13 Criminal Networks and Black Markets in Transnational Environmental Crime

Lorraine Elliott

Introduction

Environmental crime has become 'serious, transnational and organized' (Banks et al. 2008, p. 2). Crimes associated with illegal extraction, harvest and waste are serious because of their environmental consequences, because of the ways that they undermine the rule of law and good governance at local, national and global levels, and because of their links with violence, corruption and a range of cross-over crimes such as money laundering. They have become increasingly transnational as those involved take advantage of a globalizing economy characterized by freer trade, increases in the frequency and volume of commodity shipments, fewer border controls, and the opportunity to launder profits into legitimate enterprise through financial and banking systems that have a global reach. And this area of criminal activity is sufficiently systematic and organized that it now merits consideration alongside other forms of transnational organized crime. These particular forms of organized illegal trade fit the definition of what makes crime transnational set out in the UN Convention Against Transnational Organized Crime. That is, they are either committed in more than one state or are committed in one state but with a substantial part of the preparation, planning, direction or control taking place in another state (United Nations 2000, Article 3). In effect, the products, the perpetrators and often the profits move across borders with the knowing intention of obtaining illegal gain.

Indeed, transnational environmental crime, defined here to include wildlife smuggling, timber trafficking and the black market in ozone depleting substances (ODS), is reputed to be one of the fastest growing areas of criminal activity, globally worth billions of dollars in profit to criminal groups around the world. In the early 2000s, the monetary value of transnational environmental crime was estimated to be between US$31 billion a year and US$40 billion a year or more (see Lauterback 2005; Lovell 2002). By 2014, the United Nations Environment Programme and Interpol were reporting estimates for what they called 'transnational organized environmental crime' of US$70 billion to US$213 billion a year (Nellemann et al. 2014, p. 7). Estimates are also available for individual sectors. The annual value of the illegal timber trade, for example, has been estimated at a 'minimum of $US11 billion' (Nellemann and Interpol Environmental Crime Programme 2012, p. 13). Illegal wildlife trade is calculated

to be worth US$50 billion to US$150 billion a year (UNEP 2014, p. 25).

The seriousness of key transnational environmental crime sectors has been acknowledged at the global level. In March 2012, Interpol convened the first ever meeting of International Chiefs of Environmental Compliance and Enforcement. Delegates expressed their worries about 'the scale of environmental crime and the connection with organized transnational crime, including … issues of smuggling, corruption, fraud, tax evasion, money laundering, and murder' (Interpol 2012, p. 2). Two years later, governments attending the 2014 London Conference on the Illegal Wildlife Trade drew attention to the 'significant scale and detrimental economic, social and environmental consequences of the illegal trade in wildlife', highlighting the 'organised and widespread criminal activity, involving transnational networks' that facilitate these kinds of illegal markets (London Conference on the Illegal Wildlife Trade 2014, paras 1–2). The purpose of this chapter, then, is to gain a better understanding of ways in which those markets in illegally produced, harvested or extracted environmental commodities operate illicitly and covertly across borders. This chapter analyses criminal networks involved in the trafficking of protected wildlife, illegally logged wood and the black market in ODS. In order to understand this business of organized crime, this chapter draws on criminological social network analysis, and approaches to networks developed in the fields of public policy and management and transaction cost economics. In doing so, it builds a cross-disciplinary model of criminal networks that is relational (social), organizational (governance) and transactional (production). From this model follow four aspects at the core of this analytical framework: nodes; specialization and differentiation; relationships of supply and exchange; and the efficiency of mechanisms of social control.

The Market for Protected Wildlife, Timber and ODS: Demand and Supply

The illegal trade that constitutes much of transnational environmental crime relies on a political economy of 'lootable commodities' – those that are 'high in value but have low economic barriers to extraction' (Farah 2010, p. 2) – and on 'uncritical markets [that] ensure that there are buyers for goods at the right price, regardless of how they are obtained, processed or transported' (Nellemann et al. 2010, p. 34). These markets are driven by both price and cost differentials: when expected returns (price) are higher than for analogue legal trade, when 'demand exceeds the supply of legal products' (in the case of timber, for example) (OECD 2011, p. 7), and when compliance with regulations (cost) can be avoided through illegal practices as is the case in the black markets in ODS and hazardous waste.

Each of these illegal market sectors reflects patterns of demand and supply. In the illegal wildlife trade supply follows demand. Private collectors and zoos in developed and developing countries want rare and unusual species. Consumer preferences create niche markets for

components of protected plants and animals that are used in traditional Asian and African medicines, for exotic foods such as bushmeat and reef fish, and for fashion items that use ivory, tortoise shell or shatoosh (the wool of the endangered Tibetan antelope, the chiru, which has to be killed for the wool to be collected). The Asia-Pacific region is thought to account for up to three-quarters of the illegal wildlife trade either as source or destination. But South America has also become a wildlife crime 'hot spot' with up to 15 per cent of the illegal trade now estimated to be sourced in Brazil alone (Giovanini 2006, p. 27). Developed countries are not immune. Countries such as Australia and New Zealand, for example, are prime targets for poachers and smugglers seeking wild birds, reptiles and native insects for sale to collectors in the international marketplace (see UNODC 2013, ch. 7). Wild birds of prey are smuggled from the United Kingdom to the falconry market in the Middle East (Smith 2010). Poachers have targeted North American bears for the Asian medicine trade (Interpol 2014). The trade in illegally logged timber, which one observer describes as being of 'industrial scale' (Lawson 2004a, p. 1), is driven by a global demand for cheap timber and by specific market demand for high-value species such as rosewood and mahogany. It is also a consequence of private sector efforts to generate quick profits through evading government fees and taxes and avoiding the costs of compliance with environmental regulations.

The black market in ODS is, somewhat ironically, a direct but unintended demand-driven consequence of international efforts to protect the ozone layer through restricting and then prohibiting the production and consumption of such chemicals. Demands for cheap ODS (rather than substitutes that required expensive retrofitting) went 'underground', first in developed countries and then in developing countries as the provisions of the 1987 Montreal Protocol and its amendments made production and consumption effectively illegal. The illegal trade in hazardous waste, on the other hand, is explicitly supply-driven as those who produce waste seek to avoid high disposal costs and those who export it for illegal disposal seek quick profit. While much of it ends up in developing countries, Interpol's Pollution Crimes Working Group has identified a profitable trade between developed countries. Organized 'waste laundering' between the United States and Canada, for example, is estimated by Interpol to generate criminal profits of CAN$2.48 million a year (2006, p. 2).[1]

Understanding TEC Networks from a Criminological, Commodity Chain and Governance Perspective

In simple terms, networks are 'actors … linked to each other through stable formal or informal relationships of communication and exchange' (Sangiovanni 2005, p. 7). They are usually distinguished from markets on the one hand and hierarchies (states or firms) on the other, a distinction that draws its impetus from Coase's work on theories of the firm. In pure markets, 'prices capture all the relevant information necessary for exchange' (Powell 1990, p. 297). In

contrast, ideal-type hierarchies involve tight coupling between nodes, and centralized governance structures that, in turn, demand varying degrees of formal decision-making. Nevertheless, hierarchies themselves do not come with a one-size-fits-all format and this applies equally to transnational crime. In a report for the UN Office of Drugs and Crime (UNODC 2002), for example, the Centre for International Crime Prevention described a typology of hierarchies ranging across standard, regional and clustered forms. In contrast to hierarchies, networks are loosely organized, decentralized and more fluid (in theory at least) in the way that information is managed and decisions made. In contrast to pure markets, they are iterative in a way that establishes more enduring patterns of interaction, and rely on signals other than those offered just by price to determine patterns of exchange. Williams suggests that networks (and we might assume that this applies equally to illegal networks) function as a complement to pure markets, 'making them more efficient, reducing transaction costs and providing increased opportunities for both buyers and sellers' (2001, p. 65). In this context, he also distinguishes between directed networks where a 'core of organizers … want to use [a network] for a specific purpose' and transaction networks which emerge 'spontaneously … to add efficiency to the functioning of a market' (Williams 2001, p. 69).

Much of the toolkit available for analysing networks, including criminal ones in this case, and the way they function draws on three bodies of literature – the criminology literature and in particular its focus on social network analysis; the literature on transaction cost economics which offers insights into production and value chains; and the public management literature that explores governance mechanisms within markets and networks. Of these three only the first – criminology – is explicitly concerned with the illicit economy and those engaged in it. Despite their different methodologies and intent, they have in common the claim that networks are at the very least organizationally different, and perhaps even ontologically distinct from the orthodox units of analysis that have characterized each particular field of inquiry: hierarchical crime groups, markets and states, and forms of production centralized in the firm. Networks are 'typically treated as varying along three related dimensions: the number of nodes; the … frequency of interaction between nodes; and the structure of the network, defined as the pattern of connection between nodes' (Lake and Wong 2009, p. 129). Drawing on these three bodies of literature, this basic analytical framework is adjusted to provide a more multi-faceted and, potentially, more operationally useful approach to investigating the nature of transnational environmental crime networks and the management of illegal trade.

Social Network Analysis of Crime

Contemporary criminology challenges long-held views that domestic and transnational crime is managed by hierarchically structured and tightly-controlled mafia or cartel arrangements in which family or ethnic ties are dominant. Research on sectors including the drug trade, human

trafficking and the arms trade confirms that organized crime 'increasingly operat[es] through fluid network structures' (Williams 2001, p. 64). This shift in research focus – from hierarchy to networks – has been accompanied by new methodologies and analytical frameworks that have sought to understand crime networks as *social* artefacts rather than just a new form of institutional arrangement. Social network analysis (SNA) proceeds from the assumption that 'criminals are embedded in a network of relationships' (Ballester et al. 2004, p. 1). It seeks to document relationships between offenders in order to identify and understand the density and social complexity of those links and to determine the characteristics of the roles that individuals play within criminal networks.

SNA also has a distinctly applied purpose. More effective, realistic and evidence-based modes of understanding criminal activity is argued, indeed assumed, to provide a crucial basis for better law enforcement outcomes. This form of SNA therefore relies on sufficient information about the relationships between particular known individuals (Bright et al. 2012, p. 157) to map the nominal and relational aspects of crime networks. Those datasets are usually gathered through in-depth research that can include analysis of open sources such as court proceedings, judicial statements and interviews with (former) offenders. When deployed by enforcement agencies, it will also include intelligence from covert sources. That level of detail is network- and case-specific. It can tell us something about known, individual TEC networks, but is less useful for capturing patterns of transnational illicit behaviour across space and time.[2] At the more abstract level, however, SNA does offer some useful conceptual scaffolding for research into the institutional forms and likely internal dynamics of networks associated with transnational environmental crime and its associated markets. In particular, it provides a language for describing individuals or actors (nodes) in illicit networks in functional and positional terms and for analysing the dynamics of connection and coordination within those networks. That language includes concepts of brokerage, centrality and density, redundancy and structural holes which are examined more closely later in this chapter.

Commodity Chain/Value Chain Analysis

In contrast to the focus on social networks associated with contemporary criminology, commodity chain or value chain analysis, which draws in turn on transaction cost economics (TCE), brings a production-based approach to our understanding of illicit networks.[3] Commodity chain analysis is primarily concerned with the 'spatial organisation of [licit] production … in a globalised world economy' (Potts 2006, p. 2) and the 'geographical regions within which specific processes and chain relationships occur' (Potts 2006, p. 3). As an analytical tool, it focuses on the processes by which material and labour inputs are sourced and managed, the role of technology in the way those inputs are assembled, and the nodes and networks (or chains) through which a finished commodity is produced and distributed. The core assumption that underpins global commodity chain analysis is that in production for the

global market, processes in which most or all aspects of production were in the past contained and controlled *within* multinational firms have given way to vertically disintegrated structures that take network form (see Gereffi et al. 2005).

The emphasis on transaction costs ensures that the material factors of supply, production and information, as well as those of bargaining and enforcement, will play a central role in decisions about how commodity or value chains are managed spatially and functionally as well as by whom. As with chains of custody associated with illicit trade, those networks will be characterized by efforts to balance high profits against low costs. In general, we might expect that transactions costs will be higher in covert or illicit networks than in networks of production or exchange that function in the legitimate economy. Those costs are associated with the demands for complicated forms of coordination that derive from the need for concealment and minimizing the risk of exposure to law enforcement action.

Commodity chain analysis can help to shed some light on 'the nodes … that are operational along a supply chain' (Potts 2006, p. 3), decisions about 'outsourcing' in illicit networks, about the value or otherwise of decentralized structures, and the nature of *supply* relationships between nodes rather than focusing on them primarily in associational terms. The goods that are traded across TEC chains of custody are likely to adopt some but not all of the characteristics of the commodities usually under scrutiny in value or commodity chain analysis. While some TEC commodities are placed on the market in the same raw form in which they were extracted or harvested, others are transformed through various degrees of 'production' as they move through the illegal chain of custody. For example ivory is almost always carved in some fashion before reaching its final market destination. Illegal wildlife products can also be tanned (as skins), or stuffed, or turned into wearable products (shoes or belts from reptile skins) or treated in some form for consumptive and medicinal purposes. For some commodities, that production process attracts a high degree of asset-specificity – that is, a skill set or knowledge specific to that particular transaction or transformation or where tasks are complex or difficult. The geography of supply, on the other hand, particularly for wildlife smuggling and timber trafficking, will be constrained by factors other than cost. It is, in effect, non-negotiable except in cases where there is little asset specificity involved (for example if the species of timber is irrelevant) or where individuals of species can be sourced from multiple and easily accessible range states.

Organizational Models: Public Policy and Management

Public policy and management approaches to networks share some similarities with commodity chain analysis, in particular the interest in governance structures. But whereas the former understands intra-network governance as a function of pricing signals and supply/purchaser relationships and as a synonym for coordination, specifically of the linkages between the nodes in a chain, the latter identifies governance structures and processes in the

formal and informal rule-making that arises from the policy-relevant 'actions of networks of actors' (Klijn 2005, p. 329). This shares some similarities with Kahler's (2009) conceptualization of networks as structure, by which he means to focus less on specific organizational forms (networks as actors in his typology) and more on the way that those forms influence the behaviour of the members of that network and, 'through them, produce consequential network effects' (2009, p. 4). In both licit and illicit spaces, therefore, networks function to sustain collective action and cooperation through 'sequential transactions within the context of a general pattern of interaction' (Powell 1990, p. 301).

As suggested above, criminal market networks are 'organised into a structure of relations between thieves, smugglers, facilitators, sellers and buyers of illicit commodities' (Mackenzie 2011, p. 69). The form of that organization will almost certainly differ across TEC sectors and even within them. In the licit economy, differences in network structures are 'contingent on the information processing requirements imposed by the characteristics of a product and its market' (Baker and Faulkner 1993, p. 838). In contrast, in the illicit economy those differences 'appear to be related to legal and financial risks associated with the crimes in question' and, in turn, to the 'required levels of trust between collaborating criminals' (Bruinsma and Bernasco 2004, p. 79). In TEC as in other areas of transnational criminality, the organizational form that criminal chains of custody take will also be influenced in part by the complexity of logistic trails. This includes the geographic distance across which goods are transported to link source with market, the volume or bulk of shipments, and the ease or otherwise with which goods or profits can be laundered into the legitimate economy.[4]

Raab and Milward argue that illegal networks will generally demonstrate a tendency towards decentralized structures 'unless the task necessitates a centralised one' (2003, p. 434). However the literature is divided on the relationship between task demands and decentralization. With respect to legitimate production networks or commodity chains, Baker and Faulkner have suggested that 'difficult, complex [and] ambiguous tasks are performed more effectively in decentralised structures' (1993, p. 844). In contrast, Powell points to the importance of more centralized arrangements in situations of high-asset specificity, that is, where the complexity of the task requires 'knowledge specific to the transaction' (1990, p. 297).

The most common organizational forms are chain networks and hub-and-spoke networks (sometimes also called star or wheel networks).[5] Chain networks most closely approximate the ideal-type network: the structure is organizationally flat and loosely coupled rather than centralized or hierarchical (although there might well be hierarchical arrangements at any particular nodal point). As Kenney describes it, independent nodes or cells perform specific tasks and conduct arm's length transactions directly with other nodes 'without mediation and oversight with core groups' (2007, p. 244). Hub-and-spoke networks, on the other hand, involve core groups that coordinate activities among 'functionally specific nodes' such as

suppliers, transporters and distributors (Kenney 2002, p. 3). While these networks display higher levels of density or interconnectedness between nodes than chain networks, they are still constructed on a need-to-know basis in which communication between nodes is managed to limit the risks of discovery. Links between core groups are likely to be more dense than those between peripheral nodes such as those involving poachers or chain saw operators who are likely to have little contact with the 'main architects behind the trade' (Aning 2007, p. 200). Capabilities are unlikely to be evenly distributed and core groups or individuals can function as 'multi-task enterprises' (Kenney 2007, p. 242). Hub-and-spoke networks also provide more scope for, or are the consequence of, a kingpin strategy. In this organizational form, kingpins direct all aspects of an illicit chain of custody even if they also sometimes rely on trusted intermediaries as a way of buffering themselves against claims of criminal activity.

Networks for Black Markets

The varying forms of network arrangements that characterize black markets in ODS, smuggled wildlife and trafficked timber link together poachers, harvesters, producers, traders, brokers, purchasers and retailers to manage illicit chains of custody. Some of this illegal commercial exchange is managed through simple, amateur efforts involving a small number of people, uncomplicated routes and unsophisticated forms of concealment (disorganized crime). The criminal networks that sustain larger-scale TEC, on the other hand, are professional and well organized with complex transnational relationships of communication and exchange that span the illicit and licit economies and that link local harvest, extraction and waste production to a global marketplace. They involve multiple participants in the logistic trail, complex trade and transportation routes, and sophisticated methods of concealment.

The three approaches to networks in the previous section of this chapter provide both a language and the analytical tools to contribute a more nuanced understanding of illicit TEC networks in social, organizational and transactional terms. Not only does it help to track the nature of nodes in logistic trails but it also shines light on specialization and role differentiation, and on supply and exchange relationships. As noted above, the concept of 'nodes' (and those who occupy them) has been central to social network analysis in particular although transaction cost economics also uses the term, particularly in discussions of global production and commodity chains as touched on above and described in more detail below. As discussed earlier in this chapter, that production and commodity chain literature explores material factors of supply and production in both licit and illicit networks. In doing so, and in focusing attention on factors such as asset specificity and the kinds of supply relationships that exist between production nodes, it points to the importance of also asking questions about the extent and nature of role and production specialization or differentiation. Finally, the overview of public policy and management approaches outlined in the previous section offers insights

into the internal organizational structures of illicit networks and the way that those networks are governed or managed. In particular, the focus in that literature on the degree of centralized or decentralized organizational arrangement generates propositions about the importance of mechanisms of social control.

Nodes

The idea of a 'node' offers a conceptual and empirical starting point for understanding illicit networks. A node is the location at which some form of supply, exchange, production or transformation in a commodity (or the profits of such) takes place. It can be occupied by an individual or a group of individuals, including those that take on a more formal structure such as a company, a public or private agency or similar. Nodal roles can be described in functional terms. Within a TEC logistic trail or chain of custody individuals or groups might be poachers, harvesters, chain-saw operators, purchasers or collectors, exporters, transporters, cutters and carvers, or retailers. They might also be delinquent professionals – accountants, lawyers, financiers or shipping agents, for example – who act in various ways to launder profits, facilitate links to the upperworld, and minimize or even cause to disappear the threat of prosecution. Depending on the nature of the supply and exchange relationships, nodes (whether individuals or small groups or cells) can function with varying degrees of autonomy, possibly even offering their services to more than one network or market arrangement.

Nodes in TEC networks are designed to contribute to or manage illicit trade flows. The links between those nodes, therefore, consist not just of social relations but also relationships of illegal commercial exchange. The sophistication of these networks – constituted by the links between nodes – makes it possible for bulk consignments of illegal wildlife, timber, waste and ODS to be moved across borders by ship, barge, truck and plane. To make detection more difficult, illicit environmental goods are often moved along complex routes through multiple nodes or transhipment points where surveillance and enforcement is lax. Timber from the Congo basin is being moved through companies in Burundi, Rwanda and Uganda before being exported to the European Union, the Middle East, China and other Asian countries, with support from financiers in the United States (Nellemann et al. 2010, p. 6). Intelligence on merbau smuggling syndicates in Southeast Asia shows that they involve timber brokers in Jakarta, companies and individuals in Malaysia who oversee the actual logging, agents in Singapore who charter cargo vessels and who arrange false documentation, and brokers in Singapore and Hong Kong who connect sellers in places such as Papua with buyers in India and China (Newman and Lawson 2005, p. 9). The illegal trade in elephant tusks from Africa into Asia is reported to involve interlocking webs of shell companies, Southeast Asian and African nationals, and smuggling routes that trade from Africa across multiple borders and through several Asian ports before reaching its final destination (Banks et al. 2007). Ivory that ends up in China or Japan may have come from the Democratic Republic of Congo,

Cameroon and Nigeria, through ports including Hong Kong, Macau and Taiwan. Jernelov (2005) reports complicated distribution lines in chlorofluorocarbons (CFCs) from Spain via Singapore or Dubai, through India to Nepal or Bangladesh and then back again to the market in India, often relabelled or with fraudulent documentation.

The number of nodes that can be identified in an illicit network – either directly or indirectly – reveals the size of a network. The size of a network and the geographic location of the nodes within it can tell us something about the likely complexity involved in logistic trails. But it says little about the division of labour within a network or the rationale for such a division. This requires examining nodes and the relationships between them in the transactional or production terms favoured by commodity chain analysis. This is somewhat akin to the distinction that Curtis and Wendel make between social organization and technical organization, the former referring to issues of cooperation, differential responsibilities, and power and authority relationships, the latter to include 'physical location … procedures, [and] technology' (2000, p. 128). As indicated earlier in this chapter, we need to understand both – the social and the technical (including transaction arrangements) – to understand the nature of illicit trade networks.

Specialization and Role Differentiation

Commodity chain analysis, and its accompanying emphasis on modes of production, can offer further insights into the form and function of illicit networks for transnational environmental crime by directing attention to the nature and degree of specialization and role differentiation within TEC networks (see Bright et al. 2012). This pays less attention to individual nodes or actors and 'focuses instead on the business of organized crime' (Mcillwain 1999, p. 303). Questions about specialization focus on whether particular skills are required in either the production or transaction process, broadly understood, or whether individuals can easily switch roles: this relates to the asset-specificity dimension introduced above. The related question about differentiation examines whether different people perform different roles or whether individuals can or do occupy multiple nodes, that is whether they perform more than one role in the chain of custody.

Specialist skills can also take the form of particular production expertise within a network as well as the ability to channel information in situations of knowledge asymmetries, or to undertake tasks such as laundering profits seamlessly into the legitimate economy. Different kinds of illicit environmental commodities, and the markets associated with them, will require different levels of specialization. Roles such as operating chain saws for illegal logging can usually be done by unskilled or semi-skilled workers, as can timber milling. Tiger poaching, on the other hand, requires expertise: skins that are damaged in the killing process are of little value on the illicit market. While smuggling ODS across borders might require few commodity-specific skills, the illegal production of ODS is asset-specific, usually drawing on

expertise within the legitimate industry. The modes by which illicit environmental commodities are transported along a logistic chain (for example in bulk or in small consignments, by air, sea or road) will also create demands for different capabilities and skills.

The answers to questions about specialization and differentiation in illicit environmental networks will also reveal something about redundancy and criticality within those networks. Within TEC networks, in-built redundancy – that is, more than one person or node able to fulfil any particular task – can arise at a number of points in the chain of custody. As Kenney points out, multiple nodes also 'provide enterprise leaders with a range of options in planning their illicit activities' (2002, p. 13). Critical nodes, on the other hand, are those without which the network would cease to function easily, or the loss of which would make the network more susceptible to further disruption and decapitation. Critical nodes are more likely in markets and illicit trade networks which have a high degree of specialization and a low level of differentiation. As with licit markets, critical nodes in illicit TEC networks are likely to exist in functional terms at the point of production, harvest or capture; at the point of export or import, and the point of retail or final use. Critical nodes can also be defined in entrepreneurial or positional terms, sometimes captured in concepts such as 'middleman' [*sic*] or in terms of brokers and brokerage.

Robust redundancy, or minimal criticality, is more likely for those commodities for which few specific harvesting or production or transportation skills are required. The illegal trade in pangolin, prized for their meat and their scales for use in traditional Asian medicine, requires little specialization in terms of harvest and therefore comes with a high degree of in-built redundancy at that part of the chain of custody at least. In their range states in Southeast Asia, pangolin are mainly sourced from farmers who know that if they come across a pangolin it is worth money if they can get it to a local buyer. But the buyers do not rely on *specific* farmers as extraction nodes. As noted above, poaching tigers from the wild, whether alive for specialist collectors or zoos or dead for their skins, requires greater skill. The networks that manage wild-tiger chains of custody are therefore more likely to be vulnerable to harvest/extraction criticality though even this will depend in part on the pool of available 'labour'. The same is the case for, say, ivory carving. This is a specialist skill but evidence suggests that there is still a reasonable labour pool, particularly in parts of China and Southeast Asia. Therefore the extent of redundancy or criticality embedded in any *particular* ivory smuggling network will depend on access to carvers.

Relationships of Supply and Exchange

In their discussion of commodity chains and the technology that is used to produce specific components of a commodity, Gereffi et al. (2005) distinguish between different kinds of supply arrangements. These can be mapped, albeit with a bit of conceptual flexibility, onto those that supply chains that function within illicit networks. While Gereffi and colleagues categorize

overall chains as either supplier-driven or producer-driven, the term 'supply' is used in this part of the chapter to capture the provision of goods and services within illicit TEC networks. That is, while those networks are primarily driven by demand for illicit environmental goods (with the exception of hazardous waste) the internal technical organization nevertheless involves nodes who supply products, skills or expertise to the chain of custody.

Gereffi et al. (2005) identify three main forms of supply relationship that can exist between nodes: commodity suppliers, captive suppliers and turn-key suppliers. Commodity suppliers are those who provide standard, undifferentiated products at arm's length from any specific market demand. This concept can capture processes such as timber milling where the technology and skill set is standard and can be called on equally for illicit as for licit production. It may apply to transport supply such as the use of tobacco boats (so-called because they have been used to smuggle tobacco) also being used to smuggle cylinders of illegal ODS from the Caribbean to the United States. It may also capture supply sectors such as those associated with some parts of the illegal pet trade or the illegal fur trade for which there is a parallel or analogue legal trade.[6]

Captive suppliers, in contrast, make products using processes that are 'dedicated to customers' needs' under conditions where the suppliers are 'transactionally dependent' on those for whom they produce or to whom they sell (Gereffi et al. 2005, pp. 83–4). These might be specialist manufacturers who are more likely to work in forms similar to artisan craftspeople in the legitimate economy. In the TEC context, this captive supply can take the form of skills or products for a specific illicit market, for example expert preparation of the components used in traditional Asian medicines, or illegally produced (and transported) ODS, or ivory that has to be cut to reach its highest value on the black market.

The final category – that of turn-key suppliers – produce to a customer's specifications but (recalling the focus of commodity or value chain analysis on technological inputs to production) do so with machinery or processing techniques or expertise that has the flexibility to adapt to meet the needs of different buyers. In the TEC context, turn-key suppliers might include so-called 'swing plants' (Liu 2007, p. 7) that have been able to adjust from producing CFCs to producing HCFCs (hydrochlorofluorocarbons). Such suppliers might include 'processing plants' such as those reported by IFAW that have been set up to butcher and package pangolin meat. It can also include tanning and taxidermy skills that can be applied to different contexts (such as reptile skins being imported illegally into the United States or tiger skins being exported from South Asia). Such production suppliers are not always co-located with the source of the illegal commodity. EIA, for example, reports buyers of tiger skins in Inner Mongolia who divert skins to professional tanners in Hebei Province.

Efficiency and Mechanisms of Social Control

Understanding the relationship between production nodes and the way they function in

commodity chains, in an enterprise structure, is a necessary but not necessarily sufficient condition for analysing TEC networks and associated trade. In criminal networks, the efficiency dividend that might come from 'outsourcing' and open lines of communication associated with commodity chains in the licit economy conflicts with the need for security. As well as the kind of efficient communication, supply and transfer that sustains transnational market exchange in the licit economy, TEC networks are likely to place a high value on physical and descriptive concealment of various kinds – of the commodities that are being traded, of the shipments, and of the profits and the criminal actors. This demands that personal contact across a network is limited or controlled, especially if participants in illicit markets are likely to cooperate in 'complex and unpredictable ways' (Williams and Godson 2002, p. 323). The networks that sustain illicit transnational environmental markets also require effective mechanisms of social control. Doing business in the illicit economy therefore influences the ways in which intermediaries in the network establish and maintain contacts, the ways in which bonds of trust are sustained in the absence of formal hierarchy and, as Edwards and Gill point out, the ways in which 'criminal expertise is transferred' (2003, p. 62). The more effective these webs of affiliation and mechanisms of social control are, the less likely is the risk of exposure and the more resilient a network will be in protecting logistic trails and sustaining illicit markets. In that sense, trust functions in criminal networks in much the same way as in transnational inter-firm networks – to 'dampen opportunistic behaviour' and to make possible 'more complex … divisions of labour' (Gereffi et al. 2005, p. 81).

Local communities who provide labour for illegal logging, timber processing or wildlife poaching are often integrated into criminal networks through patron–client relationships. These are likely to involve semi-feudal connections to local timber barons or local officials who control aspects of criminal activity, or through social coercion that takes advantage of economic vulnerability in situations where alternative livelihoods are not available. Local communities are sometimes also 'bought off' to minimize protests in areas where resource extraction is known to be illegal (see, for example, the case studies of Cameroon in Van Oijen and Angerand 2007). Those engaged in illicit TEC market activity have also moved to take advantage of the 'upperworld' of corrupt officials and politicians, enabling them to evade control mechanisms and protect illegal chains of custody. Indeed, some commentators suggest that corruption should best be understood not as a pathology of the state, but rather as an instrument of risk management – a strategy for doing business – for criminal groups (Williams 2002, pp. 174–5). Local officials, customs officers, police and the judiciary are bribed to overlook illegal shipments, to assist with false paper trails and forged documentation, to help evidence disappear during prosecutions, to delay or drop prosecutions, and even to return no convictions when cases are brought to trial. Syndicates running timber smuggling enterprises in Indonesia, for example, are reported to have 'bought off local Indonesian customs officials and harbour masters' and used their influence to 'have any attempted

shipments by competitors stopped' (Lawson 2004b, p. 13). Companies in Ukraine have 'negotiated' with customs officers to facilitate the importation of 'uncontrolled' ODS (Demkine 2001, p. 10) and companies involved in timber theft in Papua are reported to be 'aided every step of the way by officials from the military, police and forestry departments, as long as the requisite bribe is paid' (Newman and Lawson 2005, p. 7).

Conclusion

The focus of this chapter was on exploring ways in which illicit trade in environmental commodities can be analysed and understood. In effect, the focus here has been on (illegal) trade as the business of criminal activities that are organized across borders. Using examples from the illegal wildlife trade, timber trafficking and the black market in ODS, this chapter has drawn on the toolkits provided by social network analysis, commodity chain analysis (as a feature of transaction cost economics) and public policy approaches to intra-network governance. The interest has been in networks less as a function of social or associational relationships and more as a structure of supply chains and transactional or exchange relationships. It has argued that we need to take account of spatial organization of the kinds of production that are involved as illicit commodities 'travel' from source to market destination, and to explore the nature of nodal specialization, differentiation and asset-specificity. The framework sketched in this chapter can also help to correct for the focus in much literature on end-points rather than pipelines, on poachers, smugglers, timber-barons, 'kingpins' and the 'eco-mafia' rather than those who collect and warehouse illicit goods in border towns, or carve ivory, or tan tiger skins, or construct false walls in trucks, or carry contraband commodities in ones and twos across borders. The latter may be equally crucial to logistic trails and the black trade – getting a saleable commodity to market – as the former.

References

Aning, K. 2007. 'Are There Emerging West African Criminal Networks? The Case of Ghana', *Global Crime* 8(3), 193–212.

Arquilla, J. and Ronfeldt, D. 2001. 'The Advent of Netwar (Revisited)', in *Networks and Netwars: The Future of Terror, Crime and Militancy*, edited by J. Arquilla and D. Ronfeldt. Santa Monica: RAND, 1–25.

Baker, W.E. and Faulkner, R.R. 1993. 'The Social Organization of Conspiracy: Illegal Networks in the Heavy Electrical Equipment Industry', *American Sociological Review* 58(6), 837–60.

Ballester, C., Calvó-Armengol, A. and Zenou, Y. 2004. *Who's Who in Crime Network: Wanted the Key Player*. Working Paper no. 617. Stockholm: The Research Institute of Industrial Economics.

Banks, D., Gosling, J., Newman, J., Noble, R. and Rice, M. 2007. *Upholding the Law: The Challenge of Effective Enforcement*. London: Environmental Investigation Agency.

Banks, D., Davies, C., Gosling, J., Newman, J. Rice, M., Wadley, J. and Walravens, F. 2008. *Environmental Crime: A Threat to Our Future*. London: Environmental Investigation Agency.

Bouchard, M. and Wilkins, C. 2009. 'Introduction', *Global Crime* 10(1), 1–5.

Bright, D.A., Hughes, C.E. and Chalmers, J. 2012. 'Illuminating Dark Networks: A Social Network Analysis of an African Drug Trafficking Syndicate', *Crime, Law and Social Change* 57(2), 151–75.

Bruinsma, G. and Bernasco, W. 2004. 'Criminal Groups and Transnational Illegal Markets', *Crime, Law and Social Change* 41(1), 79–94.

Curtis, R. and Wendel, T. 2000. 'Toward the Development of a Typology of Illegal Drug Markets', *Crime Prevention Studies* 11, 121–52.

Demkine, V. 2001. 'Facing the Challenge in Countries with Economies in Transition', *OzonAction Newsletter* Special Supplement no. 6, 9–12.

Edwards, A. and Gill, P. 2003. 'Measurements and Interpretations', in *Transnational Organised Crime: Perspectives on Global Security*, edited by A. Edwards and P. Gill. London: Routledge, 59–64.

Environmental Investigation Agency (EIA). 2014. *In Cold Blood: Combating Organized Wildlife Crime*. London: EIA.

Farah, D. 2010. *Transnational Crime, Social Networks and Forests: Using Natural Resources to Finance Conflicts and Post-Conflict Violence*. Washington, DC: Program on Forests [PROFOR].

Gereffi, G., Humphrey, J. and Sturgeon, T. 2005. 'The Governance of Global Value Chains', *Review of International Political Economy* 12(1), 78–104.

Giovanini, D. 2006. 'Taking Animal Trafficking Out of the Shadows: RENCTAS Uses the Internet to Combat a Multi-Billion Dollar Trade', *Innovations* 1(2), 25–35.

Interpol. 2012. *International Chiefs of Environmental Compliance and Enforcement: Summit Report*. Lyon: Interpol Secretariat.

——— 2014. *Assessment on Illegal Bear Trade*. Lyon: Interpol Environmental Security Sub-Directorate.

Interpol Pollution Crimes Working Group. 2006. *Assessing the Links Between Organized Crime and Pollution Crimes*. Lyon: Interpol Secretariat.

Jernelov, A. 2005. *The Ozone Mafia*. Project Syndicate Print Commentary.

Kahler, M. 2009. 'Networked Politics: Agency, Power and Governance', in *Networked Politics: Agency, Power and Governance*, edited by M. Kahler. Ithaca: Cornell University Press, 1–20.

Kenney, M. 2002. *The Challenge of Eradicating Transnational Criminal Networks: Lessons from the War on Drugs*. Paper prepared for the 2002 Annual Meeting of the American Political Science Association, 29 August to 1 September.

——— 2007. 'The Architecture of Drug Trafficking: Network Forms of Organisation in the Columbian Cocaine Trade', *Global Crime* 8(3), 233–59.

Klijn, E.-H. 2005. 'Designing and Managing Networks: Possibilities and Limitations for Network Management', *European Political Science* 4, 328–39.

Lake, D.A. and Wong, W.H. 2009. 'The Politics of Networks: Interests, Power and Human Rights Norms', in *Networked Politics: Agency, Power and Governance*, edited by M. Kahler. Ithaca: Cornell University Press, 127–50.

Lauterback, A. 2005. *Statement by the Chair*. Interpol Environmental Crimes Committee to the 5th International Conference on Environmental Crime, Lyon, 2 and 3 June.

Lawson, S. 2004a. *The Ramin Racket: The Role of CITES in Curbing Illegal Timber Trade*. London: Environmental

Investigation Agency.

——— 2004b. *Profiting from Plunder: How Malaysia Smuggles Endangered Wood*. London and Bogor: Environmental Investigation Agency/Telapak.

Liu, N. 2007. *Illegal Trade in Ozone Depleting Substances*. Bangkok: United Nations Environment Programme.

London Conference on the Illegal Wildlife Trade. 12–13 February 2014. *Declaration*, paras 1–2. Available at: www.gov.uk/government/uploads/system/uploads/attachment_data/file/281289/london-wildlife-conference-declaration-140213.pdf (accessed 25 March 2015).

Lovell, J. 2002. 'Eco-Crooks Outwitting Law Agencies', Reuters News Service, 28 May. Available at: www.planetark.org/dailynewsstory.cfm/newsid/16164/newsDate/28-May-2002/story.htm (accessed 19 September 2012).

Mcillwain, J.S. 1999. 'Organized Crime: A Social Network Approach', *Crime, Law and Social Change* 32(4), 301–23.

Mackenzie, S. 2011. 'The Market as Criminal and Criminals in the Market: Reducing Opportunities for Organised Crime in the International Antiquities Market', in *Crime in the Art and Antiquities World: Illegal Trafficking in Cultural Property*, edited by S. Manacorda and D. Chappell. New York: Springer, 69–86.

Nellemann, C. and Interpol Environmental Crime Programme. 2012. *Green Carbon, Black Trade: Illegal Logging, Tax Fraud and Laundering in the Worlds Tropical Forests. A Rapid Response Assessment*. Nairobi: United Nations Environment Programme/GRIDArendal.

Nellemann, C., Redmond, I. and Refisch, J. 2010. *The Last Stand of the Gorilla: Environmental Crime and Conflict in the Congo Basin*. Norway: UNEP GRID Arendal.

Nellemann, C., Henriksen, R., Raxter, P., Ash, N. and Mrema, E. 2014. *The Environmental Crime Crisis – Threats to Sustainable Development from Illegal Exploitation and Trade in Wildlife and Forest Resources: A UNEP Rapid Response Assessment*. Nairobi/Arendal: United Nations Environment Programme and GRID-Arendal.

Newman, J. and Lawson, S. 2005. *The Last Frontier: Illegal Logging in Papua and China's Massive Timber Theft*. London and Bogor: Telapak/Environmental Investigation Agency.

Organisation for Economic Co-operation and Development (OECD). 2011. *Illegal Trade in Environmentally Sensitive Goods: Draft Synthesis Report*, COM/TAD/ENV/JWPTE(2011)45. Paris: OECD Trade and Agriculture Directorate/Environment Directorate.

Potts, J. 2006. *Global Commodity Chain Sustainability Analysis: Explanations and Examples*. Prepared for the Planning Meeting of the Task Force on China's sustainable development and global markets. Winnipeg: IISD.

Powell, W.W. 1990. 'Neither Markets nor Hierarchy: Network Forms of Organization', *Research in Organizational Behaviour* 12, 295–336.

Raab, J. and Milward, H.B. 2003. 'Dark Networks as Problems', *Journal of Public Administration Research and Theory* 13(4), 413–39.

Sangiovanni, M.E. 2005. 'Transnational Networks and Security Threats', *Cambridge Review of International Affairs* 18(1), 7–13.

Smith, S. 2010. 'Halting Illegal Bird Trade to Gulf'. BBC News [online]. Available at: www.bbc.co.uk/news/science-environment-11086707 (accessed 13 March 2015).

Sturgeon, T.J. 2008. *From Commodity Chains to Value Chains: Interdisciplinary Theory Building in an Age of Globalization*.

Working Paper Series WP-2008–02. Pittsburgh: University of Pittsburgh Industry Studies Association.

UN Office of Drugs and Crime (UNODC). 2002. *Results of a Pilot Survey of Forty Selected Organized Criminal Groups in Sixteen Countries*. Vienna: UNODC Global Program against Transnational Organized Crime.

——— 2013. *Transnational Organized Crime in East Asia and the Pacific: A Threat Assessment*. Bangkok: UNODC.

United Nations 2000. *UN Convention Against Transnational Organized Crime*. General Assembly Resolution 55/25, 15 November.

United Nations Environment Programme (UNEP). 2014. *UNEP Yearbook: Emerging Issues in Our Global Environment*. Nairobi: UNEP Division of Early Warning and Assessment.

Van Duyne, P.C. 2002. 'Introduction: Upper- and Underworld Cross-Border Crime Economy', in *Upperworld and Underworld in Cross-Border Crime*, edited by P.C. van Duyne, K. von Lampe and N. Passas. Nijmegen: Wolf Legal Publishers, 1–10.

Van Oijen, D. and Angerand, S. 2007. *Illegally Logged Wood from Cameroon on the Dutch Market*. Amsterdam and Paris: Milieudefensie/Les Amis de la Terre.

Williams, P. 2001. 'Transnational Criminal Networks', in *Networks and Netwars: The Future of Terror, Crime and Militancy*, edited by J. Arquilla and D. Ronfeldt. Santa Monica: RAND, 61–97.

——— 2002. 'Transnational Organized Crime and the State', in *The Emergence of Private Authority in Global Governance*, edited by R.B. Hall and T.J. Biersteker. Cambridge: Cambridge University Press, 161–82.

Williams, P. and Godson, R. 2002. 'Anticipating Organized and Transnational Crime', *Crime, Law and Social Change* 37(4), 311–55.

---

1 Interpol describes this as a 'an organised process to export and "launder" hazardous wastes through companies in the USA and return the waste to Canada' (2006, p. 2).

2 See, for example, a specific illegal network for the trade in big cats described by the EIA (2014, pp. 9–12).

3 Sturgeon explains that the term 'value' was introduced to what had previously been described as commodity chains to overcome colloquial images of commodities as singular goods such as oil or bulk agricultural products, and also to encapsulate the idea that value is or can be added at each stage of the commodity production chain (2008, p. 8).

4 Laundering is understood here as 'all consequential handling … devoted to conceal the results of a predicate crime for profit' (Van Duyne 2002, p. 4).

5 Arquilla and Ronfeldt (2001) add to this the all-channel network where everyone is connected to everyone else. There is little evidence that this form – which in many respects is hardly a network at all – applies in any TEC sector.

6 For example, Bouchard and Wilkins (2009, p. 4), referring to Wyatt's work, note that the 'illegal fur trade is populated by individuals who are already involved in the legal fur trade, creating smuggling channels along already existing legitimate structures'.