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Viewpoint, Policy Forum or Opinion

Degradation and disease: Ecologically unequal exchanges cultivate emerging pandemics

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ABSTRACT

An estimated 75 percent of new infectious diseases are zoonotic in origin, directly resulting from human and animal interactions (CDC, 2017). New diseases like COVID-19 most often originate from biodiversity hotspots such as tropical rainforests, and forest loss represents one of the most significant forms of environmental degradation facilitating new human and animal interactions. A political-economy approach illuminates how trade inequalities lead to the exploitation of the environment and people in poor nations, creating conditions under which pandemics like COVID-19 appear. Cross-national patterns in deforestation and forest use illuminate how consumers in the Global North are keenly tied to the emergence of zoonotic diseases.

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An estimated 75 percent of new infectious diseases are zoonotic in origin, directly resulting from human and animal interactions (Centers for Disease Control, 2017). A number of these diseases have made headlines in recent years, including Zika, Ebola, SARS, avian influenza, MERS and, of course now, COVID-19. But it is not the animals and insects themselves that are to blame for “giving” humans infections, whether spread by viruses, parasites, fungi, or bacteria. Rather, anthropogenic environmental transformations driven by capitalist development are forcing humans and animals to come into contact in new ways.

Zoonotic diseases are those caused by germs spreading between animals and people. The United Nations Environment Programme (UNEP, 2016) identifies that the central sources of zoonosis emergence include deforestation, intensive farming, illegal and poorly regulated wildlife trade, and climate change. Not only are these causes due to human activities, but the disproportionate concentration of them in less-developed countries and among disadvantaged populations can be easily traced to global inequalities in access to power and resources (e.g. Rice, 2007, 2009). A political economy approach illuminates that the exploitation of the environment and people, especially in poorer countries, creates conditions under which pandemics like COVID-19 appear. New diseases most often originate from biodiversity hotspots such as tropical rainforests, and forest loss represents one of the most significant forms of environmental degradation facilitating new human and animal interactions (Centers for Disease Control, 2017; Bloomfield, McIntosh, & Lambin, 2020). Cross-national patterns

in deforestation and forest use illuminate how consumers in the Global North are keenly tied to the emergence of zoonotic diseases.

Global patterns in poverty and environmental degradation go hand-in-hand, with places like Sub-Saharan Africa, SE Asia, and Latin America facing the highest levels of poverty and environmental transformation, including the destruction of forest ecosystems (World Resources Institute, 2018). It is no coincidence that resource-rich countries of the Global South have remained poor and degraded – these regions were initially plundered for key commodities, such as coffee, timber, rubber, precious metals, iron, sugar, and cotton during colonial times, propelling Northern industrialization and economic development (e.g. McMichael, 2017; Wallerstein, 1974). The colonial project cemented an international division of labor, wherein poorer countries focus on the production and export of agricultural products and raw materials, which are more damaging to the environment and less profitable in comparison to the production processes of affluent nations with high-value industries and services (e.g. McMichael, 2017; Rice, 2009; Wallerstein, 1974).

Primary sector specialization in the periphery is upheld today through path dependencies, as well as a variety of policies and practices enacted by core governments, core-based transnational corporations, and international development institutions, such as the World Bank, International Monetary Fund, and World Trade Organization, often under the doctrine of “free trade” (e.g. McMichael, 2017; Oulu, 2016; Pacheco, 2006; Shandra, Leckband, & London, 2009). Their ideology is based on the concept of “comparative advantage”, arguing that poor nations have natural endowments in growing food and harvesting timber and other commodities given their richness in resources and location in

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tropical and sub-tropical zones. However, such approaches ignore the environmental costs of specialization, not to mention the disparate profits garnered from unequal trade relationships (e.g. Pacheco, 2006; Rice, 2007, 2009; Wallerstein, 1974).

Indeed, critical scholars in fields of political economy note that poorer countries tend to have much higher rates of environmental degradation such as forest loss, despite that the overall consumption of forest resources among people in less-developed countries is relatively low (e.g. Jorgenson, Austin, & Dick, 2009; Rice, 2007, 2009). Conversely, more-developed countries have very modest levels of deforestation within their borders, or are even experiencing growth in forests, but have the greatest rates of consumption of forest products (e.g. Jorgenson et al., 2009). This uneven international structure, often referred to as the “consumption – degradation paradox”, is explored by utilizing the concept of ecologically unequal exchange. This perspective, espoused in world-systems and dependency thinking, asserts that more-developed countries externalize or displace their consumption-based costs to less-developed countries through inequitable specializations in production and trade (e.g. Bunker, 1985; Rice, 2007, 2009; Wallerstein, 1974). The unequal distribution of the costs and benefits of environmental transformation across countries reinforces existing socio-economic inequalities, and also has important political consequences due to the intensification of power relations (Oulu, 2016).

A number of empirical studies of ecologically unequal exchange indeed find that the global organization of production facilitates greater resource degradation in poorer countries relative to rich countries, especially for outcomes such as deforestation and biodiversity loss, which have been relevance to facilitating cross-species disease transmission (e.g. Burns, Kick, & Davis, 2003; Jorgenson et al., 2009; Shandra et al., 2009). These patterns also mirror climate change dynamics; poor countries tend to suffer the most deleterious effects of climate change despite that developed countries have the most responsibility for global greenhouse gas emissions, considering historical and current levels of pollution (e.g. Roberts & Parks, 2007). There is already clear evidence of the impact of climate change on mosquito-borne diseases, where even very minute increases in temperature are facilitating the spread of mosquitoes to new areas where people lack immunity to the diseases they carry (e.g. Patz & Olson, 2006). It is often the bats, rats, and mosquitoes that remain in degraded environments, and thus are usually the species that transmit zoonotic diseases to people (UNEP, 2016).

Many of the studies utilizing ecologically unequal exchange perspectives find that some key agricultural products consumed in the Global North disproportionately drive peripheral deforestation and biodiversity loss, including beef, palm oil, coffee, and cocoa (e.g. Austin, 2010, 2012; Bennett, Ravikumar, & Paltán, 2018; Noble, 2017; Shandra et al., 2009; Vijay, Pimm, Jenkins, & Smith, 2016). The regions that produce these products tend to not be consumers themselves; for example, in most coffee- and cocoa-producing countries, well over 95% of coffee and cocoa is exported to developed countries in North America and Europe (Austin, 2012; Noble, 2017). Palm oil is used in around half of all processed grocery store products, including some brands of frozen pizza, margarine, candy bars, and peanut butter, as well as body creams, soaps, makeup, candles and detergents (Mba, Dumont, & Ngadi, 2015). The United States is one of the global leaders in beef consumption, devouring on average nearly 80 lb per person per year (USDA, 2018). In this way, populations in the Global North are acutely connected to the environmental degradation in poorer countries that causes new infectious diseases to appear.

The advent of pandemics is not an inevitability. The observed relationship between environmental transformations and disease emergence is not something that just happens “naturally” in

foreign, tropical countries, or because of the actions of “backwards” people. Consumption levels and habits in affluent countries, which are supported through deep and historically-embedded international inequalities in trade and production, accelerate and concentrate degradation in poor countries and, therefore, increase possibilities for zoonotic spillover in these places.

It is important to recognize that small frontier farmers who live on the edges of forested expanses often drive a significant amount of direct tree felling and land-use change in less-developed countries (Lopez-Carr & Burgdorfer, 2013; Painter & Durham, 1995; Rudel, 2005). However, it is not poor, rural farmers who are directly to blame. Large-scale cattle ranchers and commercialized agricultural export producers often push out small-scale rural peasants who have already deforested limited areas of land for subsistence farming (e.g. Carr, 2009; Lopez-Carr & Burgdorfer, 2013; Painter & Durham, 1995). As lands become consolidated and sold off to large-holders, this indirectly motivates new deforestation by pushing frontier farmers into untouched areas where they initiate primary forest loss to gain tenure to land. Rural frontier migrants tend to be poor, have low levels of education, and have very limited wage labor prospects; they are forced to transform environments, and sometimes, hunt or purchase wild game to secure food for their household (Bloomfield et al., 2020; Carr, 2009; Rudel, 2005). Thus, it is structural inequalities in trade and development that cause impoverished, rural populations to often be directly involved in the first instances of zoonotic spillover.

Linking the emergence of new diseases to the unequal distribution of environmental harms expands on ecologically unequal exchange perspectives in unique ways. This body of theory often adopts a more materials approach, articulating ecologically unequal exchange as characterized by asymmetrical trade flows of natural resources and energy from poor countries to rich ones (e.g. Hornborg, 1998; Oulu, 2016). I expand on this line of thinking to demonstrate that the unjust concentration of environmental degradation in poorer countries enables physical, germ exchanges across bodies, from animals to humans, generating new diseases that further threaten development and well-being. Ecologically unequal exchanges at a global level facilitate disease exchanges on a species level.

The World Resources Institute (2018) reports that the most recent years have been among the worst on record for rates of tropical forest loss. Tropical, biodiverse ecosystems are predicted to face increasing pressures in the coming years, especially from expansions in agriculture, road construction, mining, large-scale infrastructure projects, and encroachment into protected areas (Laurance, Sayer, & Cassman, 2014; Sonter, Herrera, & Barrett, 2017). Global climate change is also intensifying; 2019 was the second hottest year on record worldwide (NOAA, 2020). As environmental degradation and changes continue to grow in scale and scope, there is heightened potential of creating more deadly pandemics in the future (UNEP, 2016). Not only are additional “novel” diseases likely to emerge, but old or “forgotten” diseases are also expected to experience a resurgence, such as malaria and dengue fever.

While scientific research has long demonstrated the link between human-animal interactions and cross-species disease transmission, often overlooked are the broader conditions that facilitate, accelerate, and locate such relationships in certain areas. Inequalities lead to the displacement of environmental externalities among poor people (e.g. Oulu, 2016; Rice, 2007; Roberts & Parks, 2007). Environmental changes that create new human and animal exchanges occur most commonly in less-developed countries due to structural inequalities. Demand for commodities from affluent consumers in the Global North drives a significant amount of peripheral deforestation (e.g. Austin, 2010; Jorgenson et al., 2009; Lebouis, Damette, & Wolfersberger, 2017; Vijay et al.,

2016). The populations responsible for the consumption of resources are located far from the sites of degradation and zoonotic spillover. While infectious diseases can easily circulate back to affect people in developed countries, as we clearly see with COVID-19 and its initial concentration in more-developed Asia, Europe, and the United States, people in poor countries may ultimately be most vulnerable, given their weak infrastructure and prevalence of other health conditions, such as malnutrition (e.g. Gilbert et al., 2020). These factors, most certainly, can also be traced to neoliberal development dynamics that facilitate austerity and the prioritization of economic growth over human welfare (e.g. Kingston, 2011; Frame, 2016; Stubbs, Kentikelenis, Stuckler, McKee, & King, 2017). Capitalist globalization creates economic power structures that allow for separation between responsibility and vulnerability.

Undoubtedly, understanding and mitigating the underlying anthropogenic causes of environmental degradation deserves vigilant attention. Ecosystem and biodiversity preservation are integral in mitigating pathogen spillovers (UNEP, 2016). New priority must be given to reducing consumption levels, eliminating trade and economic inequalities, limiting environmental externalities, and creating sustainable production systems for people and the environment. A disease- or germ- specific response is never going to be enough. On average, a new disease surfaces in humans every four months (UNEP, 2016). Unless global environmental, health, and development issues are addressed holistically, new pandemics will continue to appear.

The current coronavirus crisis provides us with the unique and necessary opportunity to reimagine and restructure our relationship with the environment. International policy and development initiatives must prioritize health and environmental well-being. However, significant challenges remain as those with decision-making power align with the beneficiaries of the current economic order (e.g. McMichael, 2017). In order to create sustainable and effective interventions, there must be recognition of the larger causes of global environmental degradation, including Northern consumption levels and profit-making, and how the unequal distribution of environmental harms globally reflects and reproduces international inequalities.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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