

The Value of Diversity in Creating Food Security and Maintaining Food Sovereignty

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The homogenizing effects of the proliferation of modern Western culture are eradicating diversity around the globe causing many communities to become food insecure. Diversity can be seen both biologically and culturally, the former as biodiversity or the variety of plant life in an ecosystem; and the latter as cultural diversity or the variety of human societies or cultures. The combination of these is known as biocultural diversity, a concept that includes the intimate link between biological, cultural, and linguistic diversity which are interrelated within a complex socio-ecological adaptive system.¹ This paper will look at the modern structural and institutional threats to biocultural diversity which produce food insecurity, and of the sociocultural and environmental consequences of the loss of these interlinked diversities.² The 1996 World Food Summit defines food security as: “Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and preferences for an active and healthy life.”³ Food security is threatened by the loss of biocultural diversity, which is caused by homogeneous cultural and biological domination. Monoculture refers to both monocrops: the cultivation of a single crop or organism especially on agricultural or forest land; and a culture dominated by a single element: a prevailing culture marked by homogeneity.⁴ Thus, monocultures can inhabit both the mind and the ground.⁵ Monocultures of the mind are limitations in our perceptions of the world that lead to a “TINA – There Is No Alternative Syndrome.”⁶ Cultural and linguistic diversity is related to the diversity in the action of adapting ideas and therefore “any reduction of language diversity diminishes the adaptational strength of our species because it lowers the pool of

knowledge from which we can draw.”⁷ Monocultures of the ground include the practice of corporate “seed replacement: replacing the inferior varieties from farmers for the advanced modern varieties.”⁸ These programs ensure the destruction of alternative genetic seed varieties: “So biodiversity can be extinguished in one season - which is millennia of evolutionary history being extinguished in a second.”⁹ The dominating modern Western culture propagates a separation between nature and culture termed the ‘nature/culture divide.’ This divide is pervasive throughout history; from the biblical book of Genesis to the scientific revolution, nature has been viewed as fundamentally separate from humans. Our current struggle for food security is the fight against an oppressive conceptual framework that sanctions the philosophical logic of domination and the dualistic nature/culture divide. We cannot end the exploitation of the Earth until we radically address and overcome this conceptual framework which is deeply embedded in modern structures and institutions. This paper argues that monocultures destroy biocultural diversity, causing food insecurity and preventing food sovereignty.

Dominant Conceptual Framework

World leaders have been working together for decades trying to “solve” health, environment and hunger problems. Despite many efforts such as the 2009 World Summit on Food Security and the 2002 Millennium Development Project, food insecurity continues around the world. The struggle for food security is a struggle for justice and a fight against the dominant oppressive conceptual framework, which is rooted in the philosophical logic of domination.¹⁰ The modern oppressive conceptual framework sanctions relationships of unjustifiable domination and subordination such as: hierarchical thinking, oppositional dualism, power over others, and selective privilege.¹¹ This dualistic thinking such as: male/female, mind/matter, and subject/object, has culminated in the divide between nature and culture. This

monoculture of the mind is based in a scientific knowledge system and is currently embedded in modern structures especially governmental institutions, economic market function and legal systems. This monocultural view legitimizes the domination and exploitation of nature and those who are intimately linked with nature by inequitably privileging one group: western scientific knowledge, and disadvantaging another: local knowledge and its intimate connection to nature itself. This monoculture prevents local food security by denying the connections between local knowledge, land use and ecological systems.

History of the Dominant Conceptual Framework

In many traditional societies humans, like all other animals, are viewed as a member of the biotic community. Throughout most of antiquity “every tree, every spring, every stream, every hill had its own *genius loci*, its guardian spirit. ... Before one cut a tree, mined a mountain, or dammed a brook, it was important to placate the spirit in charge of that particular situation, and to keep it placated.”¹² This is reflected in Native American cultures, Australian Aboriginal cultures, and Pagan animism. The rise of the Judaeo-Christian religion, its creation story and concept of linear time, overtook the Greco-Roman cyclical notion of time and polytheistic mythology, and eradicated pagan animism. This mirrors the ecological argument that we must function within the inherent structures of ecosystems: “ecologists point to the structure of natural ecological systems to argue that nature is modeled on self-sustaining circular systems that recycle resources, while our economic and social systems are based on non-sustainable linear processes that are out of sync with basic natural patterns.”¹³ Christianity’s anthropocentric worldview as laid out in the Book of Genesis tells how God gave man dominion over the animal world. This prolific story of our origins situated “Christianity, in absolute contrast to ancient paganism and Asia’s religions, [it] not only established a dualism of man and nature but also insisted that it is God’s will that man exploit nature for his proper ends.”¹⁴ Our great

philosophers would, from here on out, be restrained by this dualistic conviction as seen in Aristotle's hierarchical arraignment of life, the Stoics commitment to the superiority of the mind over body, traditional Natural law's faith in human reason, and the Cartesian view of nature as a machine.¹⁵ Modern western culture continues to live this way, as we have for the past 2000 years. From industrialization and the development of market economies to modern agricultural science, humanity has attempted to understand and manipulate the natural world from the outside. Nature is seen as composed of reducible objects that can be viewed and studied by a rational objective observer: Man. Nature, interpreted in this way, has become a wild and savage 'other', separate and very different from mankind. Modern western culture is defined by the scientific knowledge system it ascribes to.

Dominant Scientific Knowledge Systems

Scientific knowledge is knowledge accumulated by systematic study and organized by general principles such as mathematics. The scientific knowledge system is a modern western cultural perspective, which uses the prefix science to elevate itself above society and other knowledge systems.¹⁶ The dominant scientific knowledge system legitimizes the homogenization of the world, and the erosion of its ecological and cultural richness.¹⁷ This positivist system is based on the scientific method, specialization, and a culture, class and gender bias; arguably Christian, educated, and male.¹⁸ It is part of the parochial traditions which emerged from a dominating and colonizing western culture.¹⁹ Its values are based on power, competition, domination and dispensability.²⁰ It encourages a reductionist, fragmented, atomistic and uniform worldview.²¹ And it is closely linked to market based capitalism and economic growth.²² Economic growth is defined here as "an increase of the transaction made on markets (goods, labour and capital markets), measured in monetary terms" through the commercial output of goods and services: Gross National Product (GNP) of economic exchanges.²³

Within international relations economic growth appears as a single shared purpose or common commitment, which reveals the presence of one dominant ordered system with which all major actors and institutions comply.²⁴ This form of governance is referred to as the growth paradigm.²⁵ As a policy priority, liberal theorists believe growth is “intended to improve social welfare by elevating standards of living and...ensur[ing] a safe standard of living for all,”²⁶ Yet modern scientific knowledge contributes to the destruction of biodiversity by converting wild ecosystems into manicured landscapes that produce economic commodities. The colonizing and globalizing force of our dominant western knowledge system negates local knowledge existence by “not seeing it.”²⁷ Modern society views many local resources as only sustenance or non-profiting, and the locals who protect it as wasting the land because they aren’t interested in maximizing it for profit. The divide between nature and culture enables modern society to dominate and exploit nature without considering the long term detrimental effects on biocultural diversity.

Biocultural Diversity and Local Knowledge Systems

Local knowledge systems relate to a peoples’ entire system of concepts, beliefs and perceptions about the world around them, and is situated within an ecological continuum with the plant world.²⁸ It has been maintained over time by diverse traditional and local societies. Local knowledge focuses on forests, which provide both food and livelihood for local populations including: fodder, fuel and fertilizer, inputs to agriculture, and the conservation of soil and water.²⁹ Local knowledge systems depend on an ecological continuum and the sustained fertility of forests and fields.³⁰ It adheres to an inherently life enhancing paradigm where it must maintain the conditions for renewability.³¹ Communities that are rooted in local knowledge are intimately linked to their physical surroundings, and natural environment. They have a long tradition of food security and sovereignty over local resources and food production systems. Food sovereignty can

be defined as the right of each nation or region to maintain and develop their capacity to produce basic food crops with corresponding productive and cultural diversity.³² It emphasizes farmers' access to land, seeds, and water while focusing on local autonomy, local markets, local production-consumption cycles, energy and technological sovereignty, and farmer-to-farmer networks.³³ Local knowledge has nurtured culturally, biologically and genetically diverse agriculture systems with a built-in resilience that has helped them to adjust to rapidly changing climates, pests, and diseases.³⁴ Local knowledge has led to:

The persistence of millions of agricultural hectares under ancient, traditional management in the form of raised fields, terraces, polycultures (with a number of crops growing in the same field), agroforestry systems, etc., document a successful indigenous agricultural strategy and constitutes a tribute to the “creativity” of traditional farmers. These microcosms of traditional agriculture offer promising models for other areas because they promote biodiversity, thrive without agrochemicals, and sustain year-round yields... Such systems have fed much of the world for centuries and continue to feed people in many parts of the planet.³⁵

Due to the encroaching proliferation of scientific knowledge systems, local knowledge is at risk. It is apparent that the variety of cultural knowledge, beliefs, and practices developed by human societies are being placed in jeopardy by the socioeconomic and political processes that threaten the integrity and the very survival of indigenous and local cultures and the environments in which they live.³⁶ This massive and rapid change has profound implications for the maintenance of all life on earth.³⁷

Biodiversity

The biological diversity of life on our planet has continually evolved over billions of years. Since the domestication of agricultural crops, farmers have used their local knowledge to save the seed from their unique micro-ecosystems that exhibit desirable traits such as resilience to pests, larger fruit, or specific climatic adaptations. Farmers who save seed have developed some of the most geographically specific adaptations, and genetically distinct varieties of agriculture crops on the planet. Farmers save and trade seed to enhance genetic diversity, which is “essential to protect their fields from blights or other depredation” and creates food security.³⁸ A wide variety of plant species, referred to as biodiversity, fosters resistance to diseases and pests, and adaptation to climatic and soil conditions. Diversity in plants and animals is vital to the health and stability of both biological and social communities. Evolving a multitude of species is nature’s best survival tactic, operating as an insurance plan for sustaining life on earth.³⁹ Local and rural communities embody the intimate relationship between food insecurity and ecological degradation through deep connections to their environments:

No segment of humanity depends more directly on environmental resources and services than the rural poor, who make up an estimated 80 percent of the world’s 800 million hungry people. They make daily use of soil and water for farming and fishing, of forests for food, fuel and fodder, of the biodiversity of a wide range of plants and animals, both domesticated and wild. Their lives are interwoven with the surrounding environment in ways that make them both particularly valuable as custodians of environmental resources and particularly vulnerable to environmental degradation.⁴⁰

An agriculture system that continuously degrades the environment puts rural and farming communities at risk; whereas, local knowledge recognises the value of biocultural diversity in creating food security.

The dominant scientific knowledge system is contributing to the loss of biodiversity through the widespread conversion of biologically diverse forests and farms to monocrops which promote landscape homogenization, export oriented economies, and the destruction of diverse habitat. The loss of traditional farming practices that serve to diversify species is contributing to biodiversity loss globally. In 1988 the First International Congress of Ethnobiology met in Belém, Brazil to link the common threats to cultural and biological diversity. The Declaration of Belem states:

tropical forests and other fragile ecosystems are disappearing, many species, both plant and animal, are threatened with extinction, indigenous cultures around the world are being disrupted and destroyed and GIVEN—that economic, agricultural, and health conditions of people are dependent on these resources, that native peoples have been stewards of 99% of the world's genetic resources, and that there is an inextricable link between cultural and biological diversity;⁴¹

Cultural and biological diversity go hand in hand as seen in the ongoing worldwide loss of biodiversity which is paralleled by and seems interrelated to the “extinction crisis” affecting linguistic and cultural diversity.⁴² The loss of biodiversity is a crisis that jeopardizes the well-being of life support systems that millions of people in third world countries depend on.⁴³ This is a result of powerful liberal nations pushing for an increase in economic productivity and growth over diversity preservation.⁴⁴As a consequence of this economic mentality local knowledge that

fosters biodiversity is displaced by scientific knowledge that produces monocultures. Some of the consequences of monocultures include the break-up of community structures, the loss of traditional land management practices, the loss of traditional ecological knowledge (TEK), the loss of species dependant on management, the loss of native species, and the destabilization of ecosystems.

Modern Structures and Institutions of Scientific Knowledge

The domination of scientific knowledge can be seen in modern capitalist society's commitment to the economic structure of market capitalism and its commitment to growth. There are three features of market capitalism that contribute to the commitment to economic growth: path dependency, economic convergence, and social convergence.⁴⁵ Path dependency is the tendency of capitalism to lock in its own competitive criteria to the exclusion of other socio-economic systems;⁴⁶ it dictates the pursuit of short-term material interests, and the competitive nature of international trade and mobile capital make it too costly for actors not to play by the rules of the game.⁴⁷ Economic convergence is a convergence of economic policies among states despite wide variations in states' histories, cultures, and levels of development,⁴⁸ with an overriding commitment to economic expansionism. Sociological convergence regards cultural dimensions,⁴⁹ from military security to national health, as deeply engraved in policy-makers collective psyche.⁵⁰ The global acceptance of economic growth was reinforced by the UN Charter of 1945 which used GNP as a universal quantifiable standard for development; "while per capita income was not deemed the sole measure of rising living standards (health, literacy, etc.), the key criterion was measurable progress toward the goal of the "good society," popularized by economists and U.S. presidential adviser Walt Rostow's idea of the advanced stage of "high mass consumption."⁵¹ Thus, "Third World" development was marked by

a “range of modern practices and institutions designed to sustain economic growth.”⁵² The constant reinforcement of growth as the ultimate path to development has created a monoculture or normative concept in economics:

Promoting growth – achieving ever-greater economic wealth and prosperity- may be the most widely shared and robust cause in the world today.

Economic growth has been called ‘the secular relation of the advancing industrial societies.’⁵³

The dedication of economists to increase a nations’ rate of growth of output and consumption prevents alternative economic structures from being appreciated. Scientific knowledge systems contribute to the modern oppressive conceptual framework that dominates the international political economy by forcing a single and narrow definition of growth, prosperity and well-being of all communities.

Environmentalists often stress the biological limits of the earth to support life and prescribe a more sustainable global economy.⁵⁴ A sustainable economy can be defined as: one whose essential practices can be carried on indefinitely while maintaining its population of humans and other species at a certain level of well-being.⁵⁵ This concept is similar to that perpetuated by local knowledge systems. It stands in direct contrast to the modern monoculture of infinite economic growth.

The Liberal Perspective

In the liberal perspective economic growth is essential for human welfare and the maintenance of sustainable development. “Most international economic organizations and the economic policies of most states today are strongly influenced by liberal principles.”⁵⁶ The keystone international economic organizations (KIEO)—the IMF, World Bank, and WTO—uphold liberal

economic principles, and liberals therefore have a positive view of international economic relations as currently structured. They assert that the KIEO liberal principles are politically neutral and states benefit from economic growth and efficiency when their policies conform to those principles.⁵⁷ Liberals believe that economic growth leads to a greater ability to protect the environment in the long run, as Cohn outlines

Orthodox liberals believe that economic growth increases peoples' incomes, giving them the ability and incentive to improve the environment. Even if the profit-oriented policies of some business firms adversely affect air and water quality in the short term, they contribute to economic growth which will improve environmental conditions over time. Thus, the best policy for the environment is to promote economic growth through open trade and foreign investment policies without government interference.⁵⁸

Liberal ideology and policy supports the scientific knowledge system and contributes to the proliferation of an oppressive conceptual framework by continuing to promote a single mode of development: economic growth.

Environmental Critique of Economic Growth

The critical environmental perspective views economic growth and capitalism as a leading cause of global environmental problems and food insecurity. Many environmentalists outline the risks of ignoring the long-term mutual effects of the environment on the economy and vice versa, such as diminishing returns and resource exploitation. Critical environmentalists also believe that developed countries follow environmentally exploitative practices; and assert that environmental degradation affects some more than others because of globalization, domination, and inequality. They

believe that the overconsumption of resources threatens the Earth's ability to support life, but that it is difficult to limit resource use.⁵⁹ Critical environmentalists critique economic growth and capitalism from their primary viewpoint that the Earth is a finite planet with a limited biological carrying capacity.⁶⁰ Environmentalists ascribe to the second contradiction of capitalism: the deterioration of the means of production or ecological exploitation.⁶¹ The process of accumulation impairing or destroying its own conditions of production has been described as:

To the extent the capital relation, with its unrelenting competitive drive to realize profit, prevails, it is a certainty that the conditions of production at some point or other will be degraded, which is to say natural ecosystems will be destabilized and broken apart... this degradation will have a contradictory effect on profitability itself (the second contradiction of capital), either directly as by so fouling the natural ground of production that it breaks down, or indirectly, in the case that regulatory measures, being forced to pay for the healthcare of workers, etc., re-internalizes the costs that had been expelled in the environment.⁶²

Critical environmentalists condemn globalization for its homogenizing effects of cultures and species.⁶³ Thus, in 1992 the Convention on Biological Diversity, in Article 8 called for the protection and promotion of the "innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity."⁶⁴ The products that yield profit and definitions of profit vary greatly from western developers to third world resource management participants. In the opinions of many third world peoples, western agri-business is the main cause of biodiversity erosion and the accompanying social consequences, and monocultures are a metaphor for social control.⁶⁵ Homogenization

reduces environmental resiliency, renders the planet at risk to the harmful effects of climate change, destroys biocultural diversity and contributes to food insecurity.

The Dominant Monoculture of Scientific Knowledge as Seen in Agribusiness

The first agricultural revolution, or Green Revolution, began in 1945 and aimed to feed the world's growing population. It industrialized the farm with new mechanical and chemical technologies and expanded the practice of growing large single specie monocrops. Technology from the 1st and 2nd World Wars led to the development of synthetic nitrogen based fertilizers, and chemical pesticides and herbicides. To help spread these technologies, developers pressured governments to implement agriculture and trade subsidies in their support. Every year, wealthier countries hand out more than US \$250 billion in subsidies to agricultural producers.⁶⁶ While the Green Revolution enabled farmers to feed hundreds of millions of people, it came at a cost to communities' food sovereignty and environmental integrity around the world. Shiva wrote that Green Revolution "produces more rice and wheat. But it destroyed our pulses; it destroyed our oil seeds; it destroyed all the multiple sources of food; it has left farmers in debt."⁶⁷ In 2001 the UN launched The Millennium Ecosystem Assessment Project, with contributions from 1,300 international scientists. In 2005 they presented an evaluation on the condition of the earth's environment stating: "the experts agree that food production is the major cause of pollution and of the destruction of ecosystems."⁶⁸ The proliferation of modern agricultural production is destroying the cultures that practice locally sustainable food cultivation and local biodiversity. The homogenization of crop species or monocrops both decreases farm biodiversity and limits species diversity in surrounding "wild" areas. "Green Revolution technologies and strategies, reliant on monoculture, chemical fertilizers and pesticides, have destroyed biodiversity, which has in many places led to a decline

in nutrition output per acre.”⁶⁹ This collapse can be seen throughout the world in: the failure of American Corn Belt in the 1970’s due to the southern corn leaf blight which wiped out American farmers single strain of corn, and in the plight of the Irish Potato famine where:

Ireland’s was certainly the biggest experiment in monoculture ever attempted and surely the most convincing proof of its folly. Not only did the agriculture and diet of the Irish come to depend utterly on the potato, but they depended almost completely on one kind of potato: the Lumper.⁷⁰

According to Pimbert, food sovereignty depends on biocultural diversity however, our “Current knowledge and policies for growth in food and farming are leading to the economic genocide of unprecedented numbers of farmers and rural livelihoods throughout the world.”⁷¹ The Green Revolution was a standard environmental management package which neglected local priorities, management systems, institutions and social organisation; and overlooked the value of local knowledge.⁷² The consequences of monocultures include: the fragmentation of community structure, the loss of traditional land management practices, TEK, species dependant on traditional land management, native species and destabilized ecosystems.⁷³

Genetically Modified Organisms

While global hunger continues to rise the next agricultural revolution has already begun; this biological transformation is commonly referred to as the Gene Revolution. Spearheaded by the biotech industry, it involves the direct manipulation of an organism’s gene, and is termed genetic engineering (GE) or genetically modified organisms (GMO). The biotech industries practice of hegemonic agribusiness and the proliferation of genetically engineered crops pose a serious threat to biocultural

diversity. The biotech industries claim that the gene revolution and genetically engineered crops are increasing food production while “reducing agriculture's impact on our environment”⁷⁴ by lowering pesticide and herbicide use for farmers. However, “the principal strategy of many agrobiotech companies is to ensure that its agricultural chemicals match its engineered seeds;”⁷⁵ resulting in many GE crops being modified with herbicide tolerant traits. The crops are then sprayed with herbicide, killing everything but the desired plant. This is seen in the development of two main seed products, “Two traits—herbicide tolerance (HT) and insect resistance (Bt) engineered into four commodity crops corn, cotton, soybeans, and canola.”⁷⁶ GE seeds are designed for monocrop farming thereby limiting farmers from diversifying or growing other plant species. There is a lack of peer reviewed scientific knowledge on the effects of GE crops on the environment or health, therefore the Convention on Biological Diversity decided that a precautionary approach should be taken towards GE crops because “much is unknown about how its products may behave and evolve, and how they may interact with other species.”⁷⁷ GE crops and mechanized industrial farming practices create homogeneity in crops, destroy traditional land management practices and perpetuate further chemical abuse,⁷⁸ which threaten biodiversity through habitat loss and increased toxins in the environment. Over the past decade herbicide usage has risen rather than decreased, by approximately 250 million pounds.⁷⁹ The Gene revolution run by the biotech industry amplifies risks to neighbouring farmers, biodiversity and wild environments, and creates new political and economic threats to farmers who plant genetically distinct and organic crop varieties.

Patterns of Control and Profit

The companies that produce chemical fertilizer, pesticide and herbicide also manufacture the GE seeds. The unsustainable industrial agriculture system is completely dependent on inputs; seeds to grow crops, fertilizers to replenish the soil, and chemicals

to eliminate unwanted pests. The consolidation of control is dominated by a handful of corporations who use intellectual property laws to commodify the world's seed supply.⁸⁰ Treating food as a commodity or a product that is developed, marketed and sold has turned the global food system into a profit driven market run by a few large corporations. The corporate dominated food system is dependent on the exploitation of local communities, environments and consumers. This paradox can be seen in the ideology behind global North /South relations. For the North to have control over the South's diverse resources for profit, the North nations develop agri-business policies for the South that allow for the destruction of biocultural diversity.⁸¹ These are the very resources which the dominant economic model depends on, and lead to a form of destructive colonialism.⁸² Local communities, the stewards of biodiversity, rarely see portions of the profits reaped from the appropriation of their genetic resources, while Northern nations continue to neglect their role in the causes of biocultural destruction.⁸³ It has become common to blame the victims of biodiversity detriment, local communities, for the destruction to their own biocultural diversity if they do not follow an economic model that maximizes resource production according to the dominant Northern proxies. The causes of biocultural diversity loss lie just as much in Northern policy as in Southern geography and the consequences affect all of humanity.⁸⁴

One modern example of the collaboration of economic and political power in pursuit of profit and economic growth is the war in Iraq. Many of the giant grain corporations such as Cargill, ADM, and Con Agra are looking to invest in the markets represented by "food aid" in Iraq.⁸⁵ The war in Iraq is as much about "blood for food and water" as it is about "blood for oil".⁸⁶ This war has its roots in the modern growth economy that fails to respect both ecological and ethical limits, such as: limits to inequality, injustice, greed and economic power.⁸⁷ This paradigm defines the entire world as "an enemy to be exterminated."⁸⁸ The creation of the present state of global war was the inevitable next

step for the modern dominating structures and institutions of scientific knowledge, as seen in economic and corporate globalization: “a handful of corporations and a handful of powerful countries seek to control the earth’s resources and to transform the planet into a supermarket in which everything is for sale.”⁸⁹ All living resources that maintain life are in a process of being privatized, commodified, and appropriated by corporations.⁹⁰ This occurs through coercion, free-trade treaties, institutions such as the WTO, and ultimately by war.⁹¹ Corporate globalization is a war economy based on violence against the poor, which robs them not only of their livelihoods and incomes, but of their very lives; and it is a war against the planet.⁹² The structures of profit and control that make up our dominant economic and political structures reinforce the dominant scientific knowledge system and undermine local communities’ ability to maintain holistic food production.

The Nature/Culture Divide

Scientific knowledge has positively contributed to our lives through modern medicine, education, science and technologies as seen by decreased infant mortality rates, increasing life expectancy, AIDS treatments, tsunami warning systems, and earthquake proof buildings. However, these same systems dominate and control nature by exploiting resources, polluting environments, the widespread conversion of land; and marginalize local cultures by devaluing and delegitimizing their knowledge. This has led to global environmental issues at a scale never before seen by humankind, and threatens the future of all species. The modern nature/culture debate can be seen between modern ecologists and environmental modernizers. Ecologists view nature as interdependent following an unwritten law of nature that must function within natural limits such as: carrying capacity, scarcity, and the 2nd law of thermodynamics.⁹³ Environmental modernizers understand nature through physics and mathematics, they attempt to manipulate and manage the environment and support Cartesian dualism.⁹⁴ Many also rely on technological fixes to solve our

current and future environmental ills. Finding a balance within modern society that can incorporate both technology and a respect for biocultural diversity is vital to overcoming the nature/culture divide, and in creating holistic food production systems.

The Dominant Monoculture of Scientific Knowledge Creates Food Insecurity

The dominant monoculture of scientific knowledge is destroying local knowledge through its modern structures and institutions such as the growth paradigm and agribusiness. This destruction of local knowledge leads to the destruction of local cultures and ways of life, which traditionally have managed and culturally modified ecosystems. When cultures are no longer able to maintain and manage their environments, ecosystems change, lose their integrity and experience the destruction of local diversity.⁹⁵ This destruction of biocultural diversity leads to the destruction of food security because local communities are no longer producing traditional foods and now must purchase them or their seeds from agribusiness. This is a destruction of local food sovereignty for local communities because they no longer control the means of production, and increasingly see the destruction of both the commons and traditionally managed lands. If monocultures of the mind are limitations in our perceptions of the world that lead to a “TINA” syndrome, then generating diversity is “the production of alternatives and keeping alive alternative forms of production.”⁹⁶ Alternatives enable biocultural diversity to be resilient and sustainable; they enable local communities to be food secure, while creating and maintaining food sovereignty.

Solutions

Food security can be achieved by acknowledging and valuing local knowledge, enabling traditional land management practices, and by preserving biodiversity. In the international political community both scientists and environmentalists advocate

near-term mitigation policies to limit the harm of current market externalities,⁹⁷ such as: corporate responsibility, reclaiming of the commons, localization, reduction of consumption, transition to renewable energy sources, and eliminating fossil fuel dependence. Some environmentalists call for a radical restructuring of the global economy such as a dismantling of current global economic structures and institutions, changing how we measure progress, or moving towards steady state economy through the field of ecological economics.⁹⁸ Critical environmentalists prescribe various policy options including: the use of alternative economic indicators such as the Index of Sustainable Economic Welfare and the Genuine Progress Indicator which adjusts for income inequalities and recognizes the importance of well-being respectively.⁹⁹

There already exist alternatives to conventional farming that are ecologically harmonious, facilitate the abundance of biodiversity and create food security. Less destructive ways to produce foods are organic farming, agro-ecology and permaculture. These holistic farming methods operate in closed sustainable systems, recycling energy back into the soil, which requires little to no inputs from the farmer. Small scale farming with a diversity of plants has many benefits such as healthier soils, crop resilience and natural pest defences. Using alternative production methods is slowly gaining popularity as education around ecologically sustainable farming spreads. Many grassroots organizations have formed to raise awareness around and change conventional chemical intensive agriculture practice such as Navdanya in India:

The Green Revolution that we are building through Navdanya is based on conserving biodiversity and conserving water while increasing food production per acre. What we need is biodiversity intensification, not chemical intensification. What we need is to work with nature's nutrient cycles and hydrological cycle,

not against them. It is time to put small farmers, especially women, at the heart of this process.¹⁰⁰

Navdanya is one of many examples of community groups working together to preserve local knowledge and biocultural diversity. Conserving indigenous agriculture is a vital key in creating local food security.

The most critical solution to biocultural diversity loss lies in democratizing knowledge, redefining knowledge to include and legitimise local and diverse sources.¹⁰¹ Local knowledge is indispensable because it is more concrete in reality and is based on natural ecological systems.¹⁰² Democratising knowledge is advocated by Shiva as:

Such a shift from the globalising to the local knowledge is important to the project of human freedom because it frees knowledge from the dependency on established regimes of thought, making it simultaneously more autonomous and more authentic. Democratisation based on such an insurrection of subjugated knowledge is both a desirable and necessary component of the larger processes of democratisation because the earlier paradigm is in crisis and in spite of its power to manipulate, is unable to protect both nature and human survival.¹⁰³

Democratising knowledge enables cultural diversity to continue and for each culture to maintain the biological diversity it has generated. Democratising knowledge enables local communities to sustainably grow the food they need, gain access to and manage commons such as forests, rivers and fields, and combat the misappropriation of TEK.

Conclusion

This paper has outlined how modern Western structures and institutions threaten biocultural diversity. The sociocultural and environmental consequences of the loss of these interlinked diversities produce food insecurity and prevent food sovereignty. Generating diversity is the production of alternatives and keeping alive alternative forms of production creates options for future challenges. Biodiversity enables food security by ensuring future edible plant options and by making ecosystems more resilient. Cultural diversity enables food sovereignty by safeguarding traditional land management practices, saving seeds, and through autonomous resource management. Agribusiness and conventional farming practices threaten food security for billions of people around the world. Genetic biodiversity in our agriculture crops are necessary in ensuring a future with healthy food and ecosystems. The conventional industrialized farm is chemically dependent and biologically void while consisting only of GE monocrops. The Gene revolution dominated by a few biotech industries amplifies risks to biodiversity and environments, and creates new threats to farmers who plant genetically distinct varieties. The globalization of our food system has exposed developing farmers to the global Free Market economy leaving them indebted to the seed and chemical companies. The current system of food cultivation treats food as a commodity and causes food insecurity and environmental degradation. Biodiversity is vital to sustaining life on earth; humanity is dependent on the complex biologically diverse ecosystems that make up the Earth's biosphere, and alternative farming practices both facilitate and embrace nature's dynamic ecological process. The current unsustainable and environmentally degrading food production system causes food insecurity, whereas shifting to local holistic agriculture practice in harmony with the environment is the best way to create food security and maintain food sovereignty. Monocultures destroy biocultural diversity, the most vital element to creating both global food security and local food sovereignty.

Notes

- ¹ Luisa Maffi, "Linguistic, Cultural, and Biological Diversity," *The Annual Review of Anthropology* no. 29 (2005): 600.
- ² Ibid.
- ³ World Food Programme, *World Hunger Series – hunger and markets* (UK and USA: Earthscan, 2009).
- ⁴ Merriam-Webster, Incorporated, *Merriam-Webster Dictionary*, 2010, <http://www.merriam-webster.com/dictionary/monoculture>
- ⁵ Vandana Shiva, *Monocultures of the Mind* (New York: Zed Books, 1993): 1.
- ⁶ Ibid., 10.
- ⁷ Maffi, "Linguistic, Cultural, and Biological Diversity," 603.
- ⁸ Ibid.
- ⁹ Vandana Shiva, "Earth Democracy: Beyond Dead Democracy and Killing Economies," *Capitalism Nature Socialism* 21 (March 2010): 88.
- ¹⁰ Karen Warren, *Ecofeminist Philosophy: A Western Perspective on What it is and Why it Matters* (Lanham, MD: Rowman & Littlefield Publishers, 2000): 24.
- ¹¹ Ibid.
- ¹² Lynn White, "The Historical Roots of Our Ecologic Crisis," in *The Environmental Ethics and Policy Book*, eds. Donald Van De Veer and Christine Pierce (Belmont, CA: Wadsworth Publishing, 1998), 48.
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