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Abstract

In human-controlled environments and in cultivated landscapes, the plants accommodate social, cultural and economic needs. This article will focus on the use of plants for agriculture, urban planning, forestry, environmental education and indoor decoration in The Netherlands. This exploration, based on literature review and observations, reveals mostly anthropocentric, instrumental and unsustainable practices. In urban landscapes, plants are pushed to the margins, if not entirely eradicated. This article shows that the moral recognition of plants is an ethical imperative, which is also critically important in order to achieve environmental sustainability. In line with ecocentric ethics and in the interest of long-term sustainability, this article suggests an alternative, more ethical and sustainable ways of relating to plants in The Netherlands and beyond.

Keywords: environmental ethics; environmental sustainability; plants; urban environment.

Introduction

Many traditional cultures used to see plants as living and vibrant beings (Caldwell 1990; Merchant 2006). "The Lorax complex" or biophilia was present in most traditional societies (Kopnina 2012a, 2015a). In *Plants as Persons*, the book of philosophical botany, Matthew Hall (2011) reflects that indigenous cultures used to recognize plants as active agents and intelligent beings. Hall (2011) reflects that as plants constitute the bulk of our visible biomass, and underpin all natural ecosystems, they deserve to be morally considerable. That is, we are obligated as moral agents to at least acknowledge the interests of all morally relevant beings when making decisions that may affect them (Hale 2011; Batavia and Nelson 2017). In modern societies, plants are recognized as essential components that enable life and human flourishing through the formation of soil (from rotting of plant materials), air (from oxygen from photosynthesis), and food (from agriculture). Plants are also used for energy production (e.g. biofuels), decoration (e.g. domestic plants), religion (e.g. 'Christmas trees'), various industries (e.g. construction, timber, paper, medicine), and measures to mitigate climate change (e.g. "carbon sinks") (Cotton 1996; de Santayana et al 2010; The Economist 2016).

However, population increase and unsustainable production threaten global ecosystems (Mathews 2016; Crist et al 2017), progressively commodifying plants as mere resources (Kopnina 2017). Presently, the commodification of plants has become normative to the extent that it may seem inevitable (Alexandra and Walsh 1997). Plants have morphed from living beings into agricultural crops and providers of recreational areas for urban dwellers (Kopnina 2013; Tabb 2016). Urbanism, with its spatial design for the streets, neighborhoods, districts, and parks (Wirth 1938) has recently exposed the link between the treatment of plants and unsustainable practices (Tabb 2016). Casagrande and Peters (2013) use an example of Phoenix, Arizona, where politicians and corporations promote the myopic consensus that the city is a green oasis in the desert. While Phoenix looks green, with its verdant lawns and palm trees, exorbitant water use is associated with prolonged, severe droughts and displacement of native plants (Bahre 2016). In a different part of the world, the Netherlands, similar processes are taking place. Expansion of agricultural and urban areas and associated water use and increased chemical inputs are causing declines or extinctions of indigenous plants and pollinator species (Biesmeijer et al 2006; Erisman et al 2016). While the commodification of plants can likely be observed in an urban area, and while the daily practices and routines described below seem normative from both an ethical and sustainability perspective, they can be seen as immoral, absurd or perverse if ethical perspectives on human-environment relationships are considered. Simultaneously, urbanism presents an opportunity to center urban design ethics on diversity and conservation as an opportunity to redress a number of environmental problems, from deforestation to climate change (Calthorpe 2010; Newman 2014).

This article uses case studies in the Dutch setting to challenge instrumentalism (i.e., using plants as commodities), highlighting practices that are widely accepted but also, as argued below, both unethical and unsustainable. The Netherlands was chosen for a number of reasons. First, the Netherlands can be seen as an example of a typical economically developed industrial and increasingly urbanized country, with most rural-urban fringes forming complex hybrid landscapes consisting of residential areas, commercial zones, agricultural land, recreational and nature areas (Nabielek et al 2013). This article assumes that such urbanization is characteristic of an increasing number of places worldwide, making the treatment of plants in the Dutch context typical of the Anthropocene landscapes. Secondly, the Dutch urban infrastructure supposedly accommodates its “green heart” (Groene Hart), or green area, which lies between the cities as a buffer against urban sprawl (Kooij 2010; Coates 2015). This article inquires how green this “heart” really is. Third, this article challenges the ecological modernization theory, which posits that greater technological and economic development will lead to environmentally friendly practices. Specifically, I question whether Dutch industrial and economic development leads to more sustainable practices in relation to plants. Fourth, and on a similar note, the Dutch case study also seems

to challenge post-materialist values theory, which proposes that economically developed nations foster ecologically aware citizenship (Inglehart 1971; Dunlap and York 2008). This article queries whether conduct toward plants generally reflects post-materialist values, particularly focusing on the practices and norms cultivated in environmental education programs.

As the key argument of this paper is that current treatment of plants in the urban settings in the Netherlands is both ethically inappropriate and unsustainable, these four characteristics of the Dutch case provide a background for exploring various practical arrangements and ethical perspectives in relation to plants. In this context, the unsustainable and highly exploitive use of the urban environment will be explored.

The section below will address the methodology. The sections following that will review environmental ethics theory on appropriate human-plant interactions, including a discussion of the intrinsic value of individual plants, plant rights, and interactions between humans and plants. The section entitled “Sustainability perspective on plants” will address plant usages and sustainability. This section will be followed by case studies pertaining to (urban) agriculture, forestry, urban planning and interior decoration involving plants in The Netherlands.

Methodology

The methods used for desk research involve the review of literature in the fields of environmental ethics and sustainability. Search terms used for literature review fitted within four main topic categories: environmental ethics, plants and ethics, plants and sustainability, and plants in The Netherlands. The criteria used to select the articles included relevance to these four topics with the aim of finding literature explicating philosophical assumptions and stances in relation to the treatment of plants and pragmatic recommendations in relation to sustainability.

For the empirical study, the location of field observations, the author has randomly sampled a number of places in The Netherlands between April 2016 and June 2018, including areas in and around Amsterdam and the Northern province of Groningen. These areas were chosen either because they were located in or around the cities or in the “green heart” area. Observation method was based on walking (the iterative exploration on foot), a common method used in qualitative urban geographical research (Pierce and Lawhon 2015), and biking. The observations were recorded through field notes and photographs.

Ethical perspectives on human-nature relationships

Two major schools of thought in environmental ethics offer guidelines for ethically appropriate treatment of plants based on the recognition of “intrinsic value.” Intrinsic value is the value of a thing for its own sake, above and beyond any value it may provide to others or its “instrumental values” (Batavia and Nelson 2017). Aldo Leopold’s land ethic (1948) inspired “ecocentric ethics”, which recognize intrinsic value in ecological collectives such as species and ecosystems. Ecocentric ethics is juxtaposed to an anthropocentric ethic (or anthropocentrism), which attributes intrinsic value only to humans and sees environmental in instrumental terms, as an object to be used (Washington et al 2017; Piccolo et al 2018). A branch of ecocentric philosophy, called deep ecology (Naess 1973; Devall and Sessions 1985; Devall 1993), challenges a hierarchical view wherein humans are separate from and superior to nature, and therefore free to exploit it. As opposed to “shallow ecology” (or a “light green” view of the environment), which links environment to human wellbeing and constitute nature as a “resource”, deep ecology (or “dark green”) recognizes intrinsic value in individual living organisms, including plants (Washington et al. 2017). Deep ecologists also recognize humans as part of nature, a holistic view that engenders respect for the integrity of ecosystems and the needs of other species. While ecocentrism places value on the ecological collectives (species, ecosystem, etc.), biocentrism locates value in the individual living organisms (Washington et al 2017). From a biocentric perspective, humans ought to acknowledge that a nonhuman entity, like a plant, has intrinsic value and should, therefore, be granted direct moral consideration (Birch 1993; Hall 2011; Batavia and Nelson 2017). Although moral consideration of plants does not necessarily mean they have rights, it does suggest they possess a basic dignity that warrants respect (e.g. Terborgh 2015; Strang 2016; Piccolo 2017).

However, intrinsic value is not a normative guide for practical situations (as this comes later) but a dramatic re-orientation of worldview, in which the license to unilaterally exploit or disregard living as objects becomes morally impossible (Birch 1993). Generally, however, the ethical treatment of plants is seen as a marginal, contentious, and/or radical issue (Burgess-Jackson 2004). Urban environments do not appear to acknowledge the intrinsic value in plants, as evidenced by general lack of respect for plants, e.g., in the use of pavements that destroy plant habitats, the prevalence of plastic flowers, and the frequent application of synthetic fertilizers and insecticides (New 2015; Tabb 2016). And without intrinsic value acknowledgment, “anything and everything can be done with plants today; there is no ethical consideration, no awareness of any problem” (Koechlin 2009: 78).

Granted, moral consideration of nonhumans can open a Pandora’s box of practical choices in deciding

whether all moral entities are equally valuable. The exact meaning of ‘right’ is rarely spelled out (Terborgh 2015). The most relevant decision perhaps is not whether all entities have equal value, but who takes precedence in any given situation. Obviously, most people would choose a child’s life over that of a weed – but does a native plant indigenous to a certain habitat, for example, have more value than introduced plant species grown for pharmaceutical use?

Without intrinsic value acknowledgment, ‘anything and everything can be done with plants today; there is no ethical consideration, no awareness of any problem’ (Koechlin 2009:78). More generally, the urban environment appears to erase the “natural”, from pavements that destroy plant habitats to plastic flowers, synthetic fertilizers and insecticides (New 2015; Tabb 2016).

Sustainability perspective on plants

The authors of *Cradle to Cradle: Remaking the Way We Make Things* (McDonough and Braungart 2002) have developed a framework in which nature’s regenerative cycle can serve as a model for human industry. In *Cradle to Cradle*, the “food equals waste” principle is illustrated by the metaphor of a cherry tree:

“The tree makes copious blossoms and fruit without depleting its environment. Once they fall on the ground, their materials decompose and break down into nutrients that nourish microorganisms, insects, plants, animals, and soil. Although the tree actually makes more of its "product" than it needs for its own success in an ecosystem... the tree's fecundity nourishes just about everything around it” (McDonough and Braungart 2002:33).

Cradle to Cradle proposes that plants must be recognized as the fundamental givers of life. This recognition implies that we should treat and use plants sustainably. At present, however, McDonough and Braungart (2002) note that everyday unsustainability can be well observed in the case of treatment of (urban) plants. The average lawn represents a paradox: people plant it, then douse it with artificial fertilizers and dangerous pesticides to make it flower- and insect-free and consequently continuously mow what they encouraged to grow (McDonough and Braungart 2002). Also, the lawnmower is usually powered by fossil fuel energy and is made of carbon-intensive materials. This average lawn is seen as normative, i.e., an accepted feature of the cultural landscape (Seddon 1998:16) and yet it is also unsustainable. As flowers are cut, and no pollination occurs, this has a cascading effect on biodiversity – fewer insects (e.g. New 2015) and fewer birds (Sumasgutner et al 2014; Tabb 2016).

Another example of unsustainable use of plants is biofuel. While biogases derived from sewage are more environmentally sustainable than bio-oils, field biomass, wood-based biomass, and peat, all of which cause loss of biodiversity, most of the biofuels currently used are derived from plants (Ketola and Salmi 2010). This burning of greenery is a ‘cradle to grave’ process in which valuable plant materials are ‘downcycled’ for a briefly lasting spurt of energy (McDonough and Braungart 2002; Braungart 2013). The use of plants as a renewable energy source was termed ‘Environmental lunacy in Europe’ in *The Economist* (2013). The assumption that biomass combustion would be inherently carbon neutral is incorrect (Braungart 2013). While the carbon balance also depends on the type of plants and burning of trees or corn may be less bad for carbon dioxide emissions than coal or oil, deforestation and pollution resulting from biofuel plantations destroy “carbon sinks” and biodiversity provided by original forests (Shiva 2000; Haberl et al 2012).

Use of plants in industrial agriculture is equally damaging. In *Stolen Harvest* Vandana Shiva (2000) explores the impact of intensive agriculture on local people and the environment. Agricultural scientists have concluded, that due to mechanized weeding and the use of artificial fertilizers and insecticides, intensive agriculture has a large environmental and social footprint (Bos et al 2013; Runhaar 2017). The main characteristic of intensive agriculture is focused on as much production per hectare as possible, resulting in a simplification of ecosystems with fields stripped from hedges and trees (Erisman et al 2016).

Towards recognition of plants

Despite the trends towards objectification and unsustainable use of nature and plants, modernity has also brought new insights into bioethics. As UNESCO (2005) formulated it, scientific progress evident from stem cell research, genetic testing, or cloning gave human beings new power to control the development processes of all living species. Concerns about the social, cultural, legal and ethical implications of such progress have led to the development of bioethics. While UNESCO is primarily concerned with human health, bioethics in the broader sense can apply to all those being implicated in – and sometimes suffering through - this scientific progress. It was recently suggested that plants are sentient, and thus able to feel pain or by some definitions, suffering (Pelizzon and Gagliano 2015). Further, plants possess complex capabilities previously only associated with animals, such as memory (Chamovitz 2012), and the ability to signal and communicate (Falik et al 2011; Marder 2013a).

Dutch Party for Plants (Partij voor de Planten <http://www.partijvoordeplanten.nl>) advocates 'Freedom for ferns, rights for roses and tolerance for tulips'...opposing the use of plants for biofuel and focusing on topics such as climate, biodiversity, and sustainability in general' (<http://www.facebook.com/pages/Partij-voor-de-Planten>). In a publicity stunt intended to draw attention to general sustainability issues in the Netherlands, The Party has announced it will run for parliament. This stunt exemplifies an emerging concern with "respect for nature" (Taylor 1986). As further evidence, the Swiss Ethics Committee on Non-Human Biotechnology (ECNH) asserts that all living organisms are inherently worthy, and, as such, should not be used 'simply as we please' (ECNH 2008).

Some scholars go so far as to suggest plants should be granted legal rights. Stone (1972, 2010) argues that plants should be afforded legal standing on the basis of operational, psychic and socio-psychic characteristics. This argument is based on the idea that it would be strange to state that 'natural objects' should have no rights to seek legal redress merely because they cannot speak up for themselves. In a similar vein, and drawing examples from discriminated human groups, Marder (2013a) notes that justice for nonhumans, including plants, should not come after social justice has been achieved but *simultaneously* with it. Efforts to extend rights to plants can be compared to social liberation movements, such as the ending of slavery or promoting gender and racial equality (Washington et al 2017). The idea of plant rights for Marder (2013b) is in a way similar to that of human rights:

"It is tragic that every day countless people suffer from torture, slavery, or arbitrary arrest, but neither this suffering nor the attempts to ameliorate it justify an indiscriminately violent treatment of non-human beings. Martin Luther King, Jr famously wrote, "Injustice anywhere is a threat to justice everywhere." Whether explicitly or not, the maximalist thrust of Dr. King's principle informs every struggle for legal rights, including that waged on behalf of plants".

And yet, although there have been some signs of moral expansion with regard to plants, prevailing social and cultural norms still generally favor purely instrumental views and unsustainable usages of plants. To illustrate this observation, the section below will discuss some Dutch examples.

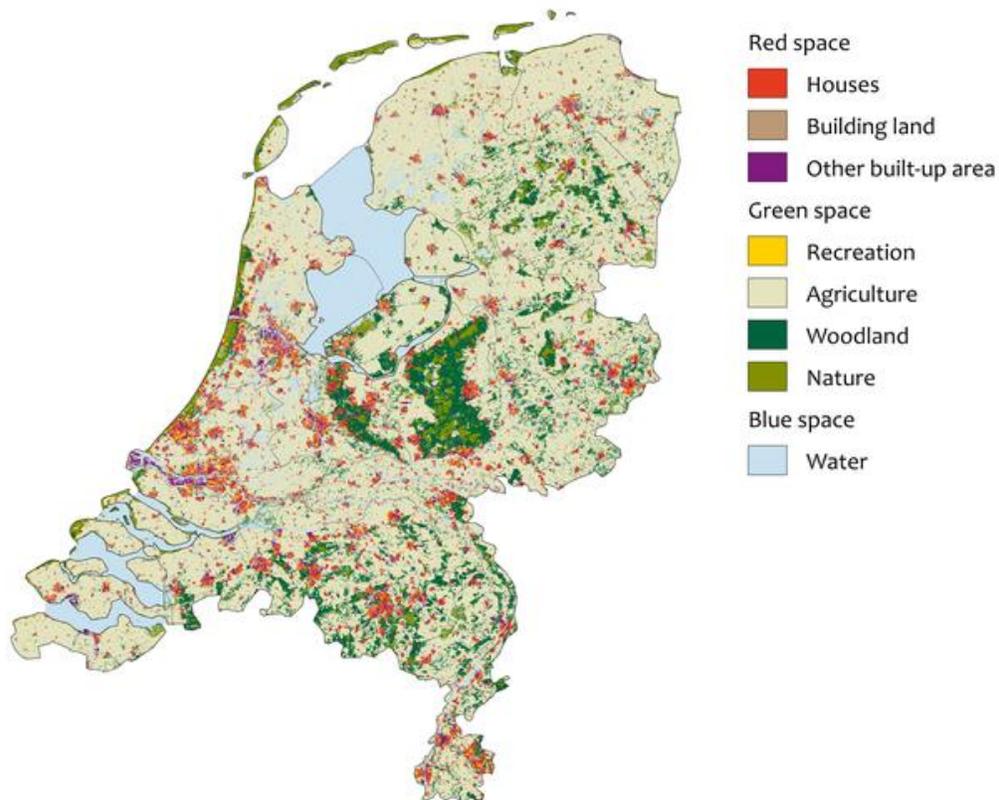
Plants in the Netherlands

As the Dutch government's website states, "The Netherlands is a green country, with more than four-fifths of its surface area used for recreation, agriculture, woodland, and nature." (<http://www.clo.nl/node/20807>). Map 1 shows that, proportionally, most of this land is 'productive' – mostly occupied by intensive agriculture (Bos et al 2013; Runhaar 2017). The Dutch "control" or risk

management model is characterized by the massive conversion of wild grassland into heavy chemical input farms (Erisman et al 2016). In this model, agriculture is fully dependent on specialized seed companies and technology suppliers, international processors and supermarkets, “with the focus on short-term revenues” (Erisman et al 2016:162).

Map 1.

Land use in the Netherlands, 2012



Source: CBS, Land Registry.

CBS/jan16
www.clo.nl/en006110

This heavy use is not surprising. The Netherlands consists of 41,543 kilometers, including water, and is populated with over 17 million people at the rate of 501 people per km² and rising (<http://statline.cbs.nl/StatWeb/publication>). From a bird’s point of view, Dutch greenery is a patchwork that looks increasingly more like an urban metropolis than a natural landscape.

Agriculture

Due to high population density and urbanization in The Netherlands, the last remaining ‘unproductive’ green areas – strips of forest and side-road shrubberies – are squeezed between roads, (sub)urban settlements and agricultural fields. The Netherlands is one of the world's largest exporters of agricultural products, thanks to its “innovative agri-food technology” (Batterink et al 2010). The Dutch agri-food sector claims it is a sustainable source of healthy, safe food that is “produced with respect for nature and the environment” (<https://www.hollandtradeandinvest.com/key-sectors/agriculture-and-food>). Contrary to this claim, an increase in the use of insecticides has led to sharp declines in pollinators and insect-pollinated plants in the Netherlands (Biesmeijer et al 2006). In the Dutch model, the plants are fully dependent on artificial fertilizers, with the soil processes for nutrient supply playing only a marginal role (Erisman et al 2016). Despite concerns about dependence on external inputs, exhaustion of the soil, increased toxicity, contamination of groundwater, and elimination of biodiversity, the Dutch debate about sustainable agriculture is characterized by a one-sided focus on the need to increase production (Bos et al 2013; Erisman et al 2016).

Figure 1. Intensive agriculture in East Groningen

Urban green

In Dutch urban areas, it is common to see clipped and pruned trees, bushes and cut grass from early spring to late autumn. One big reason for this, aside from aesthetic preferences for “neat” and “orderly” surroundings (Pitman 2007), is that the municipalities receive money from energy providers. This ‘green waste’ is used for the flourishing of the Dutch ‘green energy’ – biofuels. The Dutch renewable energy policy uses “plant waste” for the production of biofuel (Goh and Junginger 2015). Previous research in Amsterdam (Van den Berg and Koole 2006; Kopnina 2013, 2015b) demonstrates that city residents associate the trimming of urban greenery with aesthetics (‘neat’, ‘clean’, ‘well-kept’, and ‘beautiful’). They rarely associate “green waste” with energy production or biodiversity loss (e.g. eliminating species that find a home in foliage). Figures 2 and 3 show typical examples of the annually cut tree and bush branches.

Figure 2. Cut branches, Amsterdam

Figure 3. Cut bushes, Westerpark, Amsterdam

Aside from activities associated with municipalities’ management of urban greenery, residents participate in ‘greening’ of their own or communal city gardens. Unaware of the adverse effects of plastic particles’

run-out into the soil, the residents place plastic pots *on top* of soil designated for city gardens as demonstrated in Figure 4.

Figure 4. Plastic pots on top of the soil, Amsterdam

Suburban green

Much like the case of city greenery, suburban areas in the “green heart” are often used as providers of timber, as demonstrated in Figures 5 and 6. From the author’s observations, the cut branches are often collected by private land or house owners and burned, or deposited in general trash.

Figure 5. Cut bushes, Zwanenburg

Figure 6. Cut branches, Zwanenburg

In The Netherlands, there are many suburban areas with small rental summerhouses in which renters can enjoy gardening activities part of the year (normally, these houses cannot be occupied as residences). Typically, the gardens in these temporary suburban residences are strictly maintained – in fact, keeping a ‘wild’ garden that ‘spreads weeds’ is prohibited, and the same lawn mowing practices described above, are normative. Many plants, including multi-seasonal ones, are routinely destroyed at the end of the year. Figure 7 shows a typical cultivated landscape, with one of the summerhouses in the background.

Figure 7. Cut branches in summerhouses

Forest green in (sub)urban areas

As in many other locales where supposedly ecological (or mixed recreational and commercial) forestry occurs (Batavia and Nelson 2016), forest “thinning” (selective cutting of trees) is widespread (Metro 2017). Due to population density, many of these forested areas are situated near urban centers. While thinning is not as harmful as clear-cutting, it often involves removing the oldest trees for timber, not allowing their trunks to rot and form new soil. The largest city forest of Amsterdam, called Amsterdamse Bos, has large areas of productive forest, and the remaining natural areas are used for selective cutting. As Metro (2017) has reported, a certain entrepreneur has discovered that ‘there is actually a lot of wood in the forest for the city’ and has a permit for making ‘sustainable’ furniture, and ‘other useful products’.

Many other forested areas of the country, including East Groningen (Figure 8) undergo continuous thinning, with wood used for timber or biofuel.

Figure 8. Forest thinning in East Groningen

Environmental education in relation to (urban) plants

The Dutch school curriculum typically involves a number of “nature activities” including “*schooltuinen*” or a “school gardens” program. As part of this program, children are seasonally allocated small plots of land close to their school to grow their own vegetables, in a city park called Westerpark (described in Kopnina 2013; 2015b; Sitka-Sage et al 2017). The children are involved in indoor activities in a “garden house”. Most of the Westerpark area is paved, with all grass carefully trimmed, and trees and shrubberies maintained monthly by municipal workers. The children occasionally help with “trimming” and “gathering wood” (Sitka-Sage et al 2017). Children also “grow their own food and flowers” and are allowed to take their harvested vegetables and flowers home (Figure 9). This program is fused with “nature education”, in which Amsterdam children are supposed to “learn about nature” (<https://www.amsterdam.nl/onderwijs-jeugd/basisonderwijs/natuur-milieu/>).

Figure 9. School gardens – before harvest, Amsterdam

At the end of October, when harvesting is complete and all crops and weeds are cleared, the land is left bare for next year’s gardening activities. The land is prepared for another year of gardening through the use of artificial fertilizers (this information is not shared with children). Like other agricultural lands in The Netherlands, part of the year the land is barren, as shown in Figure 10.

Figure 10. School gardens –after harvest, Amsterdam

Indoor plants

As far as indoor greenery is concerned, the Dutch ‘host’ a great number of (tropical) plants in their homes and yards, creating green spaces within residential areas (Vila-Ruiz et al 2014). The robust Dutch cut flower industry, with its intensive agriculture, contributes to the soil, water and air pollution (Van Liemt 1999). Since the 1980s there has been a growing trend of purchasing artificial plants for both indoor and outdoor use (Real 1981).

The author's institute has recently purchased hundreds of large-size metal/plastic pots with artificial 'Japanese lily' plants. A small number of real Japanese lilies in similar pots with supposedly 'regulated water, soil and micro-climate control' have also been purchased. However, due to the unhappy placement of plants in the corridors with little natural light and apparent malfunctioning of the 'micro-climate control' system, most of these plants died within a month of installation and were substituted by artificial plants (Figure 11 and 12).

Figure 11. Plastic plants, The Hague University of Applied Science

Figure 12. More plastic plants, The Hague University of Applied Science

Reflection and discussion

The Dutch greenery maintenance arises from a mixture of an economic rationale (e.g. municipality's collection of 'green waste' for biofuel) and aesthetics (e.g. residents' perceptions of what a 'neat' suburban landscape should look like). While economic rationale relates to unsustainable practice (e.g. biofuels, intensive agriculture), the cultural rationale justifies "managed" landscapes as beautiful rather than depleted (Seddon 1998). As Pitman (2007) has summed up, urban landscaping depends on the "power of fashion, media and the market, the often-insufficient levels of ecological understanding and respect for land and water within the community". Urban and suburban greenery is presently 'sustained' by constant "management" (Kopnina 2013, 2015b) that diminishes urban biodiversity (McDonough and Braungart 2002). As a result, much of the urban 'wildlife' is restricted to 'pigeons and parks' (Derby et al 2015). The artificiality of controlled environments also appears to fit the urban dwellers' sense of modern aesthetics. In the case of plastic plant installations at the author's institute, it is unlikely that the production of plastic and metal with their high carbon emissions and zero contribution to the indoor air quality are considered by facility managers or building users.

Of course, the fact that the municipality typically sells "green waste" to energy companies or seems to support artificial landscapes (Kopnina 2015b) does not mean that all decision-makers and public are anthropocentric. While there is evidence that Dutch perception of greenery appreciates domesticated rather than wild nature (Van den Berg and Koole 2006), this certainly does not imply that all municipality employees or policymakers only use green façade as a "cover" for economic activities. The intention of developing the "green heart" (Kooij 2010), and 'nature-inclusive' buildings (Runhaar 2017), including

subsidy grants by municipalities to create green roofs in Dutch cities, all testify to genuine efforts to treat greenery more sustainably. However, ecocentric aspirations are still largely subsumed by anthropocentric institutions, which continue to define and regulate normative behavior in Dutch urban centers.

For example, urban children experience these managed urban environments as normative. In “trimming”, “cleaning”, and “gathering wood”, the children are initiated into “management” and “control” of plants (Sitka-Sage et al 2017). Children are nurtured and taught by adults whose culture is steeped in anthropocentric norms and values (Kopnina 2012b). To overcome “nature deficit disorder” it has been suggested that children need to get outside more often to experience nature (Louv 2008: 245-270). However, the ‘green side of life’ (Nyberg and Sanders 2014) might not be the best teacher if the only green children encounter is managed or controlled. By equating gardening to nature education, the culture of domination over nature cannot be overturned. Children need to also be taught different values (Sitka-Sage et al 2017). Perhaps, for example, children can be taught that in some cases “caring for plants” might mean leaving them alone. Respecting nature or being part of it includes the responsibility of care, which challenges anthropocentric inscriptions of power manifest in cultured environments (McKenzie & Bieler 2016).

As we have seen based on the examples above, the plants in human-controlled environments and cultivated landscapes are used to accommodate social, cultural, educational and economic needs. In this process, the subjectivity of plants is lost – both in moral terms and in terms of self-sustainability. Subjectivity, in this case, refers to plants as living beings rather than objects. Self-sustainability refers to the ability of plants or those dependent on plants to survive independently of human ‘care’, ‘management’, or even implicit ‘approval’ of their existence. Urban plants are highly dependent on the location where they are allowed to grow, whether they are watered or not (especially in case of indoor plants), and whether their leaves, branches, or flowers are cut. Be it the case of ‘weeds’, which are destroyed to make way for ‘productive’ vegetables, or ‘green waste’ used for energy-generating, plants are treated in a way that suggests they only matter to the extent that they serve people. This treatment is neither appropriate, according to various theories of environmental ethics (e.g. Stone 1972, 2010; ECNH 2008; Hall 2011; Marder 2013a, 2013b, 2016), nor does it meet the demand for environmental sustainability (e.g. Pitman 2007; Kopnina 2015b). While anthropocentrism does not necessarily equate to unsustainable practices, as, for example, the recognition of plants’ beneficial qualities is anthropocentric, it diminishes the value of plants both in ethical and practical terms. When children eat their harvest at school gardens, or when the municipality burns leaves, plants are viewed and used as a mere resource without a return “back to nature”. Contrary to the Cradle to Cradle framework for sustainability, in which

“waste equals food” (McDonough and Braungart 2002), human waste does not create food for other organisms. Instead, human excrement is typically treated with chemicals, rendering it useless as fertilizer. These are not the circular or cyclical processes that occur among other species, e.g., when birds spread seeds and fertilize the ground with their excrement. In the same way, burnt leaves produce a one-off spurt of energy, destroying valuable biomass (Braungart 2013).

In this context, The Netherlands actually demonstrates the failure of ecological modernization (Foster 2012; Kopnina 2014) in terms of the sustainability of plants. To outsiders, the Netherlands may seem a green idyll, where green fields are the norm. But scratch the surface, and you find a crowded, carbon-spewing, urban nation (Coates 2015) without the “green heart” (Kooij 2010). As Dunlap and York (2008) have noted in their case study, it appears that national wealth does not automatically lead to more ecological awareness or care, as witnessed by the case study of environmental education that equates gardening for consumption to the appreciation of nature. While these activities are being promoted for cultivating positive relationships between humans and plants or encouraging sustainability, most of them are actually geared towards harvesting – of food (vegetables). However, the publicity stunt by the Dutch Party shows increased awareness among at least some committed margin of society. This stance seems to reflect a class of “post-materialist values” theorized by Inglehart (1971) to emerge once a society's basic needs for sustenance and security have been met. Clearly, the evidence for post-materialist values in regard to plants in the Netherlands merits additional research. However, based on the observations reported in this paper, I suggest that if post-materialist values are to spread more broadly throughout society, to the extent that ecocentric attitudes toward plants become normalized, at the very least urban children’s education needs to be re-evaluated. Environmental education may have a power to transform attitudes, as shown in research that addresses different ethics groups' perceptions of the environment in The Netherlands (Buijs et al 2009). Dutch educational efforts at fostering environmental awareness in children have also suggested that educators can endeavor to become more conscious of how the hidden curricula and cultural norms of practice may be incongruent with moral ecological values environmental education is trying to foster (Sitka-Sage et al 2017).

The essential link between respect for plants and sustainability is the appreciation of plants as valuable elements of complex ecosystems. Since in intensive agriculture weeds are controlled with herbicides and no use is made of natural insect control, the natural functions are not used and there is a high degree of dependence on external inputs to increase productivity (Erisman et al 2016). In this context “respect for plants” means recognizing their function – including those of weeds – in supporting ecosystem functioning.

Pragmatically, the realization of trade-offs necessitated by the biological requirement to consume plants (Evans and Clark 2017), implies that choices need to be made about what type of plant use is justifiable – both in terms of sustainability and ethics - and what is less so. For example, from the Cradle to Cradle perspective, biofuels or industrial agriculture are both unsustainable and unethical (since “waste equals food”). Also, the odd aesthetics that favor lawn mowing; or cut flowers or plastic plants that decorate many homes and office buildings are in need of critical re-evaluation. Technological fixes or even greater economic development, are not likely to solve the issues associated with unsustainable and unethical practices, as ecological modernization or post-materialist values theories suggest (Dunlap and York 2008; Foster 2012).

Alternative ways of valuing plants

Common practices in The Netherlands testify to the dominance of unethical and unsustainable relationships with plants. To remedy this, in practical terms, requires serious political attention to the effects of population growth and consumption (e.g. Bos et al 2013). In ethical terms, a shift away from purely instrumental use of nature and plants is needed. Harmon (2009) reflects that recognizing the dignity of all living beings is a crucial step toward improving all species’ future prospects. Some argue an ecocentric ethic, and concomitant commitment to protecting autonomous, functioning ecosystems, is necessary both to safeguard ecosystem integrity and promote human flourishing (Rolston 2015; Doak et al. 2015; Crist et al. 2017). As Crist (2015: 254) has argued,

“Humanity’s willful embrace of limitations harbors the realization of humanism’s ideal. This is so because genuine human freedom cannot be achieved at the expense of the freedom of the whole. Not only that other beings and places suffer—extinguished, constricted, enslaved, managed, or treated as objects. What suffers by the exact same token is the dignity of the human that humanism holds so dear”.

But what does alternative valuation of plants entail? As we rely on plants for food, recognition of their intrinsic value would be untenable were it to require we stop all consumption. Even for deep ecologists (Naess 1973), consumption of plants associated with human survival cannot be condemned. However, if recognition of intrinsic value does not necessarily mean we can no longer use plants for our own human ends, it does imply that we ought to extend moral consideration to all plants (Birch 1993), by at least acknowledging and weighing their interests in the decisions we make. We should not simply presume the license to exploit without any “return” signifying respectful and mutually beneficial relationships with plants (McDonough and Braungart 2002). For example, to enable appropriate and sustainable plant use,

cities could create multispecies sharing spaces, reducing (urban) footprints (Thomaier et al 2015) and welcoming not only social but also natural diversity (McDonough and Braungart 2002).

Considering environmental and social costs of intensive agriculture, including the loss of biodiversity and farmers' dependency on external inputs, organic community-based agriculture (Shiva 2000) has been advocated as an alternative. In a similar way, forest regeneration involved eco-forestry (Batavia and Nelson 2016) and agroforestry promise not only to create major carbon sinks but also have a positive social effect on forest-dependent communities (Shiva 2000; Shoreman-Ouimet and Kopnina 2015, 2016). In ethical terms, as Evans and Clark (2017:54) reflect on the application of Leopold's land ethic (1948):

“In many forest management decisions, foresters face choices that require them to balance the integrity, stability, and beauty of the forest with financial expectations or other human-centered objectives. The ethical framework for many practitioners suggests that good forestry succeeds when both outcomes are met”.

Simultaneously, the forest-dependent communities can “give back” to the forest by contributing to the decomposition materials that enrich the soil through deposits of human waste or traditional green burials. While it is unlikely that The Netherlands, a developed country with a well-functioning economy, will alter its treatment of plants instructed by examples of traditional communities, some practical recommendations can be made. One such recommendation can be using biogas derived from sewage rather than plants (Ketola and Salmi 2010). Another one is supporting urban conservation by preserving local biodiversity in order to understand and facilitate responses to environmental change, and conducting environmental education that cultivates ethically progressive, non-anthropocentric views of plants (Dearborn and Kark 2010).

Overall, in The Netherlands, the practical move towards more ecologically conscious landscapes, both for city dwellers and food growers, is still in the early stages of development. Hopefully, though, the appreciation of a wilder urban environment and more ecologically friendly aesthetic in urban planning is starting to emerge (Kadas 2006; Hoyle et al 2017). The positive characteristics of urbanism and beneficial qualities of placing plants at the heart of cities inherently link sustainability and environmental design (Tabb 2016). In the Netherlands, so-called ‘nature-inclusive’ buildings are becoming more common (Sneep et al 2018). The Amsterdam municipality council has recently approved plans for involving ecologists into new building designs, trying to create buildings where ‘pioneer plants’ and other nonhuman inhabitants form a part of buildings (Gemeente Amsterdam 2018). Brown roofs made of old building materials, just like the better known ‘green roofs’ can form attractive multispecies’ habitats

(Kadas 2006). Urban agriculture offered by rooftop farms and greenhouses, indoor farming, or vertical gardens reconnect food production and cities, characterized by multispecies co-habitation of toxin-free and carbon neutral buildings (McDonough and Braungart 2002). Green Urbanism, a combination of smart green growth policies with technology that protects and enhances the environment, should be the most relevant future scenario in the age of climate change (Calthorpe 2010). In a similar way, biophilic urbanism (Triman 2013) seeks to improve natural systems between buildings and on the façades and rooftops of buildings (Newman 2014).

Conclusion

In this article, urbanism was presented as a landscape where plants and other nonhuman species are pushed to the margins, if not entirely eradicated. Evidence from the case studies above shows that the current treatment of plants in urban settings in the Netherlands is both ethically inappropriate and unsustainable. In situating the case studies in the Dutch setting, characteristic of an increasing number of rapidly urbanizing places worldwide, evidence shows that the supposed “green heart” of the Netherlands is “light green”. The case studies presented above call ecological modernization theory into question, challenging the proposition that industrial and economic development leads to more sustainable practices, at least in relation to plants. Also, the Dutch case study brings post-materialist values theory in relation to the treatment of plants into doubt, at least as far as educational practice shaping cultural values toward environment and plants are concerned.

This article has also discussed more positive ways of relating to plants in urban environments, both through practice (e.g. construction of multispecies’ use buildings or green roofs) and education (e.g. learning to share with plants and other living beings). As researchers are beginning to recognize the potential contribution of residential landscapes and yards to overall urban sustainability (Vila-Ruiz et al 2014), the case studies of the Dutch treatment of plants open up a host of challenges as well as opportunities. If the Cradle to Cradle framework could become the core of ecological modernization, more sustainable relationships between humans and plants in urban environments could be more feasible. Habitual unsustainable practices, such as placing dog excrement in non-bio-degradable plastic bags, for example, could make way for "bio-bags" and used as food for plants. Re-evaluating urbanism, Calthorpe (2010) argues that in order to address climate change we need to construct cities as “compact and walkable developments”. While it is questionable how compact modern cities are when Louis Wirth wrote in 1938 that urbanism extends beyond the physical entity of the city and 'beyond an arbitrary

boundary line' rapidly homogenizing cityscapes presented new opportunities. The beneficial qualities of urbanism related to sustainability, biophilia, intimate placemaking and positive characteristics of the green cityscapes are becoming increasingly manifest through ecologically-informed design (Newman 2014; Tabb 2016).

In discussing the relationship between humans and plants in the context of sustainability and ethics, examples of Dutch flora illustrated the exploitive and instrumental use of plants, including intensive agriculture or the use of plant-derived biofuels. Recognition of the very subjectivity of nonhuman life, and plants that sustain it is of crucial importance if progress in ethics and sustainability is to be made. As Rabindranath Tagore has beautifully personified in the fictional character of 'Balai':

“It hurt him deeply when someone plucked flowers from a tree. And he totally understood that this feeling was meaningless to anyone else... His worst troubles arose when the grass cutter came to cut the grass because he had watched countless wonders in the grass; small creepers; nameless violet and yellow flowers.... All those were cleared with a heartless weeding tool. None of them were prized trees of the garden, there was no one to listen to their protests' (Tagore [1928] 2009:256-257)”.

Perhaps, if we cannot listen to or understand the trees, we should listen to Balai.

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