

# ECOLOGICAL CRISIS AND THE POLITICS OF TRANSFORMATIVE KNOWLEDGE

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## Abstract

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Global ecological crisis has fostered the emergence of transformative knowledge projects, one of which is sustainability science. Examining the prospect of sustainability science as a counter-hegemonic project, this paper discusses critical junctures that involves intellectual hegemony as the formative elements of an alternative politics of knowledge production. Hegemonic knowledge relies on the supremacy of modern science in making sense how and why contemporary ecological crises are present as they are. Mainstream understanding also converges on the managerial dimensions of the knowledge order as the feature of the future humanity. Using Gramscian political ecology critics, this paper examines how the internal contradictions within the sustainability science literatures opens up the recognition of the limits of such approach by making knowledge production more inclusive and democratic. Three political aspects of knowledge production are being scrutinized. This includes accumulation (the redistributive aspects of knowledge production), domination (the power supremacy of particular knowledge over others), and resistance (the struggle to transform the mainstream and the dominant knowledge order into an alternative knowledge order). There is a need to further critical sustainability science project in order to address more explicitly the question of power imbalances in knowledge production on ecological crisis. The critical project is facing the complicit aspect of intellectual endeavors in sustaining the status quo associated with industrial way of knowing at the roots of ecological crisis. As an implication, there is a need to locate transformative knowledge at both material and ideological levels towards structural and systemic change.

**Key words:** ecological crisis, politics of knowledge production, sustainability science, transformative knowledge, hegemony

## Introduction

Unprecedented ecological crisis brings important questions on the political implications of hegemonic industrial knowledge production. Such questions have been responded by the emergence of sustainability science as transformative knowledge project. This knowledge project aspires a critical position on the limits of the hegemonic knowledge in addressing the very root causes of ecological problems. Within the realm of sustainability science, there is a potential to discuss further how transformative knowledge project may contribute to structural transformation that consider the limits of anthropocentric-industrial knowledge (Abson et al, 2017; Miller, 2013). Sustainability science has developed as a very important field of discipline that has unique approach in terms of how it engages various ways of knowing that includes natural science, humanities, and social science. While developing mostly in industrial countries in the

North, the massive diffusion of its scientific approach adopted by the government and non-government entities in the Global South presents an interesting topic to discuss in the academic debate. The notion of 'common future' as appeared in the Brundtland Report (Brundtland, 1987) deserves continuous reflection in the context of how this knowledge project transform our ideological position and shape our ecological consciousness as planetary citizens.

Global responses to ecological crisis are fragmented. Skeptic imaginaries presented the bleak picture of human civilization at the edge of catastrophes. The other imaginaries, meanwhile, see the world through the lens of scientific optimism, arguing humans are capable of resilient adaptability to even the most severe planetary dangers. Despite the skeptics and optimists' debate, ecological questions such as climate change, energy, food security, pandemics and diseases, deforestation, plastic pollution, are pertinent to the future wellbeing of all. The problems confronting us are unprecedented in terms of the scale and the scope of influence across nation-state boundaries (Barry and Eckersley, 2005; Foster, 1998). It also has deep implications to the interspecies and the intergenerational spheres of planetary living. How can current knowledge production practices in sustainability science help us to reflect upon and to drive our emancipation from ecological crisis in our engagement with scientific endeavor? Political response to ecological crisis ranges from moderate to radical and the future trajectory of scientific endeavor needs to negotiate with the political dimensions of knowledge production. Bringing the Gramscian political ecology critics, this paper discusses the critical attempts pursued by sustainability science in reorganizing knowledge production as a process that is ideologically contested. The deep connection between science and ideology is discussed here as an attempt to interrogate the de-politicization of science, which in many ways is still considered neutral from the possibility of power intervention.

I focus my analysis on how current sustainability science literatures engaged explicitly with political critique of knowledge production as intellectual hegemonic project. Sustainability science is mostly associated with the global agenda of sustainable development promoted by the United Nations and the other prominent international institutions, including international development aid organizations. It is therefore often termed interchangeably with science for sustainable development. Since the introduction of its formal definition in the Brundtland Report (1987) and its global reassertion at the United Nations Conference on Environment and Development (UNCED) in 1992, the term sustainability has developed as highly politicized intellectual agenda. The extent of knowledge production in the field has significantly enriched the global academic debate. A documentation of 20,000 papers authored by 37,000 authors in 174 countries and 2,200 cities emphasizes the focus of sustainability science on the management of human, social and ecological systems seen primarily from an engineering and policy perspective (Bettencourt and Kaur, 2011). I conducted literature research on selected international publications released between 1996 and 2020 that registered the keywords of sustainability, science, politics, ideology, transformation, and knowledge. I further examined how these literatures raised reflective discussions on the politicization of knowledge production within the sustainability science in the interplay of hegemonic-counter hegemonic intellectual forces.

### **Knowledge Production as Hegemonic Project**

Antonio Gramsci's concept of hegemony is central in understanding how knowledge production operates in its historical-ideological context. In Gramscian terms,

knowledge has both coercive and consensual power dimensions. Knowledge production shapes the relations between the established knowers and those who are seeking to transform the existing epistemological power structure into an alternative knowledge order. As intellectual and moral leadership, hegemony encompasses an economic compromise in the fundamental relations of production, actualized, and made explicit at political and ideological level” (Im 1991, p. 125). In practice, this is concerned with not only criticizing the existing knowledge, but also to present an alternative that is structurally feasible.

In a hegemonic project, intellectuals are the social forces whose role in political struggle is crucial. As Gramsci (1971) proposed, there are two kinds of intellectuals. The first are “traditional” intellectuals whose position is representative to the established class relations and conceal an attachment to various historical class formations. The second are the “organic” intellectuals who belong to the ideological formation of the fundamental-social class. The capacity of knowing, for Gramsci, is theoretically entitled to each man, yet its political articulation is selective. The common depiction of intellectuals as equal to freedom of thought is subject to their limits under the influence of a particular cultural hegemony being served by the consequences of knowledge (Galan, 2011). The production of ecological crisis through scientific knowledge is an arena of political struggle, in which an emerging scientific agenda established common sense is being taken for granted. Adopting Ekers and Loftus (2012), the production of nature in the form of ecological crisis is also a form of appropriation of reality through scientific way of knowing. The emergence of counter-hegemonic scientific agenda, therefore, involves the construction of intellectual leadership that can engage with broad based social positions and offer an alternative mode of knowledge production.

Scientific knowledge is formative to the structure of power relations. Its production determines the distribution of access and control over material resources. It is also ideological in the sense that it has certain oriented towards maintaining or challenging the existing order in relation to present hegemonic power. Robert Cox provided two orientations of theories: *problem-solving* theories, which are oriented towards maintaining status quo, and *critical theories*, which aim at changing the status quo (Cox, 1981), which may apply also to how we evaluate the political implications of science. Every scientific project has transformative vision on what kind of society to construct in the future, a vision of ideology that guides its functions. Ronen Palan discussed the contrast between methodological individualism versus heterodoxy in categorizing social sciences. The former presumes the rationality of the subject and locate preferences and choice as central in explaining human condition. The latter assumes that human conditions are socially constructed and maintained by individual and collective actions (Palan, 2007). The making of hegemonic order in the form of common sense is a crucial political project of the socially conscious intellectuals. The coherent will of a class (Daldal, 2014) defines the binary relations between the ruler and the ruled, or to project in the context of this paper, between the knowers and the known, between the experts and non-experts, who are distanced by their intellectual functions in their political settings.

As part of the counter-hegemonic project, organic intellectuals engage in the war on position (Gramsci, 1971) in the development of new common sense. The strategies that organic intellectuals are pursuing an alternative scientific endeavor are seen from the viewpoint of building broad-based intellectual consensus rather than the employment of coercive political means. Argumentation and negotiation through intellectual debates with various layers in the society in order to build consent and acceptance are parts of these corresponding strategies. Ideological formation cements and unifies the hegemonic

relations at the economic level (Im 1991, p.131). The aspects of political resistance need to be examined in the explicit intellectual critics on the dominant knowledge formation that justify the status quo.

### **Problematizing Unsustainability: The Industrial Knowledge Production**

Within its scientific-technocratic practices, parts of recent sustainability science literatures recognized the exclusionary problems of scientific authority and likewise, the presence of power struggle. Such exclusions are often concealed by the achievement of scientific progress, but this can no longer hold its legitimacy given the extent of the ecological contradictions facing industrial societies. The interplay of accumulation, domination and resistance are essential in the formation of knowledge on ecological crisis and its transformative consequences. Knowledge production is part of the larger political project in which power relations between the knower and the known is being reshaped through the struggle for intellectual hegemony. Sustainability literatures engage with the problems facing industrial knowledge production in three respects. The first one is related to the material and ideological dimensions of hegemonic knowledge. The second one is by questioning power imbalances in the structure of global knowledge production. The third one is concerned with the socio-cultural aspects of intellectual activities in the form of inclusions and exclusions.

### **Material and ideological bases of ecological crisis**

The material bases of crisis are associated with the extractive nature of socio-economic structure driven by infinite economic growth, which often externalizes ecological consequences in the modern production system. Industrial knowledge is dependent upon growth-oriented modes of production that poses strong socio-economic implications. Any effort to change the reliance on growth is politically costly, as it will threaten the socio-economic stabilities associated with the established order. This has also made the coercive aspect of hegemonic knowledge discernible, for example through the reproduction of modeling that includes economic growth maximization goals (Islam, 2005). The concentration of wealth in the North has also been a political economic context in which the ecological crisis must be seen in terms of its redistributive consequences (MacNeil 1990). The association of sustainability with growth-oriented approaches mixed with technological advancement has continuously appeared in the sustainability science debate. Carter (2013) referred to the command-and-control aspects of traditional industrial knowledge that has gradually met with limitations in addressing the nature of environmental problems that requires more diverse engagement with knowledge producers.

Literatures also relate to the discussion on the ideological basis of capitalist mode of production through mentioning the role of free-market consumerism, which intertwines with the infinite accumulation (Walker 2017, p. 95). Understanding the context of crisis in which intellectual organics emerged and has been consolidating their scientific projects is an entry point in explaining the organization of knowledge within these particular social groups. An explicit engagement with critics to capitalism is quite limited in the sustainability science literatures. Critics to hegemonic knowledge pointed out the resilient aspects of ecological crisis supported by knowledge bloc that is complicit to power relations through what Gramsci defined as the ecclesiastics who held a monopoly in the superstructure field (Gramsci, 1971).

## **Knowledge accumulation and power imbalances**

Sustainability science literatures recognized the persistent power disparity between the Global North and the Global South (Redclift 2011). In the Global North, the engagement of sustainability science with ecological modernization indicates the primacy of technological progress that facilitates the transition from business-as-usual scenario to a non-linear model that includes de-materialization and resource efficiency at various levels of industrial modes of production (Spaargaren and Mol, 1991; Jänicke, 1990; Hajer, 1994). The idea of sustainability, while technically promising in the North, is often perceived skeptically from the viewpoint of the Global South. This is amidst scientific claims that societies in the Global South is already and is projected to experience the most severe consequences if the linear economic growth logic is to be maintained.

Growth oriented development and massive resource extraction in the South involves the issue of poverty and lack of state capacity to provide basic services and other forms of policy intervention to cope with socio-economic vulnerabilities of the population. Sustainability scientists claimed to provide an explicit normativity in conducting their scientific program in various spatial contexts, although there needs to be more clarification on theories of justice (Ziegler and Ott, 2011). The challenge for sustainability science is to bridge the North-South inequality in their scientific agenda. Baptista highlighted how the emerging discourse on sustainability practices is problematic when there are political confrontations in the aspect of knowledge representation of the Global South. This is particularly when sustainability science project is perceived as an effort to universalize the experience of the Global North while failing to appreciate the socio-cultural dimensions of ecological crisis from the lens of the Global South (Baptista, 2014).

## **Political binaries and scientific authority**

The deeper socially and culturally textured account of practical activity in the production of nature (Ekers and Loftus, 2012) brings three critical reflections. First, some parts of the literatures on sustainability science challenge the worldview of human domination over the earth. This is by criticizing how the industrial knowledge maintains the anthropocentric power pattern and nature exploitation through scientific-technological knowledge (Mick et al, 2020). Its epistemological approach often externalizes ecological crisis from human intervention, which otherwise act as intimate and intricate elements. The second aspect is the inside-outside border of scientific discipline. Sustainability science promotes trans-inter-multi-disciplinary approach to bridge societal practice with scientific practice in knowledge production as opposed to the mono-disciplinary approach, which is currently under criticism (Lang et al. 2012). Walker emphasized that sustainability science has systemic character that transcend the boundaries of conventional field of knowledge disciplines (Walker 2017, pp. 94-95). The third aspect is the theorists and practitioner's binary. The claims that sustainability engineering needs to be a neutral sphere from any ideological intervention can no longer hold its grips in a society where every day environmental challenges are so confronting and where political intervention is required. The need to engage with philosophy of science is acknowledge explicitly in the critical discussion on the future trajectory of sustainability science (Nagatsu et al., 2020). Science and policy-making processes in the field of sustainability have intimate connections as appeared in the adoption of problem-solving approaches by the political authorities.

## **Politicizing Transformative Knowledge Epistemic dialogues**

Previous studies have associated the term transformative knowledge with specific ways of knowing beyond the engineering endeavor. Spangenberg provided an overview on how the struggle for social hegemony involves various social groups in various countries with diverse degree of engagement when defining the concept of sustainability (Spangenberg, 2011). Riordan argued that there is a science of politics, and a science for politics, and there is a need to merge the two (Riordan, 2004, p. 234). It is not only a matter of individual judgment by the scientists, but is also to situate the epistemological process as a form of collective that will represent the very diverse realms of sustainability positions. Sustainability science is often dealing with science skeptics, whose positions are not necessarily accommodating to the scientific claims being made. Meanwhile, in order to be hegemonic, the capacity to situate scientific method as part of the wider social condition of knowledge production is very central.

The transformative aspects of sustainability science seem to converge on knowledge democratization project rather than an explicit political economic critique on industrial knowledge hegemony. This appears for example in the shifting approach to data collection. A recent study by Asokan et al (2019) used the term amalgamation of “old” and “new” approaches of data collection and interpretation in sustainability science literatures. Examining the methodology, epistemology, normativity, and ontology of data-intensive approach in sustainability science, they argue that quantitative measurements are very important in making generalization of problems in unsustainability. However, the study recognized that subjective aspects of data-intensive approach is concerned with the very diverse target audience, geographical areas, and issue focus associated with diverse sets of socio-technological values (for example limits to growth, triple bottom approach, transparency, accountability, and smart governance) (Asokan et al., 2019, p. 965).

The search of sustainable path deserves recognition of the very diverse avenues in which scientists are negotiating their scientific claims. The ability of a scientific project to form a broad-based intellectual alliance is central to ensure that the hegemonic project maintains its legitimacy. Clark et al elaborated the redistributive consequences of scientific agendas on the inclusion and exclusion of sustainability problems to address within their context of political hierarchy (Clark et al., 2016, p. 4573). Urmetzer et al, for example, explored the transition towards bioeconomy, in which the components of transformative knowledge include communication, participation, and decision-making skills (Urmetzer et al., 2020). Abson et al argued that due to the failures to address sustainability at its roots, there is a need to foster new approach that considers “the role of institutions, people’s connections to nature and their influence on sustainability outcomes, and knowledge production and use in transformational processes” (Abson, 2017).

### **The ‘divided’ intellectuals.**

The production of transformative knowledge is taking place in the arena of hybridity where intellectuals are subject to multiple identity formation. Here, we often see that the boundaries between the powerful and the powerless are becoming much more distorted. Ernst et al brings the case of dialogue on low-carbon society in Germany, arguing that the role of intellectuals as observers is no more adequate in developing a broad-based scientific leadership. They use the term ‘epistemediator’ to refer to

ambiguous space in which intellectuals are in the situation of divided identity when dealing with science-practice interface (Ernst et al 2017, p. 30). In a quite similar tone, Lélé and Norgaard argued that natural scientists are demanded to develop a value-neutral judgment on their efforts in defining sustainability and this is problematic. They questioned the separation of science, self and society in scientific thinking (Lélé and Norgaard 1996, p. 356). The fixation of science as an attribute of the privileged, furthermore, is being challenged by the broader pressure to respond to the very actual and real time human vulnerability. For Anderson, the open interpretation of sustainability in its cultural meaning has created both mobilization of knowledge as well as various signification processes. The aspiration of intellectuals to participate in defining what sustainability means and how it has relevance to the determination of their multiple social identities brings its own challenges to the evolving hegemonic subject being created by this alternative science project (Anderson, 2015).

### **Beyond 'core' and 'peripheral' science**

Scientific determination, which separated 'the scientific world' with the 'non-scientific world', produces some limits. Situating the so-called indigenous knowledge and local values in the larger system of sustainability science, for example, is an issue that requires stronger philosophical approach. Indigenous knowledge is seen as way of knowing that remains part of the non-scientific realms. Hill et al (2020) used the term co-production between scientific and indigenous knowledge. This position still agrees with the very different intrinsic qualities of science and indigenous knowledge yet aims at offering a reconciliatory position by envisioning a more egalitarian standing between the two. The questions of knowledge representation are prominent with the possibility of power intervention in knowledge integration, knowledge legitimacy, knowledge authority, knowledge context, and knowledge generality (Abson 2017, p. 36). For Ziegler and Ott (2011), an inclusion of nonscientists in the process of knowledge production is an important scientific turn as they contribute specifically to non-substitute knowledge while restructuring the epistemological, political, and normative approaches of scientific agenda (Ziegler and Ott 2011, pp. 35-37). How to connect the whole parts of the knowledge puzzles requires the recognition of the plural epistemological positions. It also demands political deliberation to open for new possibilities of transcending the rigid boundaries of scientific enterprises. However, as Lang et al argued, when trans-disciplinary awareness is treated as remedial to problem-solving activity, it would neither contribute to the transformational agenda of sustainability science (Lang et al. 2012, p. 40). Márquez and Toledo's discussed the needs of sustainability science to engage in a critical revision of fundamental claims upon which the field was constructed (Márquez and Toledo, 2020). Beyond the democratization promises, a deeper structural transformation is worth pursuing if sustainability science is to be envisioned as counter-hegemonic political project.

### **Conclusion**

The ideological aspect of knowledge is not something that can always be concealed by the powerful, as the excess of power imbalances often emerge in various forms of social crisis that eroded political and social stability, as well as exacerbated their negative ecological repercussions. The movement towards transformative knowledge can be distorted by lack of self-questioning on the functioning ideology that drive scientific

assumptions. When deeply scrutinized, science is only one way of knowing, not the only way. The knowledge on ecological crisis that we produced came from a very diverse interpretation of human relations to nature. However, we often witnessed the enforcement of a universal adoption of scientific approach in various areas of knowledge production without opening the possibility of democratizing the intellectual debates. The ideological realm of knowledge in many ways is often kept implicit, and scientists are in the dangers of being complicit to the functioning of power relations. Making knowledge production inclusive does not necessarily lead to structural change and counter-hegemonic project when there is continuous moderation on industrial transformation. There is a need for deliberation to open the debate, to criticize the limits of the pre-existing knowledge order in conditioning the systemic and structural changes.

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