

Just Sustainable Food Systems in Maricopa County: Exploring Capitalist Impacts on
Ecological and Social Rifts

by

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ABSTRACT

The modern food system unsustainably produces both a food surplus and record levels of hunger. Capitalist investment into agriculture disrupted natural cycles and social relations. Marx's concept of the metabolic rift describes the way capitalist agriculture actively deteriorates the ecology (ecological rift) and disenfranchises people from food (social rift) are traced on the global scale. Then these rifts are deeply explored on the local scale of Maricopa County, Arizona to reveal the ways that even local food systems are enmeshed within the global capitalist agricultural food system. Phoenix, AZ, located in Maricopa County, has made commitments to become equitable and sustainable by 2050 in part to address issues facing the local food system. Efforts to achieve this goal (policies and studies) are analyzed using the frameworks of sustainable development (dominant "green"/ market based sustainability) and just sustainabilities (disruptive/ justice oriented sustainability). These frameworks help determine whether local efforts mend the ecological and social rifts created by capitalist agriculture, or actively deepen them. While a few studies may attempt "sustainable" solutions, they may in fact further entrench local agriculture in an unsustainable globalized food system. The efforts that are able to address both rifts, challenging the logic and structures of capitalist agriculture, are lacking in scale. In order for Phoenix to reach its sustainability goals by 2050, the ecological and social rifts must be addressed together. To do this, residents and policy makers must be able to determine between efforts that toy at the edges of capitalist agriculture and those with transformational potential, as they challenge the structures and logic of capitalism, ultimately mending the metabolic rift. While this is being done on a small scale, much more is needed to achieve a truly just and sustainable food system.

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Introduction:

According to the United Nations, food is a human right (United Nations, 1948). Yet upon analysis of the global food system, this is far from a reality. The world is producing record levels of food but millions of people remain hungry (FAO et al 2021). There have been a number of recent events that have highlighted the precariousness of our food system. The Global Food Crisis of 2007-08, the Covid -19 Pandemic and now the recent Russian invasion of Ukraine is sparking fear of food shortages causing global prices of wheat to skyrocket. Events such as these reveal how interconnected and ultimately fragile our modern food system is, particularly for the most vulnerable who already struggle to access enough food. It also reveals the unsustainable and unjust nature of our modern global food system.

Yet, it is not just the global food system that is inequitable. An analysis of Maricopa County, AZ's food system reveals that the local food system around Phoenix, is also unsustainable and unjust. Maricopa County has recently witnessed a ballooning population, resulting in rapid loss of agricultural land as 50% of all farmland has been developed to make room for 3 million new residents in the past 30 years (Guan et al. 2020, Falvo 2019). 2020 alone saw a loss of 200 acres of Maricopa County cropland to urban development (OEP 2022). The majority of remaining farmland is in the hands of a concentrated few large-scale farming operations as roughly 91% of all agricultural land is owned by about 8% farms (MARCO 2019). These farms do not plant food for local residents to consume, instead they plant water intensive cash crops for export. About 80% of the region's water that is used for agriculture goes to growing cotton and alfalfa,

despite every water source suffering from drought conditions (Myint et al, 2021). While these large farms use the region's water to grow crops for outside markets, many residents suffer from food insecurity. About 1 in 5 children in Maricopa County are food insecure alongside roughly 14% of the local population, roughly about 585,330 residents (MARCO 2019). This reflects a food system that doesn't function for its people or ecology. Instead, the ecological disruption and social inequities reflect a system driven by the structures and logics of capitalist agriculture.

As capitalists began investing and moving into agriculture it created a metabolic rift, disrupting natural ecological systems and social relations (Marx 1967, Foster 1999, Wittman 2014). Large scale capitalist agriculture disenfranchises many people from the food system, as they lose ownership of their small scale capitalist or non-capitalist means of producing food through land concentration and unfair competition. People then depend on money to purchase their food, going hungry when it can't be afforded, creating a social rift. Capitalist agriculture with its origins in Western Europe, was expanded, exported and eventually institutionalized through international organizations such as the World Bank during the "Green Revolution". Consequently, capitalist agriculture is the dominant form of producing food in today's economy, creating dependence upon massive farming operations, corporate monopolies, artificial inputs, and monocultural cash crops for export (Holt-Gimenez 2011, Figueroa-Helland et al. 2018). This form of production affects both the environment and people as there are currently 2.37 billion people suffering from food insecurity as many cannot afford food, nor do they own the capacity to produce it (FAO et al 2021).

Capitalist agriculture is also present in local food systems such as Maricopa County as seen above. Phoenix and Maricopa County are certainly making efforts to become more sustainable. While these efforts may attempt to ease the ecological rift created by capitalist agriculture, some pay no mind to the social. Yet, if Phoenix is to achieve a resilient and sustainable food system, as it claims it will by 2050, both the ecological and social rifts must be addressed (COP 2016). In order to analyze these “sustainable” efforts, the sustainable development and just sustainabilities frameworks will be utilized. The ecological and social rifts created by capitalist agriculture will be traced first on the global and then more in depth on the local (Maricopa County) scale. Finally, local county and city efforts towards an alternative food system will be analyzed through the lens of sustainable development and just sustainabilities to gauge their potential capacity to either mend, or deepen the ecological and social rifts within the Maricopa County food system.

Research Approach:

For this paper’s analysis of the global and local food systems the theoretical framework of the metabolic rift will be utilized. This framework provides a lens which interprets the domination of capitalist agriculture as an active process. The framework, with its roots in Marxist theory, provides a historical and material understanding of the development of the modern food system. Through the ecological and social rifts identified by Wittman, the ways in which the social structures of capitalist agriculture disrupt ecological cycles and disenfranchise people from food will be analyzed globally but more acutely on the local scale (Wittman 2014).

In order to understand the driving logic behind capitalist agriculture, the concept of the economic rationale will be utilized. This term from Hancock (2003), refers to the logic of capitalism within the particular context of human rights and the environment. The concepts of the economic rationale will be used to identify the fundamental logic, fueling the current capitalist agricultural system. The capitalist logic justifies unsustainability and inequity with market viability and constant growth. This concept provides a framework to recognize the prevalence of the capitalist logic within the modern food system.

These frameworks are then used to analyze reports from the United Nations, Maricopa County Food System's Coalition, and from faculty and students from Arizona State University's School of Sustainability. While a few reports are used to identify the global system's ecological and social rifts, most look specifically at Maricopa County's food system. These reports were chosen because they are the most current or most in depth studies that analyze specific facets of the local food system, from water usage by major local crops, to rates of food insecurity, to the sheer number of large and small scale farms in Maricopa County. The most recent UN report from the Food and Agriculture Organization reveals the most up to date statistics of global rates of hunger, accounting for the impacts of the recent Covid-19 pandemic.

Then, the frameworks of sustainable development and just sustainabilities are introduced in order to guide the analysis of local efforts to address problems in the food system. Sustainable development, the dominant form of sustainability is used to identify programs which fail to address both the ecological and social rifts. Just sustainabilities, on the other hand, characterizes efforts which challenge the structures and logics of

capitalism by addressing both facets of the metabolic rift. Thus, local government programs and studies, most of which come from the Phoenix Office of Environmental Programs, but also a bond framework from Phoenix's Finance Department and studies conducted by faculty and students from Arizona State University's School of Sustainability, are analyzed through these two frameworks to identify their capacity to mend or deepen the local ecological and social rifts. These efforts were chosen as they are recent attempts by the city of Phoenix to reach its sustainability goals by 2050, yet they vary in scale and potential. Programs and studies are analyzed for their capacity to be systemically transformational, by challenging the logic and social structures of capitalist agriculture or to simply play at the margins of the current food system.

Producing Ecological and Social Rifts Through Capitalist Agriculture:

Metabolic Rift

While Karl Marx is most famous for his analysis and critique of capitalism as well as his political and social theories of communism and class consciousness, he also wrote about soil and agriculture. Marx theorized the relationship between society and nature as metabolic. For Marx the term "metabolic" refers to, "the complex, dynamic interchange between human beings and nature" which recognized, "how both 'nature-imposed conditions' and human actions, transform this process" (Foster 2010, 75). Fidler quotes Marx who stated that the earth, "is the source of all production and all being" with agriculture being the, "first form of production" (Fidler 2012, 4). Society's relation to the earth is thus dictated by that society's mode of production. Different modes of

production create different metabolic orders, dictating the interchange between nature and society or what Marx referred to as, the social metabolic order. Marx saw earlier, pre-capitalist societies as having a more closed metabolic relationship with nature, in which nutrients and foodstuffs would remain local, being worked back into the land from which it came. This mode of production was occurring on a much smaller scale and “the produce of nature was often recycled back to the land, fertilizing it” (Foster 2010, 76). This seemingly sustainable metabolism was, according to Marx, disrupted and dissolved by the injection of capitalist social relations into agriculture. These capitalist social relations are characterized by concentrated ownership of agricultural land by large industrial farms and with it the capacity to produce food and wealth.

Marx developed this theory of social metabolism after studying the works of a German chemist by the name of Justus von Liebig in the 1850s and 60s. Liebig’s investigation of British agriculture concluded that the current methods to increase yields for expanding markets, “operated as a system of robbery, destroying the vitality of the soil” (Foster 2010, 76). Liebig recognized that soil necessitates three main nutrients to remain fertile enough for production: nitrogen, phosphorus and potassium (Foster 2010). Liebig continued to note that the increased distance that these nutrients must travel, from the countryside to urban areas, disrupted the soil’s nutrient cycles. These essential nutrients became waste, contributing to the pollution of cities rather than being worked back into and fertilizing the original soil (Foster 2010).

Marx recognized that soil cycles and natural conditions are inherently bound to the development of social relations. Capitalist agriculture disrupts nutrient cycles by fundamentally restructuring the mode of production, producing ecological and social

rifts. Capitalist investment in agricultural production entails, “the continuing process of enclosure and appropriation of rural labor [which] fostered the conversion of agriculture from a localized and diversified reproductive strategy into a highly productive, market oriented and eventually globalized commodity” (Wittman 2014, 808). For Marx, all progress that is made in capitalist agriculture is, ““progress in the art, not only of robbing the laborer, but of robbing the soil”” (Fidler 2012, 5). In addition, capitalist investment in agriculture leads to a strong alliance between industry and agriculture, developing together and contributing, alongside accumulation of land by the business class, to the displacement of rural workers. (Fidler 2012).

Capitalist agriculture intensified urbanization forcing many landless/jobless rural workers to migrate to the city in search of work, as labor became increasingly dependent on indentured servants and slaves. Thus, under capitalism’s drive for accumulation, agriculture, ““annihilates the peasant’ and ‘replaces him with the wage laborer”” (Fidler 2012, 4). A depleted rural population is then met with, “an ever growing industrial population crammed together in large towns; in this way [capitalist agriculture] produces conditions that provoke an irreparable rift in the interdependent process of social metabolism” (Foster 2010, 77). Ultimately the soil’s vitality is squandered as trade carries the nutrients far beyond the borders of a single country. This rift is further deepened by reducing, “the capacity of traditional agricultural stewards to manage productive landscapes through the increasing loss of indigenous knowledge and diversity in production methods” (Wittman 2012, 811). Driving this socio-metabolic rift is capitalists who pursue their own interests, in order to maximize profit and accumulate more capital. Consequently, “natural cycles and processes are subjected to the whims of the economic

cycle” as capitalism governs the complex relationships between humans and nature (Foster, 2010, 76).

The initial movement of capitalists into agricultural production began with enclosure in the nineteenth century. The process of enclosure was when the nobles and elites of Western Europe privatized previously communal lands which had supported the larger community. This process established a metabolic rift which was further intensified by, “large scale industrial agriculture, long distance trade and massive urban growth” (Foster 2010, 77). Wittman notes Polanyi's emphasis on the land commodification process in the 19th century as a fundamental component of the metabolic rift. For this is the historical process which transformed the value of land from the very real “use” value to a fictitious “exchange” value. A pre-capitalist perception of land measured it’s value by its usefulness such as, “the provision of food for social reproduction and ecological services for the reproduction of socio-ecological systems” (Wittman 2012, 809) Yet, the influx of capitalists into agriculture altered this perception of land into a tradable commodity to be bought, sold and accumulated. Thus land and food became “subject to market fluctuations” as they became valued for their capacity to accumulate wealth rather than to feed people (Wittman 2012, 809). Land also became increasingly consolidated into fewer and fewer hands as communal lands as well ““as small and middle land ownership”” succumbed “to the competition of Giant Farm” leaving many rural workers landless, devoid of any form of ownership and fleeing for the urban (Fidler 2014, 5). While enclosure was a particularly Western European occurrence, it acutely depicts the capitalist structures of land commodification and concentrated forms of ownership, which are now the global norm.

These developments, exported globally from Europe and the West through international trade policies, market forces, colonialism and imperialism, served to entrench global, national and local systems into a metabolic rift that robs, “the original sources of all wealth - the soil and the laborer” (Fidler 2014, 4). Thus, Marx is able to link the exploitation of land with that of labor and after his study of soil cycles, “advances a new conception of production and labor with two nuclei: earth and people” (Fidler 2014, 4).

Agricultural industrialization served to expand the ecological and social rifts as capital has and continues to look for technological/industrial “solutions”. One of the most notorious is the creation of synthetic fertilizers and pesticides using fossil fuels. Yet many technological “fixes” do not ease, but rather intensify the metabolic rift, by creating novel ecological or social problems elsewhere (Foster 2010). In the case of artificial fertilizers, they increase greenhouse gas emissions and the nutrient concentration contributes to water eutrophication, ultimately leading to oxygen poor water or “dead zones” that suffocate marine life (Foster 2014). This eutrophication threatens access to clean and fishable waters and consequently the human right to a clean, healthy and sustainable environment (UN Human Rights Council 2021). The drive to overcome natural limits in the name of increased production and accumulation inherent to capitalism, ultimately blinds us to its consequences (Foster 2010).

Thus the purpose of this theoretical framework is to use the concepts of ecological and social rifts in order to expose the ways that capitalist agriculture actively disrupts the health of both people and planet. The ecological and social rifts shall be applied generally to food systems on the global scale and more in depth on local scale, to trace the depth of

these rifts. This metabolic framework notes the impact on ecology and people as well as addresses the economic and political structures which perpetuate them. The structures that uphold and exacerbate the socio- ecological rifts must be addressed in order to feasibly imagine ways to start easing them. In order to construct a path towards a just and sustainable food system for Phoenix, social and ecological rifts must be acknowledged and challenged at a fundamental, systemic and metabolic level. But in order to challenge capitalist agriculture, its driving logic and rationality must first be understood.

Capitalist Logic

Pivotal to understanding and ultimately easing the metabolic rift created by capitalist investment into agriculture is to understand capitalism's driving logic. Hancock describes this logic using the term "economic rationale". This term describes the way that capitalist logic functions within the specific context of human rights and the environment. After this section I will not be referring to the economic rationale explicitly. For the purpose of this paper, "capitalist logic" or "capitalist rationale" will be used in its place. The reason for this section is to familiarize the reader with the basic driving logic of capitalism that continues to actively deepen the metabolic rift.

The economic rationale refers to the most basic perception of the world as seen through the eyes of a capitalist. Hancock describes the term, economic rationality as, "the dominant form of rationality in the capitalist political economy" in which all worth is defined in monetary terms stemming from the "centrality of the market" (2003, 18). The economic rationale also entails a notion of dominion over nature rather than cohabitation or some other form of mutualism. The environment and all natural resources are seen as

potential commodities, as seen with land during the nineteenth century enclosure movements (Hancock 2003). The “economic rationale” paradigm, “legitimizes iniquitous environmental resource ownership predicated upon ability to pay rather than considerations of either human or ecological needs” (Hancock 2003, 24). According to the logic of capitalism, human needs provide no legitimate basis for distributions of any resource as that basis belongs to the market (Hancock 2003).

Perpetual market growth, “is necessary for the very survival of capitalism. This observation pertains to the continual need to expand markets” (Hancock 2003, 25). Market expansion is the way economic health is measured by GDP. Thus, the centrality of markets and their endless expansion, serves as the sole criteria for product distribution. This, “normalizes the denial of essential resources for the impoverished as markets divert resources to supplying goods to the affluent” (Hancock 2003, 26). According to capitalist logic, it is purchasing power, not basic needs that determine where goods are allocated.

The economic rationale represents the paradigm we currently occupy, where all aspects of life are determined by the market. Hancock claims it relies on a method of, “empiricism, and cost-benefit analysis to commodify products (including natural resources)” (2003, 18). According to this logic it is, “inefficient to invest in non-polluting forms of energy and deems it appropriate to risk long-term climatic instability... and threats to biodiversity because of a singular focus on economic criteria” (Hancock, 2003, 19). The world’s continued dependence on fossil fuels is an example of how destruction will be ignored so long as resources and profits are allocated appropriately (Hancock, 2003, 19). This can be seen in a quote taken from an economic textbook that claims, “the efficient quality of pollution is not zero, but the level at which the social marginal cost of

cutting back pollution equals its social marginal benefit” (Hancock, 2003, 24). This presents a legitimate economic thought process of cost-benefit analysis in relation to atmospheric pollution as nature is freely appropriated.

Natural resources, according to capitalist logic, are “free” as owners of production, in their mission to accumulate more capital should attempt, “to overcome, even if temporarily, whatever natural and social barriers it confronts” (Foster 2010, 87). Capitalism thus is the source of the metabolic rift facing humanity and the environment. Yet according to its rationale, both are barriers which must be surpassed in order to continue accumulation, placing heavier burdens on people and ecosystems. In order to get to the root of this metabolic rift one must address, “the social relation of capital itself, given that the social metabolic order, ‘undermines the vital conditions for existence’” (Foster 2010, 86). The social relations of capitalism being highly concentrated forms of ownership where goods are allocated according to market power.

Considering the logic of capitalism, the concepts of social and ecological rifts will be used to analyze and critique the ways in which capitalist food systems exploit both people and planet. It is however, important to understand that these two concepts are not completely separate, in fact they are inextricably linked. Yet this distinction will be helpful towards the latter half of this analysis as the focus of the paper moves towards potential alternatives, many of which address only one of these rifts. But if Phoenix truly is to meet its sustainability goals, the social and ecological rifts must be perceived and addressed together. Otherwise, imagined “solutions” can serve to prop up the very forces and logics that created the metabolic rift. The economic rationale currently dominates the modern global food system through capitalist agriculture characterized by corporate

monopolies, massive farming operations, industrial/artificial inputs, genetically modified monocultures and export oriented cash crops.

Modern Global Food System

The ways in which humans, as a species, have produced food has undergone radical changes in the past few hundred years. Rather than tracing all the shifts that have occurred in agriculture, for the sake of brevity and acuteness, only a few will be discussed. The roots of our modern food system are visible in colonialism. When Europeans made contact with the “New World” it was arguably the first time the term “global trade” could become applicable. Raw materials and primary products from the Americas, many of which were sacred and revered by indigenous Americans, were transformed into commodities to be bought, sold or processed by Europeans. But before being purchased, the materials needed to be produced. Thus in America, slavery and indentured servitude were exploitative methods of producing commodities for global markets while war and broken treaties ensured Europeans the land for production as countless Indigenous American and African peoples were displaced. Through different structures, colonialism established this system in many parts of the Global South, yet one constant was the exploitation of labor and land for the benefit of privileged customers in distant markets.

This system has undergone many shifts in appearance but has continued to produce ecological and social rifts. One shift took place in the industrial revolution where steam and coal power allowed for higher yields, the ability to work more land, and

increased profits. Industry also increased the demand for labor in the urban factories, resulting in the movement of even more rural people into urban spaces, amplifying the metabolic rift. Agricultural production became mechanized allowing for more efficient production as can be seen by the sheer hours it takes to produce 100 bushels of corn. In the nineteenth century, it took 30-40 hours of planting and harvesting time to produce 100 bushels. After the industrial revolution, this was “reduced to less than three hours with the use of chemical fertilizers and large tractors for plowing, weeding, and harvesting” (Wittman 2014, 809).

Next, the Green Revolution was an attempt to, “improve world food availability by increasing productivity and streamlining an industrial model of production” (Wittman 2014, 209). Pushed by international financial institutions, this revolution in food production not only normalized but encouraged artificial fertilizers, pesticides, monoculture seeds, and giant consolidated farms (Holt-Gimenez 2011). In the 1960s structural adjustment policies were developed to exclude countries from certain loans, banks and trade agreements. Then later in the 70s and 80s, global institutions such as the World Bank and the International Monetary Fund, pushed these structural adjustments onto developing countries around the world, as a means to resist communism and fold these countries into the modern capitalist food system (Holt-Gimenez 2011). This amplified social rifts in these countries as small farmers could not compete with the cheap, large scale, subsidized, mono cultured food from elsewhere. These farmers lost ownership of their means to produce food for themselves, similar to the privatization of communal lands as seen during the enclosure movements in Western Europe. While international organizations and corporations tout the record levels of food production,

massive amounts of food aid sent to hungry countries and repeated commitments to halve the world's population of hungry people, the number of malnourished people globally has only increased (UNHP 2010, Holt Gimenez 2011). In fact, the rate of food insecurity has been on the rise since 2014, yet spiked in 2020, during the Covid-19 pandemic, reaching 2.37 billion people, roughly one third of the global population (FAO et al. 2021).

There are those however, who claim that this industrialized mode of food production is the only way to support the growing population and that only by investing further in large industrial farms, will all people be fed. Ted Nordhaus and Dan Blaustein-Rejno from the Breakthrough Institute argue in their article, "Big Agriculture is Best" that in a modern and affluent society, agriculture could, "not be anything other than large-scale, intensive, technological, and industrialized" (Nordhaus and Blaustein -Rejno 2021). They also assert that industrial agriculture and globalized trade, "benefits the global poor and further liberalization could lift millions out of poverty while improving food security" (Nordhaus and Blaustein -Rejno 2021). The authors continue to cite the North American Free Trade Agreement between Mexico and the U.S where the respective countries produced what they could do "most efficiently", for the supposed benefit of both countries.

Yet as the following sections will reveal, these claims are inaccurate and if used as guidance, will only further entrench the world in an unsustainable and inequitable food system. Here, the concepts of ecological and social rifts will be used to explore the ways that the capitalist modern food system actively creates crises for the well being of both the planet and humans on the global scale.

Modern Global Food System and the Ecological Rift

The Green Revolution stressed the use of what are now seen as unsustainable methods of food production. The emphasis on monocultures, artificial inputs and exportable crops created a food regime that is dependent upon the disruption of natural nutrient cycles which in turn affects the health of the planet as a whole. The current food system is incredibly dependent on artificial inputs. Figueroa-Helland et al., notes that by 2012, “genetically homogenous ‘modern’ monocultures already covered roughly 80 percent of global arable land” (2018, 177). Monocultures take a toll on the soil as they rely on artificial inputs to maintain soil and plant health. This is visible in the sheer amount of artificial pesticides that are used annually, roughly about 2.6 million pounds (Figueroa-Helland et al. 2018). Foster acknowledges the way modern agriculture has, “become increasingly dependent upon industrial operations and materials - such as the industrial fixation of nitrogen- in order to continue” (2010, 79). The current food system’s dependence on artificial inputs disrupts the health of topsoils, aquatic ecosystems, insect’s resistance to pesticides as well as reduces the planet’s biodiversity (Figueroa-Helland et al. 2018). Yet, this is startling considering that the nitrogen cycle is a planetary boundary of sustainability that humanity has already exceeded, alongside loss of biodiversity (Agyeman 2015).

The introduction of genetically modified monoculture seeds fueled a severe loss of the food system’s diversity. Seed diversity has been replaced by monoculture cash crops for global export and the planet has now become dominated by just a few homogenized seeds, leading to, “a loss of 75 percent of the world’s crop diversity” (Holt-Gimenez 2011, 315). This is evident in the twelve crops that currently “supply 80 percent

of global plant-based dietary energy” (Figuroa-Helland et al. 2018, 177). Ramifications of such a limited diversity in crops include higher susceptibility to pests as well as increased sensitivity to shifts in climate (Figuroa-Helland et al. 2018). Wittman notes that the industrial system of agriculture has been shown to, “reduce the stability of food production and the resilience of these ecosystems to disturbances”, being in a moment where climate change is creating many unforeseen disturbances, resiliency must be reconsidered. (Wittman 2014, 810). Modern farming operations, designed around monoculture cash crops, are typically grown for export to foreign markets, rather than for local consumption, relying on fossil fuels to transport the crops (Holt-Gimenez 2011).

The modern industrial food system produces a startling portion of the world’s greenhouse gasses. The system is dependent upon the transportation of these food products, sometimes, across the globe, contributing to the food system’s total emissions. While estimates vary, Holt-Gimenez asserts, “industrial agriculture and the global transport of food produce 20 percent of the world’s greenhouse gasses and use up 80 percent of the planet’s water” (2011, 315). More liberal estimates on the other hand place the greenhouse gas percentage closer to 50% (Figuroa-Helland et al. 2018). The rapid rate in which industrial agriculture demands natural resources and contributes to the ecological rift from soil health to biodiversity renders it inherently unsustainable (Figuroa-Helland et al. 2018). The rifts created by capitalist agriculture do not stop at ecological degradation. The capitalist food system also denies people the human right to food through the drastic consolidation of corporations, the incredible amount of food they control and the global rates of hunger that accompany them.

Modern Global Food System and the Social Rift:

Industrial agriculture ultimately succeeded in its goal of producing more food. Just in the 1990's the production of, "cereal crops increased by 17%, roots and tubers by 13% and meat by 46%" (Wittman 2014, 809). In her article Wittman mentions studies that revealed that food loss and food waste in the process of transporting food from field to fork may exceed 50% as our current global system, "relies on regional specialization and long distance transport of food" (2014, 810). The United Nation Environment Programme's Food Waste Index Food reports that 17% of all food produced globally goes to waste (roughly 931 million tons), despite the number of hungry people rising (UNEP 2021).

According to Figueroa-Helland et al. our current food system produces, "4600 kcal per person of edible food harvest, enough to feed 12-14 billion people" (2018, 176). Yet, simultaneously, "795 million people suffer from hunger while 2 billion suffer from food insecurity around the globe" (Figueroa-Helland et al., 2018, 176). This number only increased with the stress placed on the food system by the Covid-19 pandemic where rates of food insecurity jumped to 9.9 percent, a full 1.5 percent in a single year (FAO et al. 2021). That's roughly 10% of the global population that is currently food insecure. Meaning, according to the UN's Food and Agriculture Organization, that 10% of people on the planet lack, "secure access to sufficient amounts of safe and nutritious food for normal growth and development and an active and healthy life" (FAO et al., 2017). A recent UN report revealed the amount of people who did not have access to adequate food in 2020 alone increased by about 320 million (FAO et al. 2021). Also the rising cost of healthy diets coupled with, "persistent high levels of income inequality, put healthy

diets out of reach for around 3 billion people, especially the poor, in every region of the world in 2019” (FAO et al. 2021). The perplexing irony of hungry people to calories of food produced is also applicable to the Global South where about 80% of the malnourished, “reside in developing countries that produce over 70 percent of global food supply” (Figueroa-Helland et al., 2018, 176). Holt- Gimenez cited the World Food Program in stating that, “over 90 percent of the world’s hungry are too poor to buy enough food” (2011, 311). This irony represents the societal rifts created by a system that does not prioritize feeding people. Instead, capitalist agriculture views humans for their purchasing power and as a source of labor. Otherwise, the incredible food yields witnessed today would be distributed to the hungry people around the globe, regardless of their market viability.

The Green Revolution however, ensured that capitalist agriculture’s emphasis on growth, accumulation and profit took global precedence over feeding the hungry. The modern food system includes a very small number of corporations that continue to dominate larger and larger swathes of food system markets. Due to the accumulated wealth gained from concentrated ownership of agricultural productive capacity, these elite corporations are able to lobby and influence policy to increase accumulation. The destruction of regulatory frameworks pushed by the IMF and World Bank during the Green Revolution helped usher in “thirty years of liberalization, deregulation, privatization, and the consolidation of corporate monopoly power around the globe” (Holt-Gimenez 2011, 314). This also reveals that capitalist agriculture was not just supported, but aggressively pushed by large, legitimate international institutions. This framework was also heavily emphasized in the US as seen with Nixon’s Secretary of

Agriculture Earl Butz's statement, "Get big or get out" (Falvo 2019, 28). The resulting handful of corporations that control disproportionate parts of the modern food system represent the effectiveness of this deregulatory framework (Holt-Gimenez, 2011).

While large farms dominate the food system, small farmers are left without many options other than to be displaced or destroyed, as they are unable to compete with the larger operations (Figuerola-Helland 2018). These small scale producers lose ownership of their means to feed themselves and become reliant on industrially produced, imported food from other countries or regions (Figuerola-Helland 2018). This was the case in Mexico where the Mexican State, pushed by the market dynamics of the North American Free Trade Agreement, "shifted financial support from small-scale subsistence farming to production of cash crops for agro-export" (Brown and Getz 2011, 138). This resulted in a severe loss of land and an increase in food insecurity as Mexican producers of corn, a staple food source, stood no chance against the cheap subsidized corn being produced in the United States (Brown and Getz 2011). This reveals the disenfranchisement of small-scale producers, as farmers worldwide, "continue to lose access to land and productive capacity as a result of agricultural restructuring and increasing mobility of industrialized agriculture." (Wittman 2014, 810). That land's productive capacity is then purchased by major corporations who can produce food and accumulate wealth on the same land lost by the farmer. By 2002, "over 1.3 million jobs had been lost in the agricultural sector" of Mexico fueling the migration of labor to the United States as small-scale farmers lost their land and source of sustenance (Brown and Getz 2011, 139). This process is reminiscent of the rural -urban divide described by Marx where industry and capitalist consolidation renders the rural worker powerless and with little choice but

to move toward the city to toil in wage labor, deepening the social rift (Fidler 2012). This also occurs with food aid, where more affluent countries send surplus food to the hungry in poorer countries. In these cases, small scale farmers cannot compete with the free food aid being brought to their country and thus can lose their land and productive capacity. Holt-Gimenez notes the way these policy shifts allow companies to “dominate markets and shipping, and increasingly control the world’s food producing resources”, a palpable statement when looking at the few elite monopolies of the food system. (2011, 312).

The chemical giant Monsanto (now Bayer), in 2011, owned about 41% of the global seed market (Holt-Gimenez, 2011, 312) and currently controls about 95% of all genetically modified seed sales in the United States (Hubbard, 2019). Bayer, ChemChina, BASF and Corteva now control 60% of the entire world’s vegetable seed market (Holmberg and Freed 2020). Two companies, Archer Daniels Midland and Cargill, capture about two thirds of the world’s grain trade (Holt-Gimenez, 2011, 312), if the company Bunge is included, it is 80% of the grain trade (Holt-Gimenez, 2011, 315). Five firms control about 48% of the U.S grocery retail (Wal-Mart, Kroger, Albertsons, Safeway and Ahold) and over 80% of all beef packing in the United States is controlled by just four firms (Holt-Gimenez, 2011, 315). Wal-mart alone now accounts for one quarter of all grocery store sales in the United states (Holmberg and Freed 2020). In terms of the poultry industry, Tyson’s Foods, Pilgrim’s Pride and Sanderson Farms produce half of the chickens sold in grocery stores (Holmberg and Freed 2020). According to a report from the Spanish language business website called Bizxt, 10 companies control most of the food and beverage companies around the world with their

combined total sales adding up to \$390.8 billion dollars in 2016 (“Estas son los 10 marcas...” 2017).

The existence of these monopoly corporations result in a consolidation of power, resources and profits. Holt-Gimenez declares that, “monopolization of the world’s food provides these companies with unprecedented market power” (2011, 312). This market power is then translated into control of the food system from influencing policy through lobbying to determining market prices for their seeds. This can be seen in the way these corporations continue to raise prices to the detriment of small farmers. The four corporations who dominate the seed market have hiked up prices while the yields themselves have not improved accordingly. An example can be seen in the price to plant just one acre of corn, from 1995 to 2011 which increased by 259 percent while per-crop yield only increased by 30 percent (Holmberg and Freed 2020). The inequitable concentration of market power and control, held by the few food monopolies, leaves many small farmers devoid of ownership and power as people struggle to purchase food.

This reality reveals that something is not functioning correctly in this system. While these consolidated corporations control and profit off increased domination of global food systems, roughly about one sixth of the population, at any given time, is suffering from food insecurity despite record breaking food yields. (Holt-Gimenez 2011). This is a number that increased drastically in the last two years as the UN expects, “around 660 million people may still face hunger in 2030, in part due to the lasting effects of the Covid-19 pandemic on global food security” (FAO et al., 2021, 5). This acutely depicts the deep social rift that characterizes capitalist agricultural systems.

This is because as mentioned previously, allocation of resources or products are not determined by human or ecological needs, but by market power. In the modern food system, almost all of this market power lies in the hands of massive conglomerates. The 3 billion people who simply cannot afford healthy food, yet may produce some of it, represent a dire societal rift that results from a system of capitalist agriculture in which food is not a human right but a commodity to be purchased (Holt -Gimenez 2011). Also, it is painfully ironic that many of the people who cannot afford this food are connected to its production in some way shape or form. This represents the social relations created by capitalist agriculture where ownership of the means of production lies in the hands of concentrated corporations, so that agricultural laborers sometimes cannot afford or access the very food they are working to produce. A report on the Right to Food, written by the UN Human Rights Commissioner claims, “the majority of people suffering from hunger and malnutrition are smallholders or landless people... living in rural areas without access to productive resources” (UNHRC 2010). This facet of the social rift is visible in the hungry people not being able to access or pay for food amongst growing food surpluses, something not exclusive to developing countries. In California’s most agriculturally productive county, Fresno, “almost one-half of surveyed farmworkers are food insecure at some point during the year, agricultural sales increased by 32 percent, from \$2.8 billion to \$3.7 billion over the same period” (Brown and Getz 2011, 124). This shows many agricultural laborers and farm workers who directly contribute to the production of the globe’s food are not able to afford it nor do they own means of producing their own. Further evidence can be found in the Food Crisis of 2008 which

“saw record levels of hunger for the world’s poor at a time of record harvests and record profits for the world’s major agrifoods corporations” (Holt- Gimenez, 2011, 309).

In the last quarter of 2007, amidst a global food crisis that saw record levels of food insecurity, “Archer Daniels Midland’s earnings jumped 42 percent, Monsanto’s by 45 percent, and Cargill’s by 86 percent. Mosaic Fertilizer, a subsidiary of Cargill, saw profits rise by 1200 percent” (Holt- Gimenez, 2011, 312). These numbers represent a food system that believes, “No obstacle, crisis, or disaster in the food system is too large or too small that it can’t be turned into some kind of opportunity for corporate profit” (Holt- Gimenez, 2011, 312).

In sum, the social and ecological rifts are characterized by the, “displacement of tens of millions of small farmers, the reduction of crop diversity, and the destruction of biosystems”, creating a capitalist system dependent on fossil fuels, that leaves millions hungry as markets, growth and accumulation are the main concern (Ross, 2011, 250). Humanity is so entrenched in the metabolic rift created by capitalist agriculture that even local food systems, such as Maricopa County’s, find the logics, structures and practices of capitalist agriculture producing similar social and ecological rifts on a regional scale.

Capitalist Agriculture and the Maricopa County Food System

Next, the ecological and social rift framework is used to examine the ways that even local food systems such as that of Maricopa County, the fastest growing county in the United States, are connected to and mirror the larger global food system. These rifts will also explore the unique challenges facing the Maricopa County food system in terms

of drought resiliency, population growth, rising temperatures in a desert climate, and the rapid loss of agricultural land.

Yet before Maricopa County existed, this land had been supporting the O’odham (Pima) peoples for thousands of years. Since at least 300 B.C, and likely before, the O’odham, and their ancestors the Hohokam, have been cultivating food in the Sonoran desert (MARCO 2020). They constructed canal systems over 500 miles long, averaging 10 feet deep and 30 feet wide (gilariver.org). Using these canals the O’odham were able to grow tepary beans, melons, squash, corn and tobacco (gilariver.org). This irrigation system became the foundation for the modern canal system that serves the region today (MARCO 2020). O’odham agriculture supported them well into the 19th century as they fed, healed and housed many settlers moving west in search of gold (gilariver.org).

Yet after the Gadsden Purchase in 1854, agriculture on the Gila River reservation, in the Salt River Valley near what is today the city of Phoenix, where the O’odham and the allied Piipaash (Pima) people lived, was severely threatened (MARCO 2020). The threat came from many Mormon settlers who remained near what is now Mesa and the Salt River, establishing their own agriculture. To support settler agriculture they diverted water upstream from the Gila river, towards their farms and away from the O’odham and Piipaash (MARCO 2020, gilariver.org). By 1883, the O’odham and Piipaash people were confined to the Salt River Pima-Maricopa and Gila River reservations as non-native settlers quickly dominated the region’s agriculture and water management (MARCO 2020). This left many on the reservations hungry and dependent upon government-provided canned and processed foods. But in 1930 the creation of the San Carlos Reservoir, which piped water onto the Gila River reservation, saw a small revival

of agriculture (gilariver.org). The population of non-Mormon residents in Phoenix began to grow rapidly in the 1950s as air conditioning, accessible automobiles, and route 66 allowed for increased movement. However, it was not until 2004, after decades of struggle, that the Arizona Water Settlements Act was signed into law, guaranteeing water rights funding for tribal communities and agriculture (MARCO 2020).

Settlers entered into the Colorado River compact in 1922, in order to increase their supply of water (MARCO 2020). Then in 1973 construction began on the Central Arizona Project Aqueduct to divert the Colorado river to the Phoenix and Tucson areas (MARCO 2020). In 1980 following the depletion of groundwater from unregulated wells, the Groundwater Act was passed, creating Active Management Areas to better manage water. This constitutes the main region of study for this paper, the Phoenix Active Management Area (AMA). The population of the Phoenix AMA has increased from 1.86 million residents in 1985 to 4.75 million in 2018 (Guan et al. 2020). The Phoenix AMA refers to a large portion of Maricopa County, including major agricultural crop lands, power plants, the Salt, Verde and Gila Rivers and the Central Arizona Project aqueduct (Guan et. al 2020). Here, the ecological and social rifts created by capitalist agriculture are explored on the County scale.

Maricopa County and the Ecological Rift:

A quote taken from an Arizona Town Hall meeting in 2006 states, “current levels of air and water pollution, inadequate water supplies in some areas, and the loss of natural habitats, biodiversity and agricultural lands raise concerns that Arizona may have exceeded its carrying capacity in these areas” (2006) Carrying capacity essentially refers

to “the size of the population or community that can be supported indefinitely by the available resources and services” ultimately meaning that Arizona’s population has exceeded the resources available (Arizona Town Hall 2006). Conditions such as these brought Andrew Ross to argue that Phoenix is the most unsustainable city in the nation, in his 2011 book, *Bird on Fire*. Considering Maricopa County is located in the Sonoran desert, water serves as the most crucial resource that is becoming increasingly scarce. Studying water availability is important as one study directly acknowledges, temperatures will only increase in the future, particularly in desert climates and since, “deserts are already drastically hot, and hostile, additional warming is likely to be exceptionally damaging to their ecosystems” (Myint et al. 2021, 2).

Maricopa County agriculture will be directly affected by water shortages, impacting three of its four major sources for water. These three include surface water coming from the Salt and Verde River (Salt River Project), groundwater, and Central Arizona Project (CAP) water pumped from the Colorado River basin (MARCO 2020). The surface water from the Salt River Project (SRP) has and continues to, “represent the largest source of water supply to the region” (Guan et. al, 2020). Groundwater represents a significant renewable source of water in the arid Sonoran desert as it is expected that about one third of all water applied to agricultural lands, returns to the underground aquifer (MARCO 2020). While still relied upon, use of these two water sources have declined due to increased use of CAP water from the Colorado River Basin, drawing primarily from Lake Mead (MARCO 2020). However, according to multiple reports, each of these water sources are stressed and can be under serious threat in the near future (Guan et al. 2020, MARCO 2020, Myint et al. 2021).

Surface water has historically been a resilient and reliable source of water, since the days of the Hohokam peoples in 300 A.D. However, modern conditions have changed dramatically and now the flows of the Colorado, Salt and Verde rivers, “are currently (and have long been) under severe drought conditions” with projections that they will experience severe, “runoff reductions by the year 2050” (Guan et al. 2020, 5). This is expected to increase demand for groundwater, leading to unsustainable aquifer regeneration which the state has been trying to avoid since the 1980 Groundwater Act (Guan et al 2020). The debt that is currently placed on the natural aquifer of Maricopa County from agricultural use is 1.5, meaning farmers extract 1.5 times the amount of water that is annually returned to the aquifer through natural cycles (Myint et al. 2021, Falvo 2019). These rates will most likely only increase as water from the SRP and CAP suffer from decreased runoff and groundwater will be used instead. Reports claim that a reduction of surface water runoff can be attributed to increased temperatures leading to a heightened rate of evapotranspiration (MARCO 2020, Myint et al. 2020). This ecological rift is further exacerbated by increased temperatures from the urban heat island effect, where large urban spaces retain more heat than smaller rural spaces (MARCO 2020).

According to MARCO’s study on agricultural water usage, the average temperature of the Phoenix AMA has increased 6.5 degrees fahrenheit between 1895-2018 (MARCO 2020, 7). This ultimately affects the rate at which the aquifer is recharged as less water returns to the ground and more water evaporates. Lake Mead, the primary source of CAP water, is also suffering from increased evapotranspiration and severe drought conditions as its water level fell to its lowest in history last year, at just 36% full (James 2021).

According to Myint et al.'s study on more sustainable crop management of water, "inappropriate land use, land cover changes, overwhelming population growth, and adverse environmental impacts due to climate change will augment pressure on groundwater and are likely to trigger nonrecoverable depletion" (2020, 2). Agricultural use of the Phoenix AMA's annual water supply is about 40% yet has declined in recent decades to a severe loss of farmland as more water is diverted to urban and industrial sectors to support the ever growing population (MARCO 2020). But as population balloons, urban demand for water increases alongside energy's consumption of water to provide electricity for the expanding urban areas. The energy sector demands water to cool the power system, yet energy generation has increased water use from 19hm cubed in 1985 to 104hm cubed in 2009 (Guan et al. 2020, 5). Considering agriculture's literal dependence on accessible water to grow crops and food, the suspected decline in the resource could prove detrimental to local agriculture especially because most capitalist agriculture in Maricopa County is particularly water intensive.

According to multiple reports, the primary crops grown within the Phoenix AMA are water intensive and unsustainable for the region (Grant 2019, MARCO 2020, Guan et al. 2020). The most grown crops in the Phoenix AMA in 2009 included Barley (9% of cropland), cotton (30% of cropland), alfalfa (42.55% of cropland), corn (10% of cropland) and wheat (16% of cropland) (Guan et al 2020, 4, Myint et al. 2021). Myint et al. conducted a study of the amount of water used by each of these primary crops in the region, taking into account rates of evapotranspiration and found that alfalfa and cotton are particularly water intensive crops (Myint et al, 2020). According to the study, alfalfa and cotton were both the most water demanding crops and covered the most acreage of

agricultural land in the AMA about, 42.55% and 30% respectively (Myint et al. 2021, 18). Barley, which covers about 9% of cropland, was revealed as the least water intensive cash crop in the region, which only demanded “about 32% of the water use in alfalfa and 45% in cotton” (Myint et al. 2021, 15). Ultimately, of the 40% of the regions total water that goes to agriculture, “alfalfa accounted for more than half (56.81%) of the share, followed by cotton, which accounted for another quarter (25.36%), and then corn (8.01%), wheat (3.35%), and barley (0.97%)” (Myint et al. 2021, 19). This means that about 80% of the County’s agricultural water goes to cash crops for outside markets, alfalfa and cotton. Thus, the major cash crops that are produced in the region use massive amounts of local water and are grown for export or livestock consumption rather than feeding the local population (MARCO 2019). While the major cash crops require large amounts of water, a resource under threat in the desert, the current agricultural system of Arizona in general is also dependent upon imported nitrogen in order to continue.

According to a report from Doerge et al., titled “Nitrogen Fertilizer Management in Arizona” the major crops grown in the Phoenix AMA, require large amounts of nitrogen to maximize yield (Doerge et al. 1991). According to the study, cotton requires the application of 50-300 pounds of nitrogen input per acre of production (Doerge et al. 1991). While corn requires 175-225 lbs per acre and sorghum wheat, up to 60 lbs per acre (Doerge et al. 1991). The only major crop that does not require any nitrogen input is alfalfa, as it is able to symbiotically fix nitrogen itself (Doerge et al. 1991). According to the report, alfalfa is independent of supplemental nitrogen, while all other major crops of the state and the Phoenix AMA rely on nitrogen additions. Nitrogen is added to the soil to ensure the maximum yield possible from crops and as new crop varieties have been

introduced to produce higher yields, more nutrients like nitrogen are required to achieve this potential (Doerge et al. 1991). As a consequence of Phoenix relying on desert soil with little organic matter, there are insufficient nutrients to, “fully support the highly productive irrigated cropping systems found in Arizona” (Doerge et al. 1991, 1). The crops that extract this nitrogen are also rarely returned to the soil from which it was produced as the organic matter is shipped outside of the region, and the crop’s nitrogen along with it. While this study was conducted in 1991, the types of crops that are predominantly grown in the region and the soil it is planted in, have not changed. While the application or efficacy of the fertilizer may have increased in the past decades, Maricopa County still imports quite a bit of nitrogen fertilizer.

A report from the Maricopa County 2018 GreenHouse Gas Emissions Inventory, used numbers from 1987- 2006, taken from a U.S Geological Survey, to calculate an estimate of the total amount of nitrogen fertilizer used in the county. The study found that agriculture demands about 15,084 tons of nitrogen fertilizer a year, all of which, the study assumes, is artificially created and imported (Maricopa County GreenHouse Gas Emissions Inventory 2020). This reveals a capitalist agricultural system producing crops at a scale that is unable to be sustained by natural nitrogen cycles. Doerge’s report states, “there is no practical substitute for nitrogen fertilizers for commercial agriculture as is currently practiced in Arizona” (Doerge et al. 1991, 1). Yet, artificial nitrogen fertilizers which were made increasingly accessible after World War II can contribute to global greenhouse gas emissions and overuse can threaten the quality of air and downstream water quality (Holt-Jimenez 2011). Despite these clear ecological rifts in water and nutrient cycles being created by capitalist agriculture in the Phoenix AMA and in Arizona

generally, the Arizona Department of Agriculture and state representatives continue to support this large scale commercial system as it is beneficial for expanding state and global markets.

The Arizona Department of Agriculture produced a General Guide for Arizona's Agriculture in 2018. In its first pages, a message from Arizona Gov. Doug Ducey boasts that Arizona agriculture, "is estimated to be a \$23.3 billion industry" which "shipped 112 million cartons last year" to 70 different countries (AZDA, 2018, 3). The report includes a few of the countries who purchase the state's exports such as "China, Panama, France, Hong Kong, Canada and Mexico" (AZDA, 2018, 37). Ducey continues to advertise that Arizona has "one of the lowest corporate tax structures" and is "open for business" (AZDA, 2018, 3). This reveals a way that large businesses can use their means of ownership to influence state and local policy, as having a low corporate tax structure is a systemic way for the state to protect and support large corporations, not small farmers. The report also states that it expects exports to increase through involvement in the Western United States Agricultural Trade Association as, "the Department is connecting producers with exporting companies and markets in other countries" (AZDA, 2018, 37). Doug Ducey also proudly claims that in a short time Arizona will be supplying 75% of the nation's rose market (AZDA, 2018). On-farm agriculture in Maricopa County, "is a \$1.95 billion per year industry including direct, indirect, and induced multiplier effects" (MARCO 2019, 13) and if the AZDA is to be believed, that number will most likely increase. This reflects how government actors and institutions like the AZDA are entrenched within a global capitalist agricultural economy that emphasizes continued market growth, while paying no attention to the ecological rifts they create.

In his report, Grant Falvo notes the region's, "lack of appropriate governance at the municipal level to enforce water-smart, desert-adapted development" revealing how governments on both the municipal and state scale, fail to address the ecological rift of capitalist agriculture (2019, 21). This shows how it is not only on the state level, that ecological rifts are ignored in favor of market expansion. Vasquez-Leon made a similar analysis ten years earlier claiming, "despite water scarcity, the most important current risk-management policy mechanisms... encourage the most privileged (Anglo) farmers to continue to produce commodity crops that require large amounts of water" (2009, 299). She also notes the way, "these institutional mechanisms may be discouraging them from developing adaptive capacity" further enmeshing the local system into the ecological rift of capitalist agriculture (Vasquez- Leon 2009, 299). Many policy makers and representatives have never stepped foot on a local farm and are disconnected from ecological concerns. Andrew Ross claims his five year old child has a better understanding of the role of Co2 in the atmosphere than a Phoenix representative (2011). Ross also spoke to a local economist who claimed it may be cheaper to deal with the fallout of climate change than to transition towards a more sustainable system (2011). However, capitalist agriculture does not only create rifts in the local ecology, it also severely impacts the local population, creating a social rift similar to that of the global scale, leaving residents disenfranchised and unable to afford or access healthy food.

Maricopa County and the Social Rift:

One major facet of the social rift created by capitalist agriculture can be seen in the domination of giant, unsustainable cash crop operations and an exclusion of residents

from easily accessing healthy, fresh, and local food. Maricopa County Food Systems Coalition (MARCO) conducted a rare yet valuable analysis of the local food system using 2012 and 2017 Census data, supported by a grant from the Gila River Indian Community. This comprehensive food systems analysis provides a general overview of the county's methods of producing food, farm numbers, size, as well as food security and health of Maricopa residents.

MARCO's "Comprehensive Food Systems Report" depicts a food system with a significant social rift between people and their food. Maricopa's agriculture is ruled by just a few enormous farms. According to the report, 91% of farmland is owned by about 8% of farms, which equals about 203 total farms (MARCO, 2019). The report also reveals that "95% of all county sales come from just 186 farms which represents less than ten percent of all farms" with more than \$500,000 in sales (MARCO, 2019, 14). In contrast to these very few, massive farming operations, 49% of farms in the county reported less than \$2500 dollars in sales, meaning that most farms are small and simply can't compete with larger operations (MARCO, 2019, 14). The majority of farms in Maricopa County, about 1,495 farms out of 2,749, are growing food on less than 10 acres (Duval 2019). Of the 2,749 farming operations in Maricopa County, about 1800 of them do not reach annual sales that surpass \$25,000 (Duval 2019, 16). This emphasizes that the majority of Maricopa County farms are small, with little presence in the markets. On the other hand, an elite few farms manage the majority of the land, water and market power mirroring the current globalized food system, controlled by just a handful of monopolies.

A report suggests that domination of the agricultural sector is not new for Maricopa county. Since 1925, Maricopa's agriculture has been dominated by 50 farms

who control about two thirds of the agricultural land and are at least 2000 acres each (Falvo, 2019). The problem with such a monopolized local agricultural system, “is that large cash-crop farmers get to decide what is planted on the majority of Maricopa County’s crop acres, and they do not plant food for local consumption” (Falvo, 2019, 27). Acute ownership of local cropland results in the few large scale farmers deciding what gets planted. Ownership also allows these few elite farmers to have significant power in having their investments protected through state support as well as influencing local policy on things like water usage. Because these few operations control the majority of the land, and choose what crops to plant (ie. water intensive cash crops), this means, “the majority of the County’s agricultural water is used by about 50 farms” (Falvo, 2019, 27). According to Falvo, “this high-concentration cash crop model has not, in its decades-long existence, yielded a thriving local food system in the County” as producers supported by state departments such as the AZDA, prioritize exportable cash crops for the market, rather than planting food for local people (Falvo, 2019, 27).

Policy makers as seen in the previous section with Doug Ducey boasting of Arizona’s agriculture, seem to be disconnected from the majority of small scale farmers (MARCO 2019). This disconnect results in, “many decision-makers, and some local food champions, [being] unaware of how certain municipal policies and regulations can negatively impact food systems” (MARCO 2019, 4). This disconnect has made the small scale farmers feel incredibly isolated and underrepresented in government as large scale cash crop farmers, those who control the majority of crop land, are able to influence, through lobbying, the direction of legislation and state support (MARCO, 2019). As constituents and small scale farmers call for a shift towards more local accessible food,

their calls fall upon deaf ears. This is because growth appears to be part of Phoenix’s inherent economy, as a land-use attorney claims, “All of our policies are built on fast growth — it is the goal of Phoenix as an enterprise....” (Ross 2011).

The consolidated reality of Maricopa County's agriculture is most acutely felt by small scale farmers. Maricopa is one of the fastest growing counties in the nation and consequently agricultural land is being hemorrhaged in order to make room for large-scale urban development (MARCO 2019). According to studies, more than fifty percent of all land that has been used for agriculture in the County has been developed to make room for three million new residents in the past three decades (Guan et al. 2020, Falvo 2019). In 2020 alone, 200 acres of farmland were lost to urban development and according to the director of the Central Arizona Land Trust, “once a farm is paved over, it’s gone forever” (OEP 2022). The population explosion which is currently occurring, ultimately places a higher price on agricultural land as it becomes more and more expensive considering the minimal amount that remains. This then impacts small farmers who simply do not have the means to compete with massive operations or with large housing developers. Nor do small scale producers have the power to influence local legislation or garner high level investors in their favor, like cash crop farmers, as they are not producing goods solely for market expansion. The increased competition raises prices on crop land often rendering them unaffordable to the average Maricopa farmer, forcing a migration elsewhere or a change in occupation (MARCO 2019, 4).

Emily Davis wrote an article for *AZCentral News* that tells the story of a family farm in Phoenix, Blue Sky Organics, which has been operating for about 25 years with livestock, a farm stand and rows of organic produce. Yet, due to their land being

potentially bought by a housing development company, they might be forced to move, taking their dreams of growing organic food, outside of Maricopa County (Davis, 2020). In her article, Davis states that, “In 2000, there were 640 square miles of agricultural land in Maricopa County and 540 miles of residential land. In 2019, agricultural land has decreased to 410 miles while residential land has increased to 750 miles” (2020). The article cites the 2017 Census of Agriculture which found that the statewide loss of farms between 2012 and 2017 was 5%, but in Maricopa County specifically, the decline of farms was 24% (Davis 2020).

This rapid consolidation of small-scale farms ultimately represents a disenfranchisement of residents from the means of producing their own food, increasing the depth of the social rift. This process of consolidating ownership into the hands of the few, reminiscent of enclosure movements in Western Europe or neoliberal market expansion through the IMF and World bank, renders residents dependent upon imported food from other regions or countries. Ultimately, people become reliant on the capitalist agricultural system, deepening the social rift by increasing the amount of people who no longer own the capacity to feed themselves, whether as a community, city, or region. Instead, they are dependent upon food imports from all around the world, brought into chain grocery stores that are made easily accessible to those who can afford it, while those without the market power remain hungry.

Processes which were explicitly racially based, such as bank redlining in the 1930s and 1940s, contributed to this disenfranchisement. Bank redlining maps determined which parts of the city were worthy of investment and which parts investors should be wary of (McClintock 2011). By coloring certain parts of the city green, yellow

or red, banks, lenders and businesses were able to quickly determine the neighborhoods and communities that were white, wealthy and worthy of investments. While discriminatory lending practices certainly existed before the creation of these maps, “they helped to reify the delineation between rich and poor, between whites and people of color” (McClintock 2011, 99). Market based investments also apply to grocery store chains, who in the end are solely a business. A business, that as of recently has become the primary means of purchasing or accessing fresh healthy food for Americans (Holt-Gimenez 2011). Thus, supermarkets also followed the redlining map, moving and investing in the wealthy neighborhoods while leaving more risky (Brown, Black and working class) areas of the city to be populated with corner grocers and liquor stores (McClintock 2011). This reveals the way that in a capitalist food system the allocation of goods (in this case, an essential part of life, fresh food) is ultimately determined by markets and purchasing power, not by human need. It also reveals systemic methods of racist investment, where businesses and banks, owners of capital, were able to choose based off cost benefit analysis, where to invest. Acute ownership thus meant acute control over investments.

This process of redlining took place in many large urban cities around the country, and Phoenix is no exception. According to Phoenix’s redlining map the “hazardous” section D4 which correlates to a neighborhood in South Phoenix is described as, “very ragged, occupied by Mexicans, Negroes and the low class of white people” (Miller 2021). This type of language ensured that businesses, including large commercial grocery chains, abstained from investing in these neighborhoods. Supermarkets have become so dominant that, according to the United States Department of Agriculture (USDA), if you

are not within a mile of one, access to fresh food is considered difficult and you are identified as living in a food desert (Dutko et al. 2012).

This piece on redlining is to show the way that the capitalist food regime systematically disenfranchises, particularly Black, Brown and working class people, from accessing fresh food or having the capacity to feed themselves. Thus, it is no surprise that of the 200,000 plus residents in Maricopa County who live in food deserts many, “are low-income, communities of color and rural and tribal communities” (USDA Economic Research Service, 2017). In their report MARCO also found that a root cause for food insecurity in the county is poverty, the sheer inability to pay for food (2019). This inability to purchase food is partly a consequence of being disenfranchised from ownership and thus a means to accumulate wealth, power and influence. Historically racist lending practices by the USDA in the 20th century helped to exclude people of color from owning means of producing their own food, forcing them to depend on capitalist agriculture. (Orozco et al. 2018). By denying support and loans to farmers of color, throughout the 19th and 20th centuries, their ability to maintain ownership of farmland was systematically threatened by government agencies (Orozco et al. 2018). This has led to a further disenfranchisement from the food system, as elite corporations are able to influence governmental policy and gain support from wealthy investors in order to further consolidate control. (Orozco et al. 2018). This highlights the social rift of capitalist agriculture, where the means to produce goods and influence the food system belongs primarily to large scale industrial operations as food itself is viewed as a market commodity, a means to accumulate wealth.

Maricopa's food system reflects a capitalist focus on markets and a perception of food as a product rather than as a human right. A very simple way to express this is by looking at the reception of, "\$900 million of federal aid each year to provide food relief to low income residents" in Maricopa County (MARCO, 2019, 4). One disturbing aspect of Maricopa's food accessibility is that about 21% of children in the county, which is about 1 in 5 kids, experience limited or uncertain access to food (MARCO, 2019). In 2016, when residents were asked if they could pay every month for all of their essentials (housing, food and clothing), almost half of all Maricopa County residents reported they sometimes or never have enough money for all of the essentials (Maricopa CHNA 2016). This is the case even despite 12% of residents in the county receiving SNAP benefits (MARCO, 2019). Simultaneously, about 14% of the population roughly about 585,330 residents are food insecure while the obesity rate is higher than the national average at 29%, reflecting potential difficulty accessing fresh healthy food but convenient accessibility to low nutrition, processed foods which are commonly found in corner stores and fast food restaurants (MARCO, 2019). One study attempted to map out food deserts in the county by using census block data. The researchers calculated proximity to a supermarket, and the results suggest, "80% of low income block groups are located out of a grocery store's service area" which includes about 233,000 residents (D'Acosta, 2015, 40). This reveals one facet of the social rift created by capitalist agriculture, the inability to make food accessible for all of its people. An article that looked at the role of gardens in Phoenix, interviewed people in the Phoenix area and found 33% of 620 respondents claimed they were food insecure. (Giraud, 2021). Rates of food insecurity in

Maricopa County and Arizona exceed the national averages by almost a full 2% (MARCO, 2019).

Just as in the global food system, agricultural laborers, those who have a hand in harvesting and producing the world's food, are often left vulnerable. One of the only studies found that looked at the well being of farmworkers in Arizona, focused on farmworkers in Southeast Arizona, many of whom were of Mexican, Latin- American, or Indigenous origins. While not looking at food accessibility directly, the study analyzed social support systems and found that for farmworkers, far more than other populations, access to supportive social networks is critical to their survival (Vasquez- Leon 2009). Vasquez- Leon notes that despite, "their historical role in the development of agriculture in the region... farm workers remain highly vulnerable" (2009, 299). Particular periods of harvest season are especially dangerous for seasonal agricultural laborers as they can be, "abandoned in the middle of the desert by an unscrupulous contractor" (Zasquez- Leon 2009, 299). This was the only peer reviewed study that looked at the vulnerability or well-being of farmworkers in any part of Arizona which in and of itself reveals the sheer lack of attention and support that farm workers receive from the local capitalist food system. These farmworkers fuel the modern food system yet are unable to afford the food they harvest as it is meant for outside markets, not local consumption.

The local capitalist agricultural system, dominated by local large scale cash-crop farmers, does not prioritize feeding Maricopa residents. Instead, local agricultural policy, water usage and seeds planted are determined by the very few owners of crop land. The large scale cash crop producers use local water and nutrients to grow crops for export as many residents, devoid of ownership, are dependent upon food aid. Consequently,

“residents are interested in engaging in solutions that leverage food to develop social connections and build community” often working with organizations who “are committed and show key shifts towards a focus on policy and systems change” (MARCO, 2019, 4). Yet when faced with state representatives whose motivations are reaching new markets as seen with local large scale industrial farmers, Doug Doucey and the AZ Department of Agriculture, their calls for a system that feeds all residents rather than the global market, are often moot.

Many activists claim the food system is “broken” (Holt-Gimenez 2011). It is not. In fact it is functioning exactly as it is supposed to, guided by the capitalist logic the system produces profits for shareholders, precarity for the planet and hunger, particularly for people of color and low income residents. As Falvo writes in their report for MARCO, “If a few big farms use the majority of the County’s land and water to make their profits and are not helping to build a vibrant local food system that is healthy, equitable, sustainable, and thriving, **then a newly organized system of production is necessary**” (2019, 28). Thus, in order to begin working towards a resilient and sustainable local food system as Phoenix has committed to doing by 2050 (COP 2016), we must critically examine two competing forms of sustainability which can be seen as guiding potential alternatives to ease Maricopa County’s ecological and social rifts.

Moving Forward

In 2016 Phoenix made goals to become a sustainable and resilient city by 2050 (COP 2016). These goals touch on many facets of both the ecological and social rifts and if achieved would bring about an equitable and sustainable city. Phoenix’s commitment is

certainly great and worth noting. However, not all efforts are potentially transformational in that they challenge the logics and structure of the capitalist food system. Many reports and programs fail to address both the ecological and social rifts facing the county, and thus merely play at the margins of change. Two disciplines of sustainability will be used to analyze current efforts by the city of Phoenix and Maricopa County to ease the metabolic rift. While looking at local attempts to ease the current capitalist dominated food system, two main forms of sustainability emerged. Sustainable development is the form of sustainability that dominates policy and international organizations. It heavily influenced the 17 Sustainable Development Goals of the United Nations and can be seen as kind to the market mechanism of capitalist distribution by focusing solely on the ecological rift. Yet, because of the acute focus on market based environmental preservation over human well being, just sustainability emerged in order to appropriately address the social rift as well. Just sustainability sees both ecological and social issues as pivotal. This form of sustainability can challenge the current market based form of distribution by viewing food and access to natural resources as a human right, supporting cooperative based, capacity building alternatives. Just sustainability attempts to place social justice at the heart of ecological solutions accounting for both the social and ecological rifts, and thus retaining potential for transformative change.

Sustainable Development:

Sustainable development as a general theoretical framework has existed in the larger discourse of development and the environment since the concepts were introduced in 1972 at the UN Conference on the Human Environment. While the term “sustainable

development” itself was not explicitly used, the concept of a more eco-friendly form of development was articulated, primarily by non governmental organization’s (NGO) putting pressure on international organizations (Egelston 2006). Inspired by paradigm shaking books such as Rachel Carson’s *Silent Spring* and Garrett Hardin’s *Tragedy of the Commons*, sustainable development was noted in a 1987 “Our Common Future” report from the World Commission on Environment and Development or “The Brundtland Report”. In this report the core concept of sustainable development appeared, “development which meets the needs of the present without compromising the ability of future generations to meet their own needs” (Sustainable Development Commission). It is generally viewed as a, “holistic approach to the relationship between man and the environment” (Egelston 2006, 2) Yet, it was not until the Rio Summit in 1992 that sustainable development was explicitly recognized by governments around the world. In 2002, South Africa hosted the World Summit on Sustainable Development involving 191 National governments, UN agencies, financial institutions and other major groups (Sustainable development commission).

2015 ultimately became the year that all member nations of the UN signed and agreed to the achievement of the Sustainable Development Goals (SDGs) at the UN Sustainable Development Summit which articulated 17 SDG’s, 169 targets and a plan to attain them by 2030 (Attapatu et al 2021). These goals span a broad spectrum of ecological and social issues created in part by the capitalist food system and if actually implemented could bring about a paradigm shift in international cooperation and human well being, away from capitalist development. Sustainable development is theorized to have three pillars, economic, ecological and social. Yet sustainable development has been

a nucleus concept that has changed over the years. The framework's changing development is visible in the addition of the social pillar in 1995. Yet, Attapatu et al., argue that this social pillar has remained under theorized and commonly forgotten about (2021). The authors also critique the UN's form of sustainable development as creating a false sense of unlimited economic growth, regardless of the limits of the biosphere, as 'ecology' is articulated as a pillar, which society and the economy are separate from, rather than the literal foundation for all forms of development and survival (Attapatu et al. 2021). Sustainable development began as a radical potential alternative, yet it has often been rendered unjust by a particular focus on the economic and ecological pillar, in order to create, "the illusion of unlimited economic growth on a finite planet" (Attapatu et al, 2021, 5).

This means that the term sustainable development has not always held the same meaning for all actors. Certain actors have historically defined sustainable development according to their particular needs. Egelston acknowledges this disparity stating, "Business and industry groups focus on waste elimination and health and safety improvements" while, "minority groups focus on equal access to environmental resources" (2006, 2). The SDGs in theory, "seek to realize human rights for all" and the fact that every member of the UN committed to these, marks a massive shift in conversation (Attapatu et al. 2021, 5). Yet, a significant critique is made of the dominant form of sustainable development as it tends to envision, "economic growth as the primary engine of poverty reduction" (Attapatu et al. 2021, 6). The SDG's include GDP as a measure of economic success and this ultimately articulates the contradiction between continued economic growth and sustainability which lies at the heart of the framework

(Atapattu et al. 2021). The fundamental belief that “inclusive and sustainable economic growth can drive progress and generate the means to implement the Sustainable Development Goals” is the reason many critics feel as though sustainable development preserves, “the status quo by calling for an increase in economic growth.” (Attapattu et al 2021, 8). Attapattu et al., acknowledge the critique some scholars express in that, “sustainable development has been deployed by global elites to continue to subordinate nature to the imperatives of economic growth, while ignoring ecological limits and planetary boundaries” (2021, 5).

The Sustainable Development Goals of the United Nations may appear to address almost all of the issues deepening the ecological and social rifts when taken as an indivisible whole. However, when creating policy, of the three pillars they articulate, economy and ecology tend to get overemphasized (Attapattu et al. 2021, Greenburg 2018). One facet of sustainable development is a “green economy” or “green growth” which according to Atapattu et al., “does not replace sustainable development but creates an enabling framework for its realization” (2021, 8). Atapattu et al. claims that according to the UN Environment Programme (UNEP), a green economy is one, “which is low carbon, resource efficient and socially inclusive” (Attapattu et al. 2021, 8). The United Nations Environment Programme has been a proponent of “green growth” as an engine for continued market expansion to create jobs and eliminate poverty (Atapattu et al. 2021). In a report on a “green economy” the UNEP attempted to debunk the myth that sustainable development isn’t lucrative and is unable to coincide alongside economic growth. The UNEP makes efforts to appeal to potential investors by arguing that

“greening” economies, “neither inhibits wealth creation nor employment opportunities” (Atapattu et al. 2021, 8).

In her book chapter, Miriam Greenberg, argues that current forms of urban sustainable development and green projects in fact harm and displace many people. The harm however, avoids corporate investors, representatives, or wealthy individuals, the main proponents of “green growth”. Due to the, “complex metabolic interrelationships between urban and natural systems”, “green economies” can create, “unintended consequences, both social and ecological” (Greenberg 2018, 186). Greenberg looks at the construction of a community garden in San Francisco to articulate the disconnect between “green growth” and the people it was claiming to serve. The newly constructed community garden was replacing an older recycling center which supported a large amount of the houseless population in the area, providing a vital source of livelihood (Greenberg 2018).

Yet, the community garden, under the banner of “green development”, was sponsored by Levy Strauss & Co., YP (formerly Yellow Pages) and CBS EcoMedia (Greenberg 2018, 3). These companies used this opportunity to promote their commitment to “green” development and marketing (Greenberg 2018). Here, sustainability was understood in terms of community and ecological growth through, “the growth of brand equity for the sponsoring companies and their clients”. Greenberg also noted who actually constituted the “community” that the garden was meant to serve, considering activists, low income residents and houseless community members resisted the displacement of the recycling center. It appears the “community” the garden was created for, was in fact, “that of real estate and business interests at the local and city

scale as well as new and prospective upper income residents” (Greenberg 2018, 181). Ironically, this was occurring while San Francisco was earning awards for being one of the greenest cities in the country for its “Zero Waste” campaign which caused, “the materials that once went to local recycling centers were now largely diverted into waste transfer stations and landfills in poorer, non-white, southern areas of the city and beyond the city’s borders” (Greenberg 2018, 184).

This case in San Francisco is not an isolated struggle between market oriented “green” solutions and more community based efforts with one more real estate and market friendly and the other less so. This example reveals how sustainable development achieved through “green” growth are guided by market mechanisms in an attempt to portray sustainable development as economically viable, while oftentimes failing to address the social pillar. The emphasis on the economic pillar is also seen in the fact that, “potential market impact plays an outsized role in determining which sustainability projects get funding” (Greenberg 2018, 186). This is partly due to large think tanks or organizations such as the Rockefeller Foundation’s 100 Resilient Cities Initiative which attempted to support “best practices” of urban sustainability through awards, networking and publicity. (Greenberg 2018). This creates competition between developing cities to gain a “sustainability edge” over their competitors to appear more attractive for investment (Greenberg 2018). Greenberg notes how cities and urban regions, “race to win green credentials- in part as a tool to attract affluent residents and achieve global city status” (2018, 185).

Yet scholars have recognized an “equity deficit” as sustainable development, particularly in urban regions, leads to rent hikes, displacement, disappearance of local

cultures and divestment away from small businesses and local farmers (Greenberg 2018). In fact, Greenberg explicitly acknowledges, “many of the ‘greenest’ cities, are also associated with excluding and disadvantaging the low income, and disproportionately, people of color” (2018, 186). Sustainable development, to be implemented through “green growth”, ultimately remains market and growth oriented; focusing on “green” labels and awards to attract wealthy residents, rather than being primarily concerned with the ecological and social rifts presenting both the globe and local communities. Since many green “solutions” are based on market growth, “to a large extent they promise to contribute to the global production of the very problems they ostensibly seek to address” (Gould and Lewis 2016, 152). At the end of the day, “our present “green” or environmental orientation of sustainability is basically about tweaking our existing policies” (Agyeman 2005, 6). While sustainable development may have begun as a radical, paradigm shifting framework, it has been reduced to market based, “green” investments into elite sponsored programs that do not challenge but perpetuate inequality. Thus, the framework of just sustainabilities attempts to fill this gap by placing ecology and society at the center and addressing the “equity gap” found in most “green” developments.

Just Sustainabilities:

Just sustainability is a theoretical framework initially articulated by Julian Agyeman, Bob Bullard and Bob Evans in Agyeman’s 2003 book *Just Sustainabilities: Development in an Unequal World*. Agyeman quotes Low and Gleeson stating that, “sustainable development without environmental justice is an empty formula” (2005, 94).

It has since developed into a distinct form of sustainability which views ecological degradation as inextricably linked to questions of equity and quality of life. The foundational concern of just sustainabilities is, “the need to ensure a better quality of life for all, now and into the future, in a just and equitable manner, whilst living within the limits of the supporting ecosystem” (Agyeman 2003, 5). Sustainability emphasizes the pivotal role that justice and equity could and must play within ecological issues. In order to articulate the prominent role justice should play in questions of ecology, just sustainabilities utilizes the language of human rights. Yet this conception of human rights to food, water and a clean environment do not solely apply to present generations as considerations of future generations are necessary.

Agyeman argues that just sustainabilities, “implies a paradigm shift that requires sustainability to take on a redistributive function... To do this justice and equity must take center stage in sustainability discourse” (2005, 6). A foundational belief within just sustainabilities is that, “a truly sustainable society is one where wider questions of social needs and welfare and economic opportunity are integrally related to environmental limits” (Agyeman 2018, 42). Put simply, “to be environmentally sustainable, cities must also be socially sustainable” (Agyeman 2005, 42). Agyeman quotes another scholar named Adjer in saying that, “inequality, in its economic, environmental and geographical manifestations is among the most significant barriers to sustainable development” (Agyeman 2005, 43). For, so long as ownership remains in the hands of a few elites, the plans for how to become sustainable, will be developed by them! Wealthy elites, through lobbying, legislation and “green” projects, have the capacity to shift negative environmental effects away from their spaces towards lower income neighborhoods of

color (Gould and Lewis 2016, 153). This process allows the wealthy to be, “surrounded by environmental amenities while being insulated from environmental hazards” making “their capacity to comprehend the severity of environmental threats...attenuated” (Gould and Lewis 2016, 153). This is why directly connecting the environment with the disenfranchisement of low income and people of color in particular, is a fundamental facet of this form of sustainability as proponents emphasize the, “interdependency of social justice, economic well being and environmental stewardship” (Agyeman 2005, 86). Especially when considering racist lending practices and redlining maps which explicitly limited investments into low income neighborhoods and communities of color.

There are four key principles that underlie the just sustainabilities framework. Agyeman states these are “1. Quality of life, 2. Present and future generations, 3. Justice and Equity, 4. Living within ecosystem limits” (2005, 92). These four areas of concern are all related and interconnected to some degree. Quality of life is concerned with the way we measure economic well being, as just sustainabilities advocates claim we need a new way to measure progress, for GDP fails to take human well being into account as oil spills and natural disasters are technically good for GDP (Holt-Gimenez 2011). Just sustainabilities presents the Genuine Progress Indicator (GPI) as an alternative measurement of well being as it takes into account, “20 aspects of our lives to evaluate the economy” (Agyeman 2005, 93). In Addition, the considerations of not just the present, but the future generations of people who will live on this planet and depend upon this land must be considered and be the foundation for policy creation (Agyeman 2005). Justice and equity, the core of this form of sustainability, relates to the critical lens taken to, “justice and equity implications of international agreements , especially those related

to trade and economic development” (Agyeman 2005, 95). As to living within the ecosystem limits, this implies an attempt to achieve all of these social and economic changes for the whole planet while not permanently draining the earth of its capacity to support human life. This will require a change in the way markets distribute goods and food as well as a reduction in consumption for the global North.

Just sustainabilities represents a serious attempt to look, “holistically at the human condition, at human ecology, and to foster joined up or connected...policy solutions to humanity’s greatest problems” (Agyeman 2005, 43). Agyeman quotes another author by the name of McLaren who argues, “contaminated sites in American Black communities is an expression of the same unsustainability as the expropriation of indigenous subsistence resources by logging companies in Indonesia”, because both are facilitated by the same unsustainable process of neoliberal global capitalism (2005, 103). Thus the human and ecological rifts created by the current capitalist system which dominates the globe, must be emphasized and challenged together in order to create any sort of systemic shift towards equity. One means of critically engaging with these rifts is by recognizing the very real ecological limitations of the planet. While sustainable development tends to place society and the economy outside of the environment, creating a facade that unfettered growth is possible, just sustainabilities remains within its limits. This is achieved by massive reduction in consumption by the global North and through alternative means of distributing the remaining natural resources (Agyeman 2005).

One method of addressing alternative economics is an emphasis on cooperative and public ownership, participation and distribution. Just sustainabilities can be seen as promoting the creation of alternative types of markets where distribution of goods is not

solely based on purchasing power. This is done by increasing the role of the user or consumer in the design, production and distribution of the goods in which they consume, blurring the line between consumer and producer, owner and worker (Agyeman 2013). Co-production ultimately sees, “people as assets rather than burdens, invest[ing] in their capacities” and most importantly, “it is the potential of co-production, to meet needs” (Agyeman 2015, 21). The potential to meet needs stems from more people involved in ownership. Having the capacity to create wealth by cooperatively owning a form of production has the potential to re-enfranchise people into the food system. Agyeman also comments on how co-production in local food, “offers an insight into how co-production can build capacities and increase freedoms (in terms of providing security from unstable and insecure global markets for food and energy)” (2013, 21). This challenges the privatization facet of capitalist agriculture as it reclaims a form of shared community resources and thus the capacity to support one’s needs (Agyeman 2015). The cooperative model of ownership encourages sharing, communal ownership and can potentially satisfy needs while simultaneously disrupting the capitalist logic of private ownership and accumulation.

The satisfaction of these basic needs certainly concerns food which is why these two competing forms of sustainability provide the framework for my next section of analysis. The rest of the paper will look at current programs, policies and studies at the scale of Maricopa County and the City of Phoenix to determine if they are more aligned with sustainable development (market based, fails to address the social rift created by capitalist agriculture) or just sustainabilities (emphasis on both ecological and social rifts).

Sustainable Development and Just Sustainabilities in Maricopa County

Here local studies and projects are analyzed and categorized as being in line with the sustainable development framework or just sustainabilities. Two recent studies conducted within the Phoenix AMA look at drought resistant cash crops and the Food, Water and Energy Nexus, respectively. These, along with the Green and Sustainability Bonds adopted by the Phoenix Finance Department, represent a sustainable development framework as they appear to be primarily market based alternatives that may challenge the current unsustainable capitalist system of agriculture but do not address the social rift created by it. Other programs, however, fall in line with the just sustainabilities framework as they attempt to disrupt the capitalist food system by focusing on mending both the social and ecological rifts. Programs such as the Double Up Program, the Sustainable Cooperative Program, and studies such as Falvo Grants, represent movement towards an alternative food system in which people can have the capacity to feed themselves, participate in ownership, live within the planet's boundaries and where fresh food is accessible to all.

“Sustainable” Development in Maricopa County

The first objects of analysis which I categorize as falling into the sustainable development category include two recent reports on agricultural water use and the Food Water and Energy (FEW) Nexus in the Phoenix AMA.

A study conducted by Myint et al., looks exclusively at the role of water in agriculture and ways to develop more drought resistant practices. This study gained

enthusiastic support from local stakeholders, is incredibly in depth, and uses the most accurate numbers available for the quantification of water used for certain crops. The researchers look at the difference between wet and dry years as well as the role of evapotranspiration and double cropping on water usage (2021). The level of detail used in this study for calculating water use is accurate yet fails to consider population increase and the threat of growing urban development. The conclusion drawn by the authors is that farmers must critically consider the crops they are growing as there are significant differences in water demand determined by the seeds planted (Myint et al., 2021) In conclusion they claim, “extension of agriculture can even be considered for sustainable water conservation in critical agricultural production areas if lower water use crop types, drought tolerant crops, and double and/or multiple cropping practices are employed” (Myint et al. 2021, 23).

Yet the parameters of this study remain trapped by the capitalist rationale’s market focus, as it is only the region’s top producing crops that are considered in the report. Alfalfa, cotton, wheat, barley and corn are the only crop types included or investigated in the study, revealing that even in a critical analysis of carrying capacity, the logic is still oriented around markets rather than actual food for the community. The study found choosing between these cash crops during wet/dry years is pivotal to the viability of their continued production (Myint et al. 2021). While the study does not investigate the water consumption of other types of food crops, it does at least calculate water usage for barley, wheat and corn, which were all less water intensive than the main cash crops of alfalfa and cotton (Myint et al. 2021). The authors do suggest that, “If intensive water conservation becomes necessary when drought becomes a serious concern, non-food

crops that consume a much higher amount of water than food crops should be discouraged” (Myint et al. 2021, 20). The study at least acknowledges the fact that if conditions worsen, food production must be prioritized. Yet this study misses the opportunity to critique the local system of production as being concerned solely with ways to sustainably provide their product to markets. So while the study may ease the ecological rift faced by local cash crop farmers, it does little to mend the societal rift facing Maricopa county. In fact, this study may exacerbate the rift as stakeholders now have more ecologically sustainable methods of growing crops for the market rather than for its residents, lengthening the time before ecological limits force farmers to start growing food rather than products.

Another study conducted by Guan et al., still focuses on water but situates it within a larger interconnected system with food and energy. This study attempts to look at the feedback on the food and energy systems that the scarcity of water can have, yet through a sustainable development lens. The study quantifies and models the food, energy and water (FEW) nexus in the Phoenix AMA, using the Water Evaluation and Planning (WEAP) platform (Guan et al. 2020, 1). Through this method the authors propose five scenarios which attempt to speculatively imagine the future of the Phoenix area’s population growth, the role of agriculture as well as the method of energy production which are reliant on fossil fuels, natural gas and water to generate energy (Guan et al. 2020, 8). The study then uses a sustainability index borrowed from B.T Daher and R.H Mohtar, to measure the scenario’s sustainability. Of the five resulting scenarios, considering the future sustainability of the Phoenix AMA, only two produced sustainable results. The first would be a transition towards alternative emission free

energy using photovoltaic technologies by 2060, rather than the current fossil fueled power plants (Guan et al. 2020. 7). The energy sector would demand less water, allowing current agricultural operations to continue using excess water for cash crops (Guan et al. 2020). While this scenario may be “sustainable”, it does nothing to address the social rift as the capitalist method of distribution and production goes unchallenged.

The study determined one other sustainable scenario which, surprisingly, was “Business as Usual”. According to this scenario, coupled with increased urban development, “the cropland area is projected to decrease at the fastest rate, leading to the lowest food production and, at the same time, the smallest energy demand for water” (Guan et al. 2020, 13). This being “business as usual” coincides with an observation from Falvo’s study that claimed it must be assumed, “that planners and elected officials over the past century foresaw the effects of such development styles and made the conscious choice that the County’s food system would become import dependent and supplied through regional and global industrial trading systems” (2019, 23). Further dependence on imports, however, reinforces Maricopa’s reliance on an unsustainable global food system that is reliant on massive monopolies, fossil fueled transportation, and extractive monoculture cash crops. Thus, this scenario actually deepens the ecological and social rifts as residents rely on a food system that is not only unsustainable but inequitable. This scenario does not challenge the capitalist logic of distribution as food from all over the world is provided to those who can afford to access it. It would, in fact, further entrench the local system into the ecological and social rifts of capitalist agriculture, where resident’s need for food is subsumed by the demands of the market.

Similar to the San Francisco example from Greenberg’s chapter introduced in the Sustainable Development section, the former mayor of Phoenix saw sustainable or “green” programs as means to make the city more appealing. Phil Gordon served as Mayor of Phoenix from 2004 to 2012. When he was approached by community organizations attempting to establish farmer’s markets in the downtown area he claimed to be supportive, “but, like most city officials, his interest is framed, if not driven, by the prize of economic development” (Ross, 2011, 226). Gordon, like other city officials organizers worked with, saw the farmer’s markets as, ““a magnet to bring people downtown”” that would help them “polish their brand as attractive locations” (Ross 2011, 226). The representatives' desire for farmers markets essentially boiled down to market-based reasoning to attract more people to the city. Phoenix’s trend of attempting to use more sustainable efforts such as farmers markets to appear more attractive, is what I argue justifies the city’s recent adoption of the Green and Sustainability Bonds program.

In February 2020 the Finance Department of the City of Phoenix published the “Green and Sustainable Bond Framework”. This framework articulates that a “green” bond is, “a type of bond instrument where the proceeds will be exclusively applied to finance or refinance projects with clear environmental benefits” (Finance Department 2020). A “sustainability” bond, “is a type of bond instrument where the proceeds will be exclusively applied to finance or refinance a combination of ‘green’ and broader ‘socially-impactful’ projects” (Finance Department 2020). The bonds are issued with the expected spending on the project to happen in two or three years, to create short-term investments to ensure liquidity (Finance Department 2020). Yet Phoenix is not the only participant in the “green” bond market, other cities such as New York, San Francisco and

Portland, more “green” cities are also participating in the market. The adoption of such bonds could reflect a desire to appear more environmentally friendly and thus attractive.

It is also interesting to note that the proceeds provided by the green and sustainability bonds should, “be guided by and aligned with the City of Phoenix Environmental Sustainability Goals and the United Nations Sustainable Development Goals” (Finance Department 2020, 2). A detailed mapping of the 17 UN SDGs acts as one of the guiding principles. If this is true, what are the odds that programs funded by these bonds will not be primarily oriented around growth and expanding markets? The framework continues to discuss the, “momentum within global capital markets to establish a link between investments and achieving the SDGs” revealing that the funded programs will most likely be determined by market viability (Finance Department 2020, 3). After the potential project has been analyzed and measured by the sustainability office for predicted sustainability impact, the final decision as to whether to fund the project or not, falls upon the finance department. Once a project has become eligible for bond funding, “the Finance Office will evaluate whether the project can fit within market preferences and constraints” (Finance Department 2020, 3). In the end, this determines whether the project is eligible for bond funding. While projects funded through the Green and Sustainability Bonds may prove to be impactful and create positive change, it appears as though their very existence is still tied to the capitalist logic of market viability, rather than the actual physical needs of the local ecology and communities. These bonds can not explicitly challenge the structures and logics of the current capitalist food system as the emphasis remains on the markets. In the words of Atapattu et al., “An economic model based on perpetual economic growth ... is ill suited for the achievement of sustainable

development. Relying on the same system that created the problem to fix the problem is shortsighted, to say the least” (2021, 5). This is why just sustainabilities is a powerful and more challenging form of sustainability.

Just Sustainabilities in Maricopa County

The following projects, programs and studies I argue are in line with the just sustainabilities framework in that they reveal earnest attempts to reorient the structures and logics of the capitalist food system. These efforts aim to increase ownership through cooperatives and training programs, imagine ways to feed the county’s residents and increase the purchasing power of those receiving government assistance to purchase food. Ultimately, these programs represent means to ease the social rift and by doing so creating capacity to better mend the ecological rift as well.

Sustainable Cooperative Food Business Training Program:

This program is in its second round of training as applications closed on February 1st. The purpose of this program is to educate and train entrepreneurs thinking of starting a cooperative or people looking to join a cooperative food business and how to do so in a sustainable way. Funded by Phoenix’s Office of Environmental Programs (OEP) the training program is run by Thrive Consultancy inc. and supported by the Sustainable Food Economy Lab at Arizona State University. The program lasts 10-weeks and has sessions once a week for 3 hours for 25 Phoenix residents. In these classes the participants learn more about what it takes to manage or be a contributing

employee/owner of a cooperative business. The classes hit on all aspects of running a cooperative food business including planning, employee ownership, product development, sustainable practices and sourcing, marketing, fundraising and partnership development. Participants also have the option to gain employment in an already existing cooperative business such as Cutie's Lemonade or Community Cuisine (OEP 2022). The founder and director of Thrive is quoted on the OEP's website as saying they are, "committed to building forward by sponsoring cooperative business development with a focus on fostering sustainable, cooperative food businesses" as cooperatives have, "proven to be more sustainable and resilient than conventional business forms" (OEP 2022). Layton claims that the cooperative model makes businesses "that work for the owners, the community, and the planet" (OEP 2022). While all Phoenix residents are welcome to apply, on the Thrive Consultancy's website they explicitly, "encourage applications from **women** and **members of minority tribal communities**" (Thrive Consultancy inc. 2022).

The particular emphasis on minority and women to apply for the program is representative of how this program is in line with just sustainabilities. Thrive Consultancy's acknowledgement of women, minorities and indigenous people's disenfranchisement from the food system, in terms of access and ownership, entails that it has transformative potential. The training has potential to reorganize the current monopolized structure and incorporate more diverse people into positions of co-ownership. Co-ownership as mentioned in the previous section retains potential to provide the capacity to meet the needs of those involved as well as increase the decision making power of residents to potentially influence future policy. The fact that this is

oriented and taught in a way that emphasizes the need for sustainable practices, attempting to live within the region's ecological limits, reveals that this program not only has potential to help ease the social but the ecological rift as well. Integrating residents back into the food system is also being done through agricultural fellowships.

Urban Agriculture Fellowship Program:

This program from the OEP in association with the Maricopa County Food Systems Coalition just stopped accepting applications for its first round of recruitment this past January. The program funded by the American Rescue Plan Act (ARPA) Phoenix Resilient Food System Initiative will select nine applicants. These nine candidates will then work on a local farm in the Phoenix AMA for 20 hours a week while getting paid 15 dollars an hour. In addition to the wage, the candidate will also receive invaluable knowledge from a local master grower on how to operate, manage, and work on a farm. Applications were not for everyone; however, this program was specifically looking for youth between the ages of 18-24 who were interested in agriculture or farming. The reason behind this logic is to train the next generation of farmers, considering the average age of an Arizona farmer is 60+ years (MARCO 2019). Thus, by getting youth interested, involved and trained in desert specific agriculture with an emphasis on growing and operating sustainability, the training program which lasts a full year, represents a step towards a more sustainable local food system. The knowledge being passed to the younger generation is the capacity to grow food and ways to begin and manage resilient, sustainable projects (OEP 2022). This program emerged out of aging local farm owners reporting difficulty finding apprentices. While nine spots is not

going to restructure the entire local system, it symbolizes a push towards another food system in which agriculture remains in Maricopa County, is sustainable and is operated by the next generation.

Double Up Program

Through MARCO, Phoenix has begun participating in the Double Up program which exists nationally and is now accessible locally. The idea behind the Double Up program was to increase the purchasing power of people who receive SNAP/EBT benefits (formerly known as food stamps) to purchase produce locally. This amounts to about 12% of Maricopa County residents that are eligible to participate (MARCO 2019). If a resident purchases food or produce from a local grocer, Community Supported Agriculture program, Farm Express Mobile Market or farmer's market, they are able to spend ten dollars and receive twenty dollars worth of food in return (Double Up). The Double Up Arizona website has a tool in which you are able to search for locations that participate in the Double Up program, making it simple to find locations that participate.

This program does two things which can be considered as falling in line with just sustainabilities. It encourages residents to purchase food grown locally, thus supporting the small farmers who are quickly disappearing in Phoenix which in and of itself is important. The program facilitates transactions between Phoenix residents and helps to ease the ecological rift of capitalist agriculture by allowing the metabolic cycle to occur more sustainably since the soil nutrients remain within local systems, providing a means of beginning to mend the ecological rift. Another facet of this program which is equally important is to address the social rift of people not being able to purchase food. This

program serves to strengthen the purchasing power of lower income residents while rendering local healthy food more accessible. This program may not completely restructure the market-based means of distribution as seen in the capitalist food system. Double Up does, however, destabilize the capitalist logic by enabling the lower income residents, previously disenfranchised from accessing fresh food, the market power to purchase this food. As seen previously, the ability to purchase food is a significant contributor to food insecurity and thus the social rift. By increasing the dollar value of SNAP/EBT, local smaller farms are supported, healthy food is more accessible, and the potential for improved well being and less health problems increases with it.

Partnership With Native Americans X Local first Arizona/MARCO

Last year there was cooperation between Local First Arizona, MARCO and Partnership With Native Americans to construct and operate 100 hoop grow houses on Navajo lands. This was part of an attempt by Partnership With Native Americans (PWNA) to create and open lines of communication throughout tribal, regional and local initiatives to address work, challenges and opportunities in the Arizona food system (PWNA 2021). It is in this space that Tyrone Thompson of Chi'shie farms on the Navajo Nation presented his project to establish 100 agricultural hoop houses on Navajo land in order to train tribal citizens how to grow produce. It was also meant to, “create a food exchange market across various chapters of the Navajo Nation” (PWNA 2021). The Vice President of Programs at PWNA, Rafeal Tapia Jr. claims that their hope from these meetings was to establish, “viable solutions to preserve traditional food systems, support nutrition education and increase Native food access” (PWNA 2021).

While these efforts to establish hoop houses and train tribal citizens how to grow produce represents an effort to achieve food sovereignty, I argue it also falls into the just sustainabilities framework. This is because it is an effort to return the capacity to produce and access food back to tribal members. A system of food exchange across different chapters also represents a logic and structure that challenges the current growth oriented capitalist system that views food solely as a commodity rather than a human right, particularly for marginalized people such as indigenous communities.

Grant Falvo's "Local Food in the Sonoran Desert"

A report done by Grant Falvo in 2019 as a contribution towards MARCO's Comprehensive Food System Assessment, represents an alternative logic towards food that is nonexistent in the capitalist system. While not peer reviewed, it was the only discovered source that attempted to calculate how much food the Phoenix AMA could produce if agricultural land was transitioned towards drought resistant food production for the region's consumption. For the calculations, Falvo used a table taken from a 1999 report conducted by the Arizona Department of Water Management, on the level of water needed to grow a variety of different fruits, vegetables and grains in Maricopa County (2019). Falvo's study suggests that if all agricultural land in the county was converted to less water intensive agriculture for locals rather than cash crops, the County could satisfy the entire local population's USDA suggested portion of fruits and vegetables with locally grown produce (Falvo, 2019). This reveals a lot of potential, but there are few assumptions made by the study that hinder its confidence level. It relies on twenty year old water measurements and fails to account for the growing population, ever rising

temperatures, water differences in wet or dry years and whether this food production can be achieved through organic methods (Falvo, 2019). While not peer reviewed or published, this report is still powerful in that it represents an alternative rationale. One that is not focused on propping up the capitalist logic of market prioritization.

This study shows a potential shift in priorities towards a food system that strives to *actually* feed its constituents, what a novel concept! By looking at what more drought tolerant foods Maricopa County can actually grow, this study attempts to feasibly imagine an agricultural system that functions to feed local residents. This, coupled with state support to increase accessibility with efforts such as the Double Up program, has the potential to significantly ease the social rift as local agriculture would be grown for the specific purpose of local consumption. This in turn would have the potential to ease the ecological rift if the crops were drought tolerant and bio-diverse. For, in the words of Cindy Gentry, a Phoenix organizer, “No city can be sustainable as long as it is stalked by hunger” (Ross 2011, 227).

Studies have recognized many small-scale farms who currently use more sustainable methods to grow food primarily for community sustenance rather than cash crops. According to a study from Mpanga et al. that interviewed 30 small scale farmers active in Central and Northern Arizona on their methods of farming, they found, “52% of the small farms are family operations with dominant regenerative and sustainable practices (27% cover cropping, 26% compost, 23% crop rotation, 22% animal and green manure, 21% no-till, and 18% reduced tillage) (2021, 1). About 95% of these farmers used, “biological, cultural, or mechanical practices for weed, pest, and disease control” as opposed to chemical inputs (Mpanga et al. 2021, 1). Most importantly, amongst these

small-scale operations about 78% used water saving methods, pivotal in a warming desert climate (Mpanga et al. 2021). The article concludes with a declaration claiming that, “supporting and promoting these small-scale farming operations with research and technology will support sustainable local food production, reduce the negative impacts of conventional agricultural production systems, and enhance rural communities’ development.” (Mpanga et al. 2021, 7). This suggests 50% of Maricopa County’s farmers, on less than 10 acres, embody the country's potential to grow food sustainably (Mpanga et al. 2021, MARCO 2019). They represent an opportunity to build up local institutions and operations for the explicit purpose of sustainably feeding the County. It appears from the studies that if coupled with institutional support and innovative means to make local food accessible, small-scale farmers have the potential to challenge the capitalist agricultural system and ease the social and ecological rifts it has created (Mpanga et al. 2021). By addressing these two rifts, the studies ultimately represent the just sustainabilities framework in their potential ability to challenge the capitalist logic of production and distribution. When taken together, these studies envision a food system where food is accessible and agricultural production is conducted with an explicit focus on both residents' and the planet’s well being.

Discussion

The programs which fall in line with the just sustainabilities framework represent local attempts to address both the ecological and social rifts facing the Maricopa County food system. These programs are not entirely anti-capitalist nor do they exist completely outside of the capitalist agricultural system. They do, however, represent movement

towards an alternative logic, functioning within markets that essentialize human life and the health of the ecology. These programs are steps towards a local food system that mends rather than deepens the metabolic rift our system is currently entrenched in. Yet, are these efforts going to dismantle local capitalist agriculture? Most likely not. Are they enough to challenge capitalist social relations of hyperconcentrated ownership? I wish they were.

While these programs and studies may represent the imaginative seedlings of a more equitable, sustainable food system, they are simply not enough. Agricultural land is being seriously threatened by the exploding population. So while training the next generation of farmers (nine participants) is important, how will they buy land to grow on if property rates keep rising? Where will they grow food if urbanization's rampant expansion is left unchecked? Then there is the pivotal question of water. How will the county be able to produce its own food, if the rivers and aquifers are dry? So while these programs and studies represent an alternative logic to that of capitalism, there is still much more that needs to be addressed.

Firstly, the loss of agricultural land must be controlled. For if the county develops over all of this land, the capacity to feed its residents will be lost. While Guan et al.'s study claims that this scenario would be sustainable, it is not. Unable to produce their own food, local residents become completely dependent on imported food produced through unsustainable and inequitable systems of production. It will not change the way that food is distributed by the market, meaning the 500,000 plus residents that are food insecure will continue to struggle to access food.

A potential alternative to continued urban development is the incorporation of mixed-use zoning as seen with Agritopia in Gilbert, AZ, where the boundaries between urban and agricultural lands are blurred. Urban gardening also has great potential to provide people with the capacity to at least partially feed themselves and has also been shown to boost well being. Great potential also lies in the state's ability to scale up smaller farming operations (of which there are roughly 1,495 in Maricopa county) as well as support transitions to more sustainable and drought tolerant seeds and methods. Investing in local grocers or mobile produce vendors that are able to make fresh food more accessible to people in food deserts are alternative forms of distribution that when coupled with programs such as Double Up could improve accessibility. Cooperatives also have great potential to incorporate residents into means of business or farm ownership and thus into positions of potentially influencing legislation and investments. Yet even if all of these ideas came into fruition I could not guarantee a just and equitable local food system, there is more research that must be done.

One area of research which was initially intended to be the focus of this paper is to analyze what and how much food can actually be produced within the county's ecological limits. A critical analysis of Maricopa's carrying capacity can help lawmakers, farmers, and residents understand the full potential of their county. It can also provide a road map for activists, representatives, residents and others to imagine a way to realistically achieve a food system in which the ecological and social rifts created by capitalist agriculture can be eased rather than further exacerbated. This critical study must take into account the particular challenges facing Phoenix's food system such as rising temperatures, drought conditions, soil fertility, crop diversity, loss of farmland and a

ballooning population. Attention towards what types of seeds to plant, how they grow, their nutritional value and their drought adaptability is fundamental. In order to gain a better understanding of potential foodstuffs that can thrive in this region and the role food plays in maintaining a balanced relationship with the local ecology, local indigenous communities (O’odham and Piipaash) must participate in the imagining and creation of this new food system, considering their ancient relationship with this land. After the region’s capacity to sustainably produce food for resident’s is accurately gauged, then residents and policymakers can begin to feasibly imagine programs and means to achieve it.

Where Phoenix is currently, it does not seem likely that the city will achieve its sustainability goals by 2050. Many current efforts are still oriented around capitalist markets rather than local residents or ecology. It is time for this to change. Maricopa County does not have the water to continue focusing on growth and market expansion. Rather than boasting of all the countries local produce gets shipped to, the county should be focusing on serving the local residents who struggle to access adequate amounts of food. Instead of market viability deciding which program gets Green Bond funding, it should be the potential impact on community and ecology that is determinant.

Ultimately, the very structures and logics of Maricopa’s food system must be reimagined. In order to do so we must be able to navigate between efforts that will play at the margins of the system and those that can potentially constitute fundamental, systemic change. For only the latter will bring residents closer to an equitable and sustainable food system. The frameworks presented in this paper can serve as a guide to help differentiate the two. Whether future action addresses both the ecological and social rifts of capitalist

agriculture together, as just sustainabilities attempts to do, then it retains potential for transformational change. The ability to determine between structural change and merely shifting the current system, coupled with an accurate analysis of the region's carrying capacity, can provide a framework to realistically move towards a just and sustainable food system for Maricopa County.

Conclusion

The current capitalist agricultural system is unsustainable. It actively creates rifts in ecological cycles and society by disrupting natural systems and disenfranchising people from their food. In order to produce the massive food surplus that can currently feed the earth's population and then some, the capitalist food system exploits environmental resources and leaves 2.37 billion people food insecure (UNHCR 2010).

Yet, recent events have shed light on the inherent inequity within the capitalist food system. The recent Covid-19 pandemic revealed how precarious our globalized food system has become. During the pandemic, and still today, many products are unavailable or in limited supply in grocery stores. Simultaneously, people's inability to access or purchase food has been intensified as many people lost work and could not afford it, emphasizing the social rift of capitalist agriculture. The North American market also recently experienced a sharp spike in the price of fertilizer due to energy shortages, export curbs and trade sanctions, causing the cost of nitrogen rich fertilizers to rise by 10% in February (Elkin, 2022). This reveals one facet of the ecological rift, dependence on imported soil inputs, that can have consequences on global food prices further impeding low income peoples from being able to purchase food, highlighting the

inextricable relationship between the social and ecological rifts. Even more recently, however, the Russian invasion of Ukraine, has already had resounding impacts on global food prices. These two countries, together, produce about 30% of the world's wheat supply, and as the war continues, this may shed even more light on the social and ecological rifts that characterize our food system as the wheat supply dwindles and prices rise (Aizenman 2022). Since the Russians invaded Ukraine, the grain trade in Chicago, the global benchmark, has increased 50%, setting a record high (Aizenman 2022). These events reveal the precarious nature of our modern capitalist driven food system that actively deepens rather than eases the social and ecological rifts. These recent events blatantly reveal, among other things, why an alternative food system is necessary.

A push towards a sustainable and equitable food system must begin locally. The local ecology and residents must be considered in the creation of an alternative food system. For in a just sustainable food system, all residents are stakeholders, all residents are invested in the land's food and soil and all residents are fed. Local potential to protect agricultural land, grow drought tolerant seeds, conserve water, invest in small farms and explore creative means to distribute local food to residents, are, for now, significant. Yet in order to realize an alternative food system, residents and policy makers must navigate between efforts that merely shift the current inequitable system and those that challenge the structures and logic of capitalist agriculture.

Phoenix, while titled the least sustainable city in the world, still retains great capacity to achieve an alternative, just and sustainable food system. How much longer this capacity remains, however, ultimately depends on local efforts to seriously recognize the social and ecological rifts facing the region. Maricopa County and Phoenix must

promptly address the rifts *together* in order for a truly equitable and sustainable local food system to remain possible.

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