

Article

Transcending the Learned Ignorance of Predatory Ontologies: A Research Agenda for an Ecofeminist-Informed Ecological Economics

Sarah-Louise Ruder [†] and Sophia Rose Sanniti ^{*,†}

School of Environment, Resources and Sustainability University of Waterloo, Waterloo, ON N2L 3G1, Canada; sophia.sanniti@uwaterloo.ca

* Correspondence: sophia.sanniti@uwaterloo.ca

† All authors contributed equally to this work.

Received: 6 January 2019; Accepted: 6 March 2019; Published: 11 March 2019



Abstract: As a necessarily political act, the theorizing, debating and enacting of ecological economies offer pathways to radical socio-economic transformations that emphasize the ecological and prioritize justice. In response to a research agenda call for ecological economics, we propose and employ an ecofeminist frame to demonstrate how the logics of extractivist capitalism, which justify gender biased and anti-ecological power structures inherent in the growth paradigm, also directly inform the theoretical basis of ecological economics and its subsequent post-growth proposals. We offer pathways to reconcile these epistemological limitations through a synthesis of ecofeminist ethics and distributive justice imperatives, proposing leading questions to further the field.

Keywords: ecological economics; ecofeminism; gender; capitalist-patriarchy; intersectionality; post-growth; transformational change; systems thinking; complexity

As white-settlers in the Region of Waterloo, we acknowledge that we live and work on the traditional territory of the Attawandaron (Neutral), Anishnawbe, and Haudenosaunee peoples. The University of Waterloo is also situated on the Haldimand Tract: land promised to the Six Nations that includes ten kilometres on each side of the Grand River. We make this statement to act against the erasure of ongoing colonial legacies across Turtle Island and to acknowledge that we contribute to and benefit from the expulsion, assimilation, and genocide of Indigenous Peoples.

1. Introduction

As extreme shifts in global climate bring about unprecedented economic, socio-political and environmental stressors, there is an urgent need for transformative change in the ways in which humans collectively live, eat, work and interact with each other, other living things, and the planet [1–4]. Despite the necessity of a shift in normative paradigm, change has been slow and incremental, while climate change, economic disparity, food insecurity and biodiversity loss, among many others, continue to worsen [5,6]. Solutions to these ‘wicked problems’ [7] demand radically alternative approaches to economy that emphasize the ecological and conceptualize ‘economy’ as emergent from the cultural, political, legal and spiritual dimensions of society so as to prioritize intersectional, interspecies and intergenerational justice. In response, the transdisciplines of ecological economics and ecological feminisms have long aimed to theorize more sustainable and equitable futures and they offer a number of key insights.

This paper lauds the progress and critical focus of ecological economics as a heterodox transdiscipline that aims to understand and transform socio-economic systems in the face of cataclysmic crises. Over the past forty years, ecological economics scholarship has advocated for an ‘epistemic

shift' [8] in understandings of the human economy away from "contemporary economic models [that] float free from biophysical reality, blind to the energy and material flows essential for human existence and to the 'natural capital' stocks that produce them" [9] (p. 4). Instead, ecological economics proposes a thermodynamic model of economic processes that limits the scale of the economy to fit within the Earth's finite biophysical capacities [10–13]. As the field continues to mature, it is essential to think critically about its strengths and weaknesses.

Our objective in this paper is to perform a theoretical critique of the underlying framework of ecological economics and the overarching paradigm it inescapably perpetuates. Using the established theoretical frames of ecological feminisms and ecofeminism in particular, we argue that the discipline of ecological economics is inhibited by a pervasive ignorance regarding power differentials and a limited epistemology rooted in Western, androcentric, anthropocentric thinking. Our analysis demonstrates how the logics of extractivist capitalism that justify gender biased and anti-ecological structures of power in the dominant growth-oriented economic paradigm also directly inform the theoretical basis of ecological economics and its subsequent post-growth proposals [14–19].

Our analysis is especially pertinent, as there exists a persistent gap in knowledge on the political nature of adaptation to multiple, concurrent environmental and social changes. In particular, critical socio-political dimensions of transformational change "suffer from an under-theorization of the political mechanisms of social change and the processes that serve to reproduce vulnerability over time and space" [20]. Without addressing these prevalent gaps, if indeed this is possible, ecological economics will continue to advance implicitly gendered assumptions that normalize and perpetuate oppressive institutions. Specifically, the discipline fails to recognize the burdens related to transformational change, such as risk, responsibility, expertise and work hours that are disproportionately placed on marginalized groups, including women and girls, people of colour, First Peoples, nature and other *Others*. The problems identified in the theoretical frame of ecological economics are related to the very tensions and growing pains that the field currently endures, including discomfort with methodological pluralism, limited progress enacting transformational change, neglect of social justice theories and an insufficient diversity in membership and perspectives [21–26]. The ethical, social and political dimensions of ecological economics remain remarkably undertheorized, which directly contributes to the field's failure to gain traction and credibility in achieving its goals.

Based in a plurality of intersecting feminisms including Marxist, green, liberal, socialist and post-colonial, ecofeminism uses a *gender analysis* to explore the patriarchal roots of the capitalist, growth-oriented economic paradigm [21,27–29]. We differentiate our 'gender analysis' as a lens with the explicit use of gender as an investigative tool from 'gendered' outcomes, which privilege particular sex/gender identities in cultural and socio-economic structures. This analysis underscores how capitalism strategically uses value-based hierarchies to justify the exploitation and domination of both humans and nature in extractivist modes of production (e.g., 'morally' justifying human as above nature) [29–31]. By recognizing that the exploitation of nature and the social institutions of human oppression overlap, ecofeminism expertly analyses the historical, experiential, material, symbolic, and theoretical connections between the twin oppressions of women and nature. In particular, the frame elucidates the extent to which the structural externalization of non-monetized ecological and social reproductive labour directly *informs* contemporary market logic and *enables* extractivist modes of production [25,32–35]. Characterized in this paper as 'predatory ontologies,' these ways of being necessitate dominating, exploitative and oppressive relations that validate and maintain the structural inequalities pivotal to capitalism.

In the spirit of goal-oriented approaches prioritized by both ecological economics and ecofeminism, we present a research agenda through synergies of these two fields to address the epistemological limitations of ecological economics revealed in our analysis. We carry out these intentions through four steps: (1) we outline a definition and framework 'toolkit' to guide our analysis and research agenda, focusing on our ecofeminist frame and the predatory ontologies that it reveals; (2) we apply our ecofeminist frame to explore the insidious but significant role of predatory ontologies

in the growth paradigm; (3) we examine the extent to which ecological economics is also informed by these pervasive logics and demonstrate how the field ignores or underestimates the importance of dismantling them; (4) and, finally, we offer pathways to reconcile the limited epistemologies of ecological economics through a synthesis of ecofeminist framings and distributive justice imperatives and propose leading questions to further the field of ecological economics (see Table 1 at the end of our paper).

Certainly, the analysis offered by our paper's ecofeminist frame is insufficient without the articulation of a concrete alternative. Cuomo contends that a "rejection of oppression is logically dependent on an affirmation of some alternative . . . find[ing] it most important to focus on the ways in which ecological feminism aims to promote the flourishing of both human and nonhuman life" [36] (p. 34). By contrasting the concepts of oppression and flourishing, Cuomo implores ecofeminist analysis to "attend to the reasons *why* so much that is capable is not able to flourish and how more flourishing might be made possible" [36] (p. 65). Our ecofeminist frame illustrates the predatory nature of both neoclassical and ecological economic paradigms that actively inhibit the post-growth proposals of ecological economics. Without directly challenging the legacy of pervasive dualisms that shape conceptions of economic thinking, ecological economics is incapable of enacting sustainable and equitable economies of change.

Thus, we conclude our paper by emphasizing the strengths of an ecofeminist care ethic, which is founded in a profound identification *with* the Other, bringing forth elements of kinship, interdependence, and community while simultaneously abolishing the institutional structures of oppression at the core of most conventional approaches to 'economy' [25,32,37–39]. The ethical foundations of ecofeminism, when applied to ecological economics, urgently demand that ecological economists work together to build a new improved alternative form of ecological economics, as a central immediate task. By regarding economics as "being about provisioning—that is, the way societies organize themselves to provide for the sustaining and flourishing of life" [4] (p. 8), an ecofeminist-informed ecological economics frames reproduction *as* labour *as* care. As a necessarily political act, the theorizing, debating and enacting of ecological economies has the potential to offer liberatory pathways to radical socio-economic transformations that emphasize the ecological and prioritize intersectional, interspecies, and intergenerational justice.

2. An Ecofeminist Toolkit to Build a Research Agenda for Ecological Economics

Our exercise is theoretical and we hope to inspire critical reflection in theorists and practitioners within and beyond the field of ecological economics, including members of the broader sustainability community. While the analysis of ecological economics is pointed to the Daly and Farley school of thought and its three pillars of sustainable scale, just distribution and efficient allocation [12,40,41], we consider the work of various scholars in the community [13,42–45]. We join a small community of ecological economists and other transdisciplinary scholars spearheading (eco)feminist cross-pollination with traditional approaches to ecological economics [15,17,22,25,26,34,46–50]. As leading scholarly disciplines, ecological economics and critical feminist perspectives have:

challenged definitions, modified analytical tools and expanded our understanding [of economics] by confronting and dealing with the different forms of exclusions of ecological and care dimensions from most economic discourses as well as the inextricable embeddedness of the market economy within a broader economy of human provisioning and the latter in the ecosystems of our planet. [34] (p. 24)

In theorizing solutions and transformations for ecological economics through ecofeminist principles, Baudhart explains, "the gender order ought to be fully understood as part of the capitalist order" [14] (p. 66).

2.1. Ecofeminism

We present an interpretation of ecofeminism as a way of knowing and thinking about social-ecological realities within and beyond economic systems. Centrally, ecofeminism is rooted in an assumption that the dominations of nature and women are inextricably linked [27,28,30,31,51,52]. This transdiscipline encourages inquiry on the causes and systems perpetuating environmental degradation and gender-based oppression to consider how they may interact, to work toward just and sustainable futures. The focus on gender is necessarily a starting point to examine structures of power more broadly, as “injustices based on gender, race and class are related to the ideologies that sanction the exploitation and degradation of the environment” [28] (p. 23).

Ecofeminism asserts that “how we treat nature and how we treat each other are inseparably linked” [53]. For example, much like clean water and air, the labour of women in the home, such as cleaning, cooking and caring for children and elders, is taken for granted in many cultures and conventional economic systems [15,21,54,55]. While fundamental to the vitality of communities and economies, nature and women are mere externalities in formal economic accounts. There are also tangible links between the domination of nature and the domination of women’s bodies. In communities experiencing rapid resource extraction, women are more likely to experience sexual violence [56,57]. In Fort St. John, British Columbia the per capita crime rate is higher than any other municipality and 78% of women have experienced violence (n = 300)—even higher, 93%, for Indigenous women [56]. Further, socio-economic implications of resource extraction tend to increase substance use and economic dependence in relationships, which can be additional risk factors for gender-based violence [58,59].

Beyond coincidence or association, the twin oppressions of nature and women manifest in a shared logic or motive of domination that perpetuate violent and exploitative ways of being, which we name *predatory ontologies*. For our ecofeminist framework, we emphasize Plumwood’s theory of dualisms as central to the logic of Othering and the predatory ontologies it engenders [31]. Othering is a process of separation and estrangement of subject-object to permit domination (e.g., self-other, human-nature, etc.) [21]. Only when something is Other or separate from us, can it be dominated. The fracture of self-other runs through Western thought with value hierarchies (reason/emotion, human/nature, civilized/primitive, etc.) [31,51,53]. One entity is socially constructed as primary, dominant or superior and the Other is the negation, reducing the diversity of entities and experiences outside of the self to one amorphous negation (e.g., referring to any and all non-white peoples as People of Colour).

As is common in contemporary feminisms, ecofeminism practices intersectionality through the analysis of gender, race, class and species, among other dimensions of identity [21,30,60,61]. For example, interaction of sexism and classism is demonstrated through the UN Framework Convention on Climate Change’s reporting that women are more likely to be poor than men and poor women are more at risk in situations of climate disruptions because they are less likely to have access to decision-making power, resources and information during a crisis or job security [62,63]. It is important to note that the concept of ‘intersectionality’ is attributed to Kimberlé Crenshaw and her contributions to Critical Race Theory, to which ecofeminism is indebted. Still, the ‘intersectional’ essence of ecofeminist theory—as well as black feminism—predate Crenshaw’s conception of the term in 1989 [60], exemplified by Mies’ analysis of colonialism, racism and patriarchy [21,28,30,61].

Much like ecological economics, ecofeminism is problem-focused and oriented toward transformation. There are differences in power among humans, between humans and nonhuman life, and between present and future generations. As such, ecofeminism is directed toward intersectional, interspecies, intergenerational justice and the solutions must be implemented together. Ecofeminists declare nature to be a feminist issue because an understanding of gender-based oppression can inform an understanding of the domination of nature and vice versa [18]. More specifically, ecofeminism uncovers mutually reinforcing systems of domination in cultures, ecologies, and economies with a

gender lens, illuminating anthropocentric and patriarchal structures of power in society [21,37,64–66]. We develop our ecofeminist frame in the sections below, adding layers of nuance.

2.2. (Her)story: Tracing the Discourse

Ecofeminist discourses are rooted in the environmental and social justice movements of the 1960s and 1970s in North America, though movements uniting women and nature to resist domination have a much longer global history (e.g., the Chipko movement in India can be traced back 300 years, when communities organized to resist the destruction of nature brought on by British colonialism) [27,61,67–69]. Discussions of ecofeminist theory often privilege Western-Anglo-white voices—a contentious point among ecofeminist scholars—and cite pivotal works over the same decades as setting the foundation for ecofeminist theory, such as Carson’s *Silent Spring* (1962), Ruther’s *New Woman/New Earth* (1975), Daly’s *Gyn/Ecology* (1978) and Griffin’s *Woman and Nature: The Roaring Inside Her* (1979) [27–29,70]. French feminist Françoise d’Eaubonne (1974, p. 221) coined “l’eco-féminisme [ecofeminism],” building on the earlier work of Simone de Beauvoir (1952) and Luce Irigaray (1974), who are early scholars of the linked domination of women and the environment [27,29,70,71]. In the decades to follow, ecofeminism quickly spread across social movements in the United States and international academic conferences [21,27,64].

Ecofeminism is indebted to “lesbians, radical women of colour and working-class feminists who are attempting to create feminisms focused on the intersections among various forms of social mistreatment and oppression” [36] (p. 33). Ecofeminism includes and celebrates activists and scholars across the globe, drawing particular attention to practical modes of resistance to globalization and industrialization demonstrated in the ‘majority world’ (“Global South”) [21,28,64,72] (see Appendix A). At the same time as Lois Gibbs organized the Love Canal Homeowners Association to fight toxic waste in the United States, Nobel Peace Prize Laureate Wangari Maathai founded the Green Belt Movement to fight against deforestation and land grabbing in Kenya and Medha Patkar established a national non-violent movement to advocate for communities who would be displaced by the Narmada dam in India [28,64,73].

The relationship between ecofeminism and Indigenous feminisms is delicate. There are blossoming commonalities and solidarity in the communities, but ecofeminism must be sure not to appropriate Indigenous feminisms or adopt decolonization as a metaphor [21,74–77]. Non-Indigenous ecofeminist scholars, ourselves included, continue to benefit from ongoing settler colonialism; thus, Kwaymullina asserts, “non-Indigenous scholars must respect Indigenous sovereignty and meaningfully enact this respect, including through the layered process of listening to the voices of Indigenous women” [74] (p. 193). The importance of decolonizing and reconciliation cannot be overstated, but it is beyond the scope of this article to address the role and responsibilities of ecological economics and ecofeminism in a respectful and anti-colonial way.

Applications of ecofeminist theory and movements are diverse and creative, extending far beyond the connections of gender and nature. Indeed, ecofeminism addresses the culture and politics of eating animals, critiquing the ‘natural’ or ‘straight’ cis-hetero-patriarchy in favour of queer ecologies; the links between climate science and rhetoric of population control, anti-immigration and militarism; and, power dialectics of technology in development [78–86]. Furthermore, theoretical expressions of ecofeminism include, transcend and overlap with several other disciplines including environmental philosophy, sociology, religious studies, feminist theory, political ecology/economy, and language studies [27,28,31,32,86]. There are also many scholars and activists who do not describe themselves as ecofeminist because of the incongruence of the field and the misguided essentialist critique (addressed below), among other reasons, while espousing the central tenets of ecofeminism [28,36,87–90]. The ecofeminist tradition of bridging discourses and perspectives offers confidence in synergies with ecological economics.

2.3. *The Capitalist-Patriarchy: Ecological Economics as a Feminist Issue*

Ecofeminism reveals ways of being and relating that reinforce the domination, exploitation and oppression of Others. These emergent ‘predatory ontologies’ manifest in the normalization of violence against women, nonhuman life and the planet and the dominance of western-andro-anthro ways of knowing that invalidate dissent (see Warren’s [91] logic of domination, Eisler’s [52] dominator systems, and Plumwood’s [31] master model). Ecofeminism is ideally situated to address the predatory ontologies in socio-economic systems, which happen to affect women and nature most acutely: “Because classism and economic imperialism (or neo-colonialism) are feminist concerns and because this system of international accounting extracts the most severe payments from women and nature, the oppression inherent in the international market can best be understood from an ecofeminist perspective” [92] (p. 241).

Many ecofeminist scholars use the concept of the ‘capitalist-patriarchy’ to describe the manifestation of dominance over women and nature. Early mentions of the capitalist-patriarchy are explicitly political, “to emphasize the mutually reinforcing dialectical relationship between capitalist class structure and hierarchical sexual structuring” [52] (p. 5). Gender biased and anti-ecological structures of power in the capitalist-patriarchy are “grounded in the denial of dependency and interdependency . . . disguis[ing] the ways in which the market and economic man are dependent on unsustainable transfers from nature and from unpaid work” [26] (p. 168). Hierarchical dualisms manifest both politically (via socioeconomic infrastructure) and psychologically (via identity politics, with intersectional implications for power and privilege) [21,28,30,31,51,53]. While the origins and continuance of capitalism and patriarchal social relations are separate, their historical and social dimensions are linked and the power dimensions of related complex systems are emergent [30,31,52,68,69]. Von Werlhof claims, “capitalism has old and far-reaching patriarchal roots; capitalism is, in fact, patriarchy’s latest expression” [68] (p. 24). The Western masculine-feminine and culture-nature dualisms fuelling the patriarchal mastery of nature precede capitalism but the divide/dominate view of nature was entrenched worldwide in the commodification and externalization of nature in the rise of capitalism [21,31,68,69,86].

The capitalist-patriarchy and similar conceptualizations of power are relevant to ecological economics because the capitalist-patriarchy is dependent on the limitless ‘resourcing’ of women, First Peoples, people of colour, non-human animals, nature and other Others [28,54,76,91,93]. Furthermore, the capitalist-patriarchy is a universal matter of concern as the dominance of human and non-human Others is experienced globally and the consequences of these systems of power threaten the viability of life on Earth. The framing of ‘capitalist-patriarchy’ intends to describe dominations sitting at the root of the socio-economic crisis; however, ecofeminism is oriented toward transformation and revolution to transcend the predatory ontologies uniting dominations [21,36,64,70]. Yet, as ecofeminist analysis makes clear, the desired transformations are unobtainable without directly challenging the underlying dualistic logics that inform predatory power relations.

2.4. *A Shift in Perspective: Diversity, Dialectics, and Complexity*

As a conceptual framework, ecofeminism offers alternative ways of knowing that emphasize diversity, dialectics and complexity. Ecofeminism celebrates diversity in its membership, origins, knowledges, methods, and practices [21,28,94,95]. Ecofeminism acknowledges that there are multiple genders and gender expressions that shape one’s experience and interact with class, race, sexuality, and so forth. [28,78,96]. Furthermore, through a continuous engagement with global movements and activism, the discipline offers tools to understand the positional experiences of oppression and context-specific approaches of transformation [21,90,95]. The transdiscipline models a path of inclusion, which can support ecological economics in its ambitions for pluralism and partnership outside of the academy.

Ecofeminism resides in the tensions of dialectics, with a diversity of applications and conceptualizations among scholars. One interpretation of dialectics emphasizes that structures of

power interact with one another (e.g., capitalist-patriarchy) and solutions exist in the same nexus [21,52]. For instance, while considering in vitro meat or computer software, ecofeminism is simultaneously able to problematize apolitical solution narratives of science-technology while recognizing the benefits and potential to human well-being and environmental sustainability [79,80]. The hubris of geosystems engineering or spraying sulphate aerosols into the atmosphere to reverse climate change might be excessive and risky [97–100] but technologies are nearly unavoidable in contemporary everyday life. Technology is ubiquitous in industries ranging from health care and finance, to manufacturing and food processing. There is tension in the risks and benefits of technoscience ‘solutions’—the implications are not good or bad but both.

Moreover, dialectics characterize the double-bind of the capitalist-patriarchy, where the systems of oppression reinforce one another intersectionally through value-hierarchies (i.e., masculine-feminine, culture-nature, production-reproduction) [30,31,52]. Likewise, the relationship of sex-gender is dialectic in the biological and socio-cultural constructions of identity of women, First Peoples, people of colour, non-human animals, nature and all Others [83,86,101]. The capacities/characteristics of women’s bodies in social reproduction (e.g., menstruation, pregnancy) often serve to justify their ‘place’ in society (i.e., domestic sphere, in tune with cycles of the planet) and the free and limitless use of their labour [27,66,69,86]. In turn, this oppression may reinforce the belief that women are ‘closer to nature’ because they carry the burden of provisioning through stress and crises (e.g., women in the majority world develop ecological knowledge to provide food and water to their families).

In addition to the relationship between systems, ecofeminism appreciates complexity in socio-economic problems and emergent power dynamics in the domination of Others [21,85,102,103]. Intersectionality in ecofeminism is founded in an understanding that power and social position are determined by the interactions of axes of identity, beyond the sum of their parts [60,61,85,102]. While some ecofeminists centre their analysis on complexity theory, they exercise caution in addressing the Western tendency to dichotomize chaos and order in complexity theory [85]. In turn, systems thinking and complexity also contribute to diversity in knowledge and methodology [102]. Furthermore, there is complexity in the realities of problems like climate change, where the impacts evolve slowly on an Earth Systems scale and at variable rates across the globe. The perception of climate crises is socially constructed and context-dependent (e.g., the authors’ experience of climate change is dramatically different than those in island communities, costal fishers or subsistence farmers).

Our paper demonstrates the strengths of the radical heterogeneous discourse of ecofeminism, employing its frame to expertly transcend linear-reductionist logic by embracing diversity, dialectics and complexity, thereby supporting ecological economics to reconcile its epistemological limitations. As opposed to unifying differences, the solidarity of ecological economics and ecofeminism proposed above presents viable pathways in which these discourses can enrich one another, providing meaningful academic contributions and tangible routes to complex socio-economic transformation(s). Ultimately, these synergies reconceptualize, address and transform economic and political relationships across communities, generations and species.

2.5. *Response to the Essentialist Critique*

As a necessarily heterogenous discipline, ecofeminism is shaped by diverse and distinct feminisms and green perspectives in its origins and contemporary forms. Consequently, ecofeminism maintains constant tensions in its incongruence. Though ecofeminists agree that women and nature have falsely been conceptualized as inferior to men and culture, there exist radically divergent opinions and perspectives on the explicit woman-nature connection. Specifically, a conflict persists “between those who see the relationship between women and nature as socially created and therefore being socially resolved and those who see it as a deeper relationship of biological and spiritual affinity that transcends particular societies and eras” [70] (p. 51).

Known as the ‘essentialist’ debate, critics within and outside the ecofeminist discipline fear that explicitly connecting the experiences of domination and oppression of nature with that of

women inevitably solidifies the patriarchal value-hierarchy that relegates women as a subordinate ‘other’ [21,27,30,69,86]. We argue that the common discrediting of ecofeminism rooted in discomfort toward essentialism, affinity and mythology is a direct extension of the Western androcentric tradition of academia and its insidious dualisms (nature/culture, mind/body, self/other, etc.). The prevailing (and unfounded) essentialist critique of ecofeminism arises from a misrepresentation of the core of ecofeminist theory, as many scholars have proposed [28,30,69,86,90]. Leach claims the parallels drawn between the domination of women and nature should not be considered as “evidence of women’s closeness to nature but as a struggle for material resources in the context of gender-ascribed natural resource dependence and women’s limited opportunities to out-migrate as compared with men” [104] (p. 75).

The ‘straw-woman argument’ of essentialism implicitly adopts androcentric assumptions that perpetuate the very conceptual dichotomies ecofeminism and feminist theorists attempt to dismantle [105]. Notions of diversity, dialectics and complexity in ecofeminist theorizing allow for an understanding that “humans, as ecological selves, are both members of an ecological community (in some respects) and different from other members of that community (in other respects)” [27] (p. 100). Dualist structures (humans-nature) perpetuate *distance* between humans and the natural environment (an important point to which we return in the analysis) and thus “from the ecological consequences of their actions and the biological needs and limitations of their embodied existence” [106] (p. 19). From a historical materialist perspective, ecofeminism elucidates the role of power relations in resource access and allocation, exposing the gendered, material and historical processes that directly inform the embodied experience of men and women in nature: “North and South, East and West, the flexible, do-it-yourself, cooperative economy of women is daily subsumed by private and public spheres alike; just as the degraded ‘resource base’ of nature silently absorbs the longer-term costs of what is called ‘development’” [66] (p. 319).

3. Divide and Conquer: Dualisms of Neoclassical Economics

Growth as a policy priority is the most globally pervasive economic idea today [11,43,44,107], shaping the very “architecture of the modern economy” [44] (p. 37). Indeed, our economy is structurally reliant on economic growth to facilitate income, employment and social and political stability [108]. Though growth as an explicit policy objective has only been prioritized since mid-twentieth century, Victor [11] (p. 9) (among others) argues that as the conventional indicator of economic health, growth in Gross Domestic Product (GDP) has now become “virtually synonymous” with larger visions of progress including progress in wealth, political development, art, society and personhood [109–111]. To this day, intergovernmental bodies across the globe including the United Nations Economic and Social Council, the Organisation for Economic Co-operation and Development (OECD) and the World Bank work under the assumption that continued economic growth is essential to achieving humanitarian and sustainability goals [112–115]. Certainly, interrupting the legacy of growth fetishism in our globalized consciousness will be essential to ecological economics’ vision for a prosperous economy within biophysical limits; however, problematizing the growth paradigm in isolation is insufficient without a more comprehensive understanding of the drivers behind the imperative itself. By employing the gender frame of ecofeminism, this section will demonstrate the insidious and significant role of predatory ontologies in founding the basis for the growth paradigm.

Informed by the discipline of ecofeminism, we place the patriarchal drive to emancipate ‘masculine’ culture (economy; reason; the human) from ‘feminine’ nature (ecology; emotion; animal) at the heart of the growth paradigm. Originating in the core tenets of Greek philosophy (soul/body) through to the scientific revolution (culture/nature), the emancipatory drive to transcend natural limits imposed upon humans by the environment now culminates in the growth imperative of contemporary market logic (production/reproduction). Ecofeminism’s gender analysis is uniquely positioned to trace the theoretical, historical, symbolic, experiential and material connections between the systematic oppressions of women and nature, which directly *inform* contemporary market logic and *enable*

capitalist modes of production [21,27,30,46,54]. Adequately addressing the complex demands of sustainability on a finite planet remains an impossible task without directly challenging the very dualisms perpetuated by the growth paradigm [31,32,37,55,65,106,116].

3.1. Appropriating Reproductive Capacities

In agreement with ecological economics, our ecofeminist framework acknowledges that the appropriation of nature's carrying capacity or ecological reproduction, plays a fundamental role in operationalizing the growth imperative. Vast quantities of forested lands, fresh waters, healthy soils and living beings are extracted and exploited daily in the name of GDP growth [117–119]. Critical to this process, as many feminisms have recognized, is the feminization of nature as submissive, soulless, irrational and mindless [27,28,51]. In *The Death of Nature*, ecofeminist theorist and science historian Carolyn Merchant illuminates the role of the scientific revolution of the seventeenth and eighteenth centuries (and Francis Bacon's influence on Western intellectualism in particular) in shifting society's root metaphor away from an organic, nurturing worldview that emphasized Earthly interdependence, to a mechanistic worldview that emphasized power, mastery and control [86]. This shift in conceptualizing nature was pivotal to the rise of the modern scientific and economic order, for "[a]s long as the earth was considered to be alive and sensitive, it could be considered a breach of human ethical behaviour to carry out destructive acts against it" [120] (p. 280). Bold female and sexual imagery were indispensable tools that sanctioned the 'penetration,' conquering and subduing of nature—a feat inconceivable for a living, sentient planet. Anthropocentric notions of reason, intellect and consciousness were (and continue to be) considered the primary distinguishing features of human (read: masculine/male) identity from all other life forms, emphasizing the "separation from, rather than connection to, nature" [46] (p. 157). Armed with Baconian and Cartesian ideals, the false dualism between humans and nature is institutionalized in capitalist-patriarchy, which "mandated the death of nature" [120] (p. 284).

A parallel dynamic not apparent to strictly ecological critique is the appropriation of society's *caring* capacities or social reproduction, in the process of industrialism and growth. Social reproduction is defined by Katz as, "the broad material social practices and forces associated with sustaining production and social life in all its variations" [121] (p. 18). This includes both direct, relational care-giving such as child-rearing, elderly care or the transfer of cultural and technical teachings to community members, as well as indirect care-giving including household maintenance or food and water collection [122]. This essential labour goes largely unpaid and is persistently feminized; the International Labour Organization (ILO) reports that women presently perform three quarters of unpaid care work and two-thirds of paid care workers are women [122]. Moreover, time-use survey data presented by the ILO estimates that approximately 16.4 billion hours of unpaid care work is conducted daily, equating to 9 per cent of global GDP or \$11 trillion USD (2011 purchasing power parity) [122]. Through the "arbitrary naturalization" of care work [66] (p. 321), women's capacities to conduct this labour is seen as innate and biologically determined, resulting in poor remuneration and vast wage gaps that exclude women from the paid workforce and ensure their availability to provide this life-giving labour [14,46,101]. Care work is also increasingly racialized, as women in the overdeveloped world ("Global North") make their way into the paid labour market requiring the commodification of migrant workers from the majority world through what Hochschild calls the 'Global Care Chain' [123].

3.2. Emancipating Culture from Nature via Growth

Founded in predatory ontologies that sanction oppression and depoliticize privilege, the growth paradigm advances subjective notions of economy that "[sever] all ties to productive female activities and ecological services" [15] (p. 1705). By explicitly linking ecological and social reproduction, the gender analysis of ecofeminism reveals the structural motivations and socio-political realities of systematic externalization in formal economic accounts [25,33,124]. Through institutionalized notions

of privatization and market liberalization, reproductive labour is structurally diverted away from maintaining and regenerating the necessities of life, systematically eroding these capacities as they are redirected to stimulate evermore material throughput growth in the productive sphere of the economy [34,125,126].

For example, productivity demands imposed by the growth paradigm have resulted in an exorbitant amount of fossil fuel-intensive activities that have polluted the planet's carbon sinks to an unparalleled extent. Indeed, though the Amazon has historically been one of the largest carbon sinks on the planet (and considered to be the planet's 'lungs' as the most diverse tropical rainforest), scientists observe a long-term decline in the basin's carbon-absorbing capacities over the last decade [127]. This phenomenon has also been observed in the ocean's increasing rates of acidity [128], undermining the planet's natural capacities to process environmental wastes critical to climate change mitigation and risk reduction. As economic productivity continues to demand increases in growth (and thus pollution), much more drastic emissions reductions will be required to meet climate targets and ensure sustainable prosperity. Meanwhile, unprecedented losses in the diversity of species and cultures as a direct consequence of undermining these crucial environmental sinks further threaten adaptive capacities and global resiliencies [129–132].

Additionally, humans that participate in the productive sphere are framed as rational (read: masculine/male) economic 'agents' that satisfy 'wants' by way of utility optimization, armed with full information and static preferences [46]. This characterization denies inherently emotional and material aspects of human existence, strategically perpetuating human identity as separate from nature, which in turn rejects, denies and devalue the dependence of economies on social and ecological reproduction. The insidious nature of these predatory ontologies is further illuminated in conventional modes of exchange, where the life-giving services of the reproductive spheres, such as clean air or emotional labour, are relegated as adjuncts of the formal economy (read: disembodied) and thus considered 'perfectly substitutable' rather than recognizing the economy's inherently embedded nature [21,38,133–136].

By systematically devaluing the interdependent relationship of production with reproductive spheres, an increasingly dematerialized, emancipated, autonomous economy can manifest [14,15,46,137]. As Harvey observes:

The genius of eighteenth-century political economy was this: that it mobilized the human imaginary of emancipation, progress and self-realization into forms of discourse that could alter the application of political power and the construction of institutions in ways that were consistent with the growing prevalence of the material practices of market exchange. It did so, furthermore, while masking social relations and the domination of the labourer that was to follow, while subsuming the cosmic question of the relation to nature into a technical discourse concerning the proper allocation of scarce resources (including those in nature) for the benefit of human welfare. [138] (p. 131)

Ideological notions of power, mastery and emancipation are founding principles of the world's major capitalistic powers and institutions [31,138]. The resulting crisis can thus be reframed from an ecofeminist perspective as a dual crisis of care for people and the planet or a *crisis in reproduction* [14,34]. In this light, economic 'production' as a means for GDP growth (read: growth fetishism) can be understood as the institutional and material manifestation of the capitalist-patriarchy's emancipation drive.

In order to reverse and heal this shift, nothing short of a transformative change in the normative paradigm away from division and toward responsibility and collaboration is required. As we explore in the following section, the scientific and moral imperatives of the ecological economics transdiscipline are dedicated to this initiative. Yet, the field's ambitions for transformation are inhibited by an underlying predatory framework, which remains tied connected to the epistemologically androcentric nature of the growth imperative.

4. Ecological Economics & the Limits to Theory

Grounding the economy within the biophysical realities of our finite planet, the heterodox field of ecological economics challenges the neoclassical welfare economics tradition (see Gowdy & Erikson's definition [13]) by recognizing the economy as an open subsystem of the larger, materially-closed, global ecosystem. Following the contributions of many scholars, including Kenneth Boulding [111], Nicholas Georgescu-Roegen [139], Dennis Meadows et al. [140], and most notably the efforts of former World Bank economist Herman Daly [40], the transdiscipline of ecological economics emerged in the 1970's as an academic field that challenges the primacy of continuous Gross Domestic Product (GDP) growth in economic theory and political practice [42,45,108,141]. The discourse ultimately rejects contemporary notions of unlimited growth on a finite planet, emphasizing a materials balance between resources entering and wastes leaving the economy and demanding alternative modes of economic organization that embed the economy within the Earth's planetary boundaries [142–145].

The notion of sustainable scale is therefore the discipline's primary point of departure for all analysis, emphasizing the material limits of our Earth's natural capacities as both resource 'source' (e.g., biodiverse forests) and 'sink' (e.g., clean atmosphere) [41,134,146–148]. From this perspective, all economic activity is dependent on the available flow of ecological productivity into the economy in the form of natural resources and out of the economy back to nature once it becomes 'waste' (i.e., when no longer relevant for human use). Recognizing the limited capacities of sources and sinks to provide and absorb our activities and wastes, ecological economics asserts that there are indeed limits to growth [129]. Further, ecological economists mandate the intentional 'degrowth' of affluent regions and nations towards an "equitable downscaling of throughput" [149] (p. 4.7), such as material and energy consumption, allowing for the equitable distribution of human and environmental welfare around the world. This conceptualization is drastically different from the very theories by which our global markets are governed today, where exponential economic growth in real GDP is not only assumed to be possible but also desirable [150].

Research in ecological economics aims to forge pathways towards a sustainable economy that dramatically reduces the material throughput, energy consumption, and environmental impact of economic activity while maintaining people's standard of living, reducing inequality and achieving high levels of employment. By recognizing the economy as embedded within the natural environment, ecological economics theorizes alternative, 'post-growth' mechanisms for measuring human welfare that emphasize the fair and efficient distribution of financial, material, and spiritual wealth [11,44,142,144]. Though ecological economics invites the profound questioning of the patterns of production, consumption, and waste in conventional forms of economy, the 'learned ignorance' perpetuated in Western, epistemologically androcentric disciplines, including ecological economics, largely limits its theoretical analysis and practical applications, as we explore below. Through an ecofeminist lens, we reveal implicitly gendered assumptions that uncritically normalize and further entrench oppressive institutions that maintain the capitalist-patriarchy.

4.1. Depoliticized Conceptualizations of Reproduction

Quality carrying (ecological) and caring (social) capacities are preconditions to a healthy economy, which the discourses of intersectional feminisms acutely assert [34,47,54,93,151]. While ecological economics emphasizes the biophysical constraints of ecological reproduction, its conceptualizations of reproductive labour as a co-creative process are largely lacking. Theoretical foundations of ecological economics and their lasting impact on the transdiscipline emphasize ecological limits, mandating a conceptualization of nature as homogenous and constant [15,46,51]. The economy depends on the planetary ecosystem to satisfy the demands for raw materials and to absorb the wastes and pollution it generates. For Daly and many other ecological economists, nature is thus the primary limiting factor of economic processes [10,13,40,146,147]. But, as Biesecker and Hofmeister reflect:

[Daly's] concern is to find a "scale" of the economy optimal in terms of scarce natural capital as well as ways to minimize and more efficiently design "throughput quantities" as one element of a comprehensive concept of efficiency. In the conception of natural capital formulated here, *nature is viewed as a stock, not as productivity*. Under this category nature, *in the sense of a self-conserving and ever-changing, living entity, is reified into a constant*. [15] (p. 1706, *our emphasis*)

This 'reified' conceptualization drastically minimizes the social and relational nature of the living planet and in so doing, perpetuates the idea of nature as "dead and malleable," thus denying its "active dynamic agency" [51] (p. 124).

Indeed, as Braun asserts, "to speak of nature is to presuppose an ontology" [152] (p.192)—one that maintains the artificial division between culture and nature. Expanding upon earlier sentiments related to essentialist concerns in ecofeminist discourse, it can be argued that "[t]he very fact that we have a word for 'nature' is evidence that we do not regard ourselves as part of it" [153]. Resistance related to identifying humans *as* nature is an intriguing phenomenon that continues to haunt Western disciplines across the board. In this sense, society remains "an autonomous realm that obeys its own historical dynamics, while non-humans enter the story only as fetishized commodities or fixed capital" [152] (p.192). This approach implicitly validates the same principles that sanction extractivist modes of economy by continuing to deny nature's social standing [154]. As Katz and Kirby reflect:

By constituting nature as external, these representations and the practices that underlie them, not only enable domination and possession but the ideological potency of this formulation disables political engagement. We need to engage with nature in a way that recognizes that as we produce nature, so do we produce social relations. For us, this means a reinscription of ecology as *a culturally mediated social construction* and recognition of the everyday material social practices by which we produce our relationship with nature. [54] (p. 268, *our emphasis*)

The centrality of scale in ecological economics neglects the socio-cultural dimensions of economy, denies social and ecological co-production and thereby perpetuates the 'disembedded' characterization of economy as separate from ecology [21,31,33,46,86].

Moreover, the discipline's scope fails to actively engage with the sister sphere of ecological reproduction, *social reproduction*. The labour conducted in this sphere is the life force of any human community and functioning economy. By creating and maintaining the health and well-being of the labour force, social reproduction is paramount to any transformational change proposed by ecological economics. Post-growth proposals demand radically alternative forms of social organization that necessarily depend on the paid and unpaid labours provisioned by social reproduction. Yet, neglect of the social sphere results in unrealistic proposals for transformation. Specifically, a number of critics contend that by strictly concerning itself with notions of environmental limits, the work of social reproduction is *inherently assumed to be of infinite supply* in ecological economic scholarship, much like the assumed externalities of capitalism [14,34,155]. This can be most effectively demonstrated by post-growth proposals for employment.

While eliminating one day of the work week could significantly reduce transportation emissions and assist in alleviating environmental impacts [156], shortening the work week could impose increased time pressures on the work days of care providers due to the unequal (gendered, racialized, classed) division of care work, which may interfere with the quality of daily caring activities [17,18,157,158]. While men's contribution to social reproduction is largely occasional, flexible and motivated by leisure [159–162], the feminized nature of this labour imposes a 'second shift' on women, which they conduct in conjunction with their full-time job (if, indeed, these duties do not impede on their freedom to enter the labour market) [163]. Rubery et al. argue for the need to "identify what types of working-time regime can be considered favourable for gender equality" [164] (p. 89). Aligning with Sirianni and Negrey [18], Dengler and Strunk assert that a feminist-informed work-sharing proposal should focus on *shortening the hours of each workday*, which "not only alleviates

women's double burden by reducing the first shift but most importantly also liberates space for a more equal division of daily caring activities among genders" [17] (p. 17).

The intersectional properties of an ecofeminist frame can further this analysis by demonstrating privileged conceptualizations of care work in conventional economics and consequently ecological economics. Empirical investigations of the 'care economy' illustrate racial and ethnic hierarchies emergent in the distribution of social reproduction labour, such that work with relational and emotional dimensions are often "more dominated by white women, more professionalized and higher paying than their nonnurturant counterparts" [19] (p. 79). Occupations such as food preparation, laundry, or housecleaning are often transferred to poor women, immigrants, and women of colour as white middle- and upper-middle-class women make relative gains in the 'productive' labour market [165–167]. In this regard, "it is where reproductive labour is seen to lack the need for emotional skills and relational interaction that women of colour are concentrated" [19] (p.72), replicating the very predatory models that structurally value and devalue work in order to maintain the artificial division between culture and nature. Intriguingly, Tronto [167] argues that "feminists are to some extent accountable for the exploitation of women of colour in low-wage care work through this transfer because of the feminist role in fighting for the opening of the professions to women" [19] (p. 67).

Though post-growth futures envision decreases in work hours and consumption growth while freeing up leisure time, implications for distributive equity remain unclear and demand immediate attention from ecological economics. Duffy warns:

a movement to revalue nurturance could have the unintended effect of making [non-relational] jobs even more invisible and devalued. Framing the value of certain occupations in terms of the emotional and relational skills required—and even professionalizing those skills—may risk further devaluing those "menial" jobs that are not perceived to require those skills. [19] (p. 80)

Post-growth transitions towards a de-materialized and service-oriented economy will result in radically alternative, limited material standards of living where human labour power must substitute the energy and labour supplied by the conventional fossil fuel economy. Head asserts that the "[p]rovision of food and water will likely take more hours of the day, leaving less time for commerce, formal education, cultural pursuit" [168] (p. 317). Though the very foundational principles of a degrowth imperative inevitably demand a shift in labour patterns, the emergent conflicts and consequences regarding risk, responsibility, expertise, and work hours have yet to be adequately acknowledged or addressed in ecological economic analysis.

Consistent, quality care work thus cannot be assumed, particularly since the International Labour Organization reported in 2018 that shifts in family structure and care needs, higher care dependency ratios (i.e., share of non-working vs. working population) and an increase in women's employment in certain regions have spurred extra demand for care that threatens to "create a severe and unsustainable global care crisis" [122] (p. v). Instead, questions of power, autonomy, and freedom to enter or exit the market must be central to ecological economic inquiries of post-growth futures. By framing degrowth as "a means to an end," Perkins advocates for progressive approaches to wealth redistribution and anti-corruption that address distributive justice post-haste and actively tackle the structures and systems that sit at the heart of the crisis [16] (p. 6). Perkins contends,

from an ecofeminist and equity-driven perspective, it seems dangerous to advocate degrowth without very clear and specific corollary measures to negate the tendency of the powerful to come out better-off. Since degrowth involves substituting social benefits which are not derived from material throughput in the economy for economic benefits which are material-dependent, it is centrally concerned with issues like unpaid work, caring, community as differentiated from individual welfare and other such matters which feminist economists have studied for decades. [16] (p. 4)

Further, “placing increasing theoretical emphasis on nurturant care privileges the experiences of white women and excludes large numbers of very-low-wage workers from consideration” [19] (p. 66). Until distributive justice is at the forefront of ecological economic proposals, the labour of social reproduction remains effectively marginalized. This criticism is particularly intriguing since one of the founding papers and scholars of the discipline proclaimed, nearly three decades ago, that “[i]ssues of sustainability are ultimately issues about limits” [10] (p. 5). Yet, surprisingly, the theoretical framework of ecological economics finds the labour conducted in the sphere of social reproduction to be “uncritically presupposed” [15] (p. 1705).

4.2. Power and Domination in Knowledge Creation

The struggle for methodological pluralism in ecological economics further elucidates the discipline’s gendered assumptions and predatory ontologies, which also underscore the discomfort and uncertainty in tensions of qualitative and quantitative methods [23,24,26]. Following the very footsteps of neoclassical economics, collective research efforts in ecological economics have largely drifted towards ‘hard’ quantitative work that emphasizes mathematics and models: “while ecological economics was founded on both a scientific and moral critique of the mainstream, research on the ethical dimensions of economics and society has received little attention” [22] (p. 191; see also [14,23,25,169,170]). A bibliometric analysis of publications in the journal *Ecological Economics* (1989–2009) observed an ‘empirical turn’ in the discipline away from ‘appreciative’ papers and towards ‘formal and empirical’ methods that “reflect the global trend within economics for increasing ‘rigor,’ often associated to formal modelling and mathematical apparatus” [171] (p. 857). In contrast and despite social justice being a pillar of ecological economic theory, *less than three percent* of the papers published had an ethics, equity, or justice focus [171].

Nelson points to the dangers inherent in ecological economics’ empirical turn, arguing that demands for quantitative research “should not be taken as simply prerequisites for great rigor but rather as demands that masculine-biased preferences be indulged” [46] (p. 160). She notes that by being ecological, the discipline is conceived of as ‘soft’ and feminine making it challenging to gain respect among economists, an insight that might explain the underlying drive for the empirical turn. Expanding further, this ‘hard’ economics connotation may also have contributed to the move away from the philosophical roots of ecological economics. Methods of research shape observations and conclusions, as well as resulting action; in line with ecofeminist claims, ecological economist Norgaard outlines how, over several centuries, “the adoption of Western forms of knowing, technological intervention and social organization has reduced both cultural and biological diversity” [24] (p. 52). Furthermore, the priority of quantitative methods prioritizes a single paradigm; however, “the use of a single framework disenfranchised or disqualifies the majority, facilitates the tyranny of technocrats and encourages centralization. Openness to multiple frames of analysis is a prerequisite to democracy and decentralization” [24] (pp. 52–53).

Even if criticizing mainstream economics risks furthering the isolation and marginalization of ecological economics by neoclassical economics, Nadeau argues that the magnitude of the problem and the duty to “protect the lives of the 7.3 billion members of the extended human family and to enhance the prospects that subsequent generations of this family will be able to live their lives on a flourishing Earth” demonstrates that there is no “greater good” or “higher calling” than radical changes of methods and movements in ecological economics [23] (p. 107). Masculine-biased preferences consequently shape and inform the kinds of knowledge, voices, geographies, and perspectives considered valuable and valid in ecological economics research. This is not to say that all quantitative methods are inherently unjust but rather to call into question the power and implications of the tools. Until intersectional, intergenerational, and interspecies justice insights come to the forefront of ecological economics theory and practice, both moral and scientific imperatives of the discipline remain unachievable.

5. An Ecofeminist Research Agenda for Ecological Economics

The above sections describe and employ an ecofeminist theoretical framework to analyse the various tenets of neoclassical, growth-oriented economics and the competing discourse of ecological economics, unveiling implicitly gendered and oppressive assumptions within both paradigms. Although ecological economics offers much promise in reconciling economic theory and policy with biophysical realities, we argue that the discipline's core scientific and moral imperatives are largely inhibited by its epistemologically androcentric foundations. Ecological economics carries with it a 'learned ignorance' that limits its theoretical framework by actively discouraging and marginalizing the complex ethical, social, and political dimensions of 'economy.'

An ecofeminist analysis demonstrates the predatory roots of the growth paradigm and how this epistemic violence ensues as privilege, power, and gender continue to be depoliticized in ecological economic scholarship. An emphasis on the purely ecological necessarily sanctions the continued oppression of women, nature and other 'Others' and thus cannot adequately achieve the overarching goals of the discipline. The following sections will outline a research agenda by identifying and celebrating the synergies of ecofeminism and ecological economics to reconcile the contradictions between ecological economic objectives and liberate the discipline from pervasive predatory ontologies.

5.1. Transcending Predatory Ontologies with an Ecofeminist Ethic of Care

The historical, theoretical, symbolic, material, and experiential insights brought forth by ecofeminist perspectives underscore the urgent need to challenge and dismantle the destructive nature-culture dichotomies perpetuated by the patriarchal emancipation drive. Acknowledging the ecological *and* social dimensions of the reproductive sphere as critical to the maintenance of the human economy, an ecofeminist-informed ecological economics must insist these capacities "be cared for and sustained according to principles which fundamentally differ from the existing economic principles. Neglect of the realm of economic maintenance and care also means neglect of the principles by which this realm is governed and shaped" [49] (p. 110). Indeed, Cox observes that current resistance or "inability to recognize our dependence upon each other is reflected in an inability to acknowledge the extent of human dependence on the Earth and in attempts to seek tyranny over it" [172] (p. 127).

Through a fascinating exploration of the political potential of an ethic of care, Cox declares that the "recognition of caring relations and of interdependency is intertwined with care for the Earth as whole. If we accept that we are dependent on others we are better able to acknowledge our collective dependence on the Earth, we are able to undercut ideologies of competitive caring and unsympathetic disregard for others" [172] (p. 127–128). The labour conducted in the reproductive realm is necessarily embodied, embedded and takes place within discrete timescales and geographies that completely contradict the time, speed and distancing of profit exchange [15,34,51,170,173,174]. Moreover, the interdependent nature of reproductive processes fosters "a disposition towards care [that] could undermine the competitiveness and individualizing processes of neoliberalism and draw attention to the interdependence that shapes all our lives" [172] (p. 116). Ancheta concurs, asserting that a care ethic stands to be "the logical nemesis against the exploitative and degenerative directions of humanity's economic and industrial programs that constantly bombard the biosphere and humans themselves" [39] (p. 22).

Ecofeminism brings the reproductive processes essential to the vitality and maintenance of human society to the forefront. The moral dimensions and distinctively relational properties of caring make the labour of reproduction "qualitatively different from market work" [34] (p. 25; see also [175]), limiting the potential for substitution by way of technological innovation [122]. Reorienting the concern of economics to more "concrete issues of *provisioning* related to the actual social and natural environment" [176] (p. 131 *our emphasis*) confronts the strenuous demands placed upon human communities by extreme shifts in global temperature that are expected to bring about changes in food, water, fuel and energy availability, public infrastructure reliability and shifts in community identity [177] (p. 205). Floro elaborates:

A new economic thinking requires re-framing economic questions or inquiry in terms of provisioning for human life and environmental sustainability. It involves developing a framework for reallocation of resources and provisioning of socialized support for care, as well as the equal sharing of responsibilities between women and men. It also requires the integration of the costs for raising the next generation along with the costs of maintaining the resilience and carrying capacity of the environment in economic theories, models and methodologies. It demands economic reasoning and development of analytical tools that provide a deeper understanding of the gendered, distributional and ecological dimensions of economic options, choices and decisions including economic policies. Such a framework requires a better understanding of decision making processes where a more collective rather than individualistic perspective is taken. [34] (p. 28)

In this regard, an ecofeminist ethic cultivates caring relations through the processes of economic provisioning, which sit at the heart of the reproductive sphere.

Furthermore, the symbiotic (though undertheorized) potential between the degrowth imperative of ecological economics and the care imperative of ecofeminist ethics offers much promise in cultivating a radically alternative normative paradigm in the face of cataclysmic global crises [17,178,179]. Degrowth proposals for reduced economic production and environmental impact necessarily demand greater attention to the feminist concern regarding the distribution of care work. By privileging simplicity and conviviality, “[t]he imaginaries of a degrowth society thus lend themselves to a reevaluation of care work that is necessary to achieve a greater equality in the distribution of paid and unpaid work among genders” [17] (p. 14). Likewise, D’Alisa, Deriu and Demaria assert that “re-centring a society around care would pave the way to degrowth” [178] (p. 64).

Ecological economics has the potential to address both environmental and gender injustices critical to ecofeminist analysis but restricting these approaches to employment opportunities in the productive sphere such as work hours does not necessitate transformational change. Indeed, Prieto and Dominguez-Serrano argue that “theoretical elaborations and practices of degrowth are still lacking a deeply critical vision of the macro-dynamics of the present capitalist system, which would allow it to tackle the complexity and contradictions of everyday life and to seriously analyse the ‘seizure’ of women’s time and work which is at the basis of this society” [179] (p. 237). It is essential for ecological economics to investigate the gendered, predatory ontologies that shape perspectives of value and responsibility for both paid *and* unpaid care work and “help to overcome the antagonism of the monetized economy versus care and the environment” [17] (p. 19).

5.2. Template for Methodological Pluralism

Our ecofeminist lens offers direction for methodological pluralism in ecological economics. In the first volume of *Ecological Economics* published in 1989, Norgaard advocates for “conscious maintenance of methodological diversity and cultural adaptation to working with a range of answers,” arguing that “ecological economics will more likely evolve into a useful discipline if it maintains the breadth of the methodological base of economics and ecology and reaches out to the methodologies of other disciplines as well” [24] (pp. 38, 53). In our research agenda, we call for a return to Norgaard’s forward-thinking proclamation that methodological pluralism helps to sustain biological, cultural and epistemic diversity, as ways of thinking affect behaviour and decision-making [24,27,102,173].

Much like the diversity in the conceptual frameworks and theoretical perspectives of ecofeminism, there is no single ecofeminist method. Ecofeminism encourages reflexive consideration of the power and implications of methods and is especially critical of disciplines and methodologies that reproduce the status quo and mask power relations (i.e., ignorance of ongoing structures of settler colonialism, assumptions that humans justly eat animals, etc.) [28,31,37,55]. The search for methodological pluralism is connected to the duty to diversify the membership and traditions of a particular discipline. Ecofeminism highlights social and cultural dimensions of knowing, advocating for new perspectives on qualitative and quantitative observation through the inclusion of marginalized voices [21,28,64,85].

Norgaard writes, “methodological pluralism promotes participation and decentralization” [24]. The origins and development of ecofeminism demonstrate decades of integrating diverse voices, making space for marginalized groups, considering the rights and wellbeing of nonhuman life and building partnerships outside of the academy [21,27,28,64]. Ecological economics can learn from the traditions of ecofeminism to legitimize community-based and alternative ways of knowing.

An ecofeminist ethic of care “expands the scope of moral considerability to include the nonhuman but also reminds us of the collective responsibilities and duties of reciprocation that come with being a citizen of a shared planet” [80] (p. 75). Some ecological economists have theorized such moral inclusion, like Herrmann-Pillath’s “agents as ontologically diverse assemblages (such as plants and humans)” [180] (p. 222). This returns to the moral imperative at the foundation of ecological economics and demands the question: ‘who and what is ecological economics designed to serve, and what limits exist for what ecological economics can/should include?’

Rather than dismiss and bury the social constructions of knowledge through the guise of objectivity, ecological economists can accept that the economy is not culture- or value-free; however, ecological economics, as a discipline, continues to struggle with methodological diversity and addressing the aforementioned ‘empirical turn’ [23,24,26]. As outlined above, not only are there predatory implications of prioritizing ‘hard’ methods, but it is also misguided. In harmony with science and technology studies and some ecological economists, ecofeminists demonstrate how science and quantitative methods cannot be objective because of the social dimensions of knowledge creation [32,181–183]. While there is power in quantitative empirical evidence, conceptual framing will ascribe meaning to the observations and measurements because ‘data does not speak for itself.’ Some feminist theorists react to the shift toward ‘hard’ research with a rejection of quantitative methods, claiming that such methods are contrary to feminist aims [184]. While we support a gender analysis of methods and ways of knowing, we caution against the urge to dichotomize qualitative and quantitative research methods. Ecofeminist methodologies assert that there is no purely objective perspective, rejecting the notion that there is one right way and welcoming rhetoric, normative theory, and community-based research. Still, methods can be more or less suitable for particular inquiries.

We anticipate that there will be discomfort and resistance toward our propositions for open and flexible methods within the ecological economics discipline (among other disciplines). Such critiques reaffirm the primacy and dominance of ‘hard’ methods in ecological economics, as well as the related dualisms of reason-emotion, masculine-feminine. For example, Spash’s argument for realism over pluralism might perpetuate harmful dominance of hard approaches at the expense of what ‘soft’ approaches have to offer, despite intentions to provide important research directions and useful nuance in ontology, epistemology and methodology [185]. Certainly, more inquiry and debate are needed in the theoretical and epistemological foundations of ecological economics, as well as ecofeminism; however, the ecofeminism’s comfort in the uncertain and uncomfortable might offer useful new ways of approaching research and action in ecological economics. Lockwood addresses the “illusion of incoherence” in ecofeminist communities:

The truth or rightness of an ecofeminist position is evident not in its logical consistency or adherence to female perspectives. Rather, the acid test is the world: Does the ecofeminist account lead to actions which result in less suffering or greater justice? [...] Seen this way, ecofeminism’s incoherence among conceptual formulations is non-problematic because the field is held together by the empirical diminishment of suffering and the enhancement of justice within humankind (e.g., the fair distribution of natural resources and industrial waste) and among humans and nonhumans (e.g., the fair allocation of space for living a full life). [95] (p. 167)

The necessary paradigm shifts demand new approaches to research, embedded in the material realities of their objects of study and ‘soft’ ways of knowing.

5.3. Systems, Complexity and Humility

Ecological economics and ecofeminism already share some epistemological frameworks, including systems thinking and complexity theory [85]. While not all ecofeminists would identify with these frameworks, there are important ecofeminist connections with the language and epistemologies of systems thinking and complexity theory [21,102,103]. For instance, the intersectional foundations of ecofeminism demonstrate the understanding of complex systems through the interconnected structures of power (e.g., racism, classism, sexism, anthropocentrism, etc.), the interplay of oppression and privilege (i.e., someone could be oppressed by their gender and privileged by their race), and the emergence of power dimensions in social relations (i.e., social location is more than the sum of its parts) [21,60,102].

We, along with other ecofeminists, argue that the problematic dualisms with which ecofeminists take issue—such as masculine-feminine, reason-emotion, economy-ecology—can be overcome with an application of systems thinking [21,31,85,102,103]. Yet, critical systems thinking literature has largely ignored feminist or gender analysis, and the applications to ecological or environmental problems remains underexplored [102,103]. We join the commentary within ecological economics that the socio-political dimensions of low-carbon transformations thus far do not adequately address the complexities of concurrent crises or the limits of the systems in which they are embedded [179,186]. Ecofeminism can assist ecological economics in reuniting with complexity theory. Furthermore, ecological economics can learn from the practice of ‘methodological caution’ and ‘methodological humility’ in ecofeminism: knowing that one’s perspective is necessarily limited, especially as an outsider from the group being studied and to accept that academic methods could miss important information without discrediting the experience and knowledges of insiders [187]. With an appreciation of complex systems, the transformations and leverage points for change are proposed with caution and humility.

Ecofeminism can guide ecological economics in practices of embracing uncertainty and unknown, as well as the limits of knowledges and ways of knowing [94]. The ecofeminist theory of ‘embodied materialism’ outlines an acceptance of the limits of human knowledge and the accountability of embedded awareness, as opposed to learned ignorance anthropocentrism [21,31,36,51]. Given the stakes, transitions and transformations for more just and sustainable futures must be approached with caution and humility. As such, solidarity with ecofeminism is the ideal solution for ecological economics because “ecofeminism is an explicit antidote to the implicit poison of hubris” [95] (p. 159).

5.4. Power, Ability and Responsibility in Post-Growth Transformations

Acknowledging the distribution of power, ability and responsibility in post-growth transitions will be critical to their success, particularly in the face of unprecedented socio-economic and environmental stressors. Indeed, though household financial management remains a gender-neutral chore in times of relative stability [188], this crucial task is often thrust upon women in times of financial strain such as economic downturns, “as the woman is viewed to be more financially responsible and better at micromanaging scarce resources” [189] (p. 7; see also [190–192]). Yet men typically maintain final decision-making power regarding whether or not to file for bankruptcy despite their relative discomfort with the general management of household debt in times of crisis [189,193].

Though distributive justice remains a core pillar of the ecological economics framework and a pivotal component to the successful implementation of large-scale socio-economic transformation, discussions of justice remain marginal and superficial in most ecological economic discourse. Financial, temporal, material and social privileges necessarily enable ecological modes of living. Understanding and explicitly problematizing processes of unequal power relations can transform ecological economics from a tool of institutionalized oppression into a promising tool for liberation from the oppressive institutions of capitalist-patriarchy. Reiterating the critical account put forth by Spencer et al., ecological economics must acknowledge the “crucial roles of distribution and power for meeting the goals of scale, distribution and allocation. Approaches to theory, policy and governance should address

ways of countering concentrations of power, recognizing the value of collectivities and interpersonal relationships over a long-time horizon" [22] (p. 196).

Returning to the emergent hierarchies in the provisioning of caring work, Tronto points to the 'privileged irresponsibility' that results from privatized forms of care [167]. For example, childcare provided by public institutions in communal facilities is more frequently replaced by private care in an employer's home, usually provided by migrant or otherwise disadvantaged workers (in terms of race/ethnicity, class, gender). The power dynamics within "exacerbate inequalities, distribute care unequally between people with different resources and different statuses and allow the most privileged . . . [to] do least and the most disadvantaged do most" [172] (pp. 119–126). Cox argues that the resulting privileged irresponsibilities for such duties are "both a cause and effect of the marginalization of care work" [172] (p.126). Cox elaborates:

it is not just that we need to understand the full range of sites and types of care that take place but also that we need to elucidate the very different resources available to different people to carry out care and the implications of these differences . . . inequalities in access to care produce measurable outcomes that affect people throughout their lives, maintaining the privilege of those with the greatest resources available to them. [172] (p. 126)

This curious notion of privileged irresponsibility applies to the larger scholarly efforts of the ecological economics community, in relation to conceptions of and implications for distributive justice. Western scholars are predominantly located in affluent regions of the world that are "incurring ecological and care debts, giving rise to a real conflict between capital and life" [179] (p. 229). Post-growth proposals drafted by individuals in the overdeveloped world fail to recognize the disproportionate burden of risk, responsibility, and work hours related to enacting ecological economies that are necessarily placed on marginalized groups. The effectively invisible sphere of social reproduction in ecological economic accounts further elucidates the negligent approach of the discipline to questions of power dynamics implicit in the processes of resource access, allocation, and distribution. In this sense, ecological economics implicitly privileges the market as the primary location of community networks and exchange.

Intriguingly, however, the assumed vulnerabilities and adaptive capacities of communities and regions must come under scrutiny in the face of complex non-linearities innate in global climate change. Scholarship on adaptation has a frustrating tendency to frame environmental, social or financial shocks as an 'exogenous stimulus' to society, "isolat[ing] climate change impacts and adaptation from the 'messiness' of other societal spheres in order to retain . . . conceptual clarity and analytical purity" [20] (p. 525). The complex nature of adaptive capacities is most effectively elucidated in recent research with socio-economically disadvantaged households. Migrants and ethnic minorities have been recognized as particularly adept at engaging in environmentally responsible practices, such as saving water and energy or using public transport, at above-average rates [177,194,195]. Due to pre-migration experiences of scarcity and disruption, existing skills and practices related to cooking, laundering, and water capture were found to be particularly advantageous during periods of prolonged drought in Australia [194]. Thus, as Toole contends, "[h]ouseholds with strong internal and external social relations, frugal practices and high levels of pedestrian mobility may ultimately prove less vulnerable to a range of more-than-climate impacts than isolated but wealthy households, whose everyday lives are dependent on energy-intensive and less flexible modes of operation" [177] (p. 207). The socio-political complexities innate in transformational change must be recognized and understood in order to build and implement effective post-growth proposals.

6. Concluding Remarks

In the face of unprecedented biophysical and socio-economic predicaments, scholarship in the heterodox school of ecological economics must articulate feasible pathways to transformational societal change that adapt "not only to new hazards and changing resources but also to new

regimes of knowledge, as well as to changes in access to and control over resources" [20] (p. 523). However, these pathways are empirically and practically inhibited by the limited theoretical frame of ecological economics, as an epistemologically androcentric discipline that continues to neglect and thus perpetuate power differentials. Without addressing these critiques, if indeed this is possible, ecological economics will continue to advance implicitly gendered assumptions that normalize and perpetuate oppressive institutions.

Our ecofeminist analysis demonstrates how the logics of extractivist capitalism that justify gender biased and anti-ecological structures of power in the dominant growth-oriented economic paradigm also directly inform the theoretical basis of ecological economics and its subsequent post-growth proposals. We acknowledge that there are limitations to our analysis and we anticipate that there will be much discomfort from ecological economists receiving our criticism, not only because of the criticisms, but also in the balance of writing a piece that connects a diversity of disciplines and ideologies (i.e., we compromise the accessibility of the analysis to be true to both disciplines). Nonetheless, in the face of unquantifiable uncertainties and unknowable vulnerabilities, Nelson calls upon economic researchers of all stripes to take an ethical stand on climate change [4]. The way forward is unpredictable and the stakes are high, but the magnitude of the wicked socio-economic and ecological problems demand radical theory and practice.

Dethroning the predatory ontologies innate in conventional and ecological approaches to economics might be the only way to achieve the transformations that ecological economists and ecofeminists desire, though the feasibility of such a shift remains uncertain. While there are streams in the field of ecological economics that account for interconnected systems of oppression and structures of power highlighted by ecofeminism [22,24,26,48,174,196], these efforts are explicitly relegated to the margins of the field and the central narratives of the overarching paradigm remain unchanged. This suggests that the predatory ontologies outlined in our paper are so deeply rooted in ecological economics that they marginalize and invalidate dissent.

The analysis presented in this paper further warrants an investigation of the limits to the notion of ecological 'economies' itself. Moving beyond problematizing predatory ontologies in contemporary market logics, an ecofeminist frame might reveal deeper roots of the problem. Notions of 'economy' are a direct product of the capitalist-patriarchy; institutionalized systems of appropriation under the guise of economy have been critical tools of socio-ecological devastation. Indeed, what may be required is the problematizing of any and all approaches that "[accept] the structuring of economic life by the market" [197] (p. 233). Instead, returning to modes of provisioning, subsistence and commoning presents promising potential [16,21,47,94,124,196,198,199]. As Snyder remarks:

The commons is a curious and elegant social institution within which human beings once lived free political lives while weaving through natural systems. The commons is a level of organization of human society that includes the nonhuman. The level above the local commons is the bioregion. Understanding the commons and its role within the larger regional culture is one more step toward integrating ecology with economy. [200] (p. 40)

The care ethics implicit in ecofeminist theory and practice offer tools that not only dismantle the dominating dualisms of predatory ontologies, but also fundamentally foster interconnection, dependence, and kinship in relations between humans, humans and nonhuman life, and humans and nature. Indeed, the care ethic "reminds us of the collective responsibilities and duties of reciprocity that come with being a citizen of a shared planet" [80] (p. 75). The ethic of care is the way of establishing mutually-enhancing ways of being (the opposite of predatory ontologies). Only this ethical orientation and the ecofeminist frame can conceptualize and hold the connections: 'economy' *is* provisioning *is* reproduction *is* labour *is* caring.

Dismantling the predatory ontologies at the heart of the growth paradigm (read: capitalist-patriarchy in its most present and globalized manifestation) is the most urgent and fundamental task for any radical thought or action to stimulate socio-economic transformation. Our

research agenda proposes potential synergies and solidarities between ecological economics and ecofeminism that liberate current heterodox approaches to ‘economy’ from pervasive predatory ontologies. Table 1 below offers a series of questions resulting from our analysis, which we invite scholars within and beyond the realm of both ecological feminisms and economies to address imminently. In an era of cataclysmic crises, an ecofeminist ethic of care can nurture the neglected soil of social-ecological reproduction into an organic growth of mutually-enhancing Earth-human relationships.

Table 1. Guiding questions for further inquiry in ecological economics.

Overcoming predatory ontologies
How does the explicit recognition of the growth paradigm’s predatory ontologies affect ecological economic accounts of the crisis?
How does the explicit linking of nature and culture guided by ecofeminism embed, embody and decentralize conceptualizations of an ecological economy?
What are the potential synergies between the ecofeminist ethic of care and the moral imperatives in ecological economics and degrowth?
What forms of (non-predatory) decision-making can empower and encourage reciprocal relations within communities?
How does the intentional inclusion of the social reproduction realm inform post-growth proposals? Can post-growth proposals mobilize gender-neutral (i.e., care beyond the ‘feminine’) approaches to paid and unpaid care work?
How might the recognition of nature as socially and culturally mediated construct enable political engagement?
Methodological Pluralism
How can ecological economic methods be developed to enrich biological, cultural and epistemic diversity?
How can ecological economics critique and abandon methods that reproduce the status quo and mask power relations?
What might it look like to decentralize knowledge production in ecological economics?
How can ecological economics be more reflexive in the social constructions of knowledge and value(s)?
How can ecological economics make space to learn from and co-create with partners outside of the academy (e.g., activists, local business owners, etc.)?
How can ecological economics decolonize its framework and membership to work in solidarity with First Peoples and Indigenous Peoples, allies, co-conspirators?
How can community-engaged research models enhance proposals for an ecological economy?
How can methodological pluralism empower and legitimize community knowledge in academia?
What might it look like to have transdisciplinary ecological economics without technoscience supremacy?
Implementing Transformations
How can cultural transformations better account for the complexity of social-ecological crises and the predatory ontologies underlying social, political and economic systems?
How can ecological economics address the intersectional, interspecies and intergenerational power dynamics in paths for more just and sustainable futures?
How can complexity and ecofeminism inform a humility and caution in theorizing and enacting transformations?
What lessons can systems thinking and complexity offer to ecofeminism and ecological economics in identifying leverage points for change?
Can the ecofeminist approach of connecting theory and movements (e.g., praxis) provide direction for transformations in ecological economics?
In what ways can ecofeminism inspire resolutions and transformations in ecological economics beyond the undifferentiated anthropos?
Power and the Moral Imperative
What are the socio-economic implications (e.g., distributions of risk, responsibility) for the sphere of social reproduction regarding current approaches to ecological economics?
How does framing distributive justice as necessarily political, historical, material and social change the priorities of research and policy approaches in the field ecological economics?
How can distributive justice inform ecological economic approaches to confronting inequality?
What does ecological economics look like as a tool for liberation from the oppressive institutions perpetuated by growth and the capitalist-patriarchy?
How can post-growth proposals address the disproportionate weight of risk related to ecological catastrophe and responsibility related to work hours of implementing radical transformation among marginalized communities?

Author Contributions: This paper was a joint work of the two authors. S.R.S. and S.-L.R. conceived of the paper’s purpose, structure and content together. Both contributed to the researching and writing of the paper and to reviewing and approving of the final manuscript.

Funding: This research received no external funding.

Acknowledgments: The authors would like to thank the editors and four anonymous reviewers for their constructive and helpful feedback. We would also like to thank our colleagues Patricia Perkins, Peter Victor, Ben Dube, Da In (Ann) Choi and Vijay Kolinjivadi for the guidance they provided on this paper. All errors are our own.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

In this paper, we use the terms ‘majority world’ and ‘overdeveloped world’ to refer to differences of power and development across the globe. These replace terms like ‘Global South’ and ‘Global North’ in an effort to more accurately describe the people and communities to which we refer. Though less common, these terms appear in Barry’s *The Politics of Actually Existing Unsustainability: Human Flourishing in a Climate-Changed, Carbon Constrained World*, among others [72]. Still, we caution against the use of such pairs because of the power in binaries, dualisms, and dichotomies.

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