 2012).

Agribusinesses have grown and gained significant power, making them a key player in swaying government officials to favor their interests.

Agribusinesses' economic power has made them more influential as interest groups (Neff). Agribusinesses “have invested millions of dollars in campaign spending and lobbying to defend agricultural practices,” (Environment Michigan, 2011). Moreover, “over the past decade, just 10 agribusiness corporations or groups spent more than \$35 million to influence federal elections,” (Environment Michigan, 2011). Agribusinesses utilize undue influence to affect how lawmakers determine what policies will affect the agriculture sector. These corporations use their money to swing government officials in their favor. Usually, these businesses have a different agenda from smaller farmers and consumers. For instance, grain buyers favor lower costs of grains (Neff). Therefore those part of these interest groups leverage government officials to maintain or create policies that will keep prices low for their benefit. Agribusinesses have the resources to influence the agricultural bills in their favor, yet small farmers do not. This encourages the government to create effective policies that allow agribusinesses to thrive.

In 2008, when market concentration became a concern, Congress introduced the 2008 Farm Bill which would require the USDA’s Grain Inspection, Packers, and Stockyards Administration (GISPA) to develop rules that would clarify what are reasonable and unreasonable advantages within competition between farmers and agribusinesses. The goal was to allow for small farmers to “bargain with agricultural giants” effectively (Schwartz and Gurwitz, 2018). However, conservatives in Congress blocked the process from finishing in 2011. In 2016, with a new administration, Congress allowed USDA to finish their process (Schwartz and Gurwitz, 2018). Former President Trump’s Secretary of Agriculture put GISPA under the Agricultural Marketing Service, away from USDA, and built the pathway for agribusiness

consolidation to thrive. Furthermore, the Farm Bill of 2018 did not address the concerns about competition for smaller farmers and nothing to fix consolidation (Schwartz and Gurwitz, 2018). Congress did not enact policies that would regulate competition or support small farmers. The sway that agribusinesses have over government officials is concerning and is arguably a contributing reason for the dominance of American agribusinesses in the global agricultural sector.

#### Control by Corporations:

In the United States, the agriculture sector is controlled by a few large farms who are producing most of the food. As a result, small family farms have declined (Neff). This is the result of consolidation, where there was a shift from small and many farms to large and fewer farms. Between the 1950s and 1990s, “the average U.S farm more than doubled in size and less than half the farms remained,” (Johns Hopkins). The control of these farms fell under large corporations that still dominate the sector and control the supply chains. In addition to government support, large agribusinesses were able to gain this kind of power because of market concentration. Market concentration is when “market shares in an industry are owned by a small number of companies,” (Neff, 2014). This occurs when “companies take over or merge with other companies,” within the same product field, known as horizontal integration. Another way this occurs is when “companies gain control of multiple stages along the supply chain of the product,” known as vertical integration (Neff, 2014). Overall, these two strategies create market conditions for larger companies with more power and wealth to gain control over smaller farms or industries to become a larger conglomerate.

Due to their power and wealth, corporations set the standards very high for other competition, and oftentimes smaller companies cannot compete with the large quantities



produced and sold at low prices. Large corporations maintain low prices for consumers because the farmers that work for these corporations need to buy their machinery and goods to operate the farms from sellers who have more power and can inflate their prices to farmers. The processors within the large corporation can then reduce the payment to farmers and because farmers oftentimes do not have anywhere else to sell to, they are stuck in the circular system of paying high prices to produce but are paid less than they deserve (Farm Aid). These agribusinesses keep prices low to farmers and sell their products to consumers at prices they choose, which tends to be what is affordable to the consumer, and are able to make a profit. When prices are kept artificially low, sales generate quickly, resulting in large profits in a short period of time. Agribusinesses profit by exploiting the labor of farmers and sales through control of a disproportionately large share of the consumer market.

One of the largest and most powerful entities that dominates the agricultural sector is the agribusiness known as Cargill. The company was founded in 1865 in Iowa, where founder William Wallace Cargill took his opportunity to become a middleman between farmers and consumers (Jordan, 2020). Expansive transportation systems, such as the railroad, contributed to the growth of Cargill. Cargill first focused on transporting grain between farmers and consumers, and their company continued to grow. Cargill became the top company as the middleman, which forced farmers to accept their rising prices (Jordan, 2020). Soon, Cargill expanded from handling grain to handling coal, flour, and lumber (Jordan, 2020). It became a dominating force in controlling the success of the agricultural market.

Cargill faced its first of many scandals during the first world war, when the company was accused of “wartime profiteering,” (Jordan, 2020). Little was done to penalize Cargill at the time, and the company’s growth continued. During the second world war, Cargill was subsidized by

the government to boost yield for the wartime effort and this boosted their success. With the government's help Cargill's "grain exports increased 400% between 1955 and 1965," (Jordan, 2020). Today, Cargill is one of the major global agricultural companies investing in food production and world-wide trading. If it weren't for US government financial support through subsidies and manipulation of markets, Cargill would not have reached the success that it did and does today. In addition to government support, agribusinesses such as Cargill utilize technologies, practices, and marketing that increase their food production and ultimately their success.

Marketing became a key factor in the promotion and stimulation of processed foods produced by agribusiness corporations like Cargill. During the nineteenth and twentieth centuries, these corporations created new packaging for processed food products that displayed the brand to consumers (Neff, 2014). Both of these factors led to companies considering the idea of advertisement. These companies began to overproduce goods and saw the opportunity to advertise their brands. The idea is that marketing a brand could convince the consumer that one brand is better than another even though the product itself may not be that different. Further, in the 20th century, the number of consumers grew and the wealth amongst the consumers expanded. Additionally, consumers began to value convenience and price point as priorities over nutritional value. These factors led to companies exerting more power over their suppliers and manufacturers. With this control companies developed different products under their brand that could attract wider audiences of consumers. Overall, the promotion of the products led to the increased number of processed goods developed by agribusinesses and could sell a higher volume of product to more consumers world-wide. The kinds of practices to produce processed

foods and foods that would meet the demands of these large agribusinesses utilize intensive and manipulative practices that are destructive to environmental and human health.

#### Intensive Practices and their Effects:

Agribusinesses practice monoculture, where one crop is grown on a larger field or plantation. There is a lack of crop rotation, and a focus on growing as much of one crop as possible for food production. Monoculture typically uses practices of using pesticides, utilizing CAFOs, and using fertilizer that threaten environmental health, nutritional standards and are found to cause life-threatening diseases for humans and other living creatures.

People are exposed to these risks everyday through food and other household products, especially pesticides and insecticides through “inhalation, direct skin contact or ingestion,” putting their lives at risk for disease or other health complications (Neff, 2014). Pesticides can cause cancer or disrupt the functions of the reproductive, nervous, immune, or endocrine system. This affects developing children, especially during puberty by interfering with the development of their reproductive organs. In particular, a clinical study published in 2021 analyzed the potential relationship between early-life exposure to non-persistent pesticides and how it impacted puberty progression. The population of the study consisted of people from prenatal stage to adolescence and looked at non-persistent pesticides, insecticides, and herbicides (Castiello, 2021). Those exposed were compared to those who were not. The results found limited studies that were qualified for review, however, the evidence suggests that early-life exposure to non-persistent pesticides affects the timing of puberty. The study found that specifically OP pesticides, pyrethroid insecticides and herbicide atrazine were associated with earlier onset of young girls’ first menstruation, (Castiello, 2021). OP pesticides are associated with “delayed sexual development in boys and girls,” (Castiello, 2021). Lastly, pyrethroids were

linked to delayed puberty in girls and advancement in boys (Castiello, 2021). Altogether, the study concludes that exposure may change the normal onset of puberty in both boys and girls. Further research still needs to be conducted, but this is emerging evidence that should be considered to understand how these are indicators of severe problems within our agricultural practices and how there are unintentional consequences for children.

Another well-documented health issue with chemicals used in agricultural production are pesticides that are irritants when inhaled and can cause asthma (Neff, 2014). Asthma is an immune mediated disease that can cause “wheezing, breathlessness, and nighttime or early morning coughing,” (Schwartz, 2015). In a study published in 2015 conducted research in southern California, specifically in San Joaquin valley which is known to be an agricultural producing valley. The majority of the population is composed of Mexican/Mexican-Americans. The results found that the valley had poor air quality due to “residues of agricultural burning, bovine gas, toxic waste dumps... and pesticides,” (Schwartz, 2015). The results found that Tulare county of the valley had the “highest percentage of schools with any pesticides applied within a ¼ mile,” (Schwartz, 2015). Pesticides contribute to childhood asthma and the increased rates found in the area. Children are more vulnerable to these toxic irritants because they can “absorb environmental toxicants into their lungs at a much higher rate than do adults,” (Schwartz). Children are put at a much greater risk when exposed to pesticides and it results in life-threatening illnesses.

Concentrated Animal Feeding Operations (CAFOs) are used by agricultural conglomerates to produce the greatest output possible of livestock for meat production. CAFOs contribute to numerous health risks. CAFOs are known for producing massive quantities of manure from these animals, which often contain “nitrogen and phosphorus, pathogens such as

*E.coli*, growth hormones, antibiotics,” and often other chemicals (Hribar, 2010). The operators of these feedlots need to manage how they store the manure because these farms have ceased to grow their own food for feeding, therefore the manure is not necessary to use as fertilizer. The ways to manage are storing under buildings, applying it to land, or stored in man-made lagoons. Oftentimes, the manure itself is untreated, leaving contaminants in the manure (Hribar, 2010). The effects of the manure itself leads to dangerous human health risks, such as contaminating groundwater from runoff. Manure can runoff into groundwater from land application, or leak from storage (Hribar, 2010). Groundwater is a major source for drinking water, therefore, the water could contain fecal matter or bacteria, like nitrates. Issues such as blue baby syndrome in infants arise when the nitrates impact the ability of their “blood to carry oxygen,” (Hribar, 2010). In adults, nitrates could lead to birth defects, miscarriages, or other health issues (Hribar, 2010). If drinking water is put at risk, especially in communities where there is a lack of resources for clean water, it puts families and children at great risk for preventable health issues.

In terms of the air quality, CAFOs release gasses into the atmosphere that are potential contaminants. CAFOs release ammonia and hydrogen sulfides. Ammonia is a colorless but strong odor, and it is the result of the decomposition of “undigested organic nitrogen compounds in manure,” (Hribar, 2010). It is a respiratory irritant, and leads to respiratory illnesses, including chronic lung disease, (Hribar, 2010). Hydrogen sulfides also have a pungent smell, and it is the result of the “decomposition of protein and other sulfur containing organic matter,” (Hribar, 2010). The risks of hydrogen sulfides include inflammation of the respiratory tract or the loss of the olfactory neuron (Hribar, 2010). Both gasses contribute great risk to human health.

Lastly, CAFOs are known for using antibiotics for their feeding of the animals. Antibiotics are used to “reduce the chance for infection and to eliminate the need for animals to

expend energy fighting off bacteria,” (Hribar, 2010). The reasoning for this assumes that animals will be able to use their energy to grow at faster rates rather than using it to fight off disease. This affects humans through their consumption of the meat product. The consumption of antibiotics can create “antibiotic-resistant microbes,” that will make antibiotics for humans less effective when they need them to fight off diseases, (Hribar, 2010). Therefore, if an individual contracts a disease, and needs antibiotics, their body may not respond well to the antibiotics because they have consumed meat with antibiotics that made their medication less effective.

Synthetic fertilizers are also widely used in industrial agriculture as it helps increase production yields. Most of these fertilizers contain nitrates. Fertilizer runoff is a major threat to wildlife, and to human health. Fertilizer runoff occurs from soil erosion and groundwater runoff, and it eventually ends up in other bodies of water (Keena, 2022). When fertilizer ends up in waterways, it leads to oxygen depletion and eutrophication. Excessive amounts of nitrogen leads to the growth of microorganisms, such as algae. The growth of these microorganisms depletes oxygen levels in the body of water. Eutrophication is the process that is natural or accelerated by humans where the water contains excessive amounts of algae and low oxygen levels in the body of water (Keena, 2022). The effects of the decreased oxygen levels kills marine life and this starts the cycle of microorganism growth. When the marine life dies, microorganisms, such as algae, decompose the marine life and this allows them to reproduce. When they reproduce, oxygen levels continue to deplete and the cycle repeats. Algae can cause harmful effects to humans as well, including rashes, and respiratory issues (Keena, 2022). When agribusinesses use large quantities of fertilizer, they pose greater risks to the surrounding environment and to humans.

Monoculture agriculture practices lead to soil degradation and a continuous cycle of increased use of these chemical treatments. Soil degradation occurs when the quality of the soil deteriorates and the soil nutrients decline. The decline of soil nutrients impacts plant growth and crop growth as a result declines. To address this, farmers use synthetic fertilizers to increase their crop growth. A dangerous cycle of soil degradation and increased synthetic fertilizers arises. It reduces soil health and increases the risk of pests as plants become less resistant. This risk requires the farmer to use more pesticides. These combined products are designed to help crop growth, however, the chemicals pose dangerous risks to the vitality of the crops and soil as explained. Farmers may look for other options, such as GMOs. These result in the use of pesticides as the chemically engineered crops can be resistant to certain pesticides, forcing farmers to spray different and more pesticides (NRDC, 2020). The cycle of using these harmful practices is leading to dramatic biodiversity loss of diverse species from invertebrates to vertebrates across all eco-systems - terrestrial and marine alike. Biodiversity is the most valuable tool that ecosystems have for their survival and functioning. It is just as important for human health. Humans rely on biodiversity because it contributes to the variety of crops, nutrients, and even medications. One important consequence of these practices is that it reduces the amount and quality of nutrients in food products.

### Biodiversity and Agrobiodiversity

Biodiversity refers to biological diversity, which is the genetic, species, and community diversity of an ecosystem. It supports human and ecosystem health with a variety of services, such as habitats, medicinal plants, freshwater, and crop diversity. Humans depend on biodiversity for nutritional value. In addition to human values, biodiversity provides intrinsic value for the ecosystem. This includes nutrient cycling, pollination, natural pest management, and the

dispersal of seeds (American Museum). Threats to biodiversity mean threats to human survival and ecosystem functioning. The five main threats to biodiversity include habitat fragmentation, climate change, invasive species, pollution, and overexploitation of resources (Greenfield). These threats negatively impact the strength of biodiversity because each can alter or destroy habitats and species. When habitats and species are lost, a positive feedback loop begins where other organisms with the ecosystem are negatively affected. The loop accelerates causing organisms, habitats, and interactions to quickly decline.

The biodiversity of agriculture is known as agrobiodiversity. Agrobiodiversity supplies a variety of crops, diverse range of livestock and fish, different soil organisms, various landscapes, and “naturally occurring insects, bacteria and fungi that control insect pests and diseases of domesticated plants and animals,” (Thrupp, 2000). Having a range of crops, plants, landscapes, animals, and soil organisms promotes healthy agriculture. Agrobiodiversity is essential to nutrition. According to the World Health Organization, “Nutritional composition between foods and among varieties/cultivars/breeds of the same food can differ dramatically, affecting micronutrient availability in the diet. Healthy local diets, with adequate average levels of nutrient intake, necessitates maintenance of high biodiversity levels,” (World Health, 2015). The variety of foods that come from agrobiodiversity directly impacts the nutrient value. Without differing organisms and microorganisms, crops would not have the highest potential of nutrients that contribute to improving human health.

### Nutrition

Nutrition is vital to survival and growth of humans. Humans need energy to grow as individuals physically and mentally. Energy is the capacity to do work, therefore humans need this to do work (Neff, 2014). To perform and exert energy, humans require essential nutrients



involving macronutrients and micronutrients. Macronutrients are larger nutrients including carbohydrates, proteins, and fats. Each serves a function to the human body. Micronutrients are smaller nutrients including vitamins and minerals (Fletcher, 2019). These nutrients serve a purpose and play a major role in the functionality of the human body.

Carbohydrates include sugars and starches. There are simple and complex sugars that the body needs in order to support the immune system, the function of the brain, the digestive system, the nervous system, and generate energy (Fletcher, 2019). It's recommended that humans consume more complex carbohydrates including vegetables, whole grains, fruits, and should avoid consuming frequently highly processed foods that contain extra flours and sugars (Fletcher, 2019). Proteins are known as building blocks for all cellular activity. Proteins assist the growth of muscles, bones, skin, and hair. They also take part in forming antibodies and hormones. Foods that include proteins are red meat, poultry, seafood, eggs, legumes, beans, and certain dairy products (Fletcher, 2019). Humans should have a variety of protein sources available to them. Fats assist in the growth of cells, blood clotting, reduce risks of heart disease, hormone production, absorption of vitamins and minerals, and digestion (Fletcher, 2019). Certain fats are more beneficial than others, but they should be included in an individual's diet. Healthier fats include monounsaturated and polyunsaturated fats, which can be found in foods such as nuts, fish, especially salmon, seeds, and vegetable oils (Fletcher, 2019). The production of these kinds of nutrients is vital to human development.

Vitamins are a necessary nutrient to assist the development of the human body and brain. Vitamins support the immune system, help prevent diseases and cancers, strengthen bones, assist in the functioning of the brain and nervous system, and aid in digestion (Fletcher, 2019). Foods that include essential vitamins are found in fruits, vegetables, and lean proteins (Fletcher, 2019).

If an individual does not eat these kinds of foods or does not have access to them or any supplements, the individual is at risk for vitamin deficiency.

### Industrial Agriculture Impact on Nutrition

Nutrients are at great risk in industrial agriculture. The combined efforts between agribusiness corporations and government action support the production of processed foods, which threaten the quality of nutrients in an individual's diet. The practices that support industrial agriculture reduce agrobiodiversity and the nutritional value. Lastly, as high quality foods become less available to communities, many individuals face the risks of nutrient deficiency.

Food processing is altering the composition of foods to reach the desired effects. There are many reasons for why processing is done. One reason is to increase the value of a product by simplifying preparation for the consumer. Companies may try "pregelatinizing starch" to make instant pudding or gravy mixes (Neff, 2014). Another way is to add flavor or colors to improve the appearance and taste of the product so the consumer will purchase it. A second reason is for convenience by again, reducing preparation for the consumer. For example, companies create packaged flours and cake mixes to reduce the time it will take to prepare and bake a cake (Neff, 2014). Foods can be processed a number of ways. One way is physically changing the food. This can be accomplished through processes such as retorting where "sealed containers of product are heated under pressure to temperatures in excess of the boiling point of water" (Neff, 2014). This action creates canned foods. Another process is blanching, where "fruits and vegetables are exposed to hot water or steam for a brief period" to create frozen foods (Neff, 2014). Each of these actions alter the composition of the product and extend the shelf life of the product, making it more desirable for the consumer. Lastly, food can be altered through formulation which is the

“act of combining ingredients to create or improve a food” (Neff, 2014). This will change nutritional value and improve the taste. Additives can be used, which are ingredients used during formulation. Mostly salts and sugars are used, which can range from natural to artificially made ingredients (Neff, 2014). The nutritional changes that often occur in formulation are increased fats and sugars, and a loss of nutrients. Ultra-processed foods are “food and drink products are formulations made from substances derived from foods to which preservatives and cosmetic and other types of additives are added with no or little whole food. The purpose is to create durable, accessible, convenient, and highly-palatable, ready-to-drink, ready-to-eat, or ready-to-heat products,” (Neff, 2014). These foods include chips, sweet and salty snacks, sodas, energy drinks, ice cream, burgers, breakfast cereals, cakes, and more. The nutrient quality of these foods are “substantially inferior to that of foods and culinary ingredients combined. They are usually fatty, sugary, or salty, and depleted in fiber, micronutrients, and other bioactive compounds,” (Neff, 2014). Processed foods have become widely available to consumers as they are pushed by agribusinesses. As processed foods become available and are more convenient to the consumer, this indicates that individuals are consuming these products more than fresh and high quality foods. Humans are facing a lack of the essential nutrients because of processed goods.

Industrial agricultural practices threaten agrobiodiversity. A loss of agrobiodiversity means there will be a loss of nutrients and more risks to humans. These risks include “reduced access to micronutrients,” “increased consumption of ultra-processed foods, high in ultra-processed foods, high in energy, saturated and trans fats, sugars and salts,” and “reduced number of food species available to meet the daily requirement of a healthy diet,” (World Health, 2015). The loss of agrobiodiversity and increased processed foods leads to limited nutritional value and drives consumers towards a simplified nutritional diet. Lastly, the “homogenization of

agricultural crop and livestock production also limits the nutritional value of food choices available to communities and individuals,” (World Health, 2015). As intensified practices increase monoculture, it decreases nutritional foods available to communities, known as food insecurity.

### Food Insecurity

The USDA defines food security as “access by all people at all times to enough food for an active, healthy life,” (USDA, 2023). When individuals do not have access to high quality foods that allow them to live a healthy lifestyle, these particular individuals are considered to be food insecure. Food insecurity often correlates with consumption of processed foods. One study found that those who had low food security had a higher intake of ultra-processed foods compared to those with more food security by 3.1% (Leung, 2022). Therefore, those with lower food security have a higher chance of consuming processed foods that don’t acquire essential nutrients to support human development. Access to healthier foods is determined by a number of factors, but one important key to access is the food environment. Food environments refer to what influences food choices, the location of supermarkets, convenience stores, and what people are exposed to (Neff, 2014). One food environment is known as a food desert, which refers to areas where there is less access to healthy foods. Food deserts are often in urban or rural low-income areas. Another food environment is known as a food swamp, where most food options available to the community are unhealthy and mostly come from fast food places or convenience stores (Neff, 2014). Families who do not have access to enough food or nutritious foods are at risk for diseases, such as obesity and diabetes, and lack the means to live a healthy lifestyle. Additionally, their body and brain development is put at risk, especially in developing

children. Children need to consume nutrient-dense foods to aid in their development, meaning they need access to foods rich in macronutrients and micronutrients.

### Childhood Development and Connections to Nutrition

During typical development, children reach milestones at certain ages. Each milestone supports their cognitive, physical development, social and emotional development, and language development. These important developments will contribute to their overall well being as an individual and as a contributing member of society.

Cognitive development is the development of a child's ability to think and reason. According to Piaget's Theory of Cognitive Development, there are four stages in a child's cognitive development. His theory focuses on how children mature when they interact with their surrounding environment. The first stage is known as their sensorimotor stage, which ranges between birth and two years old. During this stage, a child will learn to understand their physical environment (Reich-Shapiro, 2019). As early as two months, an infant should start to watch someone as they move and be able to look at a toy or object for a few seconds (CDC, 2022). By a year old, a child should be able to put an object into a container and look for things that someone hides in front of them (CDC, 2022). The next stage is known as the preoperational stage, which ranges between ages two to seven years old. Here, a child learns how to concentrate on permanent objects, "can use mental symbols to represent objects and events," develop language through play, and become increasingly social with other children (Reich-Shapiro, 2019). At two years old, the child should be able to hold something in one hand and do something else with the other hand. By five years old, a child should be able to count to ten, begin to talk about time by using words like "yesterday," identify letters, and be able to pay attention to an activity for at least five minutes, and begin socializing with their peers (CDC,

2022). As time progresses, a child should develop their thinking and problem-solving skills. It is key for a child to acquire these skills because it will support them as they grow into their own person, their academics, and their social interactions. The third stage is known as the concrete operational stage, which occurs between ages seven to eleven. During this stage, the “child’s reasoning skills become more logical,” they begin to “take intentions into account in their moral judgments,” and can organize objects into different hierarchies, (Reich-Shapiro, 2019). With this development, children learn how to describe their feelings better. They begin to understand other people’s perspectives more clearly (CDC, 2022). The final stage is known as formal operation, which occurs from ages eleven years old and on. Children are capable of systematic thinking, meaning they begin to understand ethics and abstract ideas (Reich-Shapiro, 2019). Children learn how to formulate hypotheses, and lastly, children understand that rules stem from a mutual agreement (Reich-Shapiro, 2019). As they go through this stage, children gain a sense of what is right and wrong, and are more capable of expressing their feelings (CDC, 2022). Piaget’s theory explains how a child’s brain develops and matures as they interact with their environment. The more active they are within their environment enhances their overall cognitive and social development.

Typical language development in children includes milestones for a child’s speech and language acquisition. As a disclaimer, children develop at their own pace, but should reach most of the milestones eventually. From birth to three months old, a child starts to make “coo” sounds, smile at people, and recognize their parent’s voices. By seven months to one year old, a child will start to make long strings of sounds, sounds or gestures to seek attention, respond to simple words, and say one or two words. Later, by four to five years old, a child will begin to understand words for time, follow directions, say all speech sounds, and tell a short story

(ASHA). Language development correlates with cognitive development and social interaction. According to Vygotsky's theory of cognitive development, "children acquire cultural values, beliefs, and problem-solving strategies through collaborative dialogues with more knowledgeable members of society," meaning children learn from interacting with adults (McLeod, 2023). Vygotsky stressed the importance of social interaction and believes this is how language develops. This theory suggests there are three stages of language acquisition known as social speech, private speech, and private speech diminishes. Vygotsky stressed the value of private speech, which occurs around age three and it happens usually when children work alone, especially on challenging tasks (McLeod, 2023). Additionally, private speech is used for child self-regulation and to guide their actions. Private speech occurs after social speech, where children have interactive speech, therefore is a result of social speech. It has been found that the "frequency and content of private speech are then correlated with behavior or performance," thus private speech aids in their cognitive and behavioral development. Language development is a vehicle to cognitive development and is a result of social interactions with their environment. If either cognitive, social, or language development are impaired, it means that each of these developments will be impacted as well. The development of these fundamentals is essential to overall child development.

Physical development is the development of a child's ability to control their own body, by advancing their gross and fine motor skills (CDC, 2021). Physical development at two months old would mean the infant is able to move both of their arms and legs, hold their head up when laying on their stomach, and be able to open their hands for a brief period of time (CDC, 2021). At one year old, a child should have the ability to pull themselves up to stand, walk while holding onto furniture, and drink from a cup without a lid (CDC, 2021). At two years old, the

child should be able to run, kick a ball, and eat with a spoon (CDC, 2021). By five years old, a child should be able to button up some buttons, and hop on one foot (CDC, 2021). Their physical development will help them learn how to balance, use their fine and gross motor skills to assist them in school, play sports, and play with other children.

In order for motor skills to develop, it is necessary that there is a connection between the muscles and the nervous system. In addition to the motor skill milestones, there is sensory processing. The theory and practice of sensory integration was developed in the 1970s by A. Jean Ayres, an occupational therapist and neuropsychologist. The theory “describes how the nervous system translates sensory information into action” and this sensory integration is vital for behavior or performance (Lane, 2019). Sensory integration “emphasizes the active, dynamic, sensory-motor processes that support movement as well as integration within the social and physical environment,” (Lane, 2019). Sensory integration is important for children to learn how to regulate their behavior and movements. This sensory processing relates to how babies learn self-control and tolerate stimulations. Babies learn how to self-soothe themselves to cope with intense feelings and this is part of how they learn to understand rules. For example, babies self-soothe by sucking on a pacifier when waiting for a loved one to take care of them (Zero to Three, 2010). Babies and young children learn how to self regulate their behavior and tolerance for stimulation through interactions with others. It is important for children to have stimulation from their environment. However, too much or too little stimulation is detrimental to their growth. With a balanced amount of stimulation, children can learn how to calm themselves down and learn what they can and cannot handle. Therefore, child exposure and being active within their environment supports their cognitive, language and speech, and sensory-motor development.



Typical development is clearly impacted by a child's external environment, including nutrition. Any problems with nutrition will impact a child's developmental pathway and their overall potential. One study suggests a causal relationship between nutrients and brain development. Poor nutrition can lead to "brain damage, enhancing the risk of illness, inducing lethargy and withdrawal or delayed physical growth," (Brown and Pollitt, as cited in Rosales, 2009). The lack of nutrients can delay their cognitive, physical, and social development, potentially limiting their exposure to the external environment. That being said, if nutrition is affected, children with typical development may not reach their developmental highest potential, but they will still be functional and able to complete most tasks.

Comparatively, marginalized children, specifically children who are developmentally disabled and/or living in poor economic conditions will feel greater effects as they are already at a disadvantage. Development potential for these children within these marginalized populations is lower than children who are within typical development. External environmental factors are significant in supporting child development; therefore nutrition is vital to the development of children in marginalized areas.

#### Childhood Development: Those Developmentally Disabled

Children with developmental disabilities may have disorders that impact their nervous system, sensory motor development, speech and language development, and social-emotional development. An intellectual disability is defined as a disability that limits a "person's ability to learn at an expected level and function in daily life," (CDC, 2022). The levels at which an individual is impacted vary. With an intellectual disability, children may be delayed in learning, speaking, or physically. There are a range of disorders that stimulate these kinds of delays and many of which are still researched and evolving today. Several disorders affect the nervous

system, indicating that it may cause a child to have learning, behavioral, speech and language, and sensory-motor difficulties. Examples of disorders include Down Syndrome or Autism Spectrum Disorder (ASD), (NIH). Additionally, there are disorders that affect the sensory system, impacting a child's five senses or how the brain processes information from the senses (NIH). Disorders related to the sensory system occur in premature births, children who are exposed to infections, or children with ASD (NIH). The degree to which these developments are affected vary, but nevertheless, children with these disorders may experience more challenges than a child who develops typically. Disorders like these affect a child's daily routines, social life, behaviors, and intellectual abilities.

Cognitive development could be impacted in a variety of ways. For developing children with disabilities, this type of development may mean that it is harder for them to remember things, difficult to understand social rules, issues with problem-solving and understanding their consequences or results of their actions (CDC, 2022). Children with ASD, genetic condition, fetal alcohol syndrome and birth defects exhibit some of these symptoms. These difficulties may lead to behavioral issues when a child cannot understand things that their peers can.

Children may experience delays or disorders of their speech and/or language as a result of a developmental disability. A speech disorder known as Childhood Apraxia of Speech is where a child is unable to correctly move two of their lips and tongue in order to produce the correct sounds to communicate (ASHA). The muscles are not weak and the child may know what they want to speak but are unable to produce their words clearly. Language disorders vary and may affect a child's receptive and expressive language. Receptive language is their ability to understand their peers, therefore if they have difficulties with this, they may not be able to follow directions or understand pragmatics. Expressive language is the ability for the child to express

themselves. If there are issues, a child may not be able to use gestures or know how to start and continue a conversation (ASHA). When their communication is negatively impacted, this immediately affects a child's ability to learn, communicate with others, and develop foundational relationships. Once again, if their communication is harmed, behaviors may rise out of frustration.

Lastly, if a child's development is atypical, their fine motor skills may be harmed. Issues may be observed at age one if a child cannot grasp toys or hold a bottle by themselves (National Association). Children who exhibit these difficulties may have ASD, Down Syndrome, Cerebral Palsy, or attention deficit hyperactivity disorder (ADHD). For example, children with ASD tend to have issues with coordinating their movements, hand-eye coordination, issues with balancing, low muscle tone, and understanding left and right (National Association). Children who experience motor skill issues may have a limited ability to experience or be exposed to their external environment. When not exposed or immersed in their surrounding environment, this will hinder their cognitive development. When one of the developmental processes is affected, it affects the other processes as well. Each of these developments are integrated and work together to achieve overall human development. Children whose developments are impaired already face more challenges than the typical child.

#### Childhood Development: Children living in Low-Income Areas

Children living in low-income areas depend on their families or caretakers to give them their basic needs. Living in these economic conditions means these children do not always have their basic needs met. The causes for poverty range from sudden job loss, the expensiveness of child care, single parent household, to discrimination and disabilities. According to the 2020 U.S Census Bureau, the child poverty rate increased to 16.1%. Additionally, the poverty rates for

people of color increased. In particular, for non-Hispanics the rate increased to 8.2% while for Hispanics it increased to 17% (Shrider, 2021). Disproportionately, there is a clear difference between the Hispanic poverty rate to the White poverty rate, indicating there is a correlation between increased chance of poverty and a person of color. Families living in these economic conditions often lack resources, such as lack of social services, meaning healthcare, or education. A lack of education puts children in these conditions at a disadvantage because without a proper education, they may be incapable of advancing to higher socioeconomic classes and break the poverty cycle (United Way NCA, 2022). For people of color, families face discrimination and systemic injustices preventing them from job or educational opportunities that Whites experience.

Food insecurity is another risk that children face when living in these conditions. Families may not have access to quality and nutritious foods. Living in these conditions forces families to make difficult choices about what to spend their money on. Oftentimes when families are food insecure, they “must make decisions to maximize the amount of calories, satiety, taste, and energy-dense foods are often cheaper and more filling than healthier foods,” (Neff, 2014). Children who are food insecure are found to have an increased developmental risk (Neff, 2014). Due to the conditions they live in, children are automatically at a developmental disadvantage. This is exacerbated when they are food insecure.

Children exposed to poverty face cognitive development risks. Many children face chronic stressors in their living conditions, including constant noises, conflict within family, or family chaos with siblings and parents (Blair, 2018). This leads to higher cortisol levels impacting their stress response, their executive brain functioning, and their self-regulation of their emotions. Additionally, there tends to be a lack of cognitive stimulation found in these

households, such as books and toys, which inhibits their development of emotional regulation and school readiness (Blair, 2018). As previously examined, if one area of development is affected, such as cognitive development, this negatively impacts all areas of development. In regards to academic achievement, these stressors harm their achievement. Children who are economically disadvantaged have higher absentee rates, trouble with comprehension and memory, and typically “underperform in schools,” (McKenzie, 2019). According to the U.S Department of Education, the high school graduation rates of 2019 in low-income areas were 80% while the 2019 rates of higher-income areas were 91% (Midwestern, 2019). It is clear that living conditions impact a child’s academic success and their development.

If a child lives in poor economic conditions and is developmentally disabled, the child needs all of the support they can get. Children like them need essential resources such as education, healthcare, cognitive stimulation, social services, and adequate food access to aid in their development. These children are at an automatic disadvantage developmentally and academically, meaning they need all the assistance that government and other entities can supply them with.

Nutrition factors into their development, and supports their cognitive and bodily functions. It is our job to support these populations of children to grow into strong individuals. Children within these populations face injustices and are losing their basic human rights. It is for this very reason why focusing on nutrition is of the utmost importance. Nutrition affects development within all children, but these children already have a lower potential development ceiling. Access to nutritious foods and use of sustainable agricultural practices will supply the country with nutritious foods to support child development, along with other environmental and

human health harms. This is a call to action to transition to sustainable agriculture and improving programs that will support these child populations.

### Incomplete Solutions:

Before discussing new and improved solutions, it is vital to recognize what has been done so far. However it is also important to acknowledge that the current solutions are incomplete and not enough. The government has several programs to address the nutritional needs and other essential needs for these populations. One example is the Supplemental Nutrition Assistance Program, also known as SNAP. The goal of the program is to prevent food insecurity (Neff, 2014). It is based on eligibility, focusing on those with low-income seniors, and those with disabilities. Although SNAP has reduced food insecurity in some cases, it is still not adequate. SNAP benefits are not enough to cover costs that would supply participants with a healthy and nutritious diet. The benefits of the program do not “account for regional variability in food prices or costs of living, nor the lack of access to healthy food options,” (Neff, 2014). Furthermore, according to the USDA, SNAP limits the types of foods that participants can buy. Although the restrictions “could potentially improve participants’ nutrition,” it reduces the consumers' choices and may even reduce their participation in the program (Oliveira, 2018). Lastly, the program requires stores to meet eligibility but the stricter standards may reduce the number of eligible stores within communities (Oliveira, 2018). The SNAP benefits are designed to help participants, however, with these kinds of requirements and their inability to account for external factors, the benefits inhibit the participants' access to a nutritious diet.

Medicaid is another program that allows those who are disabled, low-income, and seniors to be participants. Although Medicaid is focused on healthcare, its nutritional role is minimal. Recent data suggests that among adults with Medicaid, 20% of these adults reported that they were food insufficient (Hall, 2020). Even though there is substantial overlap between the two programs with respect to income eligibility, this is not reflected in enrollment; only “47% of all Medicaid enrollees were enrolled in the Supplemental Nutrition Assistance Program,” (Hall, 2020). In regards to children, “only 54% of young children enrolled in Medicaid were enrolled in the Special Supplemental Nutrition Program for Women, Infants, and Children” (Hall, 2020). There seems to be a lack of integration between the two programs to provide the most benefits for their participants. Although both of these programs are a start, they each have flaws that can be improved upon.

School lunch programs are another program that are a step in the right direction, but are in need of improvement. The National School Lunch Program (NSLP) is a federally funded program that provides school lunches to children in public and private schools. It was first introduced by President Harry Truman in 1946, and the program provides free or low-cost meals to children (USDA, 2017). The program assists children who are eligible based on their socioeconomic status or their enrollment in federally assistance programs such as SNAP (USDA, 2017). School lunches are beneficial because they provide children with meals they may not have available to them at home. However, the meals themselves can and should be improved. The food itself is supplied by agribusinesses, which have been proven to be unhealthy foods that lack nutrients to meet the nutritional needs of children. One example is JBS, a well known and large agribusiness that does frequent business with the federal government. The company “has received nearly \$400 million in federal contracts since October 2017 for providing food and

services for programs including nutrition assistance, school and summer meal programs as well as food banks,” (Brown, 2023). Agribusinesses like JBS gain millions of dollars from their contracts with the government and supply schools with foods that are not nutritious and do not support child development. Additionally, because of the high volume of federal contracts with JBS, it reduces competition between agribusinesses and local farmers (Brown, 2023). This means that there is less of a chance for local farms to compete against them for federal contracts and to supply schools with local products. The federal government’s ties with these agribusinesses further drives the circulatory system of federal support for agribusinesses, the immediate growth for agribusinesses, and the reduction of local farms.

The problem of agribusinesses is growing and concerning. In the fall of 2023, the NSLP decided to offer Lunchables as part of school lunch programs. The company, owned by agribusiness Kraft-Heinz, will be implementing school lunch programs that are planned to meet the nutritional standards of the NSLP. However, this puts traditional hot lunches at risk for children. Lunchables may become part of the regular menu, which could mean that traditional hot lunches would be taken away (Maroney, 2023). If hot lunches are removed, children will have less of a choice of what to eat. Lastly, processed meats would be introduced into the school programs. According to the International Agency for Research on Cancer, processed meat is classified as a “Group 1 carcinogen,” putting children at risk for consuming carcinogens (Maroney, 2023). Lunchables pose a great risk to children’s health and overall development.

Agribusinesses deplete nutritional value, which threatens the amount of nutrients a child will get at school. Children spend most of their days at school and if they do not have access to nutritious foods, they are at risk for becoming nutrient deficient and potentially harming their



development. Improvements and new solutions for the agricultural sector and the government need to be considered in order to protect children.

### Improved Solutions

The time to act is now. The problems are clear and must be addressed. Thankfully, there are goals that can provide a framework for creating and implementing solutions that will address the issues of industrial agriculture and how it affects nutrition and child development. The goals are known as the Sustainable Development Goals (SDG), established by the United Nations in 2015. The goals are a “shared blueprint for peace and prosperity for people and the planet, now and into the future,” (United Nations, 2015). The goals recognize how global inequalities and environmental issues, such as climate change, have a compounding effect. There are a total of 17 goals with individual targets that provide countries, developed and developing, a framework to achieve these goals. In regards to addressing the issues of industrial agriculture and its effect on nutrition, there are four goals to focus on. The four goals are Zero Hunger, Good Health and Wellbeing, Partnerships for the Goals and Decent Work and Economic Growth. These can be used by private and public sectors simultaneously to achieve healthier and more accessible food systems.

The SDG goal 2 is known as Zero Hunger. This goal focuses on equal food and nutrition access for all people. There are three targets here that provide a blueprint for the U.S government and the agricultural sector to work towards. Target 2.1 is known as Universal Access to Safe and Nutritious Foods, target 2.3 is known as Double Productivity and Income of Small-Scale Producers, and lastly, target 2.4 is known as Sustainable Food Production and Resilient Agricultural Practices. There are several ways that both sectors can meet these targets. One way is for the agricultural sector to transition to sustainable practices. There are several practices that

agribusinesses can switch to and stop using their current practices. Agribusinesses can switch to integrated pest management rather than the use of pesticides and herbicides. Integrated pest management (IPM) is an environmentally safe approach to managing pests on farms and minimizes the health risks posed to humans. Some methods include using pest-resistant plants, natural predators, or by physically removing them with traps or barriers (Penn State Extension, 2011). These methods would reduce the amount of chemicals that pollute crops and still increase crop yields. These alternative practices would achieve target 2.4 and lead to sustainable food production. Another practice includes multistrata agroforestry. Multistrata agroforestry blends the layers of trees and crops on one piece of land. Crops, such as cacao and coffee, can grow to benefit the agriculture system and for trees to grow alongside which prevents soil erosion. The multistrata agroforestry is able to “prevent erosion and flooding, recharge groundwater, restore degraded land and soils, support biodiversity by providing habitat and corridors between fragmented ecosystems, and absorb and store significant amounts of carbon (Hawken, 2017). This one system can solve the issue of degrading biodiversity while increasing crop production. It will protect the biodiversity of organisms within this ecosystem, especially soil microorganisms that allow soil to thrive. In addition, this system provides better “pest control, fertilization, and water absorption,” (Hawken, 2017). These natural techniques will save farmers from having to use synthetic products as they serve the same purpose. Protecting biodiversity and reducing the number of chemical inputs will effectively increase crop yields and generate farmers more money in the long term. Conserving biodiversity protects nutrients from being lost. This ensures that humans, especially children, will consume the nutrients they need to support their development. Increasing crop yields will lead to more available food, therefore, will strengthen food security amongst communities, especially for children living in impoverished

areas. This change would accomplish targets 2.1 and 2.4 as it increases sustainable practices and food security. Although transitioning to these new practices would take time and money, they are long-term solutions that will benefit the planet and humans. These practices focus on human and environmental health by reducing the amount of toxins that enter our food system from the current practice of industrial agriculture. Lastly, if these practices are introduced to small-scale producers and there is more funding provided to these producers, it will increase their food productivity and as a result, increase the amount of food distributed to local communities.

The public sector plays a role in the implementation of these practices and encouragement of small-scale producers. Funding could be provided by the federal government through incentives or through federal contracts. For agribusinesses, the federal government could implement new policies that would require these businesses to utilize sustainable practices. If they prove to use them, the businesses could receive tax incentives. If the businesses fail to do so, the government can reduce their contracts with the federal government or increase their taxes. By incentivizing the larger companies, it will enforce healthier food production and increase nutritional values.

The federal and state governments can support small-scale producers. Increasing local food productivity will result in less food insecurity and increase the amount of nutritious foods distributed to local communities. This will give families more access to healthier options. Additionally, by supporting United States local businesses, it will benefit overall economic growth. New York is a new example of supporting local producers and lowering food insecurity. Announced recently on April 12, 2023, Governor Hochul is initiating a new program known as FreshConnect Fresh2You. This program tackles the issues of SNAP benefits and access to fresh foods. First, the program will provide “\$2 checks for every \$2 spent as part of the Supplemental

Nutrition Assistance Program,” (New York State, 2023). This ensures that participants are receiving more money to purchase healthier foods. How this works is “any farmer or vendor who is selling a SNAP-eligible food item at any farmer’s market, farm stand or mobile market operating in New York state may accept a Fresh connect check,” (New York State, 2023). This ensures that New Yorkers in need will be able to purchase healthier foods while creating stronger ties with local farmers and producers. Checks will be available as soon as April 15, 2023. New York is taking the right step forward to increasing local and regional economic growth, as well as food access.

Lastly, the government can help achieve target 2.1 by improving the programs that are currently in place, such as SNAP, Medicaid, and NSLP. The issues of SNAP and Medicaid are closely related, as their eligibility requirements overlap. The government should take action that allows for participants to utilize the overlapping criteria and gives them the opportunity to enroll in both programs if need be. For example, if a child who is enrolled in Medicaid, but has some of the same criteria to meet the SNAP requirements, that child should automatically be enrolled in SNAP regardless if they do not meet every single requirement. This single change could ensure that a child receives food benefits and give them the chance to acquire a healthier diet. SNAP itself needs enhancement. The program needs to account for geographic variability of food prices and external costs, such as food preparation. If these costs are accounted for, the program could expand the types of foods covered by benefits in the program. This would lead to more nutrient variability available to participants.

One framework that is useful to guide how state and federal governments can work together to build up the local food economy is the Affordable Care Act (ACA), or Medicaid, expansion. Many states have accepted Medicaid expansion, which requires states to commit to

spending a small percentage of their budget, along with the federal spending, to expand the services of Medicaid. There are many concerns over how state budgets are affected, but it's been proven to be cost-effective. If committed, states do not pay the full cost of Medicaid expansion. What's more is that expanding Medicaid allows state governments to cut spending on traditional Medicaid and outside programs that are "particularly programs that provide health services to low-income people," (Ward, 2020). In terms of coverage, Medicaid expansion increases healthcare and insurance coverage for participants. It is linked to higher rates of access to affordable care and "self reported health, with earlier care, and with improved surgical outcomes," (The White House, 2021). If states are able to commit to funding Medicaid, state and federal governments can use this as a blueprint to develop additional ways to fund childhood nutrition programs. To go even further, the funding of the programs can be supported by the governments and by local food producers and suppliers. This would support the goal of Decent Work and Economic Growth because it stimulates production in local or regional areas. For example, state and federal governments could fund the NSLP. The program could be further enhanced by expanding providers to local food producers. By expanding this, children will have the ability to consume local food and increase their nutrient intake. Local food is found to be produced healthier as it does not require the intensive practices that agribusinesses utilize. This is an opportunity to expose children to nutritious foods that will significantly support their development. This solution would give families and children with low-income and/or those with disabilities access to beneficial food programs and locally produced food. It would achieve the goals of universal access and local and/or regional economic development.

The third SDG goal 17 is known as Partnerships for the Goals. The individual target is 17.17: Encourage effective partnerships. Partnerships are key to accomplishing the sustainable

development goals and working towards a healthier future. No single entity can act alone. Partnerships between the government and agribusinesses are present, but require improvement. The current contracts between the federal government and agribusinesses allows the businesses to conduct the same harmful practices; this must change. To build on this situation, the government should work with these companies to help them transition to sustainable practices. This can be accomplished through subsidies, tax incentives, or investing in the technology to support them into this transition. Enforcing the large businesses to make these changes is a big step forward. This is something the government is working towards in the transportation sector. The Biden administration plans to have electric vehicles (EV) make up 50% of the vehicle composition by 2030. To achieve this goal, the administration has invested “\$7.5 billion in EV charging, \$10 billion in clean transportation, and over \$7 billion in EV battery components,” (The White House, 2023). As a result, the number of electric vehicle sales have tripled and the “number of publicly available charging ports has grown by at least 40% since he took office,” (The White House, 2023). Additionally, automobile manufacturers, such as General Motors, have announced their plans to support the supply of EV charging stations (The White House). The investment in clean energy has supported the growth of EVs and there is a successful turnout of companies that are willing to support this goal. The issues of air pollution caused by automobiles are a proven threat to human health. The same thing has been proven about the health risks posed from intensive agricultural practices. The harms are clear, and the solutions are here. Child development and nutrition are already affected and will be put further at risk if these practices continue. If investment in clean transportation can be done, so can investment in sustainable agricultural practices.

Lastly, the government must be transparent. Without transparency, how can American citizens trust the government? The government must take accountability and be transparent with American citizens and stakeholders about what nutrition is. Information must be available for stakeholders about a clear description of nutrition so they can effectively invest in companies striving to meet these nutrition standards. A clear description of nutrition can be supported by research and if necessary, adjust the nutritional standards to meet the health needs of citizens. This would meet the goal of Good Health and Wellbeing by ensuring that all citizens have access to their nutritional needs.

The solutions are here and ready to be utilized. It is now or never for these entities to take responsibility and create change for the greater good of United States citizens. Children are the most vulnerable, especially those within marginalized populations. Their access and consumption of nutrients is vital to their growth and overall development. Children in these marginalized communities already face challenges in their daily lives and with their growth as individuals. Ensuring that they have access to nutritious foods from stores and schools will avail their development and give them the possibility to be a contributing member of society. Using the Sustainable Development Goals as a blueprint is just the start. The three goals listed are just examples, but in order to meet these goals, we need to address all of the goals. Every goal is connected to one another and each has an effect on one another. They will guide the public and private sectors to achieving a healthier and sustainable future.

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