

Ebola, Politics and Ecology: Beyond the 'Outbreak Narrative'

The origin of the Ebola outbreak in West Africa has been traced to the likely confluence of a virus, a bat, a two-year-old child and an underequipped rural health centre. Understanding how these factors may have combined in south-eastern Guinea near the end of 2013 requires us to rethink elements of the familiar Ebola 'outbreak narrative', as propagated by the international media, in a deeper political, economic and ecological context. This includes examining the social, ecological and epidemiological evidence and questioning long-held and misplaced assumptions about rural resource users, rural livelihoods, deforestation and environmental change, and the role of development in both the current crisis and in realising a more resilient future. Emerging research indicates that demography, patterns of land use and of human-wildlife interaction are all implicated in zoonotic 'spillover' events, but cannot be generalised across cases and localities. This is because these patterns are highly contextual and variable regionally and locally due to divergent and dynamic sociopolitical, economic and ecological histories.

A familiar narrative of causation

In a powerful (but highly misleading) narrative we are asked to visualise rural Guinea where the outbreak suddenly and spontaneously began – a degraded rural landscape in which savannah has replaced most of the lush, humid forest that, we are told, once blanketed the region. Extreme poverty, breakdown of traditional forest management practices and unsustainable livelihood activities drive members of a rapidly growing population to burn and clear once-expansive humid forests for cultivation of staple crops and extraction of non-forest timber products. To augment lean diets and leaner incomes, impoverished people encroach further and further into the once-pristine wilderness in search of wild sources of protein – bushmeat. These activities lead to zoonotic 'spillover' events, in which pathogens jump from one infected or carrier host species to another species. In this case, a species of Ebola virus likely carried by a wild bat infected a human child, and then spread rapidly once it entered the setting of a rural health care facility and later urban environments. In an increasingly connected world, we are warned, local spillover incidents in distant locales threaten to become global outbreaks that endanger international health and security. An infected person, animal or box of smuggled bushmeat (as the magazine *Newsweek* claimed on their 29 August 2014 cover) could travel from a rural African 'hot zone' to the centres of global power in a few short hours or days.

The 'outbreak narrative' – a just-so story

Few diseases in recent memory have inspired the level of surprise, fear and fascination as the current Ebola crisis. For most of the crisis, the international media has offered the public various versions of the common-sense story described above; what Patricia Wald, a scholar of scientific and medical narratives, has termed an 'outbreak narrative'. It tells us how the worst Ebola outbreak began in West Africa just over a year ago and how it overwhelmed health systems and the efforts of the international community. Much coverage has emphasised local-level poverty, cultural practices, deforestation and bushmeat consumption as primary causal factors in the zoonotic spillover and ongoing epidemic. Unfortunately, the way in which these factors are incorporated in the outbreak narrative paints an overly simplified and often false picture, and lays primary blame for the crisis at the feet of those most tragically affected. Inaccurate assumptions about human-environment relationships and insufficient understandings of environmental change have influenced public misunderstandings and have informed top-down development interventions that may have themselves compromised resilience and exacerbated the severity of the outbreak.

Can politics and ecology help to unmask questions for development?

Many precise details surrounding the ecology of Ebola and the circumstances that led to the current outbreak remain uncertain. However, evidence from a growing body of research in a number of fields – by ecologists, epidemiologists, anthropologists, environmental historians, development researchers and journalists – indicates that important parts of the outbreak story are inaccurate or incomplete, including the assumptions about underlying local-level human-ecological relations. These include assertions around the spontaneity of the spillover and the human-ecological dynamics associated with it; ideas about rural peoples, regional deforestation and forest encroachment and the idea that hunting bushmeat is a primary driver of this crisis. Considering this, it is important to realise that over-reliance on the basic outbreak narrative distracts us from asking deeper questions about the complex ecological and sociopolitical dynamics, including changes in land, forest and resource use shaped by broader political economy and development policies and activities, that can give rise to and fuel disasters of this magnitude. A closer examination of the available evidence around the current outbreak and its initial spillover in south-eastern Guinea highlights new questions about disease dynamics. It paints a starkly different picture about possible pathways to spillover, and the role of development, that are quite different to those portrayed currently.

Relationships between rural poverty and environmental changes

There are clearly links between material poverty, entitlement deprivation and the severity of the current Ebola crisis, and likely links between changing patterns of land use and zoonotic spillover events. However, media commentators have until recently asked few questions about the political-economic drivers of poverty and land use change in the region. Local human activity has long been blamed for deforestation and the assumed gradual conversion of dense humid forests to savannah in Guinea's south-east. Yet, the idea that this region is undergoing progressive deforestation from once primary forest is fundamentally wrong. As demonstrated by anthropologists James Fairhead, Melissa Leach and colleagues, the landscape of rural south-eastern Guinea has been a mosaic of farmland, savannah, bush and forest for at least several hundred years. Research on the vegetation history of the region demonstrates that this is an ancient, anthropogenic landscape, produced through human activity, in which many of the forest patches exist because of rural people's productive activities – not despite them. False ideas about regional deforestation in this area of Guinea are received wisdoms, widely held and repeated since at least colonial times. Today they are associated with pervasive stereotypes about rural people that feature strongly in the dominant Ebola outbreak narrative (Fairhead and Leach 1995).

These stereotypes embody the widely accepted generalisation that poverty and population pressure push cash- and asset-poor rural people to use unsustainable subsistence practices and degrade landscapes, passing into previously virgin habitats of wild animals (which they trap, hunt, kill, eat and trade) that are natural reservoirs for mysterious and deadly diseases. A primary response to these misplaced assumptions around deforestation has in the past been to establish restrictive forest reserves from which humans – both long-time residents and newcomers to the region – are excluded. But these actions do not account for the fact that residents of many rural communities in south-eastern Guinea, including communities in the area in which the spillover occurred, are not cutting down old-growth trees to plant food crops. Rather, dominant local land use patterns involve agroforestry practices that actually promote the growth of dense vegetation – 'forest islands' interspersed with fruit groves, food crops, coffee, kola, small oil palm patches and fallows – surrounding villages in areas where such vegetation does not naturally occur (Wallace *et al.* 2014; Fairhead and Leach 1996).

Links between trends in development, environmental change and human-wildlife interactions

The primary drivers of environmental change in contemporary West Africa, including the countries of the Mano River Union (Guinea, Liberia, Sierra Leone and Côte d'Ivoire), today involve expansive 'land grabs' encouraged by generous reforms designed to attract international investment in large-scale export-oriented mineral extraction, timber extraction and agribusiness activities, especially palm oil production. Oil palm is one of the world's most rapidly expanding cash crops, in large part due to its use in producing biodiesel. Regional land grabs for oil palm plantations are likely implicated in massive ecological perturbations associated with ecological 'phase shifts' that result in increased risk of disease spillover events for rural communities. While land grabs in general disarticulate people from their homes and livelihoods, land grabs for plantation agriculture also reshape ecological system dynamics and reduce biodiversity by causing habitat fragmentation – including the habitats of wild bats which must then adapt to rapidly changing ecologies (Fitzherbert *et al.* 2008; Tan *et al.* 2009). This in turn affects migratory and feeding behaviour. One result is larger than normal populations of wild bats migrating from across the region to attractive anthropogenic local landscapes and forest patches containing plentiful cultivated fruit, insects, trees and other dense vegetation for roosting.

Are bats and bushmeat to blame?

Current research supports the idea that a non-symptomatic insectivorous (insect-eating) or frugivorous (fruit-eating) bat carrying Ebola virus is a likely source of the initial spillover event in the current crisis (Saez *et al.* 2015). In the context of the outbreak narrative and discussions of human encroachment in 'wild' areas, hunting bushmeat, or wild game, is particularly vilified as a hazardous practice. Much policy effort and media attention has focused on deterring hunting of wild animals as a way to avoid zoonotic spillover events. Even if criminalisation of these activities would successfully deter people from hunting and eating wild animal foods, it would not protect people who live, work and produce food in environments where bats are present from other potential means of viral transmission. In other words, bats are, and always have been, a part of life. In Meliandou, the village where two-year-old Emile Ouamouno, the first victim of the outbreak, resided, people have always lived and worked in close proximity to bats and regularly hunt and consume bat meat. However, recently published epidemiological research indicates that hunting or consumption of bats is not the likely source of spillover, and that non-food related transmission is much more plausible in this case. For Emile, this could have occurred in the context of eating or handling fruit, handling other materials that had come into contact with infectious saliva or guano, or from simply playing in and around a hollow tree that housed colonies of migratory bats.

Did a spontaneous spillover event spark the Ebola crisis?

The common belief that the initial spillover that sparked the outbreak in West Africa was spontaneous or without warning is questionable. More than a decade of serological research indicates that fruit bats are likely a common asymptomatic reservoir of the Zaire species of Ebola and that they have an incredibly extensive migratory range that includes south-eastern Guinea and other countries in West Africa (Biek *et al.* 2005; Leroy *et al.* 2005; Pourrut *et al.* 2009; WHO 2009). Tests of human blood samples collected in Sierra Leone, Liberia and Guinea between 2006 and 2008 from patients with suspected Lassa fever but who tested negative for both Lassa virus and malaria found that 19, or 8.6 per cent, of 220 samples tested were positive for Ebola Zaire antibodies (Schoepp *et al.* 2014). Taken together, these data indicate that antibodies to the same species of Ebola virus implicated in the current outbreak were present in bat populations for at least ten years, and in human blood samples collected at least five years prior to the spillover associated with the current outbreak. As we can see, Ebola virus has been present in the environment and periodic spillover events have occurred in affected parts of West Africa for quite some time.

Implications and future directions

Considering this, a relevant question we must ask to understand better the dynamics of emerging epidemics is 'why now'?

The lack of functional surveillance and ability to cope in the formal health care sector in affected countries is intimately related to broader political economic trends. In recent years, regulatory changes and dramatic increases in regional land grabs for development activities, for example, have greatly benefited international investors and national political elites. The costs of these activities, and the political rivalries they provoke, are disproportionately borne at a local level. In this case, 'development' in Guinea, Liberia and Sierra Leone has not brought benefits to human development – improved labour conditions, economic and social opportunities, reduced corruption, increased equity or improved public health and public services. At the same time these activities have contributed to environmental and economic transitions that mean rural populations face increased risk of exposure to deadly diseases without sufficient means to cope. Scientific researchers must seek to understand the dynamic relationships between political-economic forces and ecological change; determine the precise dynamics of viral transmission between wildlife and possible insect vectors; identify whether there have been previous spillovers in West Africa resulting in small rural outbreaks unnoticed by the outside world, and, if so, ask how the affected communities mobilised knowledge and resources to cope.

Coordinated ecological and epidemiological surveillance activities integrated into basic public health systems following a One Health approach¹ may not have prevented an initial spillover, but could have allowed countries affected by the crisis to remain a step ahead in terms of knowledge and preparedness. This case highlights how convergence of policies, people, animals and environments has created a new global dynamic in which the health of each is inextricably linked (American Veterinary Medical Association 2008). Questions raised in the context of this crisis point to important work ahead involving coordination among researchers, international donor organisations, governments and local communities to build capacity for environmental monitoring as part of broader health strategies.

¹One Health is a holistic global health approach that involves expanding interdisciplinary and cross-sectoral collaborations and communications for preventing epidemic and epizootic disease, and for maintaining ecosystem integrity for the benefit of humans and wild and domesticated animals (American Veterinary Medical Association 2008).

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Further reading

Fairhead and Leach (1998); Fairhead and Leach (1996); Saéz *et al.* (2015); The American Veterinary Medical Association One Health Initiative Task Force (2008); Wald (2008); Wallace *et al.* (2014).

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Credits

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