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**EXAMINING INDUSTRIAL AGRICULTURE AND
ITS EFFECTS ON WOMEN
THROUGH THE FRAMEWORK OF THE
UNITED NATIONS SUSTAINABLE DEVELOPMENT GOALS**

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I. INTRODUCTION: From Smallholder Farming to Industrial Agriculture

With the global population growing exponentially, so has the concern for food security. This was exacerbated in 2008 when global food prices rose while food supplies dropped, causing mass riots throughout the developing world.¹ Since the end of World War II, industrial agriculture has been seen by states and now multinational corporations as the remedy for feeding large, growing populations.² But as more food is being produced, more people are going hungry, and the move away from smallholder farming to industrial agriculture has impacted women disproportionately.³ This paper examines how women have been affected and how issues that have arisen can be addressed through the framework of the United Nations' Sustainable Development Goals, notably in the areas of food security (SDG 2), inequality within states and in relation with other states (SDG 10), and sustainable consumption and production patterns in industry (SDG12).

Post-World War II, the United States and European states began a policy of subsidizing the domestic agriculture sector to promote “the rapid transition from small, self-sufficient farms to large-scale industrial agriculture in order to maximize food production.”⁴ This kicked off the Green Revolution in the 1950s, when the concept of industrial agriculture was also exported to developing nations, and local farmers were encouraged to supplant traditional crops with “new varieties of rice, wheat, and corn that produced high yield in response to fertilizers, pesticides, and irrigation.”⁵

¹ James Thuo Gathii, *FOOD SOVEREIGNTY FOR POOR COUNTRIES IN THE GLOBAL TRADING SYSTEM*, 57 *LOYOLA LAW REV.* 509, 524–25 (2012).

² Carmen G. Gonzalez, *The Global Food System, Human Rights and the Environment*, 26 *NAT. RESOUR. ENVIRON.* 1, 7 (2012).

³ Rajeev C. Patel, *Food Sovereignty: Power, Gender, and the Right to Food*, 9 *PLoS MED.* 1, 1 (2012).

⁴ Gonzalez, *supra* note 2 at 9.

⁵ *Id.* at 9.

Throughout the 1980s and 1990s, developing nations in Sub-Saharan Africa, Latin America, and Asia experienced economic crises. With loans from the International Monetary Fund and World Bank came forced “structural adjustment,” which partly entailed inserting Western-educated technocrats into governments who oversaw the liberalization of their respective nation’s markets with the hope of insuring timely repayment of loans. Liberalization opened the doors to foreign investors, who saw opportunities in land rich but capital scarce nations.

Multinational agriculture corporations, whose primary interest is production and profitability, were and continue to promote the industrialization of farms in these nations as a twofold cure-all: states can prosper by foreign investments spurring state economies, and increased production can feed the growing numbers of hungry people. Industrial agriculture sounds promising, especially with corporations like agrochemical giant Monsanto claiming their commitment to “helping farmers double their yields” and “provid[ing] tools to feed a growing population.”⁶ But on the ground “[n]ations with the greatest dependency on food aid, and with the largest percentage of their population suffering from undernourishment, are increasingly net sellers of farmland.”⁷ In sum, the industrial agriculture model of crops primarily grown for profit and export by foreign investors is not feeding local people.

II. APPLICATION OF SUSTAINABLE DEVELOPMENT GOALS TO SELECTED ISSUES

Although there are many identified issues that have arisen in the evolution from smallholder farming to industrial agriculture, this paper focuses on four major concerns: market

⁶ MONSANTO COMPANY, FROM THE INSIDE OUT: MONSANTO 2014 SUSTAINABILITY REPORT 19 (2015).

⁷ Beth Robertson & Per Pinstrup-Andersen, *Global land acquisition: neo-colonialism or development opportunity?*, INT. SOC. PLANT PATHOL. 271, 272 (2010).

speculation and food insecurity, the displacement of farmers and foragers, the dwindling diversity of crops and foods, and the agrochemicalization of land and its effects on people.

A. Market Speculation and Food Insecurity

Sustainable Development Goal 2.c sets out to “[a]dopt measures to ensure the proper functioning of food commodity markets and their derivatives and facilitate timely access to market information, including on food reserves, in order to help limit extreme food price volatility.” Goal 10.5 sets out to “[i]mprove the regulation and monitoring of global financial markets and institutions and strengthen the implementation of such regulations.”

The global food crisis in 2008—triggered partly by market speculation in the United States and European Union commodity markets⁸ and grain reserves actively run down “as part of the neoliberal project”⁹—sent people in developing around the world into the streets to protest and even riot over skyrocketing food prices.¹⁰ This event could only occur in the context of the “new ‘imperial’ or ‘corporate food regime,’ which increasingly governs the production, processing, distribution and consumption of food,” and the food market where “relatively small disequilibria in the markets translate into huge fluctuations in prices.”¹¹ Speculation can have a very dark effect on the market as, “[e]xcessive levels of speculation can lead to sudden or unreasonable fluctuations or unwarranted changes (in one particular direction) in commodity prices.”¹² For those living in poverty or on the line of poverty, market volatility caused by speculation rather than food availability can determine whether food is ultimately available and affordable for families to purchase.

⁸ OXFAM INTERNATIONAL, NOT A GAME: SPECULATION VS. FOOD SECURITY 1–2 (2011).

⁹ Jan Douwe van der Ploeg, *The Food Crisis, Industrialized Farming and the Imperial Regime*, 10 J. AGRAR. CHANGE 98, 99 (2010).

¹⁰ Gathii, *supra* note 1 at 524–25.

¹¹ van der Ploeg, *supra* note 9 at 99.

¹² FOOD AND AGRICULTURAL ORGANIZATION OF THE UNITED NATIONS, PRICE VOLATILITY FROM A GLOBAL PERSPECTIVE 4 (2012).

As resilient as women have proven to be in the face of crisis, rural women, including indigenous women, in developing nations are more vulnerable to volatility in the food market than men, because of the traditional role of women as the household producer of food, as well as social inequalities which limit women's access to resources and their opportunity to find better paying jobs.¹³ This is compounded by women being the primary caretakers for children and other dependent members of the family.

In facing food crises, the response to high food prices is to reduce the purchase and consumption of food. Facing food scarcity, traditionally it is women who change their eating habits the most, eating smaller meals and less often because their priority is to feed their children.¹⁴ Although men have been shown to reduce their consumption in order to insure their children receive full meals, men do not reduce their consumption for their wives.¹⁵ This has proven to be especially harmful for women who are pregnant and/or lactating. For even healthy women, a reduction in food consumption affects women's health and their ability to pursue education and work, which widens socio-economic disparities.¹⁶

B. Displacement of Local Farmers and Foragers

There is no specific Sustainable Development Goal that addresses displacement. But Sustainable Development Goal 10.2 provides that “[b]y 2030, empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status.” Goal 10.4 sets out to “[a]dopt policies, especially fiscal, wage and social protection policies, and progressively achieve greater equality.” These two goals address inequalities, including those between men and women.

¹³ ANA PAULA DE LA O CAMPOS & ELISABETH GARNER, WOMEN'S RESILIENCE TO FOOD PRICE VOLATILITY: A POLICY RESPONSE I (2014).

¹⁴ *Id.* at 7.

¹⁵ *Id.* at 7.

¹⁶ *Id.* at 7.

The global food crisis of 2008 spawned the misconception that widespread hunger was due wholly to deficits in global food production, which set off a neocolonial land grab with foreign investors from Western and Middle Eastern countries purchasing land outright or entering into leases with state governments or large landholders ranging from 50 to 99 years.¹⁷

Industrialization has historically been responsible for the displacement of local, small-scale producers, and industrial agriculture is no exception. Producing a higher crop yield often means replacing the diversity of traditional crops grown by smallholder farmers, who farm an average of five hectares or less, with the monocropping of cash crops—corn, wheat, soybeans, and other grains¹⁸—grown for export on farms encompassing thousands of acres. Local farmers, including indigenous peoples, have been evicted from their lands by states looking to generate immediate revenue using “eminent domain for the public interest,”¹⁹ or removed in complete disregard of their multi-generational, customary farming of the public commons.²⁰ Farmers have also been removed by the state when “absentee landlords who, after decades of not showing up, claim back land occupied... for generations.”²¹ With the displacement of local farmers or local farmers working as contractors for agribusinesses, local land is being used to produce food for export rather than growing food to feed its people.

When women are displaced from traditional lands, they are not only more affected because of their role as household food producers, which magnifies the detrimental loss of land, but also because resettlement has proven to exacerbate the social inequalities between men and women.

¹⁷ JULIA BEHRMAN, RUTH MEINZEN-DICK & AGNES QUISUMBING, *THE GENDER IMPLICATIONS OF LARGE-SCALE LAND DEALS* 8 (2011).

¹⁸ *Industrial Crop Production*, SUSTAINABLE TABLE (2016), <http://www.sustainabletable.org/804/industrial-crop-production>.

¹⁹ BEHRMAN, MEINZEN-DICK, AND QUISUMBING, *supra* note 17 at 5.

²⁰ *Id.* at 6.

²¹ Daniel M. Caceres, *Accumulation by Dispossession and Socio-Environmental Conflicts Caused by Expansion of Agribusiness in Argentina*, 15 J. AGRAR. CHANGE 116, 130 (2015).

Displacement removes women from their traditional lands where for generations women were able to farm and/or forage for their families, which includes impeding access not only to food but for the “collection of firewood, water, and medicinal plants.”²² Losing access to the resources which provide food, water, fuel, and medicines all impede women’s ability to provide nutrition and healthcare for their families. Farming for women in developing nations is about the production of food for domestic consumption rather than export.²³ But with the rising industrialization of farming and the change in the economy that it brings, this has led to some agricultural communities referring to crops for domestic consumption as “female crops,” whereas those cash crops, produced for export, are “male crops.”²⁴ A shift in the way land is related to, from providing health and food for the people—families and the community—to a source of revenue, has justified displacement and the disenfranchisement of women.

Often when people are resettled, if they are compensated, the compensation will be directed to men. In negotiations over land with foreign corporations, which regularly fail to recognize local customs, women will be excluded from meetings, even when it is their land, often because of gender stereotypes and women having higher illiteracy rates than men. “[P]roperty grabbing from widows,” which is linked with illiteracy or little knowledge of property rights has also robbed windows of compensation for land.²⁵ In resettlement areas, new services and employment offered have been directed towards men because again, women often have a lower level of education and assumptions have been made by foreign agriculture corporations that it is solely men who care for their families.²⁶

²² BEHRMAN, MEINZEN-DICK, AND QUISUMBING, *supra* note 17 at 4.

²³ Patel, *supra* note 3 at 2.

²⁴ BEHRMAN, MEINZEN-DICK, AND QUISUMBING, *supra* note 17 at 4.

²⁵ *Id.* at 4.

²⁶ *Id.* at 13.

C. The Dwindling Diversity of Crops and Foods

Sustainable Development Goal 2.5 addresses the loss of genetic diversity in crops and foods, stating, “By 2020, maintain the genetic diversity of seeds [and] cultivated plants... at the national, regional and international levels.”

Related to the displacement of local people is the displacement of the diversity of local crops as they are replaced with “twelve crops currently supply[ing] 80 percent of our” plant derived foods, primarily grown for export.²⁷ In the twentieth century, “[s]eventy-five percent of the world’s food crop diversity was lost... as farmers abandoned tradition food crops in favor of a narrow range of domesticated plant species... This loss of genetic diversity increases the risk of catastrophic crop failure akin to the Irish potato famine.”²⁸ Dwindling genetic diversity through the loss of local crops is known as genetic erosion. Genetic erosion “has dangerously shrunk the genetic pool that is available for natural selection, and for selection by farmers and plant breeders, and has consequently increased the vulnerability of agricultural crops to sudden changes in climate, and to the appearance of new pests and diseases.”²⁹ Crop failure could lead to a price spike in that particular crop. This is problematic in a world where food price volatility can have such devastating effects on the poor.

Another issue in monocropping is the loss of diverse plant foods grown for domestic consumption, so food has to be imported. With cash crops dominating the domestic agricultural landscape, there is a decrease in traditional crops in the markets. The result has been that “dietary changes... and an increasing reliance on market foods with lower diversity [and] poor

²⁷ Gonzalez, *supra* note 2 at 2.

²⁸ *Id.* at 7.

²⁹ José Esquinas-Alcázar, *Protecting crop genetic diversity for food security: political, ethical and technical challenges*, 6 NAT. PUBL. GROUP 946, 947 (2005).

nutritional”³⁰ leading to undernutrition or on the flipside obesity.³¹ Integration with the market also increases vulnerability to the global food market because “the market may deliver cheap imports in some years,” but the global food crisis of 2007-2008 revealed the vulnerability of those nations that “ceded subsistence sovereignty to market reforms.”³² The same factors that have caused a loss of diversity also cause food insecurity.

The lack of diversity especially affects women because women are not only more vulnerable to market volatility but women are responsible for providing nutrition for their families. With local crops being replaced with cash crops, and quality import foods becoming increasingly unaffordable for poor and indigenous women, the nutrition enjoyed in having a diversity of plant derived foods available becomes less attainable. In a United Nations Food and Agriculture Organization (FAO) consultation with local farmers, one woman farmer in Pakistan, who was able to remain on her land and continue farming, said, “The cultivation of traditional foods has decreased in favor of cash crops so we have less available food. But also, the prices for our crops have considerably dropped and our income from them does not allow us to spend more on alternative foods for consumption.”³³ In other words, those most vulnerable, women and indigenous peoples, are the most affected by market integration, the necessity of import foods, and the lack of affordable healthy and diverse foods.

In 2007, food sovereignty advocates world wide gathered in the village of Nyéléni in Mali. Born out of this meeting was the *Declaration of Nyéléni*, which included the following excerpt.

³⁰ Kelly Houck et al., *The Effects of Market Integration on Childhood Growth and Nutritional Status: The Dual Burden of Under- and Over-Nutrition in the Northern Ecuadorian Amazon*, 25 AM. J. HUM. BIOL. 524, 525 (2013).

³¹ *Id.* at 525.

³² WILLIAM G. MOSELY, JUDITH CARNEY & LAURENCE BECKER, NEOLIBERAL POLICY, RURAL LIVELIHOODS AND URBAN FOOD SECURITY IN WEST AFRICA: A COMPARATIVE STUDY OF THE GAMBIA, CÔTE D’IVOIRE AND MALI 8 (2011).

³³ *Rural women speak out about food insecurity*, FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS (2012), <http://www.fao.org/gender/gender-home/gender-insight/gender-insightdet/en/c/122838/>.

[T]he right of peoples to healthy and culturally appropriate food produced through ecologically sound and sustainable methods, and their right to define their own food and agriculture systems. It puts the aspirations and needs of those who produce, distribute and consume food at the heart of food systems and policies rather than the demands of markets and corporations. It defends the interests and inclusion of the next generation. It offers a strategy to resist and dismantle the current corporate trade and food regime, and directions for food, farming, pastoral and fisheries systems determined by local producers and users. Food sovereignty prioritises local and national economies and markets and empowers peasant and family farmer-driven agriculture, artisanal - fishing, pastoralist-led grazing, and food production, distribution and consumption based on environmental, social and economic sustainability. Food sovereignty promotes transparent trade that guarantees just incomes to all peoples as well as the rights of consumers to control their food and nutrition. It ensures that the rights to use and manage lands, territories, waters, seeds, livestock and biodiversity are in the hands of those of us who produce food. Food sovereignty implies new social relations free of oppression and inequality between men and women, peoples, racial groups, social and economic classes and generations.³⁴

In 2009, the International Assessment of Agricultural Science and Technology for Development (IAASTD), an organization initiated in 2002 by the World Bank and the FAO, defined food sovereignty “as the right of peoples and sovereign states to democratically determine their own agricultural and food policies.”³⁵ So the concept of food sovereignty has been recognized by non-governmental and intergovernmental organizations for almost ten years, but the Sustainable Development Goals make no mention of food sovereignty.

Food sovereignty is social justice, giving back the right of food security and production to the local people by empowering traditional farmers, including women and indigenous peoples. It is only through food sovereignty that food security can be insured by local people having control over food production, which includes the promotion of traditional crops and crop diversity.

D. The Agrochemicalization of Land, and its Effects on People

Sustainable Development Goal 12.4 addresses the issue of chemical use and how that

³⁴ *Declaration of Nyéléni*, NYÉLÉNI NEWSLETTER (2007), <http://www.nyeleni.org/spip.php?article290>.

³⁵ AGRICULTURE AT A CROSSROADS 27 (Beverly D. McIntyre et al. eds., 2009).

affects the environment and animal/human life. The Goal reads, “By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment.”

Traditionally farmed crops have adapted over decades and centuries to the environment they are grown in. This means that drought resistant crops are grown in drought prone areas. And crops are proliferated that grow well in soils that contain a certain balance of nutrients found in the area. With the industrialization of farming and the replacement of traditional crops with export crops, crops not adapted to the environment, combined with the use of genetically engineered (GE) seeds, often require intensive reliance on mechanization, irrigation, chemical fertilizers and pesticides.³⁶ As chemical fertilizers and pesticides enter the greater environment through rain run off and spray drift, air, soil, and water quality is negatively affected.

Continued growing of cash crops creates a need for increased fertilizer. Excessive tillage and application of chemical pesticides (herbicides and insecticides) and fertilizers decreases the diversity of beneficial microbes in the soil, which leads to further depletion of carbon and nitrogen in the soil, even with the introduction of inorganic nitrogen. This increases the need for greater fertilizer application,³⁷ which threatens waterways. Scientists have identified a “deadzone” in the Gulf of Mexico due to excess nitrogen in the water most likely due to fertilizer runoff entering the Mississippi River.³⁸

Using GE seeds came with the promise from agrochemical companies that pesticide application could be reduced, but in practice, this has not been the case. Pesticide resistance

³⁶ *Industrial Crop Production*, *supra* note 18.

³⁷ Brenda B. Lin et al., *Effects of industrial agriculture on climate change and the mitigation potential of small-scale agro-ecological farms*, CAB INT. 1, 4 (2011).

³⁸ Leo Horrigan, Robert S. Lawrence & Polly Walker, *How Sustainable Agriculture Can Address the Environmental and Human Health Harms of Industrial Agriculture*, 110 ENVIRON. HEALTH PERSPECT. 445, 446 (2002).

becomes an issue when the same chemical pesticides are reapplied to control certain pests. After time, pests evolve to become resistant to pesticides applied at “higher rates and more frequent applications become necessary until eventually the chemical provides little or no control.”³⁹ For example, the emergence of glyphosate (a herbicide commercial known as Roundup) resistant weeds has increased the need for greater and more toxic herbicide (such as 2,4-D, well known as an ingredient in Agent Orange⁴⁰) use.⁴¹ Without a change in approach, “a crisis in weed management systems is likely, triggering possibly ominous economic, public health, and environment consequences.”⁴²

GE crops have been more promising, as initially there was a decrease in use of pesticides to combat insect pests.⁴³ But insects have evolved to be resistance to GE crops developed with inherent insecticidal properties.⁴⁴ These crops have been and continue to be sold under the guise that they eliminate the need for pesticides, but now pest management companies are recommending a return to the use of sprayed insecticides in integrated pest management programs.⁴⁵ In a study done in the United States, where pesticides are regulated at the state and federal levels, the results are that pesticide use in GE crops fields has increased since 1996 by seven percent.⁴⁶ In Cameroon, Cape Verde, Nicaragua, Pakistan, and Ukraine, pesticide use has “undergone double-digit growth in terms of the intensity of pesticide use.”⁴⁷ Pesticide use in

³⁹ *Managing Pesticide Resistance*, UNIVERSITY OF CALIFORNIA AGRICULTURE & NATURAL RESOURCES (2009), <http://www.ipm.ucdavis.edu/PMG/r280390311.html>.

⁴⁰ *2,4-D General Fact Sheet*, NATIONAL PESTICIDE INFORMATION CENTER (2009), <http://npic.orst.edu/factsheets/24Dgen.html>.

⁴¹ Charles M. Benbrook, *Impacts of genetically engineered crops on pesticide use in the U.S.--the first sixteen years*, 24 ENVIRON. SCI. EUR. 1, 5 (2012).

⁴² *Id.* at 5.

⁴³ *Id.* at 3.

⁴⁴ *Id.* at 7.

⁴⁵ *Id.* at 1.

⁴⁶ *Id.* at 3.

⁴⁷ Pepijn Schreinemachers & Prasnee Tipraqsa, *Agricultural pesticides and land use intensification in high, middle and low income countries*, 37 ELSEVIER 616, 621 (2012).

Thailand has increased by 9.1% “per annum in the period 2000-2009.”⁴⁸ An increase in pesticide use intensity in these developing nations can be attributed to “a weak institutional framework, weak rule enforcement and a limited knowledge and awareness among farmers regarding the use of hazardous chemicals.”⁴⁹

Exposure to pesticides can happen by direct exposure of a field worker but also through spray drift and run off into local waterways. The United States Environmental Protection Agency (EPA) defines spray drift as the “the movement of pesticide dust or droplets through the air at the time of application or soon after, to any site other than the area intended.”⁵⁰ Spray drift can have far reaching effects, posing health risks as pesticides are carried by the wind to nearby homes, schools, adjacent properties, streams and other bodies of water.⁵¹ Applying pesticides too close to bodies of water, spraying before a rainstorm, and even irrigation can cause pesticide runoff, which can contaminate local bodies of water where women forage for domestic water.⁵²

Women and children are vulnerable to pesticide exposure through spray drift and domestic drinking water, which women are most responsible for procuring. While pesticide exposure is detrimental to the health of men and women, the effects on women and children are insidious. Studies have shown that pesticide exposure can lead to breast cancer, as well as cancers in the cervix and ovaries.⁵³ Glyphosate, the most widely used herbicide in the world, was recently determined by the World Health Organization to be “probably carcinogenic in

⁴⁸ *Id.* at 621.

⁴⁹ *Id.* at 621.

⁵⁰ *Introduction to Pesticide Drift*, UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (2015), <http://www.epa.gov/reducing-pesticide-drift/introduction-pesticide-drift>.

⁵¹ *Id.*

⁵² *Polluted Runoff: Nonpoint Source Pollution Share*, UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (2015), <http://www.epa.gov/polluted-runoff-nonpoint-source-pollution>.

⁵³ Leslie London et al., *Pesticide Usage and Health Consequences for Women in Developing Countries: Out of Sight, Out of Mind?*, INT J OCCUP ENV. HEALTH 46, 53 (2002).

humans.”⁵⁴ In another study, it was found that glyphosate can act as an endocrine disrupter and cause “increased... cell proliferation of a hormone dependent breast cancer.”⁵⁵

In one study in the United States, women who weren't even directly exposed to pesticides were found to have pesticides, such as chlorpyrifos and carbofuran, both of which the EPA is considering banning, in their maternal serum. “Generally, if a pesticide was detected in maternal serum, it was also found in the corresponding cord serum indicating transfer of some portion of the maternal dose to the fetus.”⁵⁶ Development of the human fetus and its brain is happening rapidly in utero, which makes the fetus particularly sensitive to pesticides because the “fetus' ability to detoxify contaminants is not fully developed.”⁵⁷ In studies, these pesticides have been shown to affect birth length and weight, length of gestation period, and head circumferences. In utero exposure to chlorpyrifos has been linked to developmental delays and attention deficit disorder.⁵⁸

Another study found a link between direct pesticide exposure and childhood leukemia, with a higher rate for maternal exposure. This study included data that showed that children born to women exposed even one year before pregnancy still had a greater chance of developing childhood leukemia.⁵⁹

Perhaps the most alarming result of pesticide exposure is its damaging effects to genetic information. Pesticide exposure can affect the fetuses of pregnant women, as well as future generations through the female line. Women who have been exposed at any time to pesticides

⁵⁴ INTERNATIONAL AGENCY FOR RESEARCH ON CANCER, GLYPHOSATE 78 (2015).

⁵⁵ Siriporn Thongprakaisang et al., *Glyphosate induces human breast cancer cells growth via estrogen receptors*, FOOD CHEM. TOXICOL. 1, 6 (2013).

⁵⁶ Dana Boyd Barr et al., *Pesticide concentrations in maternal and umbilical cord sera and their relation to birth outcomes in a population of pregnant women and newborns in New Jersey*, 408 SCI. TOTAL ENVIRON. 790, 792 (2010).

⁵⁷ *Id.* at 790.

⁵⁸ *Id.* at 792–93.

⁵⁹ P. Monge et al., *Parental occupational exposure to pesticides and the risk of childhood leukemia in Costa Rica*, 33 SCAND. J. WORK. ENVIRON. HEALTH 293, 300 (2007).

that act as “endocrine disrupting substances can have epigenetic effects that are passed on to several subsequent generations.”⁶⁰ These epigenetic changes can lead to diseases passed from generation to generation, including cancers and adult onset diseases.⁶¹

III. RECOMMENDATIONS

A. Continue to monitor food commodities speculation.

Although regulations have been put in place in the United States and the European Union, serious loopholes still remain, as well as difficulties in implementing rules. Sustainable Development Goals 2.c and 10.5 set out to adopt measures to insure proper functioning food commodities markets and improved regulation and monitoring of global financial markets. It is recommended that the Commission continue to encourage regulation in food commodities markets, and continue to monitor the implementation and enforcement of new regulations in the U.S. and EU.

B. Create a new Sustainable Development Goal/sub-goal for displacement, which would include addressing the forced displacement of women, indigenous peoples, and other vulnerable groups from their customary agriculture and foraging lands.

It is recommended that a new Sustainable Development Goal/sub-goal which addresses displacement be created. In addressing displacement of women, indigenous peoples, and other vulnerable groups, the state has to look at the how peoples are being disenfranchised from their lands and how this can be remedied. Sustainable Development Goals 10.2 and 10.4 partly address the impact of displacement on women by advocating for social, political, and economic inclusivity and the hopeful realization of equality through the adoption of social protection policies. Through the framework of these goals, education and illiteracy can be addressed,

⁶⁰ Mark A. Rothstein, Cai Yu & Gary E. Marchant, *THE GHOST IN OUR GENES: LEGAL AND ETHICAL IMPLICATIONS OF EPIGENETICS*, 19 HEALTH MATRIX CLEVEL 1, 6 (2009).

⁶¹ *Id.* at 5–6.

which could help women better negotiate their and their families' security in land deals. Through education, women could also be educated in land rights and inheritance rights.

C. Promote food sovereignty in lieu of food security.

Diversity of food is essential in providing food security and better nutrition for women and their families. SDG 2.5 focuses on promoting genetic diversity of seeds and cultivated plants. But for food security to be realized, women need to have more control over all aspects of food production. Food security exists when people have access to safe and nutritious foods at all times. So it is recommended that instead of advocating for food security, a better alternative is advocating for food sovereignty, which is far broader in scope and entails communities, rather than states, claiming sovereignty over production and distribution of food.⁶²

D. Encourage states to regulate the use of pesticides and create a system for mandatory pesticide use reporting, making all reports available to the public.

Even in the United States, the use of pesticides is not made available to the general public unless state laws require it. In order for industrial farms to be held accountable to the people, transparency is necessary. Sustainable Development Goal 12.4 seeks to achieve environmentally sound management of chemicals to minimize adverse impacts on human health and the environment. This language is encouraging but it is only meaningful if accountability measures are taken. It is recommended that all states be encouraged to create regulations that monitor pesticide use, which would include mandatory pesticide use reporting to the state by private and public entities, create domestic regulatory agencies to enforce regulations, and make all pesticide use reports available to the public.

⁶² Patel, *supra* note 3 at 1.