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**Abstract:**

This article will briefly discuss the implications of the recognition of ecological justice in relation to environmental education (EE) and education for sustainable development (ESD). It is argued that the present conception of environment taught through EE and ESD negates the subjectivity of non-human species and ignores the ethical imperatives of ecological justice. Evocating environmental ethics, major directions integrating ecological justice into EE and ESD are proposed.

**Keywords:** ecological justice; environmental education; environmental ethics; natural resources; population growth

## 1. Introduction

In the special issue of Time magazine titled Feeding the Planet Without Destroying It, the paradoxes of trying to both satisfy growing human needs and preserve “natural resources” are outlined (Walsh 2012). The article quotes Jon Foley – the head of the University of Minnesota's Institute on the Environment – who calls the crises of availability of agricultural land the “other inconvenient truth:

Put simply, the act of feeding 7 billion plus human beings already puts more stress on the planet than any other single activity – and with both population and global wealth continuing to grow, we're going to need to figure out a way to produce more food without further damaging the environment. Otherwise, we may end up running out of both food and the planet” (Foley quoted in Walsh 2012).

There is a huge literature on aims, methodology, and implementation of environmental education (EE) and education for sustainable development (ESD) in relation to paradoxes of sustainable development. One of the most salient debates in EE/ESD is the discussion of complexities and interrelatedness of anthropocentric and ecocentric approaches to environmental protection. Examination of articles published in journals associated with environmental education (EE), such as *Environmental Education Research*, *Journal of Environmental Education*, and *Canadian Journal of Environmental Education* as well as those associated with ESD (e.g. *Journal of Education for Sustainable Development* and *International Journal of Sustainability in Higher Education*) reveals increased use of terms equating nature with “natural resources” (for reviews see Kopnina 2012a, 2012b, 2013a, 2013b, 2013c). In the vast literature addressing the paradoxes and contradictions of sustainable development in general and EE/ESD in particular, anthropocentric bias is rarely mentioned (e.g. Jickling 1992; Orr 1994; Fien 2000; Scott & Gough 2004; Jickling et al. 2006).

Fien (1993) has noted, for example, that the focal concern in advancing sustainable development is essentially social. Gough and Scott (2007) emphasized that EE/ESD programs that focus primarily on environmental ends are likely to do so because their concern is anthropocentric, arguing that a healthy environment is necessary for human welfare. The key orienting idea of sustainable development does not pay enough attention to our understanding

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of our relationship to nature (Bonnett 2007, p. 707), which is overridden by the economies of capital accumulation through metaphors of natural resources or capital. The concept of natural resources reflects a wider social and political trend in viewing nature in purely instrumental terms.

Yet, another trend is also emerging, and that is recognition of the environment's value independent of human interests, and emerging recognition of ecological justice, or rights of nature. At the plenary session of the 17th World Congress of the International Union of Anthropological and Ethnological Sciences (IUAES), "Evolving Humanity, Emerging Worlds", hosted by the University of Manchester in August 2013, the motion "Justice for people should come before justice for the environment" was debated (<http://www.iuaes2013.org/Plenaries.html>).

Briefly summed up, the main argument for the motion centered around the idea that conservationists are mostly Western elites and that their actions impinge upon cultural practices and economic development of local communities in order to create conservation areas. The presenters supporting the motion have argued in favor of expanding the carrying capacity of productive land against considerations of preserving the environment. Social scientists, it was argued, have a duty to uphold human rights and indigenous entitlements and privilege economically disadvantaged communities (Baviskar 2013; Nonini 2013).

The counterargument was based on the empirical evidence that environmentalism and conservation is not a Western or elitist but universal phenomenon, that love of nature is shared by many traditional societies (Kopnina 2013a; Strang 2013). The opponents agreed with the proponents of the motion in pointing out that culpability for ecological problems lies largely with corporate and political elites that perpetuate the neoliberal industrial economy and Western-style consumption patterns. As opposed to the proponents of the motion, defenders of environmental rights have pointed out that "cultural practices" of most societies have now given way to globalized consumerism. Opponents of the motion have also pointed out that in talking about "carrying capacity" and "natural resources", defenders of human rights imitate the fallacy of the dominant political elites that tend to commodify nature, denying its intrinsic value and tend to undervalue pre-industrial forms of human interaction with nature which appeared more mutually beneficial. The final argument was that if ecological justice is to be recognized, both nature and the people will benefit as humans and the environment are intimately interconnected. Environmental justice, in the proponents' view, should necessarily include the rights of non-human species – not as a secondary value after all human issues are addressed but simultaneous with the social justice movement (Strang 2013).

Presentations against the motion offered four interrelated points. First, the notion of justice is fundamentally concerned with equalizing relations between those who have power and those who do not. This raises a moral question about the provision of justice to those who can speak for themselves, in preference to those who cannot. Second, that humans, other species, and the material world are bound together in communal processes of production and reproduction that are interdependent, such that disruption for any of the participants has potentially major impacts on the others. Third, the dualistic vision of culture and nature, which underpins the putatively separate categories of "social" and "environmental", is theoretically inadequate. Fourth, we manifest the beliefs and values that we promote. If we compose a worldview in which human needs and interests are prioritized, we will act accordingly, invariably giving insufficient weight to the needs of the non-human. A more robust theoretical frame would recognize the artificiality of such dualism, reintegrate the human and non-human, and thus enable reconciliation between the critical perspectives on these issues.

Following the debate, members attending the plenary session were asked to vote for or against the motion. The majority of participants have voted against the motion. Most of the participants were convinced that ecological justice needs to be considered as part of general environmental justice debates.

If most educational practitioners and scholars of environmental education could be convinced that recognizing the rights of non-humans, or ecological justice, should be one of

the important objectives of EE, what are the implications of this for education practice? This article aims to explore some of the challenges presented by the concept of natural resources in relation to three interrelated fields: human population, consumption, and environment. We shall first address the issue of “natural resources” and “ecosystem services” in relation to the environment, then discuss demographic changes that are likely to affect the consumption of these resources. We shall then turn to implications for EE and ESD, discussing general directions in which ecological justice concerns can be addressed.

## 2. Turning nature into a resource

One of the points of contention is the fact that neoliberal discourse and often sustainable development rhetoric tend to prioritize an instrumental view of nature, treating the environment

as natural resources or ecosystem services. The lineage of natural resources in environmental and conservation discourse is rooted in the nineteenth century. George Perkins Marsh, an American diplomat, scholar, and conservationist whose work, *Man and Nature* (1864 [2011]), was one of the most significant advances in ecology and resource management, articulated many of the descriptive and normative features of the early resource conservation worldview in the mid-nineteenth century.

These ideas were later developed by Gifford Pinchot, an American forester and politician, who coined the term “conservation ethic” as applied to natural resources. Pinchot promoted scientific forestry and emphasized the controlled, profitable use of natural resources so they would be of maximum benefit to mankind, demonstrating the benefits of managing forest for continuous harvesting. The concept of resources has been ubiquitous since the establishment of The International Union for the Conservation of Nature and Natural Resources (IUCN) in 1948, and the United Nations Environment Programme (UNEP) in (1972) addressed natural resources and ecosystem services as paramount to the aims of development and growth. Powerful financial stakeholders, such as the World Bank, have supported policies aimed at implementing policy recommendations produced by IUCN and UNEP.

IUCN (1969) aims to “promote or support action which will ensure the perpetuation of wild nature and natural resources on a worldwide basis, not only for their intrinsic cultural or scientific values but for the long-time economic and social welfare of Mankind” as well as promote ecosystem services. Ecosystems have been said to have numerous recognizable processes or “functions”, which, if beneficial, are also called “services” (Hamblen & Canney 2013, p. 10). The UNEP Ecosystem Management Programme is guided by five major interlinked elements: human wellbeing, indirect and direct drivers of change, ecosystem functioning, and ecosystem services. The services fall under the following categories: regulating, provisioning, supporting, and cultural services (<http://www.unep.org/ecosystemmanagement/Introduction/tabid/293/language/en-US/Default.aspx>).

Natural resources and ecosystem services are also increasingly conceived in economic terms and “nature” in the age of the Anthropocene, is increasingly becoming a valued commodity (Crist 2013). Natural resources and ecosystem services are also increasingly conceived in economic terms and “nature”, in the age of the Anthropocene, is increasingly becoming a valued commodity. Tercek and Adams (2013, p. 1) argue that nature is not only the foundation of human well-being, but also the smartest commercial investment any business or government can make: “The forests, floodplains, and oyster reefs often seen simply as raw materials or as obstacles to be cleared in the name of progress are, in fact as important to our future prosperity as technology or law or business innovation”. Viewing nature as green infrastructure allows for breakthroughs not only in conservation – protecting water supplies; enhancing the health of fisheries; making cities more sustainable, livable, and safe; and dealing with unavoidable climate change – but in economic progress, as well.

Much of the international political rhetoric supported by the Convention on

Biological Diversity (United Nations 1993) conceives environmental sustainability as promoting human, social, and economic sustainability. The necessity of environmental management has gained prominence as a normative way of the human relationship to “nature” (Brosius 1999). Marris (2011) argues that humans have such a significant influence upon the planet that we should continue to “manage” it as if it were a giant garden, in the spirit of sustainable development.

### 3. Critique of sustainable development

Much of international political rhetoric conceives environmental sustainability as promoting human, social, and economic sustainability, whereas natural (environmental) sustainability is often presented without any reference to the possible intrinsic value of nature, reducing “nature” to a purely economic commodity. The famous adagio of sustainable development, “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED 1987, p. 4), has often been framed in terms of natural resources and ecosystem services. Rather than heeding the warnings of the limits to growth advocates in the early 1970s (Meadows et al 1972), concerns over human population growth and increase in consumption have given way to the renewed optimistic belief in the capacity of successful management of natural resources by combining social, economic, and ecological interests.

Sustainable development proponents, ecological modernization theorists, and generally all optimists of human progress embrace the promise of accommodating humanity’s growing needs through technological and managerial interventions aimed at making natural resources and services more efficient, productive, and sustainable. The Millennium Development Goals (MDG) place great emphasis on the objective of reduction of poverty and “feeding the planet”, by stressing Western-sponsored enterprise of development.

Some critics see development – or for that matter sustainable development – as neo-colonial expansion of capitalist enterprise, tracing new emphasis on environment as commodity to global decolonization movements in the 1960s and early 1970s which “altered the ease by which corporate elites could ‘access new sites for natural resources, land, and labor; the three key ingredients for keeping capitalism growing” (West & Brockington 2012, p. 1).

### 4. Leading by example?

Another criticism of sustainable development stems from the fact that the rich countries’ models emanated by developing countries are not that sustainable. For example, in discussing the unwelcome renaissance of coal in Europe, an article in *The Economist* reflects: EU energy policy is boosting usage of the most polluting fuel, increasing carbon emissions, damaging the creditworthiness of utilities and diverting investment into energy projects elsewhere. The EU’s climate commissioner, Connie Hedegaard, likes to claim that in energy and emissions Europe is “leading by example”. Uh-oh. (*The Economist* 2013)

One of these “exemplary” countries is the Netherlands, with its green fields and bicycles. Yet, most of the Dutch “productive land” is used for agriculture and urban development, with very little of the “greenery” actually reserved for conservation (Kopnina 2014a, 2014b). In the article titled “Dirty Dikes”, The Netherlands, home to corporate giants like Shell, is described as a “sink-hole of pollution” with its water “brimming with nitrates and phosphates, and the air is clogged with the particulate matter”:

“The Netherlands ... scores particularly badly on the quality of its soil, where those phosphates and nitrates linger in large quantities. They seep into surface water, the quality of which is also below EU guidelines. Emissions of nitrogen monoxide and dioxide are triple the EU average. Carbon-dioxide emissions rose by 15% between 1990 and 2010. Only vast purchases of emission rights keep the Netherlands below its Kyoto targets” (*The Economist* 2012).

European environmental policy in regard to animal welfare and nature conservation can be glimpsed from the case of The Netherlands. Recent newspaper articles have revealed the scale of industrial-scale production of animals for consumption, focusing on the so-called “wild” animals traditionally used for Christmas meals, including turkey, pheasant, deer, hare, and swine (Spits 2013). It was noted that most of these animals are now raised in close confinement and force-fed, like the chickens and more “traditional” farm animals that never see the light of day.

Public interest in wild nature in The Netherlands is increasing, as witnessed by the popularity of the documentary film *De Nieuwe Wildernis* [The New Wildness, <http://www.denieuwewildernis.nl/>] (2013), is set in the Oostvaardersplassen, a nature reserve in the Netherlands. The film includes the footage taken during all four seasons in the Oostvaardersplassen over a period of two years and features Konik horses, red deer, foxes and Heck cattle battling for new territories and survival on a small piece of land. In the winter the area transforms into a grim landscape with food scarcity and a desperate fight for survival.

The film has unleashed a media discussion about the value of nature in the Netherlands, most centered around the question of whether starving animals should be shot or allowed to die naturally (e.g. De Telegraaf 2014). Alternatives such as massive sterilization were also discussed. A readers’ poll in the Dutch newspaper *De Telegraaf* has revealed that the majority of over two thousand readers polled think that the common starling should not be protected (De Telegraaf 2014). Quoted readers have expressed opinions including “All species can die out. Let nature take its course” and “It’s ridiculous that large building projects have to be stopped because of some small animals”. Additionally, most of the readers did not think that recent record high temperatures in the Netherlands (the hottest 6 January ever recorded was in 2014) had anything to do with climate change.

It is remarkable that the idea of “nature taking its course” is used as a common justification for anthropogenically induced habitat destruction (as lands are appropriated for urban development and agriculture). Clearly, survival and starvation of animals on small pieces of land left over from urban development are relegated to the domain of neo-Darwinian evolution. “Nature taking its course” implies that the dominant species, humans, has a “natural right” to displace other species is seen as a normative fact. It would be politically incorrect (and unthinkable in the current Dutch ideological climate) to propose the same argument for the survival and welfare of one exceptional species, the human being. Regulating mechanisms applied to the few remaining “wild” Dutch residents, including sterilization and extermination, stand in stark contrast to the increasingly anthropocentric priorities of the political leaders concerned about financial crises and somewhat decreased consumption in the Netherlands. The question of the Dutch population and the scarcity of land is simply not discussed, other than by rightist political parties in relation to migration. Compromising any of the productive lands for expanding wild areas is simply not a political option, as far as Dutch policy is concerned.

If we were to perceive The Netherlands as the case of the “future” that neoliberal democratic ideology implicitly prescribes for the rest of the developing world – highly populated, with all productive land used for either agriculture or urban settlement – we can imagine that this development model will be detrimental to non-human species.

The more academic of observers in The Netherlands have added their voices to this anthropocentric discussion. Similarly to Marris (2011), Dutch philosopher Bas Haring (2011) argues that instead of decrying the disappearance of wild nature, it is time to look forward and create the “rambunctious garden”, a hybrid of wild nature and human management, because wildness and wild places no longer exist – if they ever did – and the way to save nature is by human design through the creation of novel ecosystems and geo-engineering.

Similar to Haring, Louise Fresco, the Professor of Sustainability at the Free University in The Netherlands, argues that sustainability challenges need only to address the question of human food supply (Fresco 2009) and that environmental conservationists need to steer clear of “false romanticism” about imaginary “nature” (Fresco 2012). Following

on from this, a growing human population should not be a problem as long as it can be provided with an adequate diet. Fresco has emphasized these points at a “Sustainability” lecture given at Vossius High School in Amsterdam on 11 March 2013, assuring a few hundred students’ parents that as long as we can “feed the planet”, sustainability challenges will be adequately addressed (Fresco 2013). Environmental education in this view should embrace smart technologies, genetic engineering, and intense agriculture, brushing aside naïve concerns with “cute animals” (illustrated by the picture of a lamb). Utilization of previously untouched areas for agricultural development was also recommended.

## 5. Beyond conventional sustainability

Fresco’s lecture exemplifies objectification, commodification, and “management” of “nature”, which ignore the questions of human agency in creating environmental problems. Another question that gets forgotten is that of demographic changes that necessitate increased exploitation of the Earth’s resources. While it is recognized that an economic capture approach might be inadequate as it does not capture the expanse, nuances, and intricacies of ecological identity and emotional attachments to nature (Kumar & Kumar 2008), few researchers go further and assert that the “natural resource” approach is fundamentally ethically flawed. Relating this to educational practice, according to Bonnett (2007, p. 710):

“Brundtland-type definitions of sustainable development reflect highly anthropocentric and economist motives that lead to nature being seen essentially as a resource – an object to be intellectually possessed and physically manipulated and exploited in whatever ways are perceived to suit (someone’s version of) human needs and wants. That is to say: they are redolent with the general metaphysics of mastery that informs modernity and is precisely the root cause of our current environmental predicament. With humanistic hubris, nature is constantly to be challenged, set in order, re-engineered, etc., to meet human needs – and often, not even this, but merely human convenience. The underlying attitude is implicit in the metaphors sometimes employed to describe our achievements and aspirations: man conquered Everest, tamed the jungle, needs to manage the oceans”.

In an overt critique of the concept of resources, Eileen Crist reflects that the concept of resources works as a “discursive incarceration of the living world” because it has “engraved the delusion of human supremacy into common-sense, science-sense, technocratic, and political thinking, policy discourse and other social arenas” (Crist 2012, p. 145).

## 6. Demographic changes

Many critical voices have emerged, pointing out that continuing population growth combined with the rise in consumerism cannot be solved by simply increasing the number of natural resources and services – as there are absolute limits to growth. One of these is a recent report addressed to the Club of Rome, *Bankrupting Nature: Denying Our Planetary Boundaries* by Wijkman and Rockström (2012), who assert that there are limits to growth given the finite resources of this planet. In line with this argument, William R. Catton, one of the founding fathers of the sub-field of environmental sociology, argues that “modern people have become not only hypernumerous but also hyper voracious” (2012, p. 22) and that they now inhabit the planet with no “clear-minded regard for carrying capacity limits, let alone non-human species” (p. 24).

The implications of the rhetoric of “feeding” humanity in relation to the plight of billions of plants and animals needed daily to satisfy growing human needs have been raised by environmental social scientists. As Crist reflected, the question often posed in relation to human population and natural resources should be framed differently from the conventional “What is the maximum number of people for whom Earth can provide resources without severely degrading those resources for future people?” The question we should be asking

instead, she retorts, should be

“How many people, and at what level of consumption, can live on the Earth without turning the Earth into a human colony founded on the genocide of its non-human indigenes? The latter is rarely posed because the genocide of nonhumans is something about which the mainstream culture, including the political left, observes silence. Academics largely follow suit, perhaps because they view raising an issue about which silence is observed as a non sequitur” (Crist 2012, p. 150).

The very idea of "natural resources" reinforces the anthropocentric vision of biodiversity and makes “sustainability” of non-human species questionable when growth in population and consumption continue (Bartlett 2012, p. 35). In the case of agriculture, for example, the instrumental use of resources leads to “stripping the land of its native species of animals, plants, fungi, and other organisms and replacing them with large scale monocultures” (Wuerthner 2012, p. 124).

Population discussion is thus crucial when one considers the issues associated with consumption. While conventional environmental wisdom would have it that overconsumption is the failing of the affluent, as if their numbers were negligible, “overpopulation has been regarded as the plight of the poor, as if they did not consume in ecologically unsustainable ways” (Cafaro and Crist 2012, p. 5). Poverty has rarely been linked to population growth; instead, mainstream opinion assumes that ending poverty will solve both population and environmental problems. The false dichotomy between the “innocent” poor and the “guilty” rich masks the problem that it is both population growth and consumption everywhere that contribute to environmental degradation. Part of the difficulty lies in the fact that “culpability lies in broad human participation, exceeding any particular group or (at this historical juncture) culture, and crossing class, race, religious, national, ethnic, and gender boundaries” (Crist 2012, p. 142):

“While “raising the standard of living” may be nebulous shorthand for the worthy aim of ending severe deprivation, translated into shared understanding and policy the consumer culture – the unrivaled model of what a "high standard of living" looks like. But to feed a growing population and enter increasing numbers of people into the consumer class is a formula for completing Earth's overhaul into a planet of resources: forever more intensified uses of land and waterways for habitation, agriculture and farming; for the continued extraction, exploitation, and harnessing of the natural world; and for the magnification of global trade and travel” (2012, pp. 141–142)

Thus, while international agencies and funding bodies such as the UN and the World Bank can be held responsible for supporting anthropocentric discourse that reduces nature to resources for the humans, the human and moral costs associated with both the ethical imperative of reducing poverty and the environmental ethical imperative to protect non-human species need to be considered. In the words of Strang (2013, p. 2):

“In the last few centuries, large patriarchal societies have embarked upon hegemonic colonial enterprises creating wildly unequal power relations between human societies. Anthropological work on social justice has therefore tended to be concerned with the rights of disadvantaged human groups. It is often entangled with notions of “development” and achieving more equitable access to resources. What sometimes gets lost in the shuffle is that this process of expansion has also exported to all corners of the globe unsustainable economic practices. While these may support human groups, they have had massive impacts on non-human species and ecosystems ... However, there remains a thorny question as to whether anyone, advantaged or disadvantaged, has the right to prioritise their own interests to the extent that those of the non-human are deemed expendable”.

We shall explore some of the alternative perspectives focusing on building a better future for humanity that allows us to continue to grow morally, intellectually, spiritually, and creatively, through appreciation of nature and through our willingness to share the world with other species. But first, the question of ecological justice needs to be explicitly addressed.

## **7. Environmental ethics and ecological justice**

The environmental ethics literature is wide and indicates that there is (or should be) general continuity between human and non-human worlds, reconciling humans in being part of nature (e.g. Næss 1989). Some social scientists argue against existing dichotomies between natural and human domains, as well as a division between anthropocentric and ecocentric approaches.

Another way of conceiving of a better future is through the integration of environmental ethics and ecological justice into sustainable development's framework by specifying that the key challenge is to enable future generations of humans and non-humans to meet their own needs. Based on Aldo Leopold's *Land Ethics* (Leopold 1948) and Arno Naess's concept of deep ecology, respect for the subjectivity of non-human victims of the effects of the Anthropocene needs to be reconsidered. In both land ethics and deep ecology, every being has an equal right to live and every being, including humans, is interconnected (e.g. Næss 1989). Thus, even from a human-centered point of view, the preservation of nature is imperative. In reflecting on anthropocentrism and ecocentrism, Ingold noted that the two should not be considered as opposites, but instead parts of the same whole: "Since we are human, the world around us must necessarily be anthropocentric: this, in itself, implies no lack of participation, nor does it entail an instrumental attitude" (Ingold 2006, p. 218). This interconnectedness of humanity and environment is well captured in sustainable development rhetoric and EE/ESD practice through the concept of human dependency on natural resources (e.g. Nonini 2013).

However, what is most problematic is the ethical assumption of human superiority vis-à-vis other species. One may acknowledge that people and nature are interconnected but still see oneself as morally or existentially superior. In most instances involving human and animal encounters in our developed neoliberal societies, human exceptionalism can still be clearly discerned (Catton & Dunlap 1978). Animal death is rarely seen as anything other than the result of cultural or symbolic practice (e.g. Lévi-Strauss 1968), economic interest (animal trade, hunting, or whaling), basic necessity (medical testing or consumption), ritual (animal sacrifice), or collateral damage (Desmond 2013). Animal rights are subservient to human rights and can be thought of when human rights are fully addressed, or at worst a non-issue (Finsen & Finsen 1994; Thorne 1998; Desmond 2013).

Robyn Eckersley and Brian Baxter have related these ethical questions to debates on justice, linking ecology to standard liberal theories of justice and defending the claim that all organisms have a right to a fair share of the planet's environmental resources. Baxter puts forward a detailed argument for accepting that all organisms count, morally speaking, and not simply those which human beings like or find useful (Baxter 2005). Eckersley (1995, 2004) also argues that the "rights of nature" need to be integrated into democratic systems, in regard to "nature's" instrumental value to humans. Similar to the earlier ethical shifts that condemned racism, sexism, and other kinds of discrimination, the greater emphasis on ecological justice, or justice between human and nonhuman species, promises to create a truly fair and equitable sharing of the Earth's great bounty (Baxter 2005).

## **8. Possible solutions**

How can the Earth's bounty be saved, not just for the future generation of humans but also for all Earth's inhabitants? In terms of the actual possibility of "feeding the planet", given the current human population trends and ethical (in terms of abandoning care about the fate of

non-human species) paradoxes of treating nature as a resource, a number of solutions can be proposed.

One solution is a much more efficient way of manufacturing and agricultural production in which less natural resources and land use are needed to achieve economic objectives. What Walsh (2012) goes on to argue, and quoting Foley, is that one way to do that is to focus on the parts of the planet where agricultural yield is lagging: “We need to focus agriculture improvement in places with a ‘yield gap’”, says Foley, “Then we’ll be able to grow more on the same amount of land”.

Indeed, much of sustainable development rhetoric puts the spotlight on the small farmers trapped in traditional forms of agriculture that deny them access to money, technology, and so on. According to Alan Beal (2014), development agencies seek to employ them full- or part-time in some small but very profitable factory. Under most development regimes, improved crops, improved tools, and improved marketing regimes tend to increase the acreage of land that each farmer can handle. The almost inevitable consequence is that the poorer farmers (poorer in every sense) are driven off the land and into not-so-profitable factories. If the desire is to raise all boats, assuming that improvements in the economy will benefit all social participants and that government economic policy should, therefore, focus on the general macro-economic environment, the best thing might be to encourage labor-intensive and highly specialized forms of agriculture. Thus, one makes a huge profit off a small vineyard, vegetable or flower garden, or seed-growing operation. If the urban population requires vast quantities of rice, corn, potatoes, and other crops that squeeze out specialty or subsistence farmers, we can pretty much expect the emergence of huge farms cultivated with huge machines.

While technological advancement and the promise of "ecological modernization" might correct some of the wrongs of the current industrial production system, demographics need to be addressed if nature's rights are to be taken seriously. Despite the gains offered by environmentally friendly technologies, protection of those species that are not directly useful to humans may still be endangered as not all animals and plants can serve human interests (Haring 2011). The growth of human population, despite all innovations, may still result in a thoroughly denatured Earth and the future in which our planet either undermines its own life-support systems or becomes "impoverished" in more profound ways.

According to Crist (2012, p. 150), the Earth may turn into a world that is molded and propped by the strengths that an advanced industrial civilization has at its disposal: the rational-instrumental means of technical management, heightened efficiency, and technological breakthrough.

“It is possible that by such means a viable “civilization” might be established upon a thoroughly denatured planet. What is deeply repugnant about such a civilization is not its potential for self-annihilation, but its totalitarian conversion of the natural world into a domain of resources to serve a human supremacist way of life, and the consequent destruction of all the intrinsic wealth of its natural places, beings, and elements”.

In order to stress the importance of keeping the Earth abundant, and its natural wealth (rather than just resource) intact, different educational aims may be needed for EE and ESD to achieve this realization. This thinking is much more grounded in current discourses around EE and ESD than in ecocentric reasoning. However, eco-efficiency has to be approached carefully. As McDonough and Braungart (2002), the authors of *Cradle to Cradle: Remaking the Way We Make Things*, have argued, a bad, wasteful system of production, which results in unusable waste (the so-called cradle-to-grave model) should not be sustained. Alternatively, they propose a system that supports what is also known as “circular economy”, promoted among others by the MacArthur Foundation (<http://www.ellenmacarthurfoundation.org/>) and based on imitating natural cycles, that uses “waste as food”. In a metaphor of a cherry tree, the “waste” that the tree produces (leaves, bark, cherries, etc.) is actually feeding the birds, insects, and the soil. In this production

system, nature can be seen as an inspiration for human designs, rather than a mere natural resource factory.

While the scope of this article does not allow us to delve into the details of cradle-to-cradle or circular economy approaches, these could represent a more sound approach to environmental sustainability than mere ecoefficiency and intensification of agriculture models would

prescribe. However, even these approaches require an understanding of the interaction between population growth and efficiency gains. After an initial period of exploitation, efficiency gains (including those within the circular economy framework) are usually marginal and are unlikely to match the extra demand placed on consumption by a growing middle-class population (Tennant & Brennan 2014).

Another solution is a radical re-evaluation of our current relationship with nature. If nature is to be accepted as not just a resource to be consumed and conserved for future generations, but as a partner and the teacher, we need at all costs avoid teaching the "metaphysics of mastery" (Bonnett 2007). Abandoning the care of the environment as secondary to primary human concerns, including population issues, could offer a true solution to sustainability challenges.

## **9. Translating population concerns into educational practice**

While population control was a concern in the 1960s it has since been recognized that this is closely tied to poverty, the education of women and girls, health promotion, and other UN Decade of Education for Sustainable Development themes. The report Women, Population and Climate (UNFPA 2009) has argued that investments that empower women and girls – particularly education and health – bolster economic development and reduce poverty and have a beneficial impact on climate. Girls with better education, for example, tend to have smaller and healthier families as adults. Women with access to reproductive health services, including family planning, have lower fertility rates that contribute to slower growth in greenhouse-gas emissions in the long run.

Yet the dominant preoccupation remains investment in people, not the environment. UNFPA (2011) focused on the world population reaching 7 billion people but argued "for sound planning and investing in people". Some progress toward recognizing population as a subject of EE/ESD has been made. Educational materials that have been produced related to ESD – such as UNESCO's (Fien 2010) Teaching and Learning for a Sustainable Future – include modules on population and development as well as values education, among others, and the most recent UN Rio+20 report, The Future We Want (United Nations 2012).

However, despite these efforts, population control policies have become ideologically unpalatable and are no longer discussed in politically correct circles. The implications of human demographics on the project on sustainability have rarely been discussed. The education programs associated with agencies have in fact been avoiding the issue of population control, as witnessed by the UN reports and strategies on issues such as sustainable living (e.g. Schrader et al. 2013). It appears that many EE/ESD programs simply mention population growth without critically discussing the long-term effects or providing a critical discussion of the most humane options for addressing it.

The discussion of family planning services and the wide availability of contraception should become paramount to any teaching on the environment or sustainability, rather than the current focus of most ESD programs on the question of feeding the growing number of people on this planet. If we were to take the ethical imperative of providing all people on Earth with the resources that the more privileged consumer classes now have, it becomes impossible to avoid the question of population and consumption as intimately interlinked (Wijkman & Rockström 2012).

Teaching on population issues needs to be interlinked with ethics that go beyond the conventional tenets of addressing equity and equality between humans. Discussion of environmental ethics and conceptions of ecological justice are necessary to alert students to the anthropocentrism inherent in many mainstream conceptions of sustainable development.

Methodologically, addressing these issues can involve a varied pedagogical tool kit, as already incorporated in EE/ESD. Within this framework, effective environmental education should address the depth of students' understanding (cognitive) and emotional relationship to questions pertaining to nature, the environment, and self that has the potential to reach beyond the conventional, mainstream rhetoric of (sustainable) development. Wals and Jickling (2002) reflect on the necessity of engaging students in socio-scientific disputes and argue that the ill-defined nature of sustainability manifests itself when conflicting values, norms, interests, and reality constructions meet. Through such engagement, they propose that sustainability – and its need for contextualization and the debate surrounding it – become pivotal for higher education.

Hopefully, socio-scientific disputes will also include questions that pertain to ethics and justice and do not isolate human beings as the only species that has a stake in having a sustainable future. The necessity of including environmental ethics in teaching is discussed in detail in Palmer (2006), a volume that considers general issues such as the place of environmental advocacy in the environmental ethics classroom; using outdoor environments to prompt reflection on environmental ethics; and handling student responses – such as pessimism – that may emerge from teaching environmental ethics. Such a volume is extremely valuable in discussing the implications of the commodification of nature in regard to students' understanding of environmental problems.

In criticizing insufficient educationalist attention paid to the devastating effects of population growth on environmental crises, Bartlett reflects: "the Physics Today essay and article, population growth is given as a cause of the problems identified but eliminating the cause is not mentioned as a solution. We are prescribing aspirin for cancer" (2004, p. 3). While Bartlett realizes that the physics community cannot launch a major campaign aimed at stabilizing population or addressing the growth in consumption, he recommends the following actions relevant to practitioners of environmental education:

“Research, speak, and write about energy consumption, CO emissions, and populations, with an understanding that stabilizing population is a necessary condition for solving these problems. After the message given to students in the classroom and to the public, it is important they recognize that these energy and related problems cannot be solved without stopping population growth. In order to do so, scientists and EE researchers need to overcome the conventions of political correctness and metaphysics of mastery that currently govern our relationship with the environment” (Bartlett 2004, p. 5).

Last but not least, accepting that “while we are part of the problem, we can also be part of the solution” (Gulick 2012, p. 220) is paramount to the success of any kind of planetary reform. Recognizing that humans are a part of the all-encompassing ecosphere allows for our true ecological Self to be realized. This self-realization means that, similarly to the precautionary principle in politics, if one does not know how the outcomes of one's actions will affect other beings, one should not act (Luke 2002). The greatest challenge is how this realization can be rekindled (presuming that it was ever present in pre-industrial societies) or learned, presuming that our post-industrial reality requires a very different kind of “planetary consciousness” to what we now have.

## 10. Conclusions

This article has argued that as long as educational practices are based on the Dominant Western Worldview espousing the Human Exceptionalism Paradigm based upon shared anthropocentrism (Catton & Dunlap 1978). Without rejecting anthropocentrism, no positive shift toward environmental sustainability can be expected.

In other words, no matter whether one feels part of nature or thinks humanity is one with nature, or whether yourself and humanity are interdependent with nature (as most people who believe in natural selection and Darwinian evolution would probably agree), it is whether

one recognizes that other creations – also those that cannot use for food, experiments, entertainment, etc. – are worthy subjects in themselves and how much protection, respect, autonomy, or legal rights should be accorded to individual species or individuals within the species. While environmental ethics writers sometimes disagree on these aspects, the very discussion of such non-human values and rights is essential if environmental education is assumed to have (at least in part) environmental protection as one of its aims.

In order to address ecological justice, students need to learn to at least recognize (if not to care about) the very paradox espoused by much sustainable development – one cannot have ones' cake *and* eat it too, as one cannot have a growing consumer population *and* maintain the wealth of our planet. Because of concerns with human (social, economic, and legal) issues, nature is reduced to ecosystem services, natural resources, and the bulk of food supply for future human generations.

Combining social and ecological interests, if these are to be truly balanced, becomes all but impossible. Currently, these are not subjects that are readily discussed in EE/ESD. EE and ESD will need to integrate all potential solutions, such as those mentioned in this article: focus on the circular economy or cradle-to-cradle framework; readdress population control, and explicitly evoke environmental ethics if sustainable solutions need to be found.

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