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### Indigenous Food Cultures: Pedagogical Implication for Environmental Education

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# **Indigenous Food Cultures: Pedagogical Implication for Environmental Education**

*Suleyman Demi*

## **Abstract<sup>1</sup>**

*Climate change is one of the most serious problems facing the world today. Recent happenings around the world: rampant and severe floods in parts of Asia, severe drought and water shortage in parts of Africa and extremely cold winters and warmer summers around the temperate regions, particularly American and Europe, have caused even the intransigent critics of climate change to recognize that it is real. One area that will experience the devastating effects of climate change is the food sector. Ironically, industrial agriculture has been identified as one of the leading causes of climate change across the globe. Studies have revealed that the global increase in methane and nitrous oxide in the atmosphere is primarily caused by agriculture (FAO, 2015). The global estimation of anthropogenic emissions in 2005 attributed 60% of nitrous oxide emissions and 50% of methane emissions to agriculture (Smith et al., 2007), and these proportions are expected to increase by 30% by 2050 according to recent estimates from the Food and Agriculture Organization (FAO, 2015). Current environmental education founded on Western science cannot address all the environmental challenges alone. The objective of this paper is therefore to explore the potential of Indigenous food cultures as a pedagogical tool to augment Western science to address current environmental problems. Using methodology of document analysis, this paper traces three knowledge traditions: Indigenous Knowledge, Islamic Science and Western Science and argues that each of this knowledge tradition makes sense within its own cultural context. The paper compares and contrast Indigenous food production system and the industrial agriculture and argues that indigenous food production is founded on sustainability and spirituality while industrial agriculture is found on capitalism and globalization. The paper further argues that every education must be environmental education and environment education must emphasize on spirituality i.e. relationship between humans and other creations.*

**Keywords:** Indigenous knowledge, food cultures, pedagogy, environmental education

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## **Introduction**

Climate change is one of the most serious problems facing the world today. Recent happenings around the world: rampant and severe floods in parts of Asia, severe drought and water shortage in parts of Africa and extremely cold winters and warmer summers around the temperate regions, particularly American and Europe, have caused even the intransigent critics of climate change to recognize that it is real. The highlight of this development is the agreement reached in 2014 between two major polluters in the world: China and the United States, which together contribute 42% of world emission of Greenhouse gases (Boden, Marland & Andres, 2015) and overwhelming endorsement of emission cuts by nearly 200 countries that took part in Paris conference on climate change dubbed COP21 in 2015. One area that will experience the devastating effects of climate change is the food sector. Ironically, industrial agriculture has been identified as one of the leading causes of climate change across the globe. Studies have revealed that the global increase in methane and nitrous oxide in the atmosphere is primarily caused by agriculture (FAO, 2015). The global estimation of anthropogenic emissions in 2005 attributed 60% of nitrous oxide emissions and 50% of methane emissions to agriculture (Smith et al., 2007), and these proportions are expected to increase by 30% by 2050 according to recent estimates from the Food and Agriculture Organization (FAO, 2015). There is also substantial emission of carbon dioxide ( $\text{CO}_2$ ) as result of mechanized agriculture which depends heavily on fossil fuel for tillage practices, irrigation, mechanized feeding, fertilizer production and application, transportation and other farm operations.

In addition to accelerating the rate of climate change, industrial agriculture is unsustainable for four main reasons: first, overreliance on oil which in itself is an exhaustible and non-renewable natural resource. Secondly, overreliance on chemicals (both fertilizers and pesticide) which will eventually render most soils as only a medium to provide anchorage for plants rather than nourishment. Thirdly, overconcentration of a few selected varieties of crops grown intensively which will reduce the diversity of human food bases, and finally, overconcentration on a few selected animal species which are being reared on “life support” with antibiotics. Several groups- environmentalists, social movements and organized groups as well as well-meaning individuals, have raised concerns on the environmental and health impacts of our current food system (Shiva, 1991; Via Campesina, 2009; Wittman et al, 2010). One area worth critical analysis in addressing these concerns is the current environmental education which is premised on Western science. Current environmental education has its own challenges and Orr (2004) identified one of the challenges as the belief that with adequate science and technology, humans can manage the planet earth. Orr (2004) challenged this notion by arguing that higher education and technology have sought over time to entrench human domination of the earth, and in the process of solving one problem, another is created. Our quest to dominate the earth equips individuals to become what Orr (2004) described as “vandals of the earth” (p. 6). The objective of this paper is, therefore, to explore the potential of Indigenous food cultures as a pedagogical tool to augment Western science to address current environmental problems. Hence, the main research question guiding this paper is what can we learn from Indigenous food cultures as a knowledge base for the education of young learners?

Indigenous food culture describes the mode of food production, distribution, consumption and re-use of by-products of foods by Indigenous peoples. It also emphasizes food as an ethnic marker, construction of identities and cultures. As people learn to eat their traditional foods, they learn their culture, who they are, and who they are not. Indigenous food culture is derived from Indigenous knowledge which is also grounded in Indigenous worldviews. In this paper, the term Indigenous is used as international category and Indigenous knowledge (IK) and Traditional ecological knowledge

(TEK) will be used interchangeably. Berke, Colding and Filke (2000) defined TEK/IK as a “cumulative body of knowledge practices, and beliefs, evolving by adaptive process and handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment” (p.1252). Knowledge in traditional food gathering, preparation, preservation and consumption help to create a wealth of unique cultural knowledge and identities among tribes and individuals. As a result, traditional foods and food systems are closely linked with indigenous knowledge and often extend to belief systems, spirituality, and indeed the entire well-being of Indigenous people (Kuhnlein, Erasmus & Spigelski, 2009; Wangoola, 2000). Indigenous knowledges lack recognition within the main stream academy.

In her article “*Nutritional transition and public health crisis: Aboriginal perspectives on food and eating*”, Martins (2012) argued that nutritional programmes for Indigenous communities in Canada are designed without the input from Aboriginal peoples. As result, most of the programmes become ineffective or not in tune with Aboriginal peoples, cultures and traditions. Prah (2005) argues that when it comes to Indigenous communities, there is always the tendency for people to think that they know them better than they know themselves. The idea of knowing somebody better than the person knowing him/herself, and thereby discounting other people’s knowledge has been described as “epistemic racism” (Escobar, 2004; Manaldo-Tores, 2004). This paper argues that Indigenous food cultures can be better understood through lens of IK hence, the discussion commences with knowledge production and worldviews.

## 1 Theoretical Framework: Knowledge Production and Worldviews

Berkes et al., (2000) defined worldview or cosmology as, “basic beliefs pertaining to religion or ethics, and structures of observations that produce knowledge and understanding. Worldviews influence knowledge production in all knowledge traditions. Tracing the historical knowledge traditions, IK has been in existence for millennia and grounded on Indigenous worldviews before the emergence of Islamic science (during the Islamic golden age). The Islamic science was founded on Islamic worldviews and dominated the areas of mathematics and science from the mid-8th century to the mid-13th Century (Falagas, Zarkadoulia & Samonis, 2006), until the rise of Western science. Western science, which was founded on Ancient Greek worldviews (Mazzocchi, 2007), replaced and subsumed aspects of the Islamic science. The expansion of the European Empire through colonization spread Western science across the world and this has become universally accepted knowledge. Australian philosopher Paul Feyerabend (1987) argued that any form of knowledge makes sense only within its own cultural context.

This paper, therefore, operates on the theoretical prism of Indigenous knowledge, which according to Wane (2008) provides an alternative to the dominance of Western discourse, functioning as a form of resistance against colonialism and imperialism (Dei, 2000a). IK is experiential and subjective in nature, because it is engrained in personal and direct human experience (Dei, 2000b) and it is holistic and implicit (Dei, 2004, Obomsawin, 2001; Simpson 2000). It forms the basis of a livelihood that embraces every facet of human life from agriculture, food preparation, eating habits, health care, education and training, and environmental conservation, among others (Agrawal, 1995; Demi, 2014; Warren et al., 1991, Kuhnlein et al. 2009). However, IK could be understood through an indigenous worldview, which according to Simpson (2000), operates on the following seven principles. First, the knowledge is holistic, cyclic, and dependent upon relationships and connections to both animate and inanimate beings. Second, there are many truths, and these truths are based on an individual’s lived experience. Third, everything has life. Fourth, all things are equal. Fifth, the land is sacred. Sixth, the

relationship between humans and the spiritual world is relevant. Seventh, humans are the least significant in the world. These principles are understood within an Indigenous framework; hence using other worldviews to assess Indigenous knowledges may pose a challenge, making it sound “irrational”, “unscientific” and “accidental”. Thus, from an indigenous point of worldview, humans are an integral part of nature, and their relationship with other forms of creation, both animate and inanimate, is one of mutual respect. Trask (1991) explained this when she echoed the beliefs of Native Hawaiians, who maintain that “nature was not objectified, but personified resulting in an extraordinary respect (when compared to Western ideas of nature) for life of the sea, the forest and the earth” (p. 1199).

Indigenous knowledge, therefore, forms the basis of Indigenous food systems. According to Food and Agricultural Organization of the United Nations (FAO/UN) Indigenous farming practices encompassing “fishing, pastoralism/herding, foraging and forestry are grounded on long proven knowledge and practices that help to ensure food and agricultural diversity, valuable landscape and seascapes features, livelihoods and food security” (FAO, 2009, p. 1). Based on this view, Indigenous foods and food systems are closely linked with Indigenous knowledge which is also vital for the livelihood of Indigenous people. As Kuhnlein et al. (2009) stated:

The dimensions of nature and culture that define a food system of an indigenous culture contribute to the whole health picture of the individual and the community – not only physical health but also the emotional, mental and spiritual aspects of health, healing and protection from disease. (p.3).

It is therefore evident that IK Indigenous food systems are not only vital for human sustenance but also constitute a treasure of knowledge that contributes to well-being and health, environmental sustainability and cosmic balance of the ecosystem which could be harnessed for the benefit of all human kind (Kuhnlein, 2010). In a related development, studies have revealed that Indigenous technologies of food processing and distribution were disappearing as more and more Indigenous peoples moved away from their traditional lands, local foods, and cultural knowledge (Johns & Kubo, 1988; Kuhnlein & Turner, 1991). The decline in Indigenous food practices and consumption have been linked to the rising cases of chronic illness among communities in sub-Saharan African (Raschke & Cheema, 2007) the pacific (Rowley et al., 2000) and North America (Fazzino, 2008). Indigenous communities hardly separate food from medicine; hence, the associated health benefits of food, especially plant-based food, extend their value into the realm of traditional medicine (Messer, 1977, 1984).

## 2 Indigenous Food Production vs Industrial Food Production

Food production is one the oldest occupations engrained in Indigenous knowledge since humans realized that living from the wild was not sustainable. Historical accounts have shown that long experimentation with what was in the human's immediate surroundings, as well as intuition and revelations from God, gods and ancestors, determined what could be regarded as food (Logan, 2012). Hence, classification of plants into food and medicine came as result of great sacrifices human ancestors had to go through in order to survive and pass on the knowledge to the next generation. Throughout these struggles, Indigenous people never separated food from medicine; depending on which part of the plant is used, the season of the year and physiological condition of the person using the crop, the same plant can be consumed as food or medicine (Kuhnlein et al, 2009). Again, indigenous people never separated crops from weeds; in fact, all plants are either food or medicine. As a result there was no need to destroy plants as weeds. The term “weed” was probably derived from the European system of mono-cropping. This is evident in the definition of weed in conventional

agriculture where weeds are defined as plants growing in an unwanted place. By inference, it implies that if corn is found in a tomato mono crop farm, it can be deemed as growing in an unwanted place (i.e. as a weed), which hence paves the way for its destruction. An Indigenous woman farmer in India registered her displeasure with the insensate classification of plants into weeds and crops when she said: "what do you mean by weeds? There is nothing like weed in our agriculture" (Mazhar, Buckles, Satheesh & Akhter, 2007, p. 18). However, despite the complexities inherent in definitions of weeds, most indigenous plants that were not familiar to the main stream agronomists were classified as weeds and massive investment in chemicals to destroy them was initiated when capitalism grabbed agriculture as its last business empire. Putting food production in this general context, the next paragraphs proceed to look at the key considerations in Indigenous food and industrial agriculture.

In Indigenous communities, the process of acquiring food is enshrouded in spirituality and physical considerations that ensured the continuous existence of peace, harmony and sanctity in nature. Sustainability of the environment was one of the critical issues in the food acquisition and consumption. Such considerations are connected to the belief that humans are linked to the earth, hence their continued existence depended on the reverence accorded the earth. In accordance with such beliefs, local people are encouraged to make peace with plants, animals (both domesticated and wild), and stones and so on. Good neighborliness was therefore extended to the earth (Wangoola, 2000). The soil was assumed to be a deposit account from which the account holders (people) drew only part of the accrued interest without ever touching the principal (Wangoola, 2000). All the creatures on earth were considered as partners with key roles to play to ensure cosmic balance in the environment. When speaking to Njoki Wane during a research project, an old woman farmer in Kenyan raised serious concerns with the impudence of industrial agriculture to the earth and pointed out some of the lapses in current environmental education which need to be addressed when she said;

What happens when you till the land over and over again? It shows you have no respect for the land. If you have no respect for the land, would you have respect for what grows on the land or people? I believe whatever education they are giving you is good education, but it is not complete education. You need to question the validity of what you are learning in relation not only to you, but also to your people, to us, to the land, to the plants and to the soil you are standing on. When you do that, that will be complete education . . . maybe from that knowledge, you might find a way of bringing some equilibrium between the environment, people, Creator and the universe. (Nathani, 1996, p. 138)

The above quote questions the sense of responsibility to the land and living and non-living things, which all play a critical role to make the earth habitable. It emphasizes that our relationship to the land or earth should not be premised on exploitation and domination but rather mutual respect and reciprocity. As Paul Wangoola (2000) argues, "humans are the most vulnerable and weakest link in the vast chain of nature. The earth is not for them to conquer and subdue, but their mother to live with in peace, harmony and reverend" (p.265). In that respect, Indigenous farmers do not produce food mainly for profit but to sustain nature, of which humans are a key component. Gliessman (1998) outlined five fundamental principles of Indigenous food production as follows:

- They combine several species and structural diversity in time and place.
- They explore the full range of the microclimate (which differs in terms of soil, water, temperature, altitude, slope, fertility, topography and others) within a field or region.
- They ensure close cycle of local readily available resources and by-products through effective recycling practice. (e.g. crop waste are used to feed livestock)
- They depend on a complexity of biological independencies, culminating in high levels of biological pest suppression.
- They depend on local readily available resources in addition to human and animal energy, thereby using low levels of input technology and exhibiting positive energy efficiency ratios.

Industrial agriculture, on the other hand, is premised on a business model through neoliberal policies. Until a few decades ago, agriculture did not attract the interest of capitalist economies at earlier stages of capitalism even though capitalism started as far back as 17th and 18th centuries in England (Albritton, 2012). Some of the reasons why agriculture was not the point of interest of capitalists are as follows:

- high risks and uncertainties associated with agriculture due to its over dependency on nature
- long gestation period which makes it difficult to produce to meet immediate demand
- high perishability of most agricultural products
- bulkiness of agriculture products relative to value

Starting from the period of the green revolution after the Second World War in 1945, massive investments were made to address the “challenges” associated with agriculture as mentioned above, which laid the foundation for neoliberal agricultural policies. The problems of risk and uncertainty were addressed using technology such as mechanized irrigation to address drought conditions, perishability was addressed with the introduction of storage vans that cart farm produce from place to place without spoilage, and the long gestation period was addressed using “improved varieties” that have a shorter life span from start to harvest. These developments paved the way for capitalism to get ahold of agriculture and manipulate food systems to the disadvantage of the poor people. Corporate interest in agriculture has driven smallholder farmers in the Global south and family farms in advanced countries such as Canada into oblivion. It was reported that from 1986 to 2006, Canada lost 22% of its farms and farm families (Statistical Canada, 2007). The current World Trade Organization (WTO) policy - Agreement on Agriculture (AOA) has worsened the plight of smallholder farmers, creating backlogs of unemployment in the Global south and widening the poverty gap between the rich and the poor in most countries. The implementation of WTO policies has forced smallholder farmers who cannot break even to join corporate farms and provide cheap labour to business magnates. Since its inception, capitalism has as its core mandate to make profit in the shortest possible time and concentrate income into the hands of a few elites to empower them to exert control and domination; a task it has successfully accomplished to the admiration of its proponents.

Hence, the green revolution was criticized by environmentalists and critical scholars as the beginning of the degeneracy of human health, social cohesion, economies and the cultural lives of people, particularly those in the global South (Grenier, 1998; Shiva, 1991; Wittman et al., 2010). According to Grenier (1998), “the green revolution resulted in ecological deterioration, economic decline (at the local level), poorer diets and nutritional losses resulting from the eradication of traditional foods or from their substitution by nontraditional foods” (P.8). Seemingly overwhelmed with the chemical ingestion in industrial food production, this is what historian Michelle Murphy has to say in her article entitled “*Chemical regime of living*”:

The intensification of production and consumption in recent decades has yielded a chemically recomposed planetary atmosphere to alarming future effect, while it has penetrated the air, water, and soil to accumulate into the very flesh of organisms, from plankton to humans. Not only are we experiencing new forms of chemical embodiments that molecularly tie us to local and transnational economies, but so too processed food, hormonally altered meat, and pesticide-dependent crops become the material sustenance of humanity’s molecular composition. (Murphy 2008, p. 696)

The quote from Murphy (2008) is a serious indictment not only to the industrial agriculture but also government ministries and agencies bestowed with the responsibility of regulating our food systems. It also points to the failure of the systems which allow pseudo foods to engulf the shelves of grocery

stores and supermarkets in what is best described as “spatial colonization” (Winson, 2012, p. 186). Murphy’s (2008) argument that current industrial food production ties people to transnational companies reveals a relation of control and domination that was hinted by Susan George over three decade ago when she wrote: “this is what food has become: a source of profit. A tool of economic and political control; a means to ensure effective dominance over the world at large and especially over the wretched of the earth” (George, 1976 cited in Raschke & Cheema, 2007: p. 663). Peter Rosset (2006 cited Albritton, 2009. P.200) sums up the inequities of the industrial food system when he wrote:

Why must we put up with a global food system that ruins rural economies worldwide, drives family and peasant farmers off the land in droves, and into slums, ghettos, and international migrant stream?... that imposes a kind of agriculture that destroys the soil, contaminates ground water, eliminate trees from rural areas, creates pest that are resistant to pesticides, and put the future productivity of agriculture in doubt?... Food that is laden with sugar, salt, fat, starch, carcinogenic colours and preservatives, pesticides residues and genetically modified organisms, and that may well be driving global epidemics of obesity for some (and hunger for others), heart diseases, diabetes and cancers? A food system that bloats the coffers of unaccountable corporations, corrupts governments and kills farmers and consumers while wrecking the environment.

Hence, in sharp contrast to an indigenous food system which is cyclical, the corporate food system is linear. The linearity of the corporate food system is explained by Kaufman (2004), who defined a food system as that which “encompasses a chain of activities that begins with the production of food and moves on to include the processing, distribution wholesaling, retailing and consumption of food and eventually to the disposal of waste” (cited in Sumner, 2012, p. 326). In Kaufman’s conceptualization of a food system, it ends when food waste is disposed of.

However, from an Indigenous perspective, every part of the plant or animal that constitutes food is valuable and in most cases Indigenous people do not separate food from medicine. Even by-products of foods are further utilized as medicine, feeds for farm animals, compost, energy to heat homes, to make clothing, and to some extent to provide shelter (e.g. rice stacks are used to roof houses) (see Condon et al 1998, Hanrahan; 2008; Wilson, 2005). Sumner (2012, p.327) defines a food system as “an interdependent web of activities that include the production, processing, distribution and disposal of food”. Sumner’s (2012) definition provides a better explanation of a food system due to its emphasis on interrelationship among the chain of activities, except to add that an Indigenous food system stresses the re-use of food waste to continue the cycle. Hence, the phrase “disposal of food” is not entertained since it is considered abhorrence. Simpson (2008) narrated a centuries old story of the people of Nishnaabeg who ceased to get moose, deer and caribou during hunting and their investigation revealed that the animals left their territory because their meat was being wasted. To appease the animal nation and mend their relationship, the animal nation met in council and the chief deer presented the condition upon which they would return to the Nishnaabeg territory as follows:

“Honour and respect our lives and our beings, in life and in death. Cease doing what offends our spirits. Do not waste our flesh. Preserve fields and forests for our homes. To show your commitments to these things and as a remembrance of the anguish you have brought upon us, always leave tobacco leaf from where you take us. Gifts are important to build our relationship once again. (Simpson, 2008, p.34).

The Nishnaabeg people agreed to the conditions set out by the animals, and the animals returned to their territory to offer themselves as sacrifices to provide food for the people (Simpson, 2008). As a result, contemporary Nishnaabeg hunters go through the rituals anytime they kill deer or moose. This emphasizes the fact that wastage of food is not something Indigenous people condone. To sum up, I argue that an indigenous food system hinges on two pillars: sustainability and spirituality, while

Industrial agriculture is founded on capitalism and globalization. Indigenous food systems therefore lead to food sovereignty, while industrial agriculture works with the notion of food security. This therefore leads into the discussion in the next section, food security vs. food sovereignty.

### **3 Food Security vs. Food Sovereignty**

The mantra of food security advocates that the world population is increasing at an alarming rate, hence the need for a rigorous agricultural system that will ensure massive production of food to meet human demand. However, food production is unlikely to meet human demands because human needs are insatiable. Other reasons include: increase food production correlates with increase population hence the more food is produced, the higher the population increases, and also large scale food production leads to higher inefficiency and wastage (Landesa, 2011; Leman & Sutton; 2006). To better situate the discussion, perhaps we should trace the origin of food security and why achieving food security in the world continues to be a mirage. The phrase “food security” became household phrase after the world food conference in 1974, almost three decades after green revolution was aggressively pursued across globe. In 1986, the World Bank provided a benchmark definition of food security as “access by all people at all times to enough food for active life” (World Bank, 1986).

This definition emphasizes on three key variables: availability - production of enough food to meet human demand, accessibility – moving food from surplus areas to deficit areas and also people having financial resources to purchase food and finally utilization – emphasizes on the production of higher quality food to ensure healthy living. Although the intentions behind food security were laudable, implementation of food security policies leaves much to be desired. As a result, the food situation in the world has deteriorated annually since 1996 (FAO, 2008). The challenge of achieving food security is due in part as a result of private corporations taking the center stage in food security measures, creating artificial food shortages to meet their business interest (Suschnigg, 2012). Hence, a United States senator Marcaine once said “food security in the hands of private firms is no food security; for private firms are there to make profit but not to feed people”. A former public health Attorney, Michele Simon also registered his frustrations when he observes, “Like water (and unlike most other commodities such as toys or electronics) food is indispensable and a basic human right. Why have we turned its production over to private interests? Shouldn’t at least some aspects of society remain off-limits to corporate controls?” (Simon, 2006, p.318).

The concerns raised by these two prominent individuals explain why after over four decades of implementation of food security measures, the world is still besieged with food shortages. Food insecurity is always linked to deficits in food supplies while the structural problems are overlooked. Sischnigg (2012) outlined two approaches to addressing food security: an antipoverty approach and a food sovereignty approach. The anti-poverty approach argues that the main cause of food insecurity is unaffordability of food due to a large percentage of the population falling below the poverty line. From the antipoverty approach, there is more than enough food to feed everybody in the world except that limited financial resources are impeding countless number of people to access food. A food sovereignty approach on the other hand critiques the anti-poverty approach for being short-sighted since food insecurity involves more complex socio-cultural issues than just poverty. Hence, a food sovereignty approach goes beyond poverty and asks some key question: what types of food are available? Are the foods culturally appropriate to everybody? Are the food produced through sound ecological and sustainable ways? What are the social conditions of the food producers? In other words are they receiving commensurate wages for their labour? These and others questions ground the food

sovereignty approach to solving food insecurity. Suschnigg (2012) highlighted there key factor that caused upsurge of food prices and posed challenges to global food security:

- Growing interest and massive investment into agriculture by multinational capitalist corporations who are focus on profit making by creating artificial food shortages.
- Conversion of arable land to biofuel production to meet the energy demand of the West. A situation which is best described as “the poor should starve so that the rich can drive” (Monbiot, 2012, p. 1). European oil biofuel companies are into massive land grabbing in Africa which Rice (cited Vidal 2010) estimated to amount 10 million hectares displacing peasant farmers from their land and livelihood.
- Undemocratic structural adjustment policies impose on the global south by International Monetary Fund (IMF) and World Bank.

Shiva (2008) described IMF and World Bank policies as “undemocratic” because the people who are mostly affected by the policies were not part in formulating those policies. These policies enforce countries in global South to open their market for dumping of Western products, particularly frozen food that are in high fat, sugar and salt in the guise of free trade, while they are restricted using stringent measures centered on quality, health, shape, size, colour, taste etc. Furthermore, food sovereignty advocates argue that the anti-poverty approach “runs the risk of reducing the issue of hunger and malnutrition to a humanitarian problems for rich countries to solve, a position which is highly contested by countries and societies which have long depended on agriculture for the livelihood” (Mazher et al., 2007). As a result, it is argued that food shortages in the world could be better addressed through bringing human energy back into production, giving respect and dignity to physical work, and bringing people back to agriculture to reclaim nourishment (Shiva, 2008). These are the tenets of food sovereignty.

Food sovereignty is therefore defined as “the right to healthy and culturally appropriate food produce through ecologically sound and sustainable methods, and the right of the people to define their own food and agricultural systems. It puts the aspirations and the needs of those who produce, distribute and consume food at the heart of the food systems and policies rather than demand of the markets and corporations” (Forum for Food Sovereignty, 2007 cited in Suschnigg, 2012, p. 227). Wittman et al., (2010) also defined food sovereignty as “the right of nations and people to control their own food systems, including their own markets, production modes, food cultures and environments... as a critical alternative to the dominant neoliberal model for agriculture and trade” (p. 2). Therefore, food sovereignty challenges the new face of capitalism and its imposition of trade imbalances between the North and South through removal of subsidies to global South farmers while the North enjoys subsidies, trade liberation that opens the market of Global South for dumping of goods from North, and increased concentration of transnational companies in both agro-input and food industries (Bernstein, 2013).

Therefore, food sovereignty works with the concept of self-sufficiency in food production, democracy-the ability of people to define their own food systems and cut ties from the dictates of corporations, and diversity- broadening the human food base to include various species which the industrial food companies classifies as weeds. Lack of appreciation of these complex issues explain in part the rising cases of chronic diseases such as obesity and hypertension associated with overeating in the midst of food insecurity (Martin, 2012). The rising cases of chronic illness such as cardiovascular diseases (stroke, hypertension), diabetes and certain cancers among the Indigenous people across globe was attributed to moving away from traditional foods rich in fiber, fruits, vegetables and green leaves to foods high in fat, sugars, and salt (Bjerregaard, 2010; Delomieret et al., 2009). In her book “*Food*

*Politics*", Marion Nestle (2007) asserted that different cultures understand their relation to food differently. Whereas the goal of food and eating within many Indigenous communities is a means of expressing culture, upholding traditions, and strengthening cultural knowledge about the world (Willow, 2005), the goal of conventional nutritional science research – a conduit to industrial food system, reduces foods to their biochemical properties and categorizes them according to their chemical compounds (Lupton, 1996; Scrinis 2002; Warde, 1997).

#### **4 Pedagogical implication**

The term pedagogy originated from the ancient Greek words for child and leader, and was associated with the slaves who escorted the children to school (Webster, 1990) and the room in the school where the slaves waited for the children being taught (Oxford English Diction [OED], 2013). From its meek beginning, the term has evolved into "the art, occupation or practice of teaching" including the theory or principle of education (OED, 2013). These theories and principles of education are, therefore, expected to empower individuals to become conscious of themselves, their surroundings (including their environment, social and economic activities) and improve their relationship with others (both animate and inanimate). However, critical analysis of current educational systems, particularly environmental education shows that there are much room for improvement. As a result, there has been a call to overhaul the current environmental education in a particular and education in general (Orr, 2004). Perhaps what we need at this point in time is to change the paradigm shift in environmental education from the romantic notion of saving the earth to more critical perspective of saving ourselves. Environmental education is premised on the wrong foundation with the assumption that we can save the earth. Sobel (1996) wrote, "if we want our children to flourish, to become truly empowered, then let us allow them to love the earth before we ask them to save it" (p. 36). This notion considers the children and the environment as a separate entity and arrogates the power to either destroy or save the earth in the hands of individuals. What happens is that an individual could behave irresponsibly to the environment, only to do something close to nothing and pat him/herself on the back that s/he has saved the environment.

An Indigenous perspective argues that humans are integral part of earth hence whatever we do to the earth we do it to ourselves (Martin, 2012). This perspective instills in the younger generation to be environmental conscious and disabuse their minds from being an imperial saviour of the earth to saving their own lives, that of their families and friends, communities and other living organisms that share the earth with us. This reminds us of the earlier argument by Orr (2004) that every education must be environmental education. Elaborating further on the argument that our quest to dominate the earth equip individuals to become "vandals of the earth" (Orr, 2004, p.6), one could draw a lesson from the recent scientific research in terms of biotechnology which is focused on changing the genetic constitution of organisms to suit human interest. A case in point is the introduction of Genetic Modified Organism (GMOs) which focuses on the developing drought/cold resistant crops, pest and disease resistant crops as well as higher yielding varieties of crops and animals species.

The GMO technologies are expected to make it possible to grow crops where under normal circumstances it would have been difficult. In addition, GMO technologies are to develop crop and animal species which will better adapt to future worsened climatic conditions. This gives humans a false sense of hope that irrespective of our actions towards the environment, science can solve the problems we could likely face. However, recent happenings in some parts of the world and in particular the United States where pest, weeds and diseases are developing resistance to pesticides and weedicides and ultimately reducing the resilience of GM crops point to the fact that we cannot

effectively manage nature. Rather it is easier to control human desires, economics, politics and communities than to manage the earth (Orr, 2004). Some of the rhetoric of capitalism is that human desires cannot be controlled; hence humans are better off finding technologies that will address environmental problems. However, this assertion is far from the absolute truth since there are several Indigenous communities across the globe that live naturally and are able to contain their desires.

The connection and belonging that the Indigenous peoples have to their natural surroundings is not premised on romantic notions of “living close to nature”, but rather considered a reciprocal relationship where the earth provides resources for human survival as long as the people reciprocate the king gesture by taking care not to exhaust resources in their surrounding (Turner, 2005). For example, Indigenous peoples in Canada live in one the most advanced countries in the world, precisely 8th on the global scale, and yet they practice their traditional hunting, trapping, fishing and agriculture despite the struggles in accessing and using their traditional territories for food procurement activities (Martin, 2012). Instead of finding out what can be learnt from the Indigenous practices, those practices are considered an indication of their inability to put the “land to good use”, hence the need for the lands to be given to international corporations and oil companies who are believed to “put the lands to good use”.

The other myth of environmental education identified by Orr (2004) is the assumption that knowledge is increasing; by extension, we live in an information world. He argues that people are confusing data with knowledge and that reducing knowledge to the availability of information is a narrow way of understanding knowledge. Such a narrow understanding of complex social issues forces people into the illusion that development leads to well-being and happiness (Albritton, 2012; Shiva, 2008). As disappointing as it may sound, “the earth does not need more successful people, what it desperately needs are more peacemakers, healers, restorers, story tellers and lovers of every kind” (Orr, 2004, p.12). Anthropologist, Marshal Sahlins (1972) argued that if leisure is the measure of affluent societies, then ironically, our human ancestors were more affluent compared with contemporary societies because they had little to worry about in terms of accumulation of food and acquisition of material resources. Coming back to the myth of environmental education, Orr (2004) argues that “what can be said truthfully is that some knowledge is increasing while others kinds of knowledge are a being lost” (Orr, 2004, p.6). Over a quarter of century ago, Barry Lopez (1989) hinted on the pervasive loss of basic local knowledge which human survival hinges on. He wrote,

[I am] forced to the realization that something strange, if not dangerous, is afoot. Year by year the number of people with firsthand experience in the land dwindles. Rural population continue to shift to cities ...In the wake of this loss of personal and local knowledge, the knowledge from a real geography is derived, the knowledge on which a country must ultimately stand, has come something hard to define but I think sinister and unsettling (P.55)

This explains why each year we add to the pool of smart individuals with the highest forms of degrees but whom are ecologically illiterate (Orr, 2004). The environmental problem we are facing currently is multifaceted and hence, more than scientific knowledge is required to address these challenges. Indigenous food culture and by extension Indigenous knowledge is required to augment current scientific knowledge. At the center of Indigenous food culture is the emphasis on spirituality. Spirituality is central to human existence and failure to accord spirituality its central role in modern societies culminated in what Chinua Achebe (1994) best described as “things fall apart, the center can hold”. By spirituality I do not mean religion or fetishism but rather how individuals perceive themselves in relation to other beings either animate or inanimate in way that ensures reciprocity and mutual respect and not in relationship of domination and subjugation. In highlighting how Indigenous people celebrate diversity and extend respect to all beings, Amadahy and Lawrence (2009) wrote:

Mother Earth and all her children teach us that diversity is necessary to our health and well-being. You do not see the trees insisting that they all bear the same fruit. You do not see the fish declaring war against those who do not swim. You do not see corn blocking the growth of squash and beans. What one plant puts into the soil, another takes. What one tree puts into the air another creature breathes. What one being leaves as waste another considers food. Even death and decay serve to nurture new life. Every one of Mother Earth's children co-operates so that the family survives. (p. 116)

## 5 What Can We Learn From Indigenous Food Cultures

With the above considerations in mind, Indigenous food cultures clearly provide a wide range of lessons that can be used to address poor health, environmental crisis and natural resources management. However, for the purpose of this paper, I will examine four lessons that can be learned from the above scholarship on IK within the context of food: spirituality, food diversity, harvesting regulations / restrictions and reliance on local available materials. Details of these lessons are discussed in the following paragraphs.

### *Spirituality*

Spirituality connects people to the food they consume. It is a popular belief among indigenous people that if, for example, a hunter catches game, the game—the body of a dead animal—is considered a sacrificial act, sacrificial because the living animal has made itself available. With this view, the act of catching game is not a result of the hunter's dexterity; it is the result of the animal sacrificing its life for the hunter, enabling him to feed himself and his family (see Simpson, 2008; Wangoola, 2000). Such belief mandate Indigenous people to accord great respect to the food they eat and be moderate in their consumption to show their respect for the lives of the animals slaughtered. This belief also encourages Indigenous communities to rely largely on traditional crops instead of animal flesh except the nomadic families who depend mainly on animal products. Furthermore, Indigenous food cultures make use of every part of crop or animal that is harvested effectively. These food practices ensure that food wastage is reduced to the barest minimum. Food wastage is also restricted through cultural norms and values that forbid individuals from taking more than required at a time and emphasize the use of crop or animal by-products (Simpson, 2008; Wangoola, 2000). For instance, in Indigenous animal husbandry, livestock are mainly fed with crop by-products while substantive foods are strictly reserved for human consumption. These practices provide some advantages: first, humans are saved from competition from farm animals for food which eventually help to ensure food sufficiency.

In contrast, industrial agriculture contributes to creating food insecurity through use of whole grains and cereals as key components of animal feed. In 2007 for example, 58.6 percent of corn (maize) produced in the United States was used as animal feed by the meat industry, 28.6 percent was converted to ethanol for agro-fuel and 4.77 percent was used to produce high-Fructose Corn Syrup (HFCS) for the confectionary industries (US Department of Agriculture, 2008). Hence, the main typical United States diet is essential meat with periphery carbohydrate (Dietler, 2007), in contract to traditional food cultures which depend largely on crop products. It is estimated that on average, 9 billion chickens are slaughtered annually in United States, which translate to approximately 2.5 million chickens killed daily, a figure which exceeds what were killed in an entire year just 8 decades ago (FAOSTAT, 2009; USDA NASS, 2008; Weis 2009). The transformation of US diets from high calorie crop products to low calorie meat has been described as “meatification of diets” (Albritton, 2012: p. 108) and has greater environmental consequences. Meat production contributes disproportionately to greenhouse emissions (Carlsson-Kanyama & Gonzalez, 2009; UNEP, 2012). Another advantage that could be derived from strictly feeding farm animals on crop by-products and

forage is that it ensures production of lean meat that help to reduce fat related complications and diseases. Several studies have linked the rising cases of chronic illness to high fat content of industrial meat (Barnard et al., 2009; 2006). Spirituality is, therefore, a key component of indigenous food cultures, however, this is lacking in current environmental education. Hence, emphasizing on spirituality in environmental education will help to reduce wastage and keep our environment safe.

### ***Food diversity***

Crop diversity of the world has declined significantly with the introduction of industrial agriculture. The quest for profit by industrial agriculture has resulted in the selection of few higher yielding crops that are energy dense but nutrient poor to be grown on large scale for commercial purposes. According to Food Agricultural Organization (FAO; 2009), about 7,000 species of plants have been cultivated since humans adopted farming. But currently only 30 crops provided an estimated 90% of the world population's dietary needs, with wheat, rice and maize alone contributing almost half of energy consumed globally (Kumar, Dubey & Singh, 2008). Out of an estimated 15,000 species of mammals and birds that have been identified, only 30 to 40 have been domesticated for food production and less than 14 species include cattle, goat, sheep, buffalo and chickens account for 90% percent of global livestock production (Kumar et al., 2008). Recent introduction of Genetic Modified (GM) crops and animals mainly in Americas which is also growing steadily in Africa and other continents (Mannion & Morse, 2013) is likely to further dwindle available world food diversities. One of the strength of Indigenous food system is the emphasis on crop diversity. From the indigenous point of view, there is nothing like authentic human foods, what constitute as food to one indigenous tribe could be a taboo to another tribe or could be used a pet for some or an object of worship to others (Demi, 2014). In some parts of Africa where people practice system of totems, people are forbidden to eat or harm plants or animal that symbolizes their totem. For instance, a tribe whose totem is a deer neither eat the meat of deer nor sit on its skin or harm deer in any way (Wangoola, 2000). The animal is also expected to reciprocate this kind gesture by not destroying the crops of people belonging to such tribe or harming them (Wangoola, 2000). The system of totem ensures that most plants or animals species are protected by one tribe or the other, hence, reducing the chances of plant or animal species becoming extinct within a particular geography area. This serves as very effective mechanism of sustainability that Indigenous people employ to maintain cosmic balance in the ecosystem which can serve a great pedagogy to young learners.

### ***Harvesting regulations/restrictions***

In some Indigenous communities, there are certain traditional rules and norms that govern how people harvest farm produce, seafood or hunt in order not to deplete the existing stock. Such traditional norms are meant to give protection to vulnerable life stages of animal, aquatic, and plant species (Johannes, 1978). A clear example is the prohibition against catching of lobsters with eggs in the marine fisheries (Acheson, Wilson & Steneck, 1998); prohibition against hunting during breeding season of most species in South India and Africa (Gadgil et al 19993; Wangoola, 2000); and taboos regarding hunting and killing of pregnant animals (Wangoola, 2000). In most farming and fishing communities in Ghana, West Africa, for example, there are days set aside in a week where fishing or engaging in farming activity is prohibited. These reserved days for giving people opportunity to rest, it also provides a breathing space for sea or forest lives. Also, harvesting of certain farm produce are timed to coincide with festivals in order to ensure that nobody lacks during such festive occasions. For instance, among the Awutu/Efutu (collective called Guans ethnic groups) people of the Ghana, it is a tradition that a chief is supposed to be the first person to eat fresh yam to commence the harvesting of yam. This practices ensures three thing: 1) prevents people from hastily harvesting of immature yams,

2) ensures yam harvesting starts at the same period where majority of the farmers have their crops fully matured and prevents theft from the farms of early planters and finally, to allow the chief and elders to ascertain the quality of the yam in the season to prevent any likelihood of food poisoning. These practices not only ensure sustainability but also control human desires which according to Orr (2004) is lacking in current environmental education. Hence, Indigenous food cultures could help young leaners control their desires.

### ***Reliance on local material***

Indigenous food system makes good use of the local readily available materials. The reliance on local inputs and avoidance of synthetic chemicals ensure that safe organic foods are produced for human consumption. These practices intend help to improve human health and also preserve the environment for future generations. Avoidance of synthetic chemicals by Indigenous people is based on their belief that the soil/land gives back what humans put into it. Hence, when humans put chemicals into the soil, crops will ingest the chemicals and return to us. However, since we do not desire to consume chemicals, it is equally unsafe, at least on health grounds, to consume chemically depended crops and animals. Another area of concern in food distribution and transportation industry has been the amount of Greenhouse Gases (GHG) being emitted also known as carbon footprint during the process. Some critics argue that at times when we estimate the energy use to convey food to certain places and juxtapose that to the total energy that the food is supposed to provide, we will come to the shocking realization that the energy use in conveying food exceeds the total energy provided by the food (Suschnigg, 2012). So apart from the health and environment consequences of chemical fertilizers and artificial inputs, their transportation from industries to farms also emits significant amount of GHG which could accelerate the rate of climate change. Hence, indigenous food systems of using local available farming materials help to conserve the environment. With the above considerations in mind, IK regarding food spirituality and diversity practices can serve as a highly useful pedagogical tool in environmental education.

## **Conclusion**

In her book “*Soil not oil: Environmental justice in a time of climate crisis*”, Vandana Shiva (2008) identified three crises facing the world: an energy crisis, climate crisis and food crisis. All three crises are linked to the environment and account for the high poverty and poor health among people. She argued that these problems are connected so an attempt to solve them separately could worsen the situation. According to Shiva (208), three factors contributed to these crises: globalization and industrialization, subsidies and agricultural industrialization. According to Shiva, the capitalist approach of solving these problems is grounded on “growth” and “industrial development”. Capitalism assumes that there must be “growth” to eliminate poverty and that there must be “industrial development” for the poor global South to achieve the living standard of the rich global North. The growth is achieved through exploitation of resources where the lands of poor people are turned into oil fields, the food for the poor are converted to fuel to run industrial infrastructure and large labour forces are thrown out of work.

Industrial technologies also replace human labour with machines creating more emission of greenhouse gases which precipitate climate change and the resultant food insecurity. Subsidies to oil and gas economy and industrial agriculture are making socially, ecologically and economically high cost of food production systems, energy production and transportation artificially cheaper compared to ecologically sound systems such as organic foods and renewable energy. To overcome this problem,

Shiva (2000) suggested there must be a paradigm shift and we must begin to look at energy beyond oil and gas - to renewal sources of energy. But to be able to do that, we must first re-invent democracy to make the citizenry active participants in governance rather than passive observers. These measures according to Shiva (2008) could reduce environmental pollution and create employment. They will reduce profit and restore our traditional food systems. These are the tenets of indigenous food cultures and should serve as pedagogical tools for environmental education. However, such kind of education should be based on spirituality – the relation between humans and other beings both animate and inanimate. Also, Indigenous knowleges must be raised to be at par with the Western science to those who belief in Indigenous knowledge system.

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## **About the Author(s)**

**Suleyman Demi** is an environmental activist and educator. His research interests span from Environmental Sustainability, Social and Environmental Justice, and Indigenous Knowledge and Philosophy. He is the co-author of three articles on food security and has contributed one book chapter. Most recently, Suleyman Demi is a proud recipient of The GreenSaver Alastair Fairweather Memorial Award in the Environment for 2014 -2015 Academic year at the school of Environment, University of Toronto where he continues to pursue a PhD in Social Justice Education and Environmental Studies.