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RESEARCH ARTICLE

Toward 'planetary health security'? Critical scoping review of conceptual linkages between 'health security' and 'planetary health'

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Abstract

'Health security' — the subjection of health to 'security' frameworks — and 'planetary health'— the study of human health impacts of the degradation of planetary ecosystems — have emerged in the last decades as prominent global health fields. However, limited literature connects them, particularly incorporating critical perspectives. We explored interactions between these approaches conceptually, institutionally, and empirically, aiming to chart a conceptual genealogy of these interactions. To this end, we conducted a scoping review using Arksey and O'Malley's method and Levac's revisions, exploring health, security, and ecology literatures. We identified 75 eligible sources of 10,352 screened and synthesised findings inductively using Braun and Clarke's thematic approach. Based on our findings, we synthesised five themes relating to how environmental degradation is framed as a security threat, the role of biosecurity and broader 'non-traditional' security threats, institutional ties between health and environmental governance, environmental costs of militarised health responses, and the rise of new technologies for managing planetary health risks. We found multiple descriptions of environmental health as 'crisis' and 'security' issue, yet health security's scope remained limited to containment of emerging infectious diseases, rather than prevention or broader health concerns. This initial exploration across disciplinary literatures of conceptual interactions between planetary health and health security showed both mobilising the language of 'security' to frame health issues yet raised concerns over inequitable experiences resulting from this framing. An overt emphasis on containment over prevention and tacit commitments to the protection of some lives over others could result in asymmetrical health experiences, rendering some geographies and populations 'sacrificial' in their health risks.

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Background

In areas of the world where "a feeling of insecurity arises more from worries about daily life than from the threat of war or conflict" [1], microscopical agents are increasingly perceived as major threats with the potential to destabilise 'peacetime' and social normalcy. Global 'security' efforts have consequently become attentive to public health, accounting for the emergence of the field of 'health security' over the last three decades [2]. Broadly, this refers to the framing and treatment of public health emergencies as 'security' matters, subject to what social scientists refer to as 'securitisation' [3]. Health security is often also defined as "the activities required, both proactive and reactive, to minimise the danger and impact of acute public health events that endanger people's health across geographical regions and international boundaries" [4]. This trend has developed at a global scale and has largely established itself as norm in the global health field, as demonstrated by the list of over 70 countries that signed the Global Health Security Agenda (GHSA), initially developed by 44 countries in 2014 [5]. Common dimensions of securitised approaches to health include the socio-cultural framing of diseases as political enemies [6], restrictions to mobility within and across national borders based on epidemiological concerns [7,8], the decoupling of healthcare and health surveillance [9], the involvement of military actors in the provision of public health [10], and the reallocation of resources from health systems to emergency health response [11].

At the same time, the field of 'planetary health' has gained prominence in global health over the last decade. Planetary health is defined as "a solutions-oriented, transdisciplinary field and social movement focused on analysing and addressing the impacts of human disruptions to Earth's natural systems on human health and all life on Earth" [12], based on the premise that "population health and the continuity of human civilization depend on the integrity—the health—of the Earth's life-support systems" [13]. Comparable — but not equivalent — to the notion of 'One Health' and notions of ecological interdependence between humans and all beings, planetary health has become a conceptual heuristic to think about the environmental conditions required to sustain human health, with a scope best summarised by historian Warwick Anderson in 'Toward Planetary Health Ethics?' [14]:

> "Planetary Health, systemically and at global scale, has emphasized the impact on human population health of the degradation of planetary ecosystems, principally through anthropogenic global heating, leading to extreme heat events, bushfires, drought, flooding, destruction of arable land, freshwater shortages, rising oceans, and the range expansion of vectors of infectious diseases."

As such, the contemporary importance of planetary health thinking in global health discussions cannot be overstated. Ecological forces such as extreme weather events, water scarcity, and shifting disease-vector geographies are increasingly framed as health determinants [15], with their severity only expected to grow due to anthropogenic climate change. From a 'health security' standpoint, understanding the Earth's capacity to sustain life at a systemic level is crucial not just for the health and wellbeing of populations but also to prevent and mitigate any potential 'collapse' of society as we know it [16]. Given

that health security is concerned with the dimensions of health through which the social order may be compromised and that the interdependence of societal wellbeing with the environment has been demonstrated [17], understanding how 'health security' and 'planetary health' co-exist, co-produce, and contradict each other is of particular importance. Placing these in dialogue, we ask, what would the scope, implications, and ethics of a potential nexus between health security and planetary health be?

Notably, these two fields have developed in parallel, with minimal conceptual interactions between them [18]. There has been even less cross-pollination of critical perspectives, in spite of critical security studies' long-standing interest in how 'security' narratives are defined and applied [19] and an imperative in the field of political ecology to "examine power relationships and question mainstream claims about environment and development" [20]. The proliferation of concepts rooted in the field of 'security', after all, may implicitly or explicitly normalise inequitable and/or imperialist narratives. This is reflected in growing scholarly concerns over what anthropologist Catherine Besteman calls "security imperialism" [21], ultimately concerned with how the implementation of 'security' measures across various domains of social life wield violence and tend to "prioritize the extractive objectives of political and economic elites," as multiple scholars have noted [21–23]. Furthermore, public health scholars have raised concerns that framing health as a security matter can translate to an unequal concentration of resources to protect privileged populations during moments of crisis, while doing little to protect most of the global population or address the causes of risk [22]. Reports of law enforcement agents using violence against civilians for failing to comply with regulations during COVID-19 curfews, for example, highlight the potential consequences of applying 'national security' principles in the context of health [24].

Thus, investigating 'health security', as a field associated with broader 'security' narratives, demands a stance of 'criticality', that is "a self-conscious posture and attention to 'the way different kinds of linguistic, social, political and theoretical elements are woven together in the process of knowledge development" [25]. Understanding how 'health security', as global health norm, interacts with global ecologies, and whose interests it might explicitly or implicitly represent in the process, becomes increasingly important, as is understanding what the world that health security works to build looks like [26]. Indeed, medical anthropologist Didier Fassin notes [27], narrative shifts in and of 'global health' represent "new ways of describing and interpreting the world—and therefore of transforming it". What would a 'planetary health security' be built upon and work toward, and with what implications?

We aimed to explore how 'health security' and 'planetary health' approaches interact and map onto each other in a world where 'health,' 'security,' and 'ecology' are all partial outputs of human design. Objectives were to: (i) summarise the scope of existing literature encompassing health, security, and ecology; (ii) synthesise findings related to the conceptual, institutional, and empirical connections or conflicts between these concepts and the principles, actors, or processes connecting them; and (iii) identify related power asymmetries embedded in the conceptual interactions between health security and planetary health.

Methods

Study design

We conducted a scoping review using Arksey and O'Malley's [28] method with Levac's [29] revisions. Table 1 provides study definitions.

Stage 1. Defining the research question

Our research question was: "How do 'health security' and 'planetary health' interact conceptually, institutionally, and empirically, and what insights might critical perspectives on these interactions offer?"

Stage 2. Identifying relevant sources

First, we searched 5 relevant electronic databases (i.e., CINAHL, GreenFile, Medline, Scopus, Web of Science) on 31st May 2024, using terms and related terminology for 'security,' 'health,' and 'ecology' adapted to subject headings for each

Table 1. Definitions.

Health security	"Global public health security is defined as the activities required, both pro-active and reactive, to minimise the danger and impact of acute public health events that endanger people's health across geographical regions and international boundaries." [4]
Political ecology	"Political ecology refers to the study of power relationships and how they shape and are shaped by interactions with the environment, particularly in the context of issues such as water allocation, land management, and deforestation. It emphasizes the connection between political and economic systems and their impact on the environment, particularly in developing countries." [30]
Planetary health	"Planetary Health is a solutions-oriented, transdisciplinary field and social movement focused on analysing and addressing the impacts of human disruptions to Earth's natural systems on human health and all life on Earth." [12]
Criticality	"Criticality is a self-conscious posture and attention to 'the way different kinds of linguistic, social, political and theoretical elements are woven together in the process of knowledge development, during which empirical material is constructed, interpreted and written.'" [25]

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database. Given the absence of literature directly linking 'health security' and 'planetary health,' we searched using broad conceptual abstractions to also include indirect and conceptual connections. Thus, terms included in title, abstract, or key words were "(security OR securitiz* OR securitis* OR secur* OR militar*) AND (health OR medic* OR wellbeing OR illness OR disease) AND (ecology OR planetary OR OneHealth OR anthropocene OR ecocide OR capitalocene OR plantationocene OR chthulucene OR ecosystem OR plantations OR climate)."

Stage 3. Selecting studies

Table 2 shows our eligibility criteria, established iteratively based on the research question and with lines of inclusion/exclusion based on thematic relevance. All source types, time-periods, study designs, and languages were considered if full-text was accessible. After download and deduplication using EndNote software, all authors screened titles and abstracts against eligibility criteria to remove irrelevant documents. Authors then screened remaining full texts against eligibility criteria to identify the total documents for study inclusion. We resolved discrepancies through discussion and consensus.

Stage 4. Extracting (charting) data

Three of the authors used Covidence software to extract data to Excel spreadsheet categories of: (i) source identifiers (i.e., study authors, publication year, title, language); (ii) source characteristics (i.e., academic discipline, countries included, research question, study design, participants); and (iii) findings (i.e., 'security' definitions, attribution of human agency to ecological systems, incorporation of critical perspective, and lessons described).

Stage 5. Synthesising and reporting

First, we summarised the scope (i.e., extent, nature, distribution) of eligible sources. Second, we synthesised source findings inductively, using reflexive thematic analysis as described by Braun and Clarke [31]. Third, all authors discussed potential implications to identify central themes, points of argumentative tension, and synthesised critical perspectives and their implications for policy, practice, or research that we incorporated in our findings and discussion.

Findings

Literature scope

Extent. Fig 1 provides the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) diagram of the 75 eligible sources of 10,352 identified. Most were research articles (n = 70), of which 21 were literature reviews

Table 2. Eligibility criteria.

Criteria	Included	Excluded
1. Context	• Global health security is used to contextualise the paper and then linked to some aspect of planetary health's conceptual scope.	• Participant recruitment was conducted in military settings, but security concerns are out of study scope.
2. Topic	• Discusses all of 'health,' 'security', and 'ecology (or associated terminology) while at least one of these is referred to as a social or historical process, system, or design to which human agency is attributed. • Discusses impacts of military/industrial activity (e.g., armed conflict, military bases) on environmental health. • Ecological concerns that are not related to climate change are discussed but do refer to broader human relationships with Earth's life systems (e.g., soil health and contaminants as result of industrial or military activity). • Refers to health-related technologies that are designed to adapt to changing environmental conditions and are linked with immediate security purposes or vocabulary. • Refers to health-related technologies designed to adapt to changing environmental conditions and are immediately linked with 'security.' • Refers to Global Health Security as a tangible agenda, index, or political body explicitly in relation to Earth's life support systems. • Health security or biosecurity is discussed causally as a reason for changing health and/or environmental systems, or vice versa.	• 'Security' is broadly used referring to 'safety,' 'guarantee', or 'protection' in general. • 'Refers to 'environmental/food/water security' but not 'health security.' • Refers to One Health and examines human-animal interactions without contextualising these in social and/or ecological systems or historical contexts. • 'Environment,' 'ecosystem', 'ecology' or related vocabulary does not refer to Earth's life support systems but merely to a given "setting" or "context". • Military research on environmental adaptations that do not discuss ecological processes related to Earth's life support systems.
3. Outcomes	• NA	• NA
4. Source type	• Primary literature sources (e.g., research-based scholarly journal articles, theses/ dissertations, reports, symposia/ conference abstracts including primary or secondary data). • Secondary literature sources (e.g., literature reviews if primary sources are not already included). • Commentaries/editorials including primary or secondary data. • Reports and book chapters including primary or secondary data.	• Tertiary sources with no primary or secondary research data (e.g., encyclopaedias, dictionaries, handbooks, legal/guidance documents). • Audio/video reports. • Conference abstracts covering the same material as an available publication. • Social media, blogs, media articles.
5. Time-period	• All up to 31st May 2024	• NA
6. Language	• All	• NA
7. Study design	• Any	• NA
8. Participants	• Any	• NA

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(i.e., 2 scoping, 4 systematic, 15 narrative/undefined), 3 were commentaries/editorials, and 2 were conference/workshop reports. Publications started with 1 in 2000, with most published in 2017 or later (51) and peaked in 2022 (12/51).

Nature. Most publications were in English (n = 73), with 1 each in Spanish and Portuguese. Academic disciplines included environmental sciences (n = 24), public health and epidemiology (n = 22), medicine (n = 10), geography (n = 9), international relations (n = 5), anthropology (n = 4), political science and history (n = 3 each), science and technology studies (n = 2), law (n = 2), sociology (n = 2), physical sciences (n = 2), and economics (n = 1). Most sources used purely qualitative approaches (n = 53, of which only 5 included human participants), 15 used purely quantitative approaches (of which 2 included human participants), and 7 used mixed-method approaches (of which 2 included human participants).

Distribution. Geographically, most studied a single country (n = 31), while 27 had a global or fully conceptual outlook, and 17 studied several countries. Publications focused on North America (n = 12, of which 1 included Canada and 3 only Alaska), Central and Eastern Europe (n = 11, of which 3 focused on Ukraine), Southeast Asia (n = 10), South Asia and Europe (n = 6 each), East Asia (n = 5, 3 focused on China), Latin America (n = 4), and Oceania (n = 4, 3 focused on Australia).

Thematic synthesis

We synthesised findings into five inductive themes, exploring critical discussions within each: (1) environmental health as security issue; (2) biosecurity and non-traditional security; (3) institutional connections; (4) militarisation, environment, and health; (5) emerging risk-management methods and technologies.

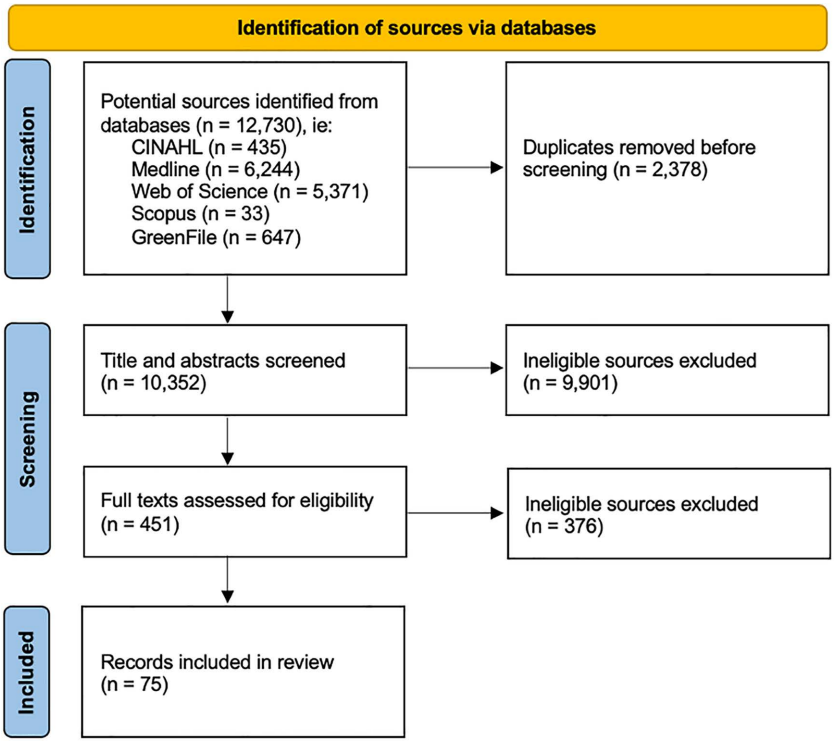

Fig 1. PRISMA diagram. NB: Adapted from [106].

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Environmental health as security issue. Nearly a third (28%; 21/75) of sources developed theoretical connections between health, security, and ecology, frequently framing the declining health of the planet as a security issue. Most (20/21) discussed forms of environmental degradation (e.g., climate change, deforestation, biodiversity loss, soil degradation) and 18 explicitly attributed human agency to it. Humans were framed as 'ecosystem engineers' whose collective agency was the main determining factor of the planet's health [32]. Western industrialisation and intensified reliance on fossil fuels following World War 2 were assigned primary responsibility for accumulation of greenhouse gases in the atmosphere and, consequently, global climate change [33–37]. Five articles referred to land use changes, responding to growing demand for industrialised agriculture, as reasons for environmental degradation [38–42]. Three discussed human modifications to ecosystems as consequences of establishing urban settlements, introducing concepts such as 'urbanisation of nature' or 'microbial borders' [43–45]. Three discussed the impact of military conflict on environmental health, proposing the concept of 'conflict pollution' [37,46,47].

All 21 articles linked declining environmental health to the idea of security, conceptualising this relationship in multiple ways. One framed this by arguing that the post-Cold War period has seen the world's geopolitical order move away from state-centric frameworks, consequently allowing 'security' to be conceptualised beyond narrow definitions based solely on militaristic ideas of national security [3]. Nearly half (n = 10) discussed the effects of climate change as security threats [3,32,33,35,37,38,46,48–50], suggesting that climate change increases the hazards humans are exposed to and that the "probability of conflict is increased by ecological degradation" [32]. One framed climate change as a 'threat multiplier' for other security issues [38]. The implications of framing environmental or health concerns as security issues were explored in 4 sources [3,37,43,44], suggesting that 'preparedness' for potential health emergencies and environmental crises is a growing ethos of global security efforts [40]. Two investigated 'securitisation' as a process, highlighting that

security practices "are part of a wider process of problematisation and politicisation" [43] wherein framing something as a security concern responds to "subjective constructions" that elevate the perceived stakes of the issue at hand [3]. On the other hand, two sources discussed the implications of different 'energetic' political pathways, exploring the different consequences for human and environmental health of fossil fuels and nuclear energy while discussing energy supply as a security matter [33,34].

Approximately half (48%) of these sources explicitly introduced critical conversations. Most commonly discussed (n = 5) was an asymmetrical distribution of environmental health risks, suggesting the consequences of climate change to be unequally distributed while highlighting race, class, gender, and/or indigeneity as risk factors [36,43,46]. Similarly, occupational risks due to environmental exposure were framed to be unequally distributed across social divisions [34,41]. Wolf introduced a theoretical provocation suggesting that "rather than investigating how the poor came to inhabit landscapes of risk," we ought to ask "how zones of risk came to inhabit the territories of the poor" [43]. Other critical conversations, with 2 articles each, involved the lack of representation and unilateralism in risk management and decision-making by health authorities [37,51] and the prioritisation of some issues and communities over others when determining what gets framed as a security threat [35,43].

Biosecurity and non-traditional security threats. Only 12 (16%; 12/75) sources established links with an important theme of 'biosecurity' and 'non-traditional' security (NTS) threats. NTS was broadly defined to include security issues that are not directly military but pertain to the wellbeing of individuals and society [52], including health security or concerns over 'eco-terrorism' (defined as "use of force or threat directed at the environment or ecosystem to terrorise or frighten people") [53,54].

Most (9/12) discussed 'biosecurity,' defined as "protection of human beings and their surrounding environment against hazardous biological agents" [55] and as "biological border security" [40]. Conversations on biosecurity raised the idea that "law enforcement agencies and animal health agencies share common goals during the response to a biological threat" [54] while also cautioning that biosecurity practices were not devoid of socio-political biases: "biosecurity practices are influenced by capitalist forms of life and other social relations that operate within and beyond the lab" [56]. Most articles discussing biosecurity (6/9) linked this concept to food production systems. Four of those articles [57–60] linked animal farming to emerging infectious diseases (EID), citing high livestock density as enabling vector-borne pathogen transmission [60]. All four related biosecurity risks to intensified livestock productivity demands, explicitly alluding to pig and poultry farming. Two [57,60] discussed antimicrobial resistance (AMR) or multi-drug resistance as growing health security threats, with antibiotic use in agriculture directly associated with livestock farming productivity demands.

Of 12 articles discussing biosecurity and NTS, only four (33%) explored critical dimensions and primarily as regional asymmetries in vulnerability. Two [60,61] considered Southeast Asia to be a region particularly vulnerable to environmentally induced EIDs, while 1 [52] suggested South Asia as most vulnerable to NTS threats. The remaining article argued that biosecurity measures require equipment and protocols that small-scale farmers could not afford, exposing them to risks that those involved in large-scale farming could be better protected against [60].

Institutional connections. Twenty-four (33%; 24/75) sources discussed the relationship between health security and global ecologies at an institutional level. Of these, most (18/24) did so by associating health security with 'One Health' agencies, whereas 12 discussed health security as a political agenda or institutional network relating to environmental changes. Five sources discussing the latter [62–66] referred to the 'Global Health Security Agenda' (GHSA), established in 2014 by 44 national governments with the aim of determining "regulations for global response and preparedness to the emergence of infectious diseases" [63]. Two discussed the importance of WHO's 'Joint External Evaluations' (JEEs) — alongside indices such as the Global Health Security Index, Epidemic Preparedness Index, and World Organisation for Animal Health's (WOAH) 'PVS' evaluation — in setting political priorities related to health security [62,67]. However, an article provided a critical perspective on these indices, arguing that they "reflect a predilection of global responses to focus on containment instead of prevention" and "do little to reflect the health effects resulting from anthropogenic activity" [62].

Of the 18 articles discussing One Health, this approach was broadly used to emphasise that domesticated animals, plants, and wildlife are part of the same "environment" and "social systems" as humans, and must thus be equally prominent in health security conversations [42]. One [66] proposed a 'One Health Security' vision, based on the "integration of professionals with expertise in security, law enforcement, and intelligence to join the veterinary, agricultural, environmental, and human health experts essential to One Health and the Global Health Security Agenda". Another [62] historicised 'One Health', tracing its emergence to WHO, WOAH, and United Nations' Food and Agriculture Organisation (UNFAO) in 2010, and criticised it for not "embracing the ecological, socioeconomic, cultural, and political contexts within which the agenda was framed". Although One Health was frequently discussed using a conceptual understanding of interdependence between humans and their environment, its scope was exclusively framed in relation to EIDs across all sources, contrary to planetary health's investments in broader considerations involving human health and the planet's capacity to sustain life.

Only 5 (21%; 5/24) sources exploring this theme included critical perspectives. Four [64,68–70] discussed asymmetrical distribution of risks related to climate change and health emergencies affecting vulnerable populations the most, including "inequitable and risk-uninformed development planning" in the case of Southeast Asia. One [62] discussed inequities embedded in GHSA development, highlighting how "recognised tensions exist between perceived threats to high-income nations [...] and the health security needs of low-income countries". This article also elaborated on the shortcomings of indices such as WHO's JEE, arguing that the assessment "is limited in how it (does not) consider health inequities within and among country population[s]."

Military activity and environmental health. Twenty-six (33%; 26/75) sources discussed the impact of military activity — a result of securitisation [71] — on environmental and human health. Disposal of heavy metals and other forms of waste (e.g., nuclear) caused by military activity, alongside their environmental and health implications, were frequently discussed under umbrella terms of 'ecotoxicology' ("the study of the fate and effect of a toxic compound on an ecosystem") and 'environmental epidemiology' ("epidemiology that relates to non-infectious disease agents in the environment") [53]. The scope of environmental degradation discussed included damage to agricultural land that may render it unusable [72], sea floor littering [73], and the overall pollution of land, air, food, and water sources. One article [34] associated environmental degradation through release of toxic waste to political narratives of national security, claiming that "whether the (toxic) releases were unintentional or intentional, they were justified in the name of national security." Common study locations for this theme were Balkan countries (n=5), of which four articles [46,74–76] discussed long-term environmental health effects of bombings and ammunition disposal by NATO in the late 1990s; Ukraine (n=3), of which two [77,78] discussed environmental health impacts of the war with Russia; and Alaska, with three articles [79–81] discussing long-term environmental health impacts of United States' military bases.

Eight (31%; 8/26) included critical perspectives, considering the human equity implications of the impact of military activity on environmental health. Almost all (7/8) discussed differential exposure to environmental contaminants in ways that map onto existing social inequalities [34,75,79–83]. Three discussed "environmental injustice" due to exposures of Indigenous people (in Alaska) to carcinogens, endocrine-disrupting substances, and contaminants through the environment and through chronic dietary exposure [79–81], while one article made an analogous argument in Puerto Rico [75]. One study [83], discussing differential exposure to contaminants along racial lines in the United States, claimed that "persons of colour are disproportionately affected by factors that increase the risk of environmental contaminant exposure" and linked race to the probability of living in areas with known environmental contamination. Authors included additional examples, such as the disproportionate representation of non-white citizens in the military and in low-paying jobs with higher incidences of exposure to environmental contamination [83]. One article discussed how, by repurposing an abandoned military shooting range to host relocated asylum-seekers in Greece, migrants were exposed to toxic ammunition residues [82]. Likewise, one article discussed occupational radiation (over)exposure of workers in nuclear plants [34]. The remaining article discussed tendencies among transnational security bodies such as NATO to make unilateral decisions with implications for national and subnational health systems [37].

Emerging risk-management methods and technologies. Seventeen (23%; 17/75) sources discussed novel technologies or risk-management methods associated with planetary health or health security. Most (n = 11) proposed innovative approaches for the prevention and early identification of risks (e.g., primarily linked to EIDs, environmental hazards, biosecurity), including the use of drones for mosquito surveillance [84], genomic surveillance of antimicrobial resistance [85], meteorological data use for biosecurity [86], the study of 'bioindicator' species and other biomarkers to detect radioactive contamination [87], or modelling a digital replica of the Earth [88]. Three discussed 'who' conducts the science at the intersections of health security and planetary health, raising questions concerning 'civilian science,' open-source analysis, and STEM higher education [33,47,89]. Two proposed 'nature-based' approaches to improve environmental and human health, including arguing for the incorporation of "traditional indigenous plants" and "pharmafood" in the repertoire of health security and the 'bioremediation' of toxic pollutants in soil using 'natural' approaches [63,90].

Critical discussions were introduced in only 2 (12%; 2/17) of these sources. One argued that "respect towards human values and rights such as solidarity and equity should underlie every agenda of national security" [63] and that using traditional botanical knowledge could support health security efforts in "developing" countries. The other discussed citizen science as 'critical pedagogy', claiming that citizen-scientists should be empowered to participate in all steps of scientific knowledge production [89].

Discussion

Overview

Despite the growing relevance of 'planetary health' and 'health security' in contemporary global health discourse, the interactions — conceptual or otherwise — between these fields remained unmapped prior to this review, resulting in gaps in understanding how these overlapping issues are shaped and interpreted. In fact, of 10,352 sources screened, only 1 linked 'health security' and 'planetary health' directly, suggesting that these two fields have developed separately [18]. Considering the ways the role of the environment in human health is increasingly framed as an 'existential' or 'security' threat, understanding the transformations to global health that these fields elicit together appears overdue. The interactions we identified between these fields were primarily indirect, mapping onto each other through discussions on phenomena within the conceptual scope of both. Moreover, even less attention has been allocated to critical analysis of the interactions between health security and global ecologies, despite socio-ecological asymmetries having strong and direct influence over the issues with which health security is concerned. Accordingly, this scoping review charts these relationships and lines of critique, offering insights into these dominant global health areas and their intersections.

At large, our findings map a network of global environmental risks that are consequences of a major point of tension and contradiction embedded in the idea of 'human civilisation': that its expansion has altered the environment in ways that (continue to) interfere with the Earth's capacity to sustain life, humans included [33–37,43–45]. Fuelling human civilisation has come at the expense of environmental modifications that create differential vulnerabilities for many inhabitants [33,34]. Feeding humans is now largely reliant on hyper-productive animal farms that induce land-use changes with detrimental effects on the environment, while enabling the transmission of new (and old) zoonotic diseases [38–42]. Housing humans in urban settlements has transformed ecological relationships in many extractive ways, creating new forms of 'bio-insecurity' and new tiered forms of exposure to harm for some populations but not necessarily all [43–45]. Military activity has transformed ecosystems in ways that make them irreversibly unhealthy — if not inhospitable — for humans and other species [37,46,47].

Yet, most discussions in the health security field seem to ignore or dismiss these realities, concerned instead — almost exclusively — with the risks posed by infections affecting humans even while other aspects of human and environmental health are increasingly framed as security matters [3,32,33,35,37,38,46,48–50]. Our findings, then, prompt the question: if

such a vast array of environmental health issues is increasingly framed as security concern, how did 'health security' come to adopt a significantly narrower focus?

Health security: What and for whom?

Based on the literature reviewed, we attribute these apparent contradictions to two primary reasons, both related to the scope and political context in which health security has taken shape. First, securitisation responds to subjective constructions and interpretations of risk, requiring political mobilisation to frame a particular moment and issue as 'crisis,' as argued by two of the sources included [3,43]. Most health impacts of declining environmental health, however, are long-term, only gradually experienced thus far, and — at least initially — affecting populations that may lack political representation [35,37,43,51,62]. Their effects are akin to what cultural theorist Lauren Berlant termed 'slow death' in the context of non-communicable diseases: "the physical wearing out of a population and the deterioration of people in that population that is very nearly a defining condition of their experience and historical existence" [91]. The 'moment' of crisis, in this case, is often prolonged, making the process of prioritising attention and resources equally diffused. Instead, infectious diseases can be transmitted rapidly, acting aggressively on both individuals and societies within the span of days, if not hours. Covid-19 is an example, showcasing how political mobilisation was asserted through health security responses when the issue was deemed of immediate relevance. On the other hand, the 'slow' effects of environmental degradation in human health have so far failed to replicate such political momentum, even amidst the narrative shifts that many sources proposed or reported [92].

Second, health security's lack of engagement with broader environmental health issues may also be indicative of its embedded geopolitical commitments, as suggested by Traore *et al*'s argument that health security assessment tools focus on containment while overlooking prevention [62]. Seemingly, the field of health security — and most of biosecurity — is concerned with effective containment of health risks within specific geographies [93], yet these may be unilaterally decided by policymakers who are not always directly affected [37,51]. This, we suggest, reveals how health security's political investments diverge from promoting socio-ecological transformations that may mitigate and prevent future health issues, instead protecting those who can afford to be 'secured' in a world of unequally distributed risk. As multiple scholars note [44,93,94], this logic of containment reflects deeper geopolitical inequalities. Namely, it reflects a tendency by 'health security' practices to protect those who can afford protection while leaving others in what have been termed 'sacrifice zones,' where risk is offloaded onto already vulnerable populations. A recent example of this 'sacrificial' approach can be found in the series of unilateral decisions by Western governments to close borders when the COVID-19 Omicron variant was first identified in 2021, during which several African countries were cut off from much of the world while having limited access to vaccines, a consequence of global asymmetries in distribution now referred to as a form of 'vaccine apartheid' [95,96]. This case exhibits how framing health as a matter of national security operates across borders as a method through which global health cooperation breaks down, exposing those with lower resources to greater risks. Thus, even with shifting narratives, our review showed the political centres, institutional networks, and objects of attention of health security to be at odds with a broader ethos of environmental care and equitable protection of all humans and other forms of life.

Rethinking the Anthropocene subject

Through foregrounding critical perspectives, asymmetrical distributions of risk and responsibility were central to how we understood the relationship between health security and planetary health, particularly in investigating whose health each field prioritises implicitly and explicitly. Generally, neither field seemed overly elaborate in defining its audience or targets, relying on loosely universal assumptions of working to protect 'human health.' This raised issues. Scholars who have addressed questions of 'planetary' responsibility for the Earth's declining capacity to sustain life have repeatedly encountered challenges making sense of who 'the human' includes, and how differing

relationships among humans and 'the environment' can be accounted for [97–101]. Indeed, 'Anthropocene anthropologist' Amelia Moore has argued that "speaking about the collective 'we' of humanity should not imply that 'we' are politically one" [99]. Likewise, as Kathryn Yusoff powerfully argues in her work on race and geology, 'to be included in the 'we' of the Anthropocene is to be silenced by a claim to a universalism that fails to notice its subjugations'—a poignant warning against framing planetary narratives without acknowledging colonial histories. [100]. 'The Human,' as a category, is itself contested.

Naming responsibility has also presented challenges for social scientists. For instance, the above reasoning on the use of 'the Human' points at shortcomings in the notion of the 'Anthropocene' which, akin to Lal's notion of humans as 'ecosystem engineers' [32], posits that our global geological era is the result of human agency. Multiple scholars in the environmental humanities have attempted to adjust terminology to redirect responsibility to transnational capital—as Moore does with the notion of 'Capitalocene' [98]—or to the historical expansion of plantation agriculture—as Haraway and Tsing do with the 'Plantationocene' [97]—but have likewise encountered criticism for developing incomplete accounts or for further obscuring where responsibility actually resides [101]. Nevertheless, beyond these conceptual and political limitations, discussions on the distribution of responsibility for environmental degradation were virtually absent in the findings of our review, possibly because the two fields in question, both Western constructs of 'health,' may have tacit political and epistemic attachments that require their subject to be purposely left undefined [13,22,102]. Western industrialisation, after all, was presented as a central force driving today's environmental health circumstances [33–37]. Therefore, more critical research interrogating the geopolitical structures that shape the issues at hand, such as why certain geographies are at higher risk of infectious disease emergence or why pollution threatens the health of some populations more than others, remains a pending task for a more complete picture of the intersections between the global health fields examined.

Future directions for planetary health

Our review additionally raised questions about what characterises 'planetary health' as a distinct heuristic, given the existence of other concepts proposing environmental notions of health that may be broader in scope (e.g., 'eco-health') or may have more political traction (e.g., One Health). One Health in particular featured prominently as an appealing approach discussing these connections although, our findings suggest, it is typically used in the context of policy and almost exclusively concerned with infectious diseases. Most One Health literature we encountered did not discuss socio-ecological contexts at length or at all, ignoring the environmental conditions in which the multi-species interactions it is concerned with occur. Hence, while suitable for health security's emphasis on infectious diseases, One Health failed conceptually to encompass other environmental health issues, excluding other "security" concerns such as ecotoxicology or soil degradation that some sources highlighted [32,53].

On the other hand, planetary health, while offering a more holistic lens than traditional public health or One Health approaches, also showed limitations. In particularly, planetary health literature revealed a tendency to prioritise anthropocentric concerns, at times overlooking non-human ecologies, Indigenous worldviews, or issues that affect subjects whose status as 'humans' has been historically contested. After all, as critical scholar of race and ecology Jayna Brown argues, "racialized and colonized subjects have been excluded from 'the human,' a category made ontological through the naturalization of Western imperial origin narratives" [103]. Thus, as much as linking health security narratives to planetary health can broaden their conceptual scope and confront issues beyond infectious diseases containment, our analysis similarly warns against planetary health applications that focus exclusively on human health or erase Indigenous ways of interpreting ecological interdependence or other frameworks that fall outside the scope of Western/English-speaking academic discourse (e.g., Latin American 'cuerpo-territorio' [104]). In fact, Western definitions of 'nature,' and its implications for preservation, have been shown to be used to evict Indigenous people from lands where they have lived in ecological balance for centuries [105].

Ultimately, we argue, there needs to be critical consideration of health security's focus on containment, as it may be a perilous accomplice to any notion of planetary health with overt commitments to human health. This reinforces sacrificial logics that render some forms of life more worthy than others, with only a select few standing a chance of survival in a world with a dwindling capacity to sustain life in all its forms. After all, global health scholar Stefan Elbe has repeatedly shown how contemporary health security preoccupations place lower-income populations "in a state of near-total disposability during global health emergencies," often with little or no access to medical resources such as vaccines [23]. Such a tiered approach contradicts equity, raising concerns over potential securitised responses to present and future environmental issues should joint efforts between planetary health and health security— a 'planetary health security'—ever proliferate. Accounting for such concerns, we suggest a shift in focus towards strategic and preventative efforts that centre on protecting and preserving the collective health of Earth's lifeforms and ecologies, as well as the proliferation of new concepts, narratives, and approaches that foreclose hierarchies and exclusions in health access.

Limitations

This study has several limitations. First, sources included are those within our search capacity. However, to ensure sufficient coverage, we included five databases and all languages. Second, as normal in scoping reviews, we did not evaluate source quality to enable as broad and diverse a range of eligible sources as possible. Third, we found only one result linking 'health security' and 'planetary health' fields directly or critical perspectives regarding their interactions, and thus established connections based on conceptual scope. This required active interpretation in selecting eligible studies, which may not be replicable by other researchers with different interpretative sensibilities. While producing a less replicable mapping of the relationship between these two global health fields, it allowed a deeper conceptualisation of interactions between themes and concepts that would not have been possible with narrower selection criteria.

Conclusion

Academic literature connecting health security with planetary health — or other forms of environmental health — is scarce, with a near-exclusive focus on infectious diseases. However, due to the extent of anthropogenic activity on global ecologies, planetary health faces existential threats framed by many scholars as 'security' issues. Most health security responses focus on containment rather than prevention, exposing some populations more than others to environmental health risks. Likewise, 'security' narratives have long been associated with environmental degradation due to the militarised activity that securitisation, in all its forms, tends to default to. Adequate and equitable responses to environmental health risks require shifting from containment towards prevention, therefore necessitating related shifts in socio-ecological designs and emphasis on protecting the health of all human (and non-human) beings in the short and long-term. Moreover, securitised approaches to health are rarely compatible with equity, as various critical perspectives highlighted, and should elicit wary responses whenever encountered if health equity is held as an ideal. This review offers a first mapping of these relationships and emphasises the need for critical perspectives that foreground principles of ecological interdependence and human equity for the future of global health.

Supporting information

S1 Prisma Checklist. Prisma Checklist for scoping reviews.
(DOCX)

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