

# Legal Pluralism in Infrastructural Designs: Alternative Supply Chains in the Moroccan Argan Oil Export

Science, Technology, & Human Values  
1-25

© The Author(s) 2021



Article reuse guidelines:  
[sagepub.com/journals-permissions](https://sagepub.com/journals-permissions)  
DOI: 10.1177/01622439211042666  
[journals.sagepub.com/home/sth](https://journals.sagepub.com/home/sth)



Bertram Turner<sup>1</sup> 

## Abstract

This article explores an emergent assemblage in which material semiotics interacts with legal plurality. It is argued that infrastructural designs constitute specific configurations of such assemblages. While research on infrastructure is proliferating in anthropology and STS, law as a constitutive component in all its forms and manifestations has not yet been sufficiently examined from this perspective. Infrastructures enact the ordering of their constitutive components and develop their own specific legal configurations. They combine components from various legal registers with routinized social practices and the normativity of technologies and materiality. Law in infrastructure is thus in itself inherently plural. The article exemplifies what plural law does to infrastructures and how social and legal relations take on infrastructural properties. These plural technolegal

---

<sup>1</sup>Max Planck Institute for Social Anthropology, Halle, Germany

## Corresponding Author:

Bertram Turner, Max Planck Institute for Social Anthropology, Advokatenweg 36, Halle 06114, Germany.

Email: [turner@eth.mpg.de](mailto:turner@eth.mpg.de)

entanglements are examined using a case study of one specific strand within the infrastructure of the multilayered supply chain that brings Moroccan argan oil to the global market. This strand emerged in response to the breakdown of a supply infrastructure that was set up as a model development cooperation project.

### **Keywords**

legal pluralism, infrastructure, breakdown, argan oil, Morocco

## **Introduction**

In this article, I take the relationship between anthropology and science and technology studies (STS) with respect to law, especially to legal pluralism (LP), as an epistemological point of departure for the analysis of infrastructure's underlying legal entanglements. A case study in Moroccan argan oil production and distribution will illustrate how legal pluralism is inherently inscribed into infrastructural design. After a discussion of legal pluralism and infrastructure and how they are coproduced, supply chains will be examined as a specific manifestation of such legal–infrastructural assemblages. The ethnography of a repair initiative following an infrastructural breakdown illustrates the technological entanglements of infrastructuring work and highlights its affective qualities. In the conclusion, the economic, moral, and affective qualities of the technolegal and human–non-human relationalities in infrastructure repair work are analyzed.

## **Legal Pluralism in Anthropology and Law in STS**

Legal pluralism refers to a situation in which actors see themselves as being able to choose from among more than one register of rules that can be applied to the same social interaction (Benda-Beckmann and Turner 2020). In the wake of increasing globalization, the anthropological concept has moved beyond the social sciences and into legal studies, especially in the form of global legal pluralism (GLP; e.g., Berman 2016). Alongside its career as GLP in international and comparative law, the concept has continued to develop further in the anthropology of law. More radical ways to think about the plurality of law have emerged in the light of debates on ontological multiplicity, decolonization, the technicization of lifeworlds and the allocation of accountability under the conditions of the

contemporary world order (e.g., Appadurai 2015; Davies 2017a, 2017b; Robinson and Graham 2018).

The encounter between the anthropology of law and STS has led to an expanded view of law as an assemblage of strategically positioned networks in which human and non-human constituents interact and extend far beyond institutional boundaries (Turner and Wiber 2020). Such networks link seemingly disconnected items, artifacts, and people, forming plural legal configurations of previously unexplored degrees of complexity and signification. The STS approach to law allows scholars to reject nature–culture–society boundaries, particularly in the analysis of hybrid normativity (Lessig 2006; Cloatre and Cowan 2019). The LP portfolio must thus deal with registers of ordering that draw on the normativity generated in the interstices of human–non-human interaction and in material–technological assemblages. The resulting pluriverse of law (see, e.g., Davies 2017b) includes multiple registers of ordering that are mutually constitutive socio-material enactments. Such recent STS-inspired developments in the anthropology of law investigate how people, other-than-humans, and things regulate the law and are regulated by the law. Infrastructure is one of those recent analytical interests.

## Infrastructure

Both anthropologists and STS scholars have recently been taking an increasing interest in infrastructure, leading to a concern that the infrastructure concept may lose its analytical precision. In anthropology infrastructure has served as both an object of anthropological research and an analytical tool to inquire into interconnections (Star 2002). In many cases, such studies of infrastructure do not consider legal aspects, or do not assign them a prominent role in the analysis (e.g., von Schnitzler 2013, 2014; Harvey, Jensen, and Morita 2017). Nonetheless, this new literature helps to illuminate forms of interconnectedness in which scholars of LP are especially interested. After a few introductory remarks on infrastructure, I explore how a focus on plural legal practice in infrastructure can produce additional insights.

The concept of infrastructure helps understand how a variety of disconnected components reconfigure to form a larger assemblage (Edwards et al. 2009). Infrastructures are usually built by combining existing components into an assemblage and in so doing bringing them into interactions with one another in the environments within which they are situationally embedded. Infrastructure is commonly understood as a physical reticulated system

such as a transport network. In the STS literature it denotes complex fabrics of interrelated social, technological, and organizational components (e.g., Star 1999; Bowker et al. 2010).

According to this approach, infrastructural designs do not merely provide technological solutions to social needs or economic projects, but rather contain embedded narratives about what they are actually good for. They consist of technological supply structures and, at the same time, fluid embodiments of social, political, and legal decisions (Niewöhner 2015). An infrastructure creates a web of relationships. It emphasizes how flows and circulation of inventories of knowledge, material, technologies, regulations, normative templates and values, institutions, organizations, bureaucracies, humans, other-than-human species, resources, and much more combine into an enabling design. Tracing these allows us to discern what they are based on, unveiling the consecutive interlacing of materialized social and political decisions, moral orders, and technological networks that reflect the political and legal background of their enactment. Infrastructures as translation machines translate technology into law, politics into space and time, and inventories of knowledge into capital.

Maintenance of such relationality and connectivity over time and space forms an infrastructural design (Anand, Gupta, and Appel 2018, 12). The composition of components is carefully arranged in such a way that each component, when combined with the others, may have effects other than those it has when acting on its own (Turner 2016). As Star and Ruhleder (1996, 113) put it, the “configuration of these dimensions forms an infrastructure” which is “without absolute boundary or a priori definition.” Infrastructures are not autonomous systems operating independently of individuals (Pinch 2010). Depending on an infrastructure’s design, its effects may be highly visible, or they may be far less evident (Bowker et al. 2010; Pinch 2010). As Larkin (2013, 330) emphasizes, infrastructures are not just “out there.” Infrastructures involve making connections throughout, across, and between spaces and places, distances, temporalities, and scales, whereby they provide temporal stability. When analyzing infrastructures, it is crucial to determine what components different actors consider to be part of an infrastructure and for what epistemological and political reasons. In other words, a single infrastructure can inhabit multiple worlds—which display different enactments of legal regimes of ordering. For this reason, it is important to factor law in as a constitutive component.

## Infrastructural Legal Pluralism

Recent infrastructure research provides a useful analytic tool to expose how plural law is embedded in complex relationalities. Large infrastructural assemblages call into being communities of plural legal orders. In what follows, I argue that the concept of infrastructural legal pluralism is useful for exploring emergent assemblages in which normatively effective registers expand the complexity of legal plurality and affect the specific configuration of that assemblage.

There is an emerging interest in applying an international law perspective to “law in infrastructure” examining how legal regimes that contribute to infrastructuring interact with the normativity that the infrastructure itself produces. This research has the stated objective of giving international lawyers a better understanding of “thinking infrastructurally” (Kingsbury 2019). However, the focus of such research is not, as in this paper, on positioning law in infrastructures more concretely.

LP can be contextualized as part of infrastructure’s invisible underlying structure. Infrastructures embody law as encoded information. They create legal spaces and are projects of ordering. In enacting the ordering of their constitutive components, they develop their own specific legal configurations. They constitute sites of encounter where various legal registers, state legal systems, international law, corporate regulations, and all sorts of registers of local ordering meet. As Redfield (2016) points out, the material norms of micro-infrastructures are connected with global normativity. Infrastructures enable spectacular interweaving of law with the other-than-legal. As von Schnitzler (2013, 2014) has shown, those who install a technological tool often expect it to work as if it was implementing a positivist understanding of law and correct or determine human behavior.

Following Kahn (2017) it is possible to understand formal law in terms of “jurisdictional infrastructure,” which includes the way it is institutionally arranged in space, setting up a landscape of executive power. But given the spatiality of infrastructure, and the delivery of goods or services from one site to another, the infrastructure techno-law travels through numerous spaces of formal law, which in turn interact with the infrastructure and specifically with its law. The legal infrastructure of infrastructures thus offers networked practices and communication that are interwoven with other infrastructural components to stabilize the service provided across spatiotemporal, epistemic, and onto-legal divides.

In contrast to the way I wish to investigate law in infrastructure, the expression “legal infrastructure” is often used to signify the materiality of

law, as for instance information technology (IT), especially in form of LegalTech (see, e.g., Ubena 2012). Others such as Hadfield (2016) understand “legal infrastructure,” without any reference to STS, as the legal foundations of all economic activity and the market. But as can be said for law and infrastructure: “There’s next to no research and education about how to design rule systems, institutions, and technologies that deliver what we need from legal infrastructure in a rapidly changing world.”<sup>1</sup>

More broadly, however, infrastructures are shaped by norms and this infrastructural normativity guides connectivity, flow, communication, participation, authenticity, and flexibility. The normative tools also provide information about different values, social concepts, and inclusion or exclusion from the service provided (von Schnitzler 2016). Infrastructure thus by definition displays features of legal plurality. The focus on infrastructure allows us to analyze the internal parameters of material-semiotic production of ethnic, racial, legal, social, political, and economic inequalities and the social relations that result from them. Moreover, infrastructure projects are sites of intense human-rights struggles (Likosky 2006).

The technolegal expertise that reflects the legal plurality inherent in infrastructure also enables governance. Valverde, Fleur, and Raso (2019) highlight the emergence of complex governance structures and plural legal orders in the establishment of infrastructural projects that reconfigure state administration, bureaucracy, contract law, and infrastructure normativity in an environment that enables public–private partnerships, allowing for what the authors call “deal making.” Anand, Gupta, and Appel (2018, 2) describe the role of the normative power of infrastructure in asserting domination, control, and dispossession. Hence, the power of governance and the resistance it may encounter either remain fluid or stabilize, depending on internal configurative dynamics (Edwards et al. 2009).

Many authors emphasize the fragility, vulnerability, and temporality of infrastructures (Lakoff and Collier 2010; Kely 2016). It has been said that infrastructure is most visible when it is breaking down (Bower and Star 1999; Star 1999; Howe et al. 2016). As long as infrastructure works, it may remain unnoticed. Law is supposed to prevent infrastructural collapse; however, it may also be the weak point that results in a breakdown, as in the ethnographic case study analyzed below. Once an infrastructure is interrupted, users either withdraw from it, or they may become active in infrastructuring work, trying to fix problems or to explore alternative options, giving rise to the proliferation of informal forms (Simone 2004).

## **Global Supply/Value Chains as a Specific Type of Infrastructure: The Case of Argan Oil**

Global supply/value chains (GVC) are large-scale enacted collaborations connecting resource extraction in one place with product processing and consumption in other places. GVC infrastructure is of course complex, displaying internal contradictions that arise from its multiple, only partially connected layers, such as mutually contradicting knowledge regimes and legalities (Turner 2016).

My case study involves GVC infrastructures connected with argan oil harvesting in southwest Morocco and looks at the emergence of this oil as a niche product that has been “bio-prospected” from a local natural resource and launched onto the global market. Argan oil is the world’s most expensive nutritional oil. It is lauded for its distinctive nutty flavor and has found its way into the rarefied circles of high-end cuisine. The oil has also been successfully incorporated into the pharmaceutical and cosmetic industries. It is a nontimber forest product extracted from the fruits of the argan tree, which is endemic to southwest Morocco and part of a unique forest ecosystem. The infrastructure that links up extraction with consumption also connects local Amazigh people with the global economy and is supposed to support nature conservation and sustainable resource management of the endangered argan woodlands ecosystem, which since 1999 is legally protected as a UNESCO biosphere reserve (le Polain de Waroux 2012; Turner 2014, 2015).

The infrastructural grid of the argan GVC has diversified into a wide range of interrelated chains with different genealogies. The point of departure is the woodlands where the local population holds access and usufruct rights on allocated plots, which includes harvesting of the argan fruits. Women traditionally process the raw material into oil. From there the infrastructure subdivides into strands for edible versus pharmaceutical/cosmetic oil. This is done through different types of upstream production, including: individual or collective artisanal manufacturing; production in cooperatives with varying degrees of technological investments as part of a solidarity economy; and industrial production in factories. The infrastructure can be further subdivided according to the standards applied and the contractual relations between producers and further links in the chains, such as local and/or Moroccan sale points, specialized food companies, pharmaceutical and cosmetic multinational enterprises (MNEs), and more. Most oil exported to pharmaceutical and cosmetic MNEs is produced in industrial factories, while oil from cooperatives only constitutes

up to 20 percent of the market (Dias Pereira and Santos 2018; Roumane 2017).

The cooperative sector developed starting in the late 1990s. Today about 300 registered argan cooperatives of all sorts exist. The two main types of cooperatives came into being in parallel but are based on competing ideological tenets. Cooperatives follow a transnational legal template laid down in the guidelines of the UN Committee for the Promotion and Advancement of Cooperatives (COPAC; <http://www.copac.coop/>) and in corresponding Moroccan state legislation. At the same time, this framework is supposed to reflect traditional work culture and collective property regimes. Thus, one type of cooperative was established at the village level, where women assembled in the past to do the monotonous processing together. This model was initiated by a development agency that encouraged the processing of the locally owned harvest using sustainably sound practices. However, this method produces oil that contains suspended particles and thus has a short shelf life of only a couple of months. It is mainly used as edible oil and does not meet the standards required for further industrial processing. Only a few cooperatives of this type were established and those that still exist today have modified their model somewhat from the original conception.

The second type was initiated by Moroccan activists involved in the argan business. Production is based on highly technological processing, officially called “semi-mechanized.” The sites of these cooperatives were chosen strategically so as to ensure favorable locations with access to the power grid, which compelled women from the surrounding rural areas to engage in new forms of mobility. This cooperative model depends on the purchase of the raw material on the market, which subjects them to price speculation and shortfalls. Their technological approach to oil processing, which uses extruding machines and filtration, responds to MNEs’ demand for pure oil (Dossa 2011; Turner 2014).

The architecture of the cooperative sector was financially supported by various donor organizations, including development agencies, NGOs, and foreign and Moroccan state funding programs (Bouroua 2016). Moreover, all sorts of additional actors became involved in the booming argan industry, including MNEs, global governance institutions such as UNESCO, Moroccan state institutions such as the forestry department DREF-SO (Direction Régionale des Eaux et Forêts du Sud-Ouest), the National Agency for Development of Oasis Zones and the Argan Tree (ANDZOA; <http://andzoa.ma>), and the cooperative department ODCO (Office du Développement de la Coopération; <http://www.odco.gov.ma>).

As a result of all these activities, starting in the late 1990s a highly sophisticated supply chain infrastructure emerged (Dossa 2011; Le Polain de Waroux and Lambin 2013; Biermayr-Jenzano, Kassam, and Aw-Hassan 2014; Robinson 2014, 2020; Turner 2014, 2015, 2016; Bellihi and Bazi 2015; Romagny et al. 2016; Dias Pereira and Santos 2018; Meager 2019). Until recently, all processing units had one thing in common: there was one step in the production process that could not be technologically upgraded, namely, the cracking of the kernels. As a result, all argan businesses were dependent on women for their labor and traditional knowledge. But recent technological upgrades have transformed this step in the oil production, which will have repercussions throughout the argan GVC infrastructure.

The infrastructure narrative that the cooperatives promoted was the empowerment of rural women, poverty alleviation, sustainability, and nature conservation; the factories also invoked their dependence on women's labor. For this reason, the cooperatives were considered a role model for the successful infrastructural integration of local producers in a GVC. This narrative enshrines the promise of infrastructure (Harvey and Knox 2012; Anand, Gupta, and Appel 2018), which is associated with a better future and with economic growth, better living conditions, safe work, and recognition.

The ethnographic vignette described in the next section drew my attention to an infrastructure failure within the cooperative model. A concrete case in 2000 led me search for other comparable scenarios. As I discovered, local attempts to repair the cooperative-based argan infrastructure after breakdown were not rare. But only very few succeeded, and they did so only by gaining a foothold at the margins of the mainstream argan industry. The data presented below are condensed from five separate ethnographic accounts that all reference a specific moment in the infrastructural history of the argan supply chain. Each of these moments developed different juridico-political-material practices. Tracing three of them took me from the villages in remote parts of the argan region to the metropolis, that is Montreal, Amsterdam, and Paris. The people and places referred to in this article have been kept anonymous. My ethnographic research took place over a period from 1996 until 2019 in the argan forest in southwest Morocco and with communities of migrants from that area living abroad.<sup>2</sup> It combined participant observation at the grassroots level and interaction with use rights holders, small peasants and large-scale farmers, female members of cooperatives and their families, household-level argan oil producers, local intermediary traders in argan products, and local administrators and state forest management officials. In addition, the theoretical framework combining

STS with anthropological research informed my methodological choices and research trajectory from villages at the foot of the Moroccan Atlas Mountains to MNE headquarters as I followed the emergent infrastructure. The fieldwork thus incorporated discussions and interviews with main actors in the argan GVC, including development agencies, academics involved in argan research, and wholesalers of raw material for oil processing further along the industry's supply chain. As multisited research, it included interviews with representatives of MNEs in the pharmaceutical and cosmetic industries and INGOs and UN institutions in Morocco and in Europe, the United States, and Canada, where some of the relevant normative templates are produced.

### **The Infrastructural (Dis)Integration of Village Cooperatives**

The village communities to which the cooperative members belong are among the most disadvantaged in the study region. The establishment of cooperatives promised villagers a little extra income based on a model of production on demand: the development agency first attracted clients, then passed on the order to the cooperative and provided for the transfer of the product. But this model only brought small revenues, the result of a weak distribution system (Bouroua 2016) and the women laborers' insistence on advance payment. In order to establish a self-financing distribution system, the development agency suggested that the cooperatives unite in an overarching commercialization union. This required financing through retention of a part of the profit of member cooperatives. The union ultimately failed because of corruption, nepotism, and the incompetence of the Moroccan elite actors who led it. In accordance with the legal contract between the development agency and the union, the agency held the local cooperatives financially liable for the breakdown. This debt was passed on to the individual members of the cooperatives, who did not feel responsible for the mismanagement of the union. In the view of locals, the development agency had failed to adequately supervise the union and was responsible for the breakdown.

The infrastructure breakdown appears to be a typical translation problem, the result of different understandings of the legal contract, namely a clash of the development agency's "project law" perspective (Weilenmann 2009) based on transnational templates, with the locals' customary law perspective. The contract was explicitly explained to the Amazigh people as a modern form of *tou'iza*. In customary law, *tou'iza* indexes a wide range

of local practices of solidarity work and mutual support, ranging from neighborhood help that is considered morally and legally obligatory, to more complex forms of working together such as agriculture or community projects. In contrast to contract law, *tou'iza* is thus situated in the realm of a moral economy. The breakdown of the infrastructure's composite lawsript triggered a cascading process that encompassed the entire GVC.

This case also shows how the legal concept of the contract follows the neoliberal logic of delegating responsibility and the burden of risk to the upstream partner or primary producer. As Chu (2014) has shown, infrastructure may increasingly politicize the legal framework and deflect accountability away from Western capitalism. Thus, law was the cause of an infrastructural breakdown with the normative aspects including both transnational rules for cooperatives and customary regulations.

The failure of the cooperative union resulted in a "phase of stagnation," as it was officially called. Local people date this phase to between 2000 and 2003: "when production had resumed, albeit at a reduced pace" and the union undertook a reboot. For some cooperatives, the project continued once the development agency had reconsidered its strategy and offered a guaranteed purchase quantity instead of production on demand, while others opted out. These cooperatives either disintegrated and the women resumed individual household production with modest sale rates at local markets or they adopted the model of the "semi-mechanized cooperatives." Within this sector, some few succeeded in the course of time to acquire the reputation of flagship interfaces between a local solidarity economy and the "market out there," while others continued muddling along (Robinson 2020).

## Local Initiatives and Experimentation

While numerous cooperatives lapsed into idleness, in some villages the cooperative members engaged in discussions with the village council on how to organize the sale of their argan oil, bypassing the development agency and reverting to previous times, when women produced oil and men of the same household sold it along the main highways or in larger cities. Despite the negative experience with the union, local people also believed they could better their own situation by building on the ruins of the broken infrastructure. Thus, in spite of its eventual failure, the infrastructure had raised expectations about the future: the promise of integration into a global market and growing prosperity in a region where the access to cash is quite limited. The failed cooperatives served as examples and role models that

inspired Moroccans to set up their own version in line with their understanding of the model. But how were they to find customers and transport the product to the consumer in the outer world? And how could they overcome the hurdles of bureaucracies, administrations, legal regulations, and boundaries?

A new approach was started in 2002. Moroccans living abroad (MRE; Marocains Résidant à l'Étranger) regularly traveled to their natal villages during the summer to spend their holidays in their country of origin. When they departed for the places they now lived, in France, the Netherlands, or Canada, they always took argan oil for private consumption with them. With their regular movements and widespread translocal network, the village's MRE community offered a possible solution to the problem of how to transport and sell the argan oil abroad. In theory, the close social relations of the replacement infrastructure would limit the sort of inequalities that had been inscribed in the failed GVC. In a way, the development narrative was thus translated into a story of hope (Anand, Gupta, and Appel 2018).

The first step was to acquire necessary knowledge about the large infrastructure of the global argan oil trade. Villagers and MREs visited cooperatives that relied on new technologies of oil extraction, collected information about state funding programs and legal requirements for cooperatives, learned how to fill out application forms, and mobilized local political figures to act as intercessors with state institutions such as the forest administration (DREF-SO) and the regional office of ODCO. One exciting option included the possibility of qualifying for one of the cooperative funding programs. They decided to register the village community as an official cooperative, in this way changing its legal status and getting access to state funding. Informal gatherings of oil-processing women thus transformed into communities of law as infrastructural units. Official recognition for the quasi-cooperatives appeared as part of an infrastructural translation process in which the transnational legal scripts that define a cooperative's properties are applied in accordance with national practices. In addition, the villagers integrated "their MREs" into the network via their kinship links. This arrangement is an example of how, as discussed in Harvey, Jensen, and Morita (2017, 9), "particular social relations gain infrastructural properties vis-à-vis wider collectives" (in this case, the village and MRE communities).

The prospect of access to cash had already mobilized all sorts of people in the argan zone to organize into cooperatives. Hybrid forms of the two major types mushroomed, and locals interpreted the cooperative doctrine in innovative ways (see, e.g., Montanari and Bergh 2019; Perry et al. 2019).

A wide variety of social groupings—families, households, neighborhoods—started calling themselves cooperatives and performed what they understood to be the work of a cooperative. However, only a few of those tried to commercialize their produce via MRE networks. Others established more modest chain infrastructures; some opened up a shop in a nearby town or a tourist spot; many set up salesrooms in their villages and erected signboards to attract clients.

These first attempts turned out to be onerous and not very successful, with little infrastructural stability. Over two to three years, annual deliveries were organized to coincide with MRE holidays, and MREs returned to their host countries with knowledge, strategies, narratives, and argan oil. But development and state funds poured more money into the cooperatives' coffers than did the oil trade itself.

Ideally, a cooperative would be composed of trusted people on the Moroccan side, whether members of an extended family, a neighborhood, or a village, who are involved in a sort of import company based on an MRE NGO or CSO. But these alternative supply chain infrastructures were even more vulnerable and unstable than their precursors, requiring protection from undesired external intervention, careful information brokerage, and internal cohesion. They became sites of experimentation, of application of new technologies, of improvisation and emulation and trying out what other networks had successfully done. Through experimenting with technologies and materialities, the villagers in turn generated alternative normativities, as will be discussed below. One strategy the villagers and MREs pursued was redeploying infrastructural fragments to alternative ends in order to simplify the connections in the chain and avoid administrative and/or legal bottlenecks. Those efforts that proved competitive on the market made use of economic co-optation and imitation strategies, which wove the projects into the fabric of the contemporary global argan oil trade. The diverse strands within the argan GVC inevitably took shape through mutual codevelopment and coproduction. Within a few years (2003–2010), the self-initiated business relations stabilized and villagers enjoyed relative autonomy and emancipation from the larger economic networks to which they had previously been bound.

Upstream experimentation focused on reducing manual labor, improving the shelf life and the purity of the product, and rearranging access to raw material. These changes led to a technicization of the artisanal production. By investing part of their profits in industrial commodities, village producers were able to make technological upgrades. Access to the power grid, which became available in the 2010s in the course of the official

electrification program, allowed the use of new technological tools that facilitated both oil processing and resource management. One such tool was a recently devised electrified version of the traditional hand mill. Other technomaterial components were brought into play or invented, such as drip-irrigation kits, or “tribal arts” packaging displaying tribal tattoo markers of identity. Hygiene standards improved with access to fresh water and new storage equipment replaced the porous plastic soft drink bottles that had previously been reutilized as oil containers. New working standards and regulations emerged from these new technologies and practices. The result was the emergence of a bricolage infrastructure that combined older and newer technologies, endowing newer components with more traditional, customary meaning and vice versa.

## **New Infrastructure Normativity**

Along with the technomaterial components, a complex infrastructural legal framework was solidified by borrowing and processing legal components from many sources. One important step to establishing a solid legal foundation of the network was the self-legalization of the two cooperating units, the village cooperatives and their MRE satellites. Legal guidelines for cooperatives now applied to kin groups or other groups based on social and territorial proximity, and these displayed their own specific plural legal registers and provided a sound legal format for the upstream partner. In addition, the traditional village councils became legally recognized “associations for rural development,” thus providing a contact for negotiations with state institutions (Turner 2006; Charfi 2009). A complementary organizational structure emerged downstream, where families and people sharing the same place of origin formed legal units by adopting the legal status of an NGO, CSO, or registered trade company.

The organizations at the two ends of the infrastructure are spatially far apart but bound into a web of collaboration by official legal means, for example contractual provisions, and also by customary legal rules in which social and spatial proximity are associated with providing mutual support. A moral economy infrastructure for argan oil trade was enacted, and in some cases translated into a “nonprofit status” of both the upstream and the downstream partner. In this way, masses of legal requirements (tax and commercial regulations) are circumvented while also ensuring the legal security that was considered indispensable.

Updates to the local legal regime were also necessary. Village councils took up this initiative by suggesting adjustments to resource management

and other domains related to the argan business. The new interest in the forest as a resource, transforming nature into infrastructure (Carse 2012), entailed a radical change in the local legal framework. Access rights to forest plots that had fallen somewhat into disuse have been reinstated and the transmission of these rights clarified, as have traditional norms regulating the care for the resource, such as closed seasons and specific harvesting technologies. Local actors were linked to the official legal sphere through their legal empowerment in the form of state recognition as cooperatives; this opened the possibility of applying for official export trading licenses. In this way the normativity of the informal chain was linked to the legal universe of the official argan infrastructure and supply chain law proper, encompassing matters such as labor law standards and export permits following certification with the designated state institutions.<sup>3</sup> Non-capitalist configurations of niche product infrastructures existing in the shadow of powerful GVCs necessarily develop their specific technolegal foundations so as to enable a moral economy model for the chain (Kapfhammer and Winder 2020). Legal pluralism that designs stability and predictability across ontological differences between up- and downstream normativities may help infuse a moral commitment into the material and technical components of infrastructure (see Jensen and Morita 2015, 84 on Marres 2013, 423).

However, most endeavors to commercialize argan oil ultimately failed in the face of the infrastructural challenges of professionalizing the logistical and legal aspects of export. In addition, the normativity of transport systems, shelf life requirements, quality standards, and import licenses, all of which follow a logic of “law as calculation” that is inherent to a capitalist world order, have been inserted into the chain as a translation machine and reappear locally in different degrees of amalgamation with labor laws, environmental protection, and nature conservation regulations, and so on. In effect, the legal agency of an infrastructure lies in the interstices of relationality and coproduction of all contributing components, both human and nonhuman.

The real challenge was to overcome the spatial distances between upstream and downstream endpoints. In the first years, MREs headed for European metropolises in overloaded cars, or, in the case of Canada-based MREs, arranged semi-official means of transport. It was standard to declare private, noncommercial use of the oil instead of applying for an export permit. Over time it became necessary to organize deliveries without MRE intervention to make the project sustainable. Infrastructure similarities with the official GVCs helped surmount the challenges of border crossing,

complying with food standards for export into the EU and Canada, and acquiring certification as a product produced according to the solidarity economy. In fact, a few of the networks succeeded in riding on some of the infrastructural components that all supply chains share. The corresponding infrastructure in the host countries with officialized endpoints as non-profit NGOs or eco-business CSOs involved a distribution network with organic food wholesalers and health food stores or organic food shops as sales points. Other networks founded professional sales companies.<sup>4</sup>

A third branch preferred to remain in the informal economy. They continued to transport oil in canisters or plastic bottles themselves via the MRE routes to places in Europe. The oil was then sold at farmers markets and similar events and venues. These MREs regarded themselves as part of the local cooperative and hoped that strategic ignorance of the legal and economic consequences of crossing a non-EU border with a commercial commodity would work. For a time, this business model was able to survive under the radar of the officially certified argan oil GVCs. However, things changed once official oil importers began to regard the informal networks as competitors.

## **People Connected through Infrastructure**

It is important to emphasize, as Anand, Gupta, and Appel (2018, 18) have done agreeing with Catherine Fennell's point: new forms of sociality and obligation have emerged out of the earlier failed infrastructure. While infrastructures create social roles that have to be scripted in new ways or transform existing ones, as Angelo and Hentschel (2015) argue, repair work creates new social roles, for both the villagers and their MRE relatives. Cooperatives have enrolled as a new form of sociality in infrastructure and the villagers have rescripted this form. Village councils connected with cooperatives have resurfaced as environmentalist NGOs and bodies of local self-organization. New trans-scalar ties connect MREs and their places and families of origin. The MRE-based development NGOs abroad create feedback effects in Morocco; such relationships combine the MRE investment in a better future with a stronger affective association with the village outposts. New forms of maintaining social cohesion have emerged between villagers who stay and migrants far away (Larkin 2008).

These relations are a form of "people in and as infrastructure" and involve permanent maintenance work that encompasses technical, social, political, and legal elements (Simone 2004). Human relations acquire an infrastructural quality and chain infrastructure solidifies into a complex,

translocal legal regime of ordering and chain governance. New normative-political authority emerges out of the infrastructure. Representatives of the two communities influence upstream legal decision making and decisions about natural resource extraction, and MREs insert new ideas that have materialized through their interaction with people and ideas in their host countries. Thus, the GVC produces a specific infrastructure-based concept of belonging that unites people on different continents.

## **Resetting the Legal Pluralism of Infrastructure after the Breakdown**

As I have dealt with in detail elsewhere (Turner 2016), the concept of infrastructure makes it possible to examine the normativity of a supply chain as a specific form of plural legal configuration and to ask how chain-specific normativity interacts with the wider legal environment in which it is embedded (see also Snyder 1999; IGLP 2016). In such technoscientific infrastructures, Fischer (2005, 55) notes how “market, law, code, and norms compete for hegemonic control over the rules of play.” Supply chains represent infrastructural translation networks in which normative components (knowledge, practices, protocols, and material technology) are cotranslated as they move from one link in the chain to the next. Law is translated from one context to the next, and law itself translates and transforms the subjects and objects it governs. GVCs as a worldwide infrastructural grid constitute a master tool of global capitalism and offer participation in the global economy in exchange for extractivism, exploitation, and disenfranchisement. However, upstream producers in the postcolony often resist infrastructural injustice while downstream consumers increasingly refuse irresponsible consumption. This may lead to infrastructure breakdown and the emergence of alternative options. When exploring alternatives, producers may profit from their experiences in GVC production and emulate its infrastructural design. This need not be tinkering with a decaying infrastructure, as has been argued in the anthropological literature, but can be about emulation and setting up a separate chain. As Pinch (2010, 84 f.) emphasizes, the interplay of a flexible plural law with technology is important for the integration of old and new infrastructure components into a functioning whole. Law is a stabilizing component that glues disparate layers of supply chain infrastructure together as a way of coping with exclusion from official chain-making.

The case study shows how new technologies, or more precisely an amalgamation of traditional and newly imported technologies, that were

coproduced along with economic, legal, and other social changes, paved the way for the repair of a failed infrastructure. Eventually, parts of the repair infrastructure that were born out of resistance were successful in integrating the failed model and contributed to the creation of new, changed versions. Most of the material components of this alternative infrastructure chain were not specifically constructed for this purpose; they all are already there: trees, fruits, cell phones, roads, vehicles, long-distance trade network facilities, and more. They all have been assembled into a specific configuration together with nonmaterial components. On the basis of this, new technomaterial components were brought into play or newly created. The normativity generated by the new technolegal assemblage of the cooperative leads to an updating of the older technology that preceded the foundation of modern “mechanized” cooperatives. The same holds true for the social organization of the human actors who run the technologies. Plural normativity constitutes a fundamental and indispensable component in the infrastructural architecture. While supply chain infrastructure makes it possible for forms of solidary economies to be integrated into neoliberal infrastructures, the village cooperatives rejected this and found an alternative approach.

## **Conclusion**

This article theorizes supply chain infrastructure as an emergent assemblage and analyzes how plural law is scripted in infrastructural design in coproduction with constitutive technoscientific and material components. Legal plurality regulates the entanglements of infrastructural components, which in turn display their inherent normative power and ordering capacities.

The ethnography of repair work after a law-induced breakdown of a supply infrastructure enables us to understand the legal entanglements underlying infrastructure; they include the normativity inherent in technology and scientific knowledge regimes. Thus, when complex infrastructure fails, the interweaving of the components that make up the infrastructural assemblage generates effects other than those that the agents who thought to control the infrastructure’s agency expected.

There are many possible effects: infrastructural legal configurations may persist and provide the framework for repair; they may also be subject to normative bricolage at the grassroots and across scales; or they may be updated to maintain flows and interactions. Breakdowns do not necessarily eliminate inequalities inscribed in the infrastructure. Quite often the disadvantaged are among those most affected by breakdowns. However, the

breakdown opens up potential for change and “new infrastructures make their promises in different ways to different people” (Hetherington 2019, 41). As Pinch (2010, 80) put it, “users can act as ‘agents of technological change’” and “‘repurpose’ technologies for completely new uses.” Graham and Thrift (2007) argue that infrastructures are in permanent need of repair, which offers opportunities for upgrades that are more than restoration. Thus, broken infrastructure may lead to innovation that in turn produces new normativity. The hope that inheres in the promise of infrastructure sets free energy to engage into repair work, enacting new social roles and shaping new legal protocols.

Such technolegal repair work exhibits an affective cohesion that incorporates human agents across time and space in a moral assemblage. Here, the moral and affective qualities of the technolegal and human–non-human relationalities in infrastructure repair work come to the fore. They allow the human agents to insert additional layers into the infrastructural design, translating “neutral” technonormativity into a matter of care that enables technomaterial upgrades of the infrastructure and the stabilization of the human and more-than-human relationalities on which the infrastructure is based. In this way they overcome the fragility of infrastructure’s plural law whose components constantly interact within the assemblage and its nonlegal constituents while bound in dialogue with the legal environment in which the infrastructure is embedded. Such an affective–normative quality makes this strand different from the complex and multilayered mainstream supply chain while still compatible enough to operate in its wake as one possible alternative enactment. It is not uncommon for alternative GVC infrastructures to exist in the shadow of capitalist chain networks (see, e.g., Kapfhammer and Winder 2020). The two are even interwoven in complex ways, imitate one another and profit from one another.

Legal developments may lead to technological upgrades to explore new opportunities beyond the mainstream, while technological aspects may materialize in standard settings to the extent that legal and technological factors can hardly be separated. Large-scale infrastructure exhibits an increasing impact of encoded normativity, forming plural legal configurations of hitherto unexplored complexity whose power far exceeds the situatedness usually ascribed to the normative project. Such assemblages invite an epistemological approach that combines STS with legal anthropology. Translocal technolegal assemblages enact communities of law across spaces along infrastructures. The normativity of infrastructure materializes in the interstices of technoscientific, material, and legal encounters.

## Acknowledgment

I am grateful to Brenda Black for her input that goes far beyond language editing work, to my co-special issue editor Melanie Wiber, the LOST Group (<https://lost-research-group.org/>), the editors of ST&HV and two anonymous reviewers for their very insightful suggestions and comments on previous versions of this text.

## Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

## Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

## ORCID iD

Bertram Turner  <https://orcid.org/0000-0003-1235-8758>

## Notes

1. Lippe (2017) with reference to Hadfield (2016).
2. Research was carried out in Morocco for several weeks each year between 1996 and 2005, in 2010, 2011 and 2016. Between 2006 and 2019 fieldwork in communities of Moroccan migrants in Canada (Montreal, Toronto and Vancouver), France (Paris) and the Netherlands (Amsterdam) was combined with tracing argan oil infrastructure strands from the producer to the consumer. From 2001 to 2010, the fieldwork was part of a project on “Sustainable Development and Exploitation of Natural Resources, Legal Pluralism, and Transnational Law in the ‘Arganeraie’ Biosphere Reserve” within the “Project Group Legal Pluralism” at the Max Planck Institute (MPI) for Social Anthropology in Halle/Saale, Germany. Since 2010 I have continued my related work within the MPI’s more recently constituted Department “Law & Anthropology.”
3. See Frohlich 2017 analyzing the normativity of labels as information infrastructure.
4. For an example of such a self-initiated network that is not included in the ethnography presented, see Roberts 2014.

## References

- Anand, N., A. Gupta, and H. Appel, eds. 2018. *The Promise of Infrastructure*. Durham, NC: Duke University Press.

- Angelo, H., and C. Hentschel. 2015. "Interactions with Infrastructure as Windows into Social Worlds: A Method for Critical Urban Studies: Introduction." *City* 19 (2-3): 306-12. doi: 10.1080/13604813.2015.1015275.
- Appadurai, A. 2015. "Mediants, Materiality, Normativity." *Public Culture* 27 (2): 221-37.
- Bellihi, H., and M. Bazi. 2015. "Role of SMEs in the Economic and Social Development: Case of Terroir Products in Souss Massa Draa Region (Morocco)." *Advances in Economics and Business* 3 (8): 340-47.
- Benda-Beckmann, K. von, and B. Turner. 2020. "Anthropological Roots of Global Legal Pluralism." In *Global Legal Pluralism*, edited by P. Schiff Berman, 67-141. Oxford, UK: Oxford University Press.
- Berman, P. Schiff. 2016. "The Evolution of Global Legal Pluralism." In *Authority in Transnational Legal Theory: Theorising Across Disciplines*, edited by R. Cotterrell and M. Del Mar, 151-88. Cheltenham, UK: Edward Elgar.
- Biermayr-Jenzano, P., S. N. Kassam, and A. Aw-Hassan. 2014. *Understanding Gender and Poverty Dimensions of High Value Agricultural Commodity Chains in the Souss-masaa-draa Region of Southwestern Morocco*. Amman, Jordan: ICARDA (International Center for Research in Dry Areas).
- Bouroua, A. 2016. "Financement et Spécificités des Règles des Coopératives Agricoles Marocaines." *Revue Marocaines des Coopératives* 6:23-36.
- Bowker, G. C., K. Baker, F. Millerand, and D. Ribes. 2010. "Toward Information Infrastructure Studies: Ways of Knowing in a Networked Environment." In *International Handbook of Internet Research*, edited by J. Hunsinger, L. Klastrup, and M. M. Allen, 97-117. Dordrecht, the Netherlands: Springer.
- Bowker, G. C., and S. L. Star. 1999. *Sorting Things Out: Classification and Its Consequences*. Cambridge, MA: MIT Press.
- Carse, A. 2012. "Nature as Infrastructure: Making and Managing the Panama Canal Watershed." *Social Studies of Science* 42 (4): 539-63.
- Charfi, A. 2009. "The Role of Emigrants in Rural Development Associations in Morocco." *Journal of Ethnic and Migration Studies* 35 (10): 1643-63.
- Chu, J. 2014. "When Infrastructures Attack: The Workings of Disrepair in China." *American Ethnologist* 41 (2): 351-76.
- Cloatre, E., and D. Cowan. 2019. "Legalities and Materialities." In *Routledge Handbook of Law and Theory*, edited by A. Philipopoulos-Mihalopoulos, 433-52. New York: Routledge.
- Davies, M. 2017a. *Law Unlimited. Materialism, Pluralism, and Legal Theory*. New York: Routledge.
- Davies, M. 2017b. "Plural Pluralities of Law." In *Pursuit of Pluralist Jurisprudence*, edited by N. Roughan and A. Halpin, 239-60. Cambridge, UK: Cambridge University Press.

- Dias Pereira, L., and N. Santos. 2018. *Investing in Collective Action: Opportunities in Agrifood Cooperatives*. Rome: FAO. Accessed March 11, 2020. <http://www.fao.org/family-farming/detail/en/c/1152436/>.
- Dossa, Z. 2011. "Cooperatives: A Development Strategy? An Analysis of Argan Oil Cooperatives in Southwest Morocco." *Euricse Working Paper No. 029* (12). Italy: Fondazione Euricse.
- Edwards, P. N., St. J. Jackson, G. C. Bowker, and R. Williams. 2009. "Introduction: An Agenda for Infrastructure Studies." *Journal of the Association for Information Systems* 10 (SI): 364-74.
- Fischer, M. M. 2005. "Technoscientific Infrastructures and Emergent Forms of Life: A Commentary." *American Anthropologist* 107 (1): 55-61.
- Frohlich, X. 2017. "The Informational Turn in Food Politics: The US FDA's Nutrition Label as Information Infrastructure." *Social Studies of Science* 47 (2): 145-71.
- Graham, S., and N. Thrift. 2007. "Out of Order: Understanding Repair and Maintenance." *Theory Culture and Society* 24 (3): 1-25.
- Hadfield, G. 2016. *Rules for a Flat World. Why Humans Invented Law and How to Reinvent It for a Complex Global Economy*. Oxford, UK: Oxford University Press.
- Harvey, P., C. B. Jensen, and A. Morita. 2017. *Infrastructures and Social Complexity. A Companion*. New York: Routledge.
- Harvey, P., and H. Knox. 2012. "The Enchantments of Infrastructure." *Mobilities* 7 (4): 521-36.
- Hetherington, K., Ed. 2019. *Infrastructure, Environment, and Life in the Anthropocene*. Durham, NC: Duke University Press.
- Howe, C., J. Lockrem, H. Appel, E. Hackett, D. Boyer, R. Hall, and M. Schneider-Mayerson. 2016. "Paradoxical Infrastructures: Ruins, Retrofit, and Risk." *Science, Technology, & Human Values* 41 (3): 547-65.
- IGLP Law and Global Production Working Group. 2016. "The Role of Law in Global Value Chains: A Research Manifesto." *London Review of International Law* 4 (1): 57-79.
- Jensen, C. B., and A. Morita. 2015. "Infrastructures as Ontological Experiments." *Engaging Science, Technology, and Society* 1 (2015): 81-87.
- Kahn, J. S.. 2017. "Geographies of Discretion and the Jurisdictional Imagination." *Political and Legal Anthropology Review* 40 (1): 5-27.
- Kapfhammer, W., and G. M. Winder. 2020. "Slow Food, Shared Values and Indigenous Empowerment in an Alternative Commodity Chain Linking Brazil and Europe." *Sociologus* 70 (2): 101-22.
- Kelty, C. 2016. "Introduction: Evil Infrastructures." *Cultural Anthropology Field-sights*, April 28. Accessed March 11, 2020. <https://culanth.org/fieldsights/serie/s/evil-infrastructures>.

- Kingsbury, B. 2019. "Infrastructure and InfraReg: On Rousing the International Law 'Wizards of Is'." *Cambridge International Law Journal* 8 (2): 171-86.
- Lakoff, A., and S. J. Collier. 2010. "Infrastructure and Event: The Political Technology of Preparedness." In *Political Matter. Technoscience, Democracy, and Public Life*, edited by B. Braun and S. J. Whatmore, 243-66. Minneapolis: University of Minnesota Press.
- Larkin, B. 2008. *Signal and Noise: Media, Infrastructure, and Urban Culture in Nigeria*. Durham, NC: Duke University Press.
- Larkin, B. 2013. "The Politics and Poetics of Infrastructure." *Annual Review of Anthropology* 42 (1): 327-43.
- le Polain de Waroux, Y. 2012. "Social and Ecological Change in the Argan Woodlands, Morocco." *PhD Thesis*. Louvain-la-Neuve, Belgium: Université Catholique de Louvain.
- le Polain de Waroux, Y., and E. F. Lambin. 2013. "Niche Commodities and Rural Poverty Alleviation: Contextualizing the Contribution of Argan Oil to Rural Livelihoods in Morocco." *Annals of the Association of American Geographers* 103 (3): 589-607.
- Lessig, L. 2006. *Code. Version 2.0*. New York: Basic Books.
- Likosky, M. B.. 2006. *Law, Infrastructure, and Human Rights*. Cambridge, UK: Cambridge University Press.
- Lippe, P. 2017. "Will Trump Make Legal Infrastructure 'Great Again'?" Accessed June 5, 2018. [http://www.abajournal.com/legalrebels/article/will\\_trump\\_make\\_legal\\_infrastructure\\_great\\_again/9](http://www.abajournal.com/legalrebels/article/will_trump_make_legal_infrastructure_great_again/9).
- Marres, N. 2013. "Why Political Ontology Must Be Experimentalized: On Ecohomes as Devices of Participation." *Social Studies of Science* 43 (3): 417-43.
- Meager, K. 2019. "Working in Chains: African Informal Workers and Global Value Chains." *Agrarian South: Journal of Political Economy* 8 (1-2): 64-92.
- Montanari, B., and S. I. Bergh. 2019. "Why Women's Traditional Knowledge Matters in the Production Processes of Natural Product Development: The Case of the Green Morocco Plan." *Women's Studies International Forum* 77(November-December): 1-11. doi: 10.1016/j.wsif.2019.102275.
- Niewöhner, J. 2015. "Infrastructures of Society, Anthropology Of." In *International Encyclopedia of the Social & Behavioral Sciences*, vol. 12, edited by J. D. Wright, 119-25. Oxford, UK: Elsevier.
- Perry, W., O. Rappe, A. Boulhaoua, L. L. Hassan, Y. Elhouss, H. Ait Ahssain, Z. Ait Barich, H. Akhiyat, T. A. Aznague, and S. Hraïd. 2019. "Argan Oil and the Question of Empowerment in Rural Morocco." *The Journal of North African Studies* 24 (5): 830-59.
- Pinch, T. 2010. "On Making Infrastructure Visible: Putting the Non-humans to Rights." *Cambridge Journal of Economics* 34 (1): 77-89.

- Redfield, P. 2016. "Fluid Technologies: The Bush Pump, the LifeStraw® and Microworlds of Humanitarian Design." *Social Studies of Science* 46 (2): 159-83.
- Roberts, N. 2014. "A Moroccan entrepreneur brings argan oil to America by way of women's co-ops. Accessed August 27, 2021. <https://www.theguardian.com/money/2014/jul/13/argan-oil-morocco-entrepreneur-skin-hair-cosmetics>.
- Robinson, D. F. 2014. *Biodiversity, Access and Benefit-sharing. Global Case Studies*. New York: Routledge.
- Robinson, D. F. 2020. *The Moroccan Argan Trade: Producer Networks and Human Bio-geographies*. New York: Routledge.
- Robinson, D. F. and N. Graham. 2018. "Legal Pluralisms, Justice and Spatial Conflicts: New Directions in Legal Geography." *The Geographical Journal* 184 (1): 3-7.
- Romagny, B., S. Boujrouf, N. Ait Errays, and M. Benkhallouk. 2016. "La filière "huile d'argan" au Maroc: Construction, enjeux et perspectives." In *Les terroirs au Sud, vers un nouveau modèle?: une expérience marocaine*, edited by M. Berriane and M. Geneviève, 271-89. Rabat, MO: IRD.
- Roumane, A. 2017. "Structures Coopératives et valorisation économique de la biodiversité. Cas de la filière d'huile d'argan au Maroc." *Revue Internationale de l'Économie Sociale* 346 (2017): 59-72.
- Simone, A. M. 2004. "People as Infrastructure: Intersecting Fragments in Johannesburg." *Public Culture* 16 (3): 407-29.
- Snyder, F. 1999. "Governing Economic Globalisation: Global Legal Pluralism and European Law." *European Law Journal* 5 (4): 334-74.
- Star, S. L. 1999. "The Ethnography of Infrastructure." *American Behavioral Scientist* 43 (3): 377-91.
- Star, S. L. 2002. "Infrastructure and Ethnographic Practice. Working on the Fringes." *Scandinavian Journal of Information Systems* 14 (2): 107-22.
- Star, S. L., and K. Ruhleder. 1996. "Steps Toward an Ecology of Infrastructure: Design and Access for Large Information Spaces." *Information Systems Research* 7 (1): 111-34.
- Turner, B. 2006. "Competing Global Players in Rural Morocco: Upgrading Legal Arenas." *Journal of Legal Pluralism* 38 (53-54): 101-39.
- Turner, B. 2014. "Neoliberal Politics of Resource Extraction: Moroccan Argan Oil." *Forum for Development Studies* 41 (2): 207-32.
- Turner, B. 2015. "Die normativ-technologische Konstruktion einer Wertschöpfungskette: Arganöl aus Marokko." *Yearbook of the Max Planck Society* 2014/5. Accessed March 11, 2020. [http://www.mpg.de/8898304/JB\\_2015?c=9262520](http://www.mpg.de/8898304/JB_2015?c=9262520).
- Turner, B. 2016. "Supply-chain Legal Pluralism: Normativity as Constitutive of Chain Infrastructure in the Moroccan Argan Oil Supply Chain." *Journal of Legal Pluralism* 48 (3): 378-414.

- Turner, B., and M. Wiber. 2020. "Law, Science, and Technologies." In *Law and Anthropology*, edited by M.-C. Foblets, M. Goodale, M. Sapignoli, and O. Zenker, 1-21. Oxford, UK: Oxford University Press. doi: 10.1093/oxfordhb/9780198840534.013.44.
- Ubena, J. 2012. "E-documents and E-signatures in Tanzania: Their Role, Status, and the Future." In *Handbook of Research on E-government in Emerging Economies: Adoption, E-participation, and Legal Frameworks*, edited by K. J. Bwalya and S. F. Zulu, 90-122. Hershey, Penn: IGI Global.
- Valverde, M., J. Fleur, and J. Raso. 2019. "Governing Infrastructure in the Age of the 'Art of the Deal': Logics of Governance and Scales of Visibility." *Political and Legal Anthropology Review* 41 (S1): 118-32.
- von Schnitzler, A. 2013. "Traveling Technologies: Infrastructure, Ethical Regimes, and the Materiality of Politics in South Africa." *Cultural Anthropology* 28 (4): 670-93.
- von Schnitzler, A. 2014. "Performing Dignity: Human Rights, Citizenship, and the Techno-politics of Law in South Africa." *American Ethnologist* 41 (2): 336-50.
- von Schnitzler, A. 2016. *Democracy's Infrastructure: Techno-politics and Protest after Apartheid*. Princeton, NJ: Princeton University Press.
- Weilenmann, M. 2009. "Project Law—A Power Instrument of Development Agencies. A Case Study from Burundi." In *The Power of Law in the Transnational World. Anthropological Enquiries*, edited by F. von Benda-Beckmann, K. von Benda-Beckmann, and A. Griffiths, 156-75. Oxford, UK: Berghahn.

## Author Biography

**Bertram Turner** is an anthropologist and senior researcher in the Department Law & Anthropology, Project Group Legal Pluralism, at the Max Planck Institute for Social Anthropology in Halle, Germany. He combines legal anthropology and legal pluralism with STS in his research on supply chain infrastructure, extractivism, more-than-human environmentalism, and migration.