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Counter-Mapping: Visual Strategies for Alternative Imaginaries

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Abstract

Throughout the pandemic, maps of visual data published in the digital mediascape were used to communicate the global impact of Covid-19. While public and private entities offered "big picture" perspectives, hegemonic visualizations often neglected to address the disproportionate toll of the pandemic on the members of marginalized communities. This article presents findings from a mixed-methods investigation of 12 case studies, comparing eight grassroots counter-mapping sources against four mainstream mapping sources, created by government and academic institutions, that will be referred to here as "hegemonic." The purpose of this study was to investigate how visuals presented online by community-focused counter-mapping collectives differed from those presented by mainstream sources, examining what these differences might indicate about the social imaginaries at play. Case studies from Argentina, Brazil, Canada, and the US produced a corpus of 1,556 images manually collected from online sources. An initial content analysis using NVivo generated quantitative data forming the foundation for later semiotic analysis examining each individual image while also considering the collection holistically. Informed by social semiotics, the findings highlight how counter-mapping employs bespoke illustrations and community insights to portray a more nuanced perspective of the impacts of the pandemic. In contrast, hegemonic maps rely on vector-based graphics that reflect dominant worldviews. Altering the practices of mapping, counter-mapping empowers communities, challenges systemic inequities, and reimagines how visual data shapes public knowledge.

Keywords

counter-maps; Covid-19; critical cartography; digital literacy; media literacy; social semiotics; social imaginaries; visual culture; visualizations

1. Introduction

Throughout the pandemic, maps publishing data in digital media attempted to describe the impacts of Covid-19 worldwide. As populations survived various forms of lockdown, online materials played a significant role in shaping public understanding of the global impacts of Covid-19. Recent research indicates that visual representations in the media significantly impact worldviews, and yet without critical evaluation, this influence goes unchecked (Dan et al., 2021; Garimella & Eckles, 2020; Hameleers et al., 2020; Iyer et al., 2014; Messaris & Abraham, 2001). Maps combine statistical information with spatial location and can convey an objective sense of authority that has the potential to distort data, particularly at a time of heightened public anxiety (Kent, 2020). Kent explains that maps "offer an unbeatable combination of implied authority (as derived from their assumed objectivity and unauthoredness) with a unique capacity for presenting spatial patterns in an instant" (Kent, 2020, p. 188), pointing to ready-made mapping solutions that produce mediocre data representations. He expresses concern about commonly used techniques in Covid-19 mapping, such as graduated circles used to indicate the number of cases or deaths in a particular area. While this technique provides a visual reference for the number of fatalities reported in an area, the format can also misinform viewers regarding which actual area the reported deaths occurred. As maps can never be completely objective, they must be read within a context situating the cartographer's positionality.

Historically, maps have been utilized as tools to support the objectives of colonial and imperial powers, perpetuating existing power dynamics and reinforcing their interests (Firth, 2015). For example, the Mercator projection is a commonly used map of the Earth that is nonetheless significantly distorted. This globe portrays the spherical Earth as flat, centralizing Europe while shrinking the South and expanding the North. Firth explains that, "Maps reflect and perpetuate relations of power, more often than not in the interests of dominant groups" (Firth, 2015, para. 2), recognizing that these distortions highlight the value of critical cartography (Firth, 2015), examining the weaponization of maps while emphasizing the potential of map-making to reimagine the present and possible futures.

Visual strategies employed in both cartography and image making indicate the underlying values and social imaginaries shaping their design. When maps misrepresent information, cartographers may have *intended* to misinform in an effort to seek power and influence as part of the propaganda of imperial and colonial efforts. Alternatively, a map presenting misleading or skewed information could be produced by those relatively unaware that the version of reality they are creating is made from inaccurate data or their own flawed perceptions. While it is difficult to determine the intent of cartographers by simply looking at their maps, critical readings nonetheless consider the context from which mapmakers produce their content as providing important insights.

The research described below examines this problem further by analyzing visualizations produced by counter-mapping collectives in Argentina, Brazil, Canada, and the US. These compare the visual strategies employed in their mapping practices to those of hegemonic, publicly funded cartography in their same countries. In this research, "hegemonic" maps refer to data visualizations designed by "dominant global institutions, reflecting Western epistemological frameworks" (Jeppesen & Sartoretto, 2023, p. 150). In contrast, counter-mapping refers to visualizations that challenge and resist dominant cartographic strategies (Jeppesen & Sartoretto, 2023; Kidd, 2019). While hegemonic maps may focus on representing areas with large populations and/or entities with significant wealth or power, counter-maps resist such

narratives by representing people, places, and objects with data that is often excluded from mainstream narratives (Peluso, 1995). Using the influence of maps as seemingly objective mediums of representation, Nancy Lee Peluso explains that, "local groups' appropriation of the technology of mapping may help to counterbalance or at least offset the previous monopoly of authoritative resources by state or capital" (Peluso, 1995, p. 386), where local groups are reclaiming the power to reimagine what is included and what is excluded. Just as the boundaries enforced by lines on maps function to justify and reinstate land claims by those in power, counter-maps function as forms of community protest that can "greatly increase the power of people living in a mapped area to control representations of themselves and their claims to resources" (Peluso, 1995, p. 387).

Mark Denil (2011) presents the idea of radical cartography as a stand-in for other, similar phrases (such as counter or alternative cartography). He defines radical cartography as presenting "a major paradigmatic shift which introduces a new vocabulary, grammar, and syntax" (Denil, 2011, p. 10); however, he also admits that the three identified do not themselves neatly align with this definition. In response, I would argue that counter-mapping should not be defined by the necessity of presenting a major paradigm shift, but might simply provide a different, alternative, or counter-narrative to that of hegemonic discourse. While the concept of counter-mapping presented here might align with Denil's notion of radical cartography, which "engages in the construction of a new reality" (Denil, 2011, p. 12), the uniqueness of its data, I would argue, does not make or break a counter-map's legitimacy.

The insights presented below come from a research project evaluating imagery published by a number of counter-mapping case studies (CMCS). An initial quantitative content analysis was holistically performed before diving deeper into examples expanded through qualitative social-semiotic analysis. The objective of the research was to analyze the visual strategies employed by counter-mapping practices, comparing and contrasting them against hegemonic maps to draw out and reflect upon their social imaginaries (Treré et al., 2017). It will be argued that hegemonic maps were found to present an oversimplified summary of Covid-19 impacts, whereas counter-maps provided a more nuanced account of ongoing circumstances.

2. Theoretical Framework

During the pandemic, populations were encouraged to "stay home," and for those lucky enough to have homes with access, the internet became an important device for connection, enabling online media to facilitate learning about the pandemic. The predicament of such an environment summons Susan Sontag's (2002, p. 28) warning, where "reality has abdicated. There are only representations: media." As Covid-19 spread across the globe, so too did various visual representations of the virus (Giaimo, 2020) and its impacts. Reflecting on the visual materials published in response to the pandemic, Sria Chatterjee (2020, para. 3) writes, "the processes of visualisation are implicated in forms of care as much as they are in political violence, surveillance, xenophobia and institutional racism." In particular, Chatterjee warns that the visual mapping of the virus across space over time may be used as an attempt to justify the collection of citizen data repurposed by a surveillance state to control populations.

In a study of visual representations of Covid-19 images, Ana Delicado and Jussara Rowland (2021) refer to Karin Knorr Cetina's (1999) term "viscourse" which emphasizes that images are never neutral and highlights that critical praxis must examine the connections between visuals and their contextual motivations. In this vein,

Delicado and Rowland drew attention to the overuse of stock imagery, maps, charts, and data visualizations during the pandemic, recognizing the pedagogical and practical intentions of this imagery. In their sample, the lack of ethnic diversity in the representation of scientists and healthcare workers relied on preexisting visual tropes, an approach that severely limits the accuracy of the visual information presented.

Stephanie Milan and Emiliano Treré (2020) address the power of who is "counted" in pandemic reporting, expressing deep concerns regarding the neglect and under- or misrepresentation of marginalized communities. The authors stress that data poverty can translate into real dangers as numerical representations influence public responses. While not presented as the overall solution, Milan and Treré bring to the fore marginalized groups who have initiated innovative forms of representation aiming to bring the invisible into view. These counter-mapping collectives champion solidarity and care via grassroots activism to mobilize additional support for vulnerable populations.

In the digital age, a key shift in contemporary map-making practices is the emergence of the prosumer (Celentano & Pittarello, 2012). With the introduction of affordable, collaborative design software, paired with open-access publishing platforms on websites and social media, prosumers are provided with greater opportunities for co-production. This invites collaborative counter-mappers to move from readers to writers, victims to storytellers, and citizens to cartographers. While participatory community-led mapping represents a bottom-up rather than top-down form of critical cartography, scholars caution that there are challenges associated with these approaches. Langlois et al. (2015) draw attention to the long history of using data to track and control marginalized communities.

Elwood (2009) explains that crowdsourced data used in Google Maps has a tendency to overrepresent high-income and popular locations. This suggests that geographic information systems can exacerbate existing inequalities, as Elwood (2009, p. 352) explains, "The geoweb re-inscribes digital divides along existing lines, disadvantaging the poor, racial and ethnic minorities, rural residents, residents of the Global South, and so on." Furthermore, platforms for participatory mapping tend to exclude those who lack the access and/or specific skill sets required to contribute to these platforms, leading to an imbalance in representation even when community input is encouraged.

Bernhard Siegert (2011) provides insight into the function of maps as spaces of representation where instruments can shape and influence thought, revealing the ideologies of the cartographers who design them. Siegert shifted the focus from the relationships between the map and the territory to the relationships between the techniques of representation and their connections to power, emphasizing that "a main feature of the analysis of maps as cultural technologies is that it considers maps not as representations of space but as spaces of representation" (Siegert, 2011, p. 13). This explains that the signs within a map represent "epistemic orders and their struggles for dominance over other epistemic orders" (Siegert, 2011, p. 13). The analysis in Section 4 builds upon Siegert's argument that, as a cultural technique, mapmaking presents the territory as a political reality—a worldview whose power and authority make particular claims.

J. B. Harley's work encourages audiences to decode their maps by reading between the lines, learning to recognize the tropes being employed that challenge their assumed claim to objectivity. He emphasizes "that cartographic facts are only facts within a specific cultural perspective" (Harley, 1989, p. 3), pointing out that European cartography follows a positivist epistemology which suggests that objects in the world are real,

objective, and can be expressed in mathematical terms that offer the "only" path to cartographic truth. The signs and symbols developed within this framework function to support their ideological values while discounting any alternative forms of representation developed outside of them.

Applying Foucault's critique of knowledge to the analysis of cartography, Harley recognized the importance of mapmaking practices existing beyond the hegemonic "standard," writing that, "the map-maker is often as busy recording the contours of feudalism, the shape of religious hierarchy, or the steps in the tiers of social class, as the topography of the physical and human landscape" (Harley, 1989, p. 6). By considering maps as a form of cultural text, Harley (1989, p. 8) encouraged a nuanced, critical, socio-cultural deconstruction of mapping practices, an approach that considers "the history and anthropology of the image" where the narrative quality of maps contains myths represented as truth.

This analysis also engages with the work of Mary Midgley (2001, 2004) who highlights concerns regarding the myths and social imaginaries shaping symbols used in publicly disseminated maps. These myths not only inform map production but also influence the meaning viewers derive from visual information. Midgley assists with the recovery of meaning from cartography, encouraging viewers to consider visual narratives as a whole, recognizing that dominant technologies might lead audiences astray via the reductive metaphysical myths of dualism and atomism.

According to Midgley (2001), the division of body and mind introduced by Descartes has led to a reduction of the mind to the body, where psychiatrists and behavioral psychologists alike reduce their patients and clients to physical mechanisms and external behaviors that ignore their thoughts and feelings. Midgley likens this to a man looking for his lost keys at night, searching only in the spots lit up by the streetlights not because they are more likely to be there, but because it is the easiest place to look. Midgley challenges us to look beyond the spotlight, considering the mind as more than moving parts in a body. In this same way, maps can be understood as more than their reductionist approaches to understanding the world.

The discussion in Section 4 highlights the importance of addressing the intersectional nature of societal challenges as exemplified by the counter-mapping examples selected here. These seek to avoid the oversimplifications plaguing mainstream mapping. The analysis of hegemonic maps and counter-mapping examples reveals the double character of cartography as a medium that can facilitate the oppression or liberation of communities associated with the data presented. The resulting ideas contribute to a broader discourse encouraging a praxis of visual literacy in response to misleading data visualizations and imagery being published in an online mediascape.

3. Methodology

3.1. Methodology Overview

The research described in this article began with the identification of eight counter-mapping collectives and four hegemonic cartographic sources, resulting in a corpus of 1,556 images that were manually collected from online sources. A content analysis was executed on the corpus, using NVivo to track coded signifiers, followed by a close semiotic reading of the case study materials. This multi-method strategy provided multiple entry points, each considering how the visuals presented by counter-mapping collectives differed from those

presented by hegemonic sources, offering data from which to interpret the social imaginaries influencing these visualizations.

Two research questions shaped the inquiry described here:

> RQ1: What semiotic visual design strategies are employed by Covid-19 counter-mapping collectives, and how do they differ from those present in hegemonic maps?
>
> RQ2: What do the identified visual strategies reveal about the social imaginaries at play?

Social semiotics inform this methodological approach, where Carey Jewitt and Rumiko Oyama (2004, p. 2) explain that the "social semiotics of visual communication involves the description of semiotic resources, what can be said and done with images (and other visual means of communication) and how the things people say and do with images can be interpreted." Critical theory further informs the semiotic analysis, encouraging a consideration of the intersecting oppressive hierarchies of race, gender, and class semiotically manifest within the visual data.

3.2. Sample Sets

Developed in conversation with the research team, the counter-mapping case study selection focused on eight sources, all of which covered evictions to a greater or lesser extent. Evictions became an identified topic of concern often overlooked by mainstream Covid-19 mapping, emerging as a focus because (at the time of development in January of 2022) it was clear to the research team that the housing crisis was having a significant impact on the ability of individuals to "stay home, and stay safe" during the pandemic. Despite this, we saw little representation of this factor in mainstream Covid-19 mapping. Eviction-related content provided a catalyst for our initial investigation of counter-mapping sources; however, the identified community collectives produced counter-maps covering topics and content extending far beyond both evictions and Covid-19.

The eight case studies selected originated in four countries: Argentina, Brazil, Canada, and the US (see Table 1 and 2). In contrast, four mainstream sources of Covid-19 data mapping were identified and analyzed from these same countries of origin, including Johns Hopkins University, the Canadian Government, the Argentinian Government, and the Brazilian Government. The research team's expertise, encompassing both North American and South American contexts, informed the selection of these case studies.

To collect the corpus of imagery, each source website was visited, capturing every instance of graphic visual content on the host site via screenshot. While collecting a total of 1,556 images, notes were taken marking emerging themes, recurring tropes, and visual cues. These notes later informed code development. Images included not only visuals recognized as maps, but also data visualizations, photographs, videos, icons, illustrations, and other digital graphics. The conscious decision to include imagery beyond the maps themselves stemmed from an interest in acknowledging the role that surrounding imagery could play in reading the maps. As Harley (1989, p. 9) pointed out:

> To "deconstruct" a piece of writing is therefore to operate a kind of strategic reversal, seizing on precisely those unregarded details (casual metaphors, footnotes, incidental turns of argument) which

> are always, and necessarily, passed over by interpreters of a more orthodox persuasion. For it is here, in the margins of the text—the "margins," that is, as defined by a powerful normative consensus—that deconstruction discovers those same unsettling forces at work.

For example, Delicado and Rowland (2021) noted in their investigation of Covid-19 imagery that the lack of ethnic diversity in scientists and doctors presented in visuals may point toward the ethnocentricity at play in the selection of visual content in Covid-19 communications. Considering this, the study design described here incorporates not only the maps presented by various entities but also considers all visible imagery on the websites, associating these with the relevant maps.

3.3. Content Analysis

Using NVivo qualitative data analysis software, a detailed content analysis was conducted on 953 images collected from counter-mapping sources and 603 images gathered from mainstream sources of Covid-19 mapping. Building on initial observations from the data collection phase, additional themes were explored until thematic saturation was achieved. The codes developed and tracked within NVivo were created and coded by one researcher, meaning that intercoder reliability did not apply. The codes were developed based on the literature reviewed, aiming to collect all relevant data to provide insight regarding the similarities and differences between hegemonic and counter-mapping content. The identified codes tracked particular visual elements including people, flora/fauna, maps, and graphs. Further coding recorded instances of people (singular and plural) in addition to observations regarding whether they presented as male, female, racialized, children, or older adults.

The problems arising from judging such categories by visuals alone were discussed at length within the research group. For example, it is impossible to determine a person's gender identity solely through their visual representation. For this same reason, it can also be challenging to assess if an individual is elderly or not. It was often difficult to decide when to use the code for a "racialized" person due to similar limitations. However, it is worth noting that the initial prompt contributing to the development of these codes asked: Could this person be subjected to maltreatment based on visually defensible social constructions of race, gender, or age? This question returns to the visual nature of the research including subquestions that support a research objective exploring how age, race, and gender were represented in visual data mapping during the pandemic.

While much of the numerical data from mainstream mapping sources was surprisingly similar to that from counter-mapping sources, a few key differences emerged that provided direction for subsequent semiotic analysis. For example, the code "illustration or handwriting" collected data regarding the use of hand-drawn designed elements. The number of these instances was remarkably higher in the counter-mapping examples (63%) when compared with the mainstream examples (28%). These findings provided a foundation from which semiotic analysis could build a closer examination.

3.4. Semiotic Analysis

The discussion in Section 4 focuses on a semiotic analysis resulting from a close reading of a selection of counter-maps and mainstream maps (Figures 1, 2, 7, 8). Midgley's (2001, 2004) work offers opportunities to

re-examine the social imaginaries at play in our expectations of maps. This research highlights the dual nature of cartographic representations in society which can serve as a tool of oppression while also supporting the liberation of marginalized communities. Mapping imagery published by those in power can employ visual methods that reinforce hegemonic ideologies (Siegert, 2011), promoting the continued oppression of marginalized communities (Milan & Treré, 2020). Alternatively, grassroots initiatives offer bottom-up counter-narratives where their maps challenge these same hegemonic assumptions by representing liberatory social imaginaries whose reality is reinforced through visual strategies.

3.5. Ethical Considerations

The corpus of imagery collected and analyzed in this study was sourced from publicly available websites, none of which were accessed behind a paywall or required a private sign-in to function. The data presented is based on an analysis of the imagery collected and did not engage human participants; therefore a human subject research protocol was not required. Explicit written consent was obtained from all of the sources of imagery included in this article. A number of limitations to this study remain, including the constraints emergent from a single-author-led investigation.

The evaluation of the corpus was performed in a systematic and critical manner, drawing upon existing literature and previous investigations (McKee, 2022) while seeking input from the aforementioned team as well as colleagues and faculty in the York and Toronto Metropolitan University Communication and Culture program. At the same time, the positionality of the author as a White, cisgender, able-bodied, Canadian of European settler descent inevitably shapes the way visual materials were interpreted.

4. Findings

4.1. Content Analysis Findings

Tables 1 and 2 provide an overview of the numerical data emerging from the NVivo content analysis which allows for a comparison between content represented in the counter-mapping visuals and that of hegemonic case studies (HCS). These numbers reflected relatively similar results between both sample sets across multiple categories. For example, considering the number of images that included people, compared with the entire collection of images from each case study, the results were relatively similar with an average of 44% in the CMCS versus 37% in the HCS. People who were coded as female-presenting appeared roughly equal in both sample sets, with an average of 57% (CMCS) and 50% (HCS), with the representation of racialized individuals recorded at 19% (CMCS) and 13% (HCS). Recorded occurrences of male-presenting people differed between the two sample sets, with an average of 28% (CMCS) versus 58% (HCS).

Other emergent differences, as previously mentioned, the occurrence of handwriting and illustrated visuals was notable, appearing more often in the CMCS at 63% compared with 28% in the HCS. Flora and fauna appeared more often in the CMCS at 25% to only 5% in the HCS. Bar graphs and line graphs appeared far more frequently in the HCS compared with the CMCS. Taking cues from these initial findings, a semiotic analysis of the corpus was executed to draw further insight from the case studies. Section 4 explores these findings.

Table 1. Summary of content analysis findings for the CMCS.

	Maps		People														Format				Content					
CMCS	% of image maps	Responsive map	Person or people	%	People	%	Person	%	Child	Older	Female presenting	%	Male presenting	%	Racialized	%	Video	Photo	Illustration or handwriting	%	Protest	Graffiti or mural	Flora/fauna	%	Bar graph	Line graph
Anti-Eviction Mapping Project	3%	3	89	44%	73	36%	16	8%	7	3	51	57%	53	60%	36	40%	0	106	77	38%	7	14	20	10%	0	0
Antieviction Montreal	22%	16	42	53%	14	18%	28	35%	1	0	19	45%	27	64%	22	52%	28	60	7	9%	3	7	17	22%	1	0
Eviction Solidarity Network	21%	7	5	15%	4	12%	1	3%	0	0	2	40%	0	0%	2	40%	5	5	16	47%	0	0	5	15%	0	7
Iconoclasistas	29%	0	259	81%	216	68%	43	13%	25	0	158	61%	135	52%	20	8%	0	175	266	83%	1	1	106	33%	0	0
Keep Your Rent—Toronto COVID Evictions	80%	4	0	0%	0	0%	0	0%	0	0	0	0%	0	0%	0	0%	0	0	1	20%	0	0	0	0%	0	0
O LabCidade	50%	31	8	13%	8	13%	0	0%	5	0	5	63%	1	13%	0	0%	0	1	3	5%	0	0	1	2%	5	0
RVAgreen	100%	194	194	100%	194	100%	0	0%	4	0	4	2%	7	4%	1	1%	0	16	194	100%	0	0	194	100%	0	0
The Mapping Action Collective	17%	1	26	45%	15	26%	11	19%	2	1	9	35%	9	35%	3	12%	0	21	38	66%	0	1	11	19%	1	1
Totals		256	623		524	55%	99		44	4	248		232		84		33	384	602		11	23	354		7	8
Median	25%	5.5	34	45%	14.5	22%	6	5%	3	0	7	43%	8	24%	2.5	10%	0	18.5	27	38%	0	0.5	14	17%	0	0
Average	40%	32	77.875	44%	65.5	34%	12.375	10%	5.5	0.5	31	57%	29	28%	10.5	19%	4.125	48	75.25	63%	1.375	2.875	44.25	25%	0.875	1

Table 2. Summary of content analysis findings for the HCS.

	Maps		People														Format				Content					
HCS	% of image maps	Responsive map	Person or people	%	People	%	Person	%	Child	Older	Female presenting	%	Male presenting	%	Racialized	%	Video	Photo	Illustration or handwriting	%	Protest	Graffiti or mural	Flora/fauna	%	Bar graph	Line graph
Government of Argentina Ministry of Health Coronavirus	2%	1	27	66%	25	61%	2	5%	7	2	21	78%	15	56%	2	7%	2	28	13	32%	0	0	6	15%	2	0
Government of Brazil Covid-19	36%	13	2	6%	0	0%	2	6%	0	0	0	0%	2	100%	0	0%	0	0	4	11%	0	0	0	0%	8	10
Government of Canada Covid-19	4%	6	80	40%	24	12%	56	28%	3	7	56	70%	28	35%	27	34%	68	73	28	14%	0	0	11	6%	32	41
Johns Hopkins Coronavirus Resource Centre	9%	7	122	37%	76	23%	46	14%	8	2	62	51%	49	40%	11	9%	2	124	123	38%	0	2	0	0%	24	53
Totals		27	231		125		106		18	11	139		94		40		72	225	168		0	2	17		66	104
Median	6%	6.5	53.5	39%	24.5	18%	24	10%	5	2	38.5	60%	21.5	48%	6.5	8%	2	50.5	20.5	17%	0	0	3	3%	16	25.5
Average	13%	6.75	57.75	37%	31.25	24%	26.5	13%	4.5	2.75	34.75	50%	23.5	58%	10	13%	18	56.25	42	28%	0	0.5	4.25	5%	16.5	26

4.2. Mapping the Problem: Oppressive Cartography

To better understand the problem authoritative mediums like maps represent, it is helpful to consider Midgley's (2004, p. 1) understanding of myths, which she described as both "imaginative patterns" and "networks of powerful symbols that suggest particular ways of interpreting the world." Considering this, the Johns Hopkins Covid-19 Dashboard (Figure 1) visually prioritizes data charting the total confirmed cases and deaths from the virus as well as vaccination doses administered. Orienting these numbers on a North America-centered world map, it describes itself as "the most trusted, accurate source of information available on the pandemic" (Surowiec, 2021, para. 1).

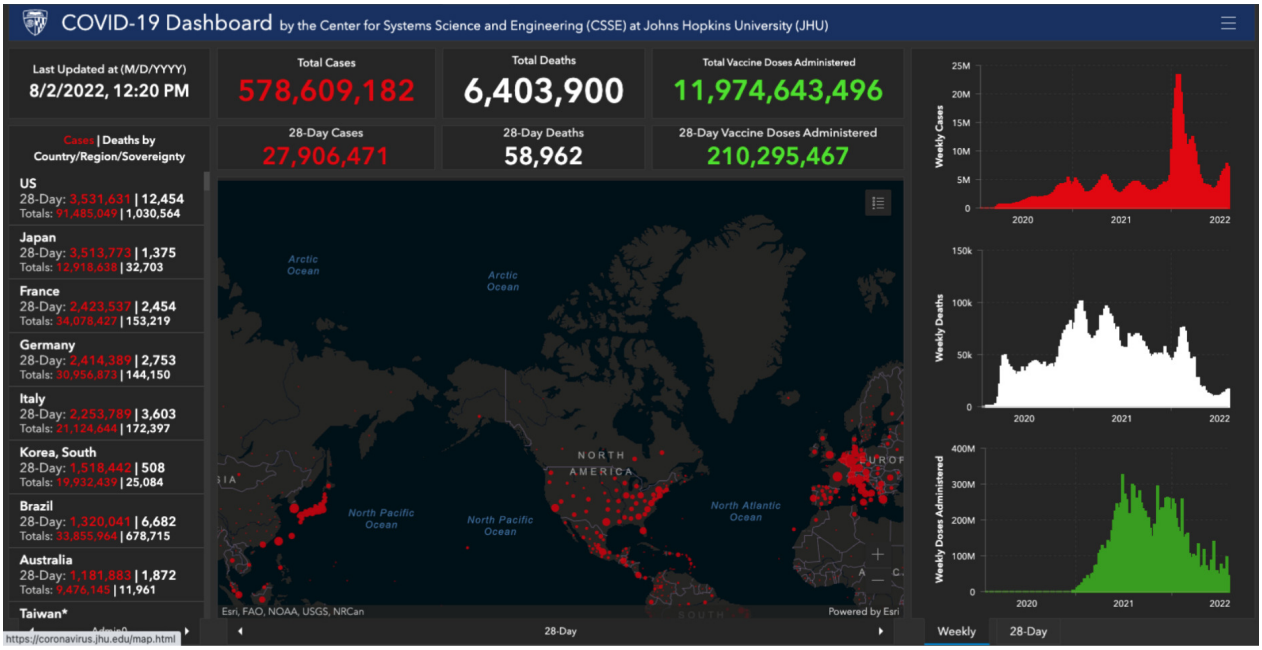

Figure 1. Screenshot of the Covid-19 dashboard updated on August 2, 2022. Source: Johns Hopkins University (n.d.).

In Figure 1, confirmed cases are presented in red, deaths in white, and vaccinations in green. The red numbers demand immediate attention, indicating this is of primary concern, followed by a bright green that suggests associations of growth, life, or hope. As noted by Harley (1989, p. 7): "Much of the power of the map, as a representation of social geography, is that it operates behind a mask of a seemingly neutral science." Questions arise when reflecting on these cartographic decisions. For example, might deaths be a more significant cause for alarm and so be presented in red? How might gender, age, race, income, preexisting health conditions, the climate crisis, food insecurity, multi-generational housing, and/or evictions impact these numbers? Furthermore, what does it mean to represent the global population using numbers and circles? Joanna Redden draws attention to this problem in relation to big data, warning that the datafication of reality can rely too heavily on computation and "may reinforce neoliberal frameworks of meaning over social justice frameworks" (Langlois et al., 2015, p. 33). Chun (2021) and Chun and Barnett (2021) warn that the correlations indicated by big data are being misidentified as causation, impacting how we understand people and their behaviors. In short, the story presented by the Johns Hopkins University Covid-19 dashboard oversimplifies the pandemic by focusing solely on cases, deaths, and vaccinations to describe a far more complex problem.

The visual strategies employed in maps like this one also create a forced distancing between the viewer and those represented by the data. Human beings become dots, held by larger or smaller circles that indicate higher or lower numbers, where anything more-than-human is completely absent aside from a flattened, colorless representation of land masses. The myth that technology is our one and only savior is debunked by Haraway who emphasizes that the world is full of more-than-human entities who we ought to be living-with, making-with, and becoming-with in a world "where who lives and who dies and how might become clearer for the cultivating of multispecies justice" (Haraway, 2016, p. 3). Using the term more-than-human, Haraway refers to animals, plants, microbes, as well as technology and environments, shifting away from anthropocentrism by recognizing our interconnected nature.

As pointed out by Firth (2015, para. 8), "Mapping can also emphasise relations to institutions, landscapes, wildlife and environments, leading people to reconceive their relation to invisible structures or the natural world." These graphic decisions connect to specific social imaginaries, such as Midgley's myths, which can drive decisions to prioritize one visual symbol or strategy over another. The focus on case numbers narrativizes them as a central problem where deaths become a secondary concern, offering vaccination as the primary solution. Many questions remain unaddressed in this representation, such as how limited access to vaccinations impacts death rates in countries presented on the margins of the map including the majority of South America, South, East, and Central Africa, and a significant portion of Asia. It is worth noting that this map is responsive and so allows viewers to scroll to centre these regions. However, it is also important to consider that the "default" view reflects a colonial, hegemonic narrative where North America and Europe remain central.

In *The Myths We Live By*, Midgley takes issue with the contemporary tendencies used to explain phenomena. She writes:

> The reductive, atomistic picture of explanation, which suggests that the right way to understand complex wholes is always to break them down into their smallest parts, leads us to think that truth is always revealed at the end of that other seventeenth-century invention, the microscope. (Midgley, 2004, p. 1)

The digital revolution can be understood as perpetuating an atomistic understanding of the world, justifying algorithmic decisions as "objective" even when driven by codes that operate on zeros and ones. Ruha Benjamin (2019) describes a beauty competition that boasted using software to "objectively" sort pageant applicants resulting in only one winner out of 44 who presented with darker skin. Data sets used to run the software embed the same racist biases that plague society at large, beginning long before the age of technology. The research of Benjamin and others, including Chun (2021) and Alexander Monea (2022), describes examples of technology reinforcing racism, sexism, and homophobia, among other oppressive tendencies. Maps and other imagery circulating online are not immune. As Benjamin (2019, p. 99) points out, "Far from being neutral or simply aesthetic, images have been one of the primary weapons in reinforcing and opposing social oppression." The myths and meaning visually embedded in maps can therefore reinforce hegemonic biases while presenting them as "objective," promoting narratives that are reductive, lack nuance, and do a disservice to viewers seeking knowledge.

4.3. Myths and Meaning: Maps and Seeing

Maps and other imagery aim to tell the "truth" but do not exist in binary camps of either false or true. Instead, representation moves along a spectrum, with each symbol, icon, and graphic decision shaped and informed by intersecting social imaginaries that influence what is seen and how it can be interpreted. In an example from RVAgreen 2050, a project by The City of Richmond, Virginia, their map presents over 190 different layers of data that can be toggled on and off to be seen or hidden at the will of the viewer (Figure 2). While this map was considered part of the eight CMCS, it originates from a government-led initiative that provides a segue between the oppressive and liberatory examples examined here. This map effectively addresses the intersectional nature of pertinent data which significantly impacts our holistic understanding of the pandemic. The map itself is titled the RVAgreen 2050 Climate Equity Index, and according to the website, "can be used to explore factors that could make you and your community more susceptible to harm due to crises such as climate change or the Covid-19 pandemic" (City of Richmond Office of Sustainability, n.d.).

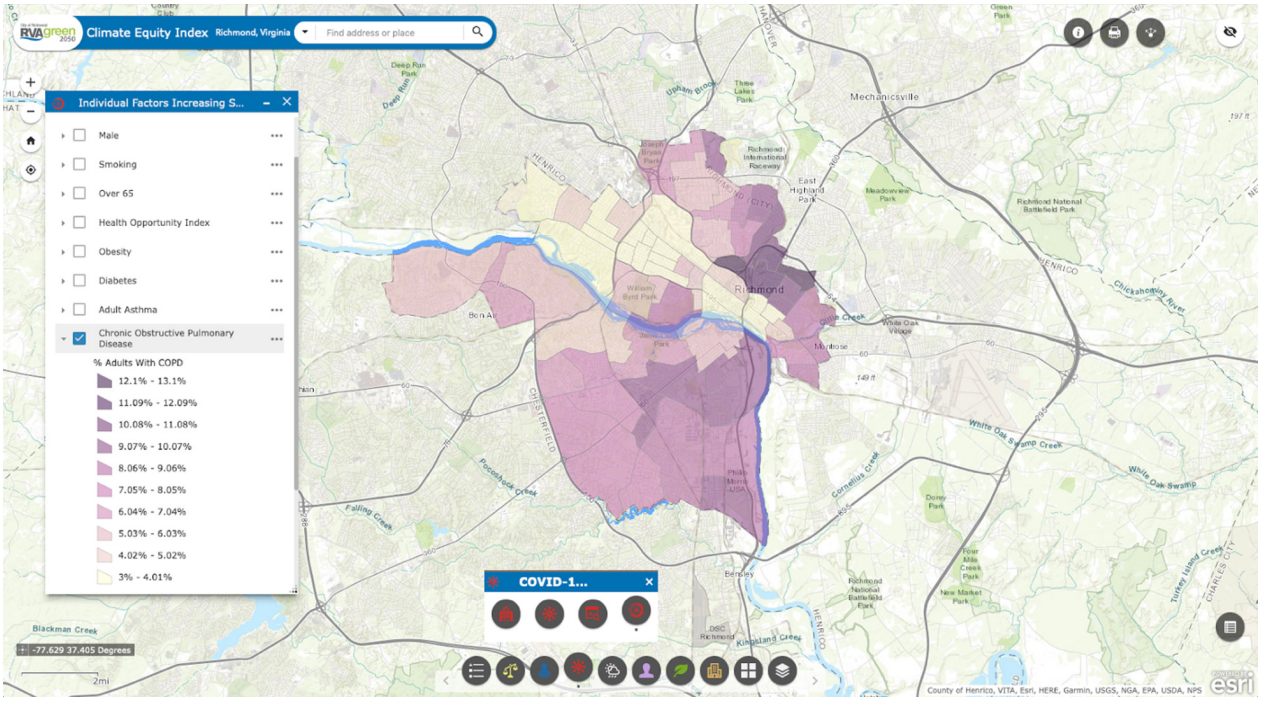

Figure 2. Screenshot of the RVAgreen 2050 Climate Equity Index captured on March 22, 2022. Source: City of Richmond Office of Sustainability (n.d.).

This map provided information about co-morbidity factors that may be heightened in certain areas due to factors including social health and safety. For example: where are people suffering from diabetes or coronary heart disease; where are there high rates of uninsured people, those suffering in areas of high crime, or living alone while over 65; where are there custodial grandparents, single-parent households, low food access, or people living below the poverty line; who does not have access to the internet or a vehicle; where do people live in crowded conditions with limited access to green space; where are the centers that support unhoused people; and where are the senior centers, the vacant lots, the industrial areas and the residential communities? RVAGreen has incorporated layers of data for each of these questions, providing the ability to view more than one at a time. The designers of the project must have acknowledged that problems should be addressed from

multiple angles considering the plethora of factors contributing to ongoing challenges. Natural resources are mapped alongside human health and well-being including lakes, courthouses, and arts districts, alongside areas with populations under 18, minority populations, and voting stations. RVAgreen attempts to show the whole picture (Figures 2 and 3), covering more ground than the Johns Hopkins map in acknowledging the intersecting nature of a problem like Covid-19.

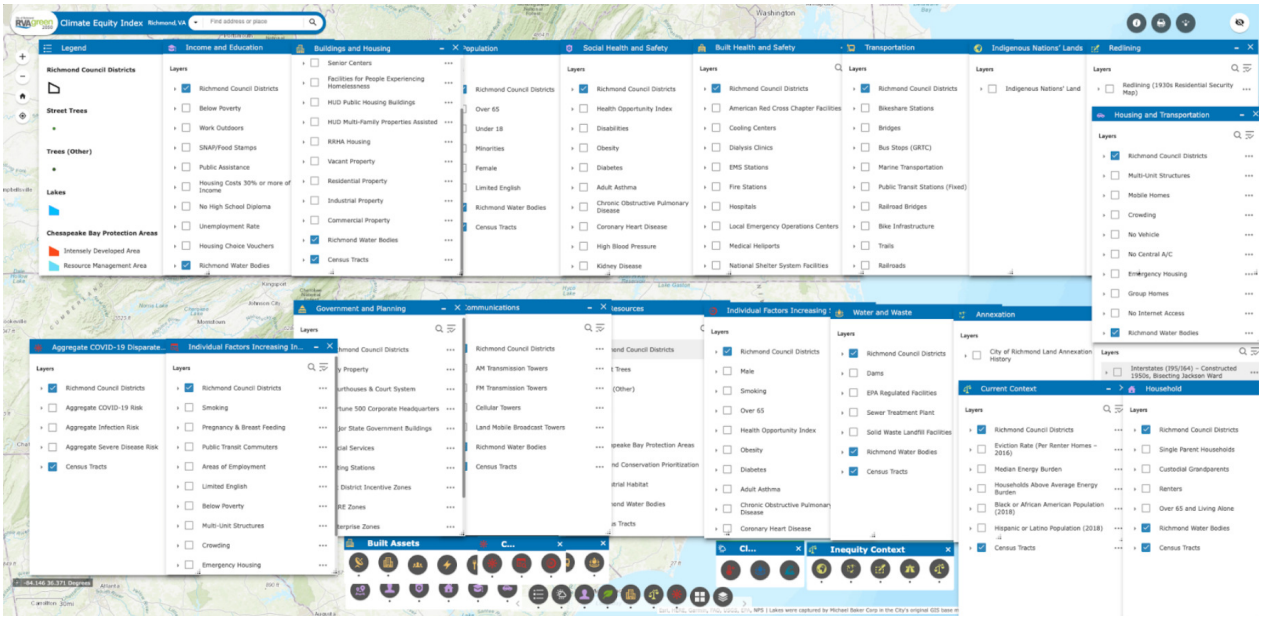

Figure 3. Screenshot of the RVAgreen 2050 Climate Equity Index, captured on April 18, 2023, with as many legend options as possible viewable on one screen. Source: City of Richmond Office of Sustainability (n.d.).

Midgley used maps as a metaphor for understanding dualism and the problem of consciousness, arguing that the answer to these challenges will not emerge from identifying an atomic structure shaping one particular map by then reducing all others to its logic. She explained:

> If we want to understand how this bewildering range of maps works, we do not need to pick on one of them as "fundamental." We do not need to find a single atomic structure belonging to that one map and reduce all the other patterns to it....What we do need is something different. We have to relate all these patterns in a way which shows why all these various maps are needed, why they are not just contradicting one another, why they do not just represent different alternative worlds. To grasp this, we always draw back to consider a wider whole. (Midgley, 2001, p. 82)

There are other ways to represent complex problems rather than reductivism. This may require a closer examination from multiple perspectives that then draws together their complexities to reflect on the whole. When approaching complex issues such as the mind/body problem, a global pandemic, systemic racism, or the climate crisis, we must consider these multiple angles and resist the urge to assume the whole as merely the sum of its observable parts.

The RVAGreen map provides an example of a responsive map that provides a significant level of agency to the user. Reflecting on the numbers reporting how many maps were responsive in the case studies, the results indicate a similar median of 5.5 in the counter-mapping group when compared to the hegemonic

group at 6.5. Yet responsive maps may also represent a false sense of control. While the RVAgreen example provides a nuanced approach to cartographic representation, it also reveals weaknesses in the design that offer us valuable learning opportunities. Figure 3 illustrates one such concern. While the extensive data layers provide an impressive amount of information, it becomes increasingly challenging to navigate as more layers are added. A data narrative could be considered an alternative or addition to this cartographic journey, guiding the viewer through particular layered combinations that may lead to impactful conclusions.

RVAgreen has offered this to some extent in an YouTube instructional video (RVAgreen 2050, 2020), explaining that "some layers, like the 'Stories of Covid-19 Resilience' layer, will display points across the map symbolizing the location of a particular story, factor or city asset" (RVAgreen 2050, 2020, min. 1:26). They point out important intersections such as "climate impacts—extreme heat—urban heat layer" combined with "social vulnerability factors," "social health and safety," and "adult asthma" that may be an important point of focus where "people with asthma are more at risk for severe health impacts under extreme heat" (RVAgreen 2050, 2020, min. 2:56). Narrative explorations bring the viewer along a journey, led by those more familiar with the data, helping to navigate it to make more meaningful discoveries. This, paired with the ability for viewers to explore the data on their own, would enrich the epistemological experiences provided by the map.

Problems with the RVAgreen map also run deeper in its design. The map itself is built using GIS software called esri (n.d.) designed by ArcGIS who boast that "just about every problem and situation has a location aspect," offering services including mapping, 3D GIS, imagery & remote sensing, spatial analysis & data science, field operations, and data collection & management. This map, along with others depending on GIS software, imports preexisting design biases embedded within the software. Midgley's (2004, p. 1) words of warning are apt to consider here, noting that, "our dominant technology shapes our symbolism and thereby our metaphysics, our view about what is real." RVAgreen's legend (Figure 4) illustrates these concerns. The human elements represented provide details through iconographic symbols that oversimplify through a visual strategy extending to the representation of natural resources and climate impacts. As Elwood (2009, p. 353) warns, "some scholars take the position that the geoweb is a new medium for reinscription of existing forms of domination."

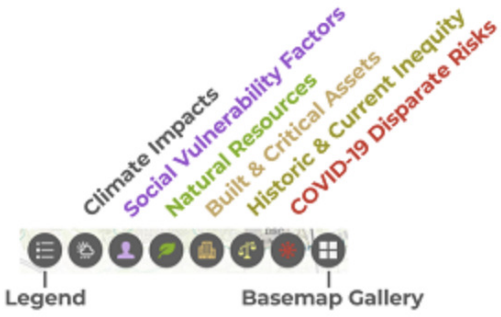

Figure 4. Screenshot of the RVAgreen 2050 Climate Equity Index legend captured on April 7, 2023. Source: City of Richmond Office of Sustainability (n.d.).

It is reasonable to accept that icons used with the assistance of GIS software provide a quick and simplified solution to the problem of symbolic representation. This strategy saves time, particularly if the alternative is to hire graphic designers who must be identified, negotiated with, briefed, and finally paid for their services.

The GIS software eliminates these additional steps, but a further price is paid for their solutions. It is worth revisiting Midgley's point, considering what information is lost by opting to lean on dominant technologies. While the data that RVAgreen is working with is rich with nuance, their visual strategy for selecting icons seems one-dimensional.

Reflecting on the mechanistic oversimplification of the mind/body problem, and other challenges, Midgley (2004, p. 2) writes:

> At present, when people become aware of this imagery, they tend to think of it as merely a surface dressing of isolated metaphors–as a kind of optional decorative paint that is sometimes added to ideas after they are formed, so as to make them clear to outsiders. But really such symbolism is an integral part of our thought-structure.

Midgley's thoughts encourage a critical analysis of what may appear to be turnkey solutions.

4.4. Maps, Myths, and Legends

Returning to the data emerging from the content analysis portion of the research, a clear differentiating factor between the CMCS and mainstream mapping sources is the amount of illustrated or hand-drawn work. Hand-drawn notes, collected from the community, and bespoke illustrations were developed for map-specific purposes where on average roughly 63% of the imagery visible on the counter-mapping case study websites included handwriting or illustrated designs, compared with only 28% in the mainstream sources. Upon examining the case study collections holistically, it became clear that a "human touch" was a crucial factor for the counter-mapping imagery. Representations of people in mainstream sources often employed stock-like, generic images of individuals undergoing testing or vaccination, as well as medical professionals posing for official portraits. Many of the images in the CMCS reflect the value of community input and feature interviews with individuals, photographs of collaborative efforts generating maps together (Figures 5 and 6), and bespoke illustrations speaking to nuance and circumstance (Figures 7 and 8). As Firth (2015, para. 8) explained, "collaborative map-making can be a way to democratise knowledge-production," and these approaches to visual representation were clearly present in the counter-mapping data set.

Reflecting on the numerical data emerging from an initial analysis, the representation of plants and animals was significantly higher in counter-mapping examples, ranging from 0–354 instances with an average of 44 and a median of 14 instances within the counter-mapping visuals. In comparison, the hegemonic maps had between 0–17 references to flora or fauna, with an average of four and a median of three. This may reflect different imaginaries regarding the value of more-than-human life. Looking closely at specific maps, the Iconoslasistas' map titled *Cuerpo-Territorio*, translating to Body-Territory, from 2021 (Figure 7), considers the numerous connections between environmental violence and its impacts on the body. The mapped regions flank the design's left and right sides describing the multifaceted issues plaguing specific areas in South America, connecting these to serious bodily consequences. The legend at the bottom right translates the symbolic icons used to indicate areas of trauma with the land including mining, desertification, destruction of biodiversity, contamination, fracking, and deforestation.

Figure 5. Image of collaborative mural-map painting featured on the Anti-Eviction Mapping Project which depicts the mural in Clarion Alley titled *Narratives of Displacement and Resistance*, highlighting the issue of no-fault evictions in San Francisco, USA. Source: Anti-Eviction Mapping Project (n.d.).

Figure 6. Image from the Iconoclasistas website depicting a body mapping exercise on gender violence from 2016. Source: Iconoclasistas (2020).

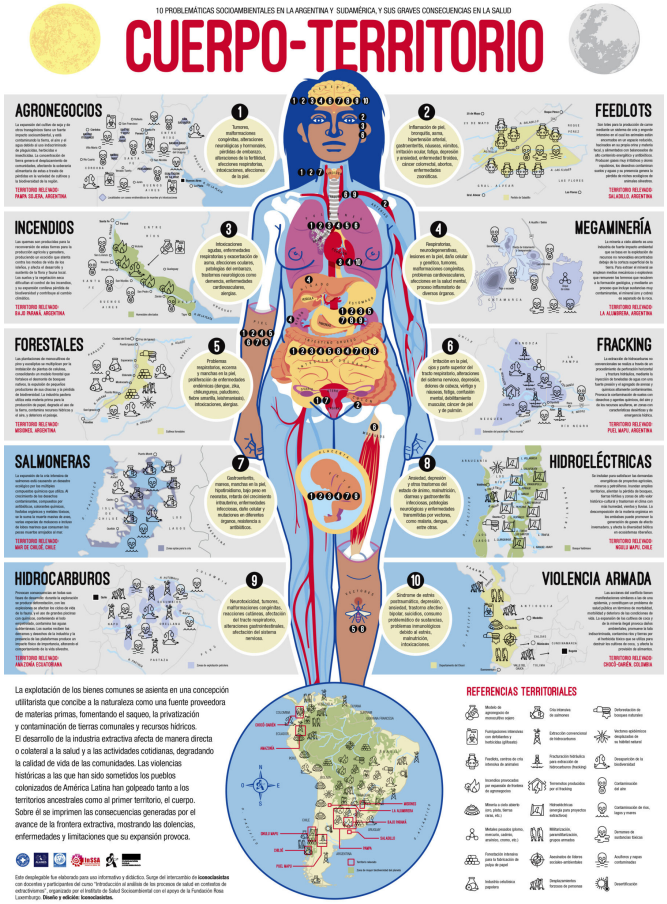

Figure 7. Map *Cuerpo-Territorio*, created by the Iconoclasistas collective, connects the exploitation and violence against territories and the related tolls on the bodies of those who reside in those territories. Source: Iconoclasistas (2021).

The body illustrated in the center of the map is surrounded by 10 numbered collections where ailments correspond with multiple areas of the body that describe the impacts of environmental abuses. As a whole, the map holistically unites problems that are all too often addressed in isolation. For example, armed violence is described in the bottom right, where its geographical representation focuses on the territory of Chocó Darién on the eastern coast of Colombia. It describes via symbols the murder of socio-environmental leaders as well as the forced displacement of civilians, among other serious concerns. The related ailments described in the tenth category indicate issues including: post-traumatic stress disorder, depression, anxiety, substance abuse, suicide, and the related immune disorders that result in afflictions connected with regional violence.

The number 10 appears on the body in the brain and heart and, in this way, we can see the direct connection between violence and trauma in the body. The description at the bottom left points toward the myths or social imaginaries facilitating such violence, namely the idea that nature is an endless source of raw materials, supporting the ongoing extraction and contamination of land for the profit and power of the few, where these extractive activities directly and negatively influence the health and well-being of the bodies living in these territories. A hegemonic, false sense of separation between the body and the land speaks to Midgley's concerns about Descartes's claim of dualism where the body and mind are separate and humanity is not part of nature but distinct from it. These are the myths that shape the way we see the world and can cloud our ability to recognize the connections and intersections leading to a deeper understanding of the problems we currently face as body-territories. *Cuerpo-Territorio* challenges the myth that nature is an endless resource for humans to use and abuse without consequence. The map instead reinforces an entirely different social imaginary that sees our bodies and the land as deeply interconnected and meant to be valued, respected, and treated with care.

4.5. Liberating Cartography

The counter-mapping examples from the Iconoclasistas collective demonstrate an alternative form of data activism engaged in mythmaking through cartographic symbology in their map titled *Mapamundi* or World Map (Figure 8). Looking at this map, the woman depicted in the upper right corner immediately draws the viewer's attention. She summons to mind older representations of fertility goddesses, such as the *Venus of Willendorf*, dating back to circa 28,000–25,000 BCE (Kuiper, 2025). The shape of her body emphasizes life-giving power and the headline underneath her asks, "Who owns this land?" The caption continues, stating:

> In a world where bodies that give life and territories are considered objects of conquest, plundered by neocolonial capitalist acts and threatened by multiple forms of sexist male patriarchal violence, women resist and organise their communities through care economies, protecting common goods and food sovereignty. (Iconoclasistas, 2019)

Her left arm is raised in a gesture of solidarity while her right hand points towards the additional representations of women from six different regions with the text underneath them describing their relationships as economies of care. Following the line of her hand, the gesture leads the viewer to consider the question "who owns the land?" while simultaneously reading the body language of the women who are depicted with two sets of hands holding agricultural tools for harvesting and containers for food. These images speak to the multiple roles taken on by women around the world who care for the land they live on, using it to feed their communities. In contrast, if one is to execute a Google Image Search for the terms "icon

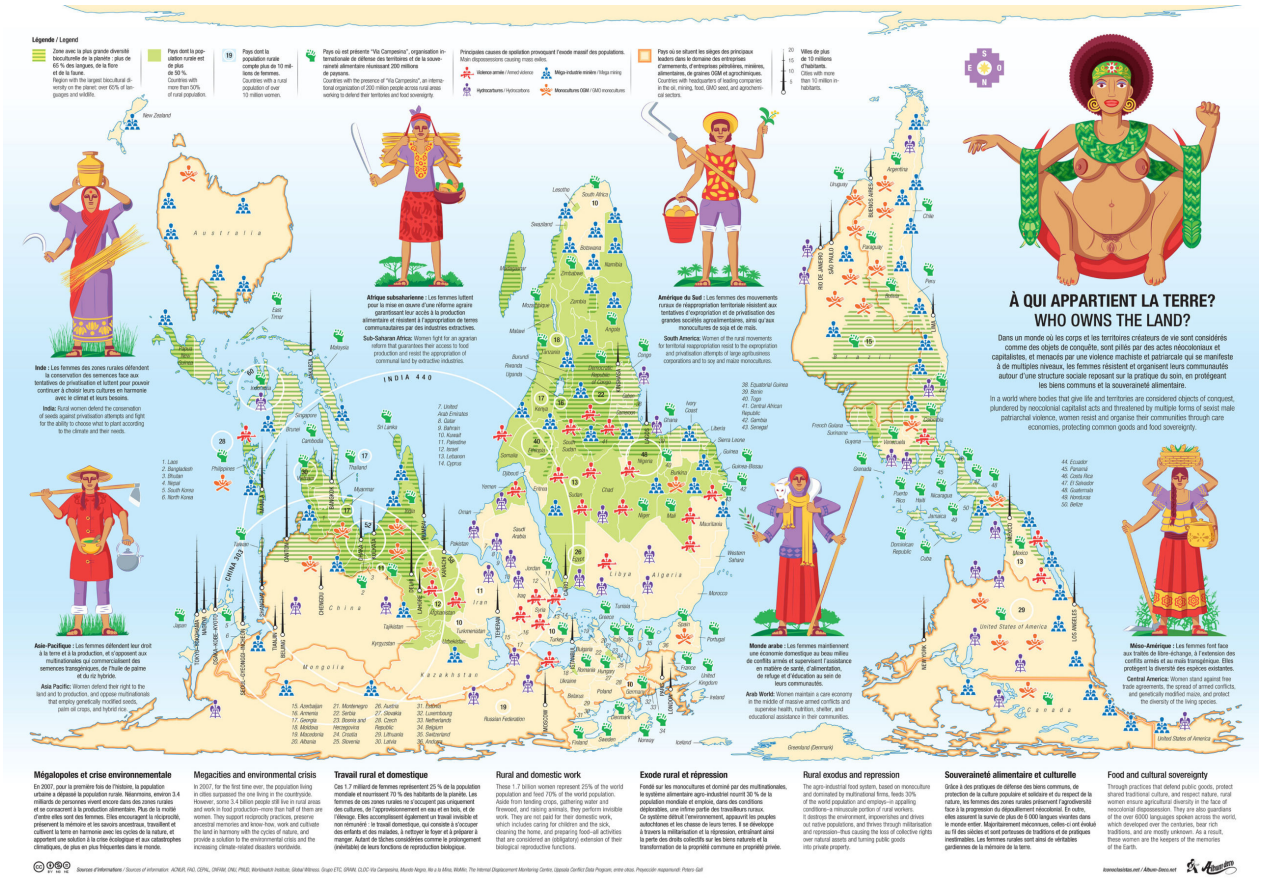

Figure 8. Map titled *Mapamundi*, 2019, created by the Iconoclasistas collective, addresses numerous intersecting problems including patriarchal hierarchies, environmental abuse, colonial violence, and beyond. Source: Iconoclasistas (2019).

for women" or "icon for pregnant woman," the top images are, by contrast, generic and one-dimensional. Much like the illustrated representations of people in the Johns Hopkins Map and the RVAgreen map, maps that rely on predesigned rather than bespoke iconography have women represented with generic symbols, stripped of color, and distinguishing features. Most concerning is that they are frequently portrayed as *doing nothing*. In contrast, research referenced in *Mapamundi* explains that while rural women own only 13% of the land, they produce 70% of the food people consume. It would then be fair to say that these women actively contribute to their communities and that this is visibly clear in their iconic representations in *Mapamundi*.

As Peluso (1995, p. 386) explains:

> Contrary to the conclusion on hegemony that Harley draws from his extensive research on the politics of mapping (1989:301), maps can be used to pose alternatives to the languages and images of power and become a medium of empowerment or protest.

Returning to a holistic view of the *Mapamundi* illustration, it is essential to note that the orientation of the map centers the South at the top of the map and the North at the bottom. Australia, Africa, and South America are also centralized, while Russia, Europe, and North America are foreshortened, appearing at the bottom. According to the Iconoclasistas website, this design strategy was inspired by the Gall-Peters

cartographic representation which features inverted poles (Iconoclasistas, 2019). The Iconoclasistas explain that this design decision holds special relevance as a challenge to Western-centric domination. This cartographic strategy challenges the colonial violence that typically diminishes the Global South both visually and figuratively. By reversing the typical approach to the North/South orientation, Iconoclasistas reject hegemonic myths and colonial social imaginaries and instead visually re-present an alternative imaginary of resistance, providing a powerful example of a liberatory cartographic strategy.

5. Conclusion

The research study presented here provides an exploration of liberatory, grassroots counter-mapping visualizations, comparing and contrasting these examples to hegemonic maps that perpetuate oppressive, reductive ideologies. Through content and semiotic analysis, the examined maps provide examples of visual strategies that reinforce social imaginaries, reflecting the belief systems of the cartographers who produce them. Mainstream sources often relied on visual representation strategies that carry hegemonic biases by using generic icons to convey overly simplified versions of their realities. In contrast, counter-mapping collectives chose innovative, bespoke illustrations and community-focused visualizations which offered a more nuanced approach to storytelling, attending to the multilayered, intersectional nature of their realities. This research on counter-mapping encourages a critical approach, exploring the role of maps and visualizations as forms of public pedagogy which enables us to question their complex relationships to social change. The symbols in maps represent the social imaginaries that drive our value systems with maps offering a unique medium for narration by utilizing spatial, graphic, emotive, and quantitative modes of communication. The visual strategies employed in cartography must therefore be taken seriously as vessels by which to inform and inspire, influence, or mislead the public.

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Conflict of Interests

The author declares no conflict of interests.

Data Availability

Data collected for this research is available upon request.

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