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Pastoralist livelihood diversification and social network transition: a conceptual framework

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Around the world, many pastoralists are diversifying their livelihoods by incorporating alternative income generating activities. Much scholarship has examined the causes of this trend, however, less has been written about the consequences of diversification, especially how it may affect the structure and function of pastoralists' social networks. This perspective presents a conceptual framework for a pastoralist social network transition, driven by livelihood diversification, and its effects on resilience at household and community scales.

KEYWORDS

livelihood diversification, social networks, reciprocity, information, strength of weak ties

Introduction

Pastoralist livelihoods are important and widespread. Globally, between 200 and 500 million people rely on livestock husbandry as their primary economic activity (Mbow et al., 2020). Furthermore, pastoralist livelihoods are changing. Driven by various factors, many pastoralists have diversified into agriculture, wage-labor migration, and other activities in the past few decades (Little and McPeak, 2014). Much has been written, across many disciplines, about the *causes* of pastoralists' livelihood diversification. Less attention, however, has been paid to its *consequences*, especially to its effects on pastoralists' social networks, including their structures and functions. In this Perspective, I present an interdisciplinary conceptual framework for a pastoralist social network transition, driven by livelihood diversification, and its effects on resilience at household and community scales.

Pastoralists' livelihoods and social networks are deeply entangled and can serve similar purposes. While social networks are valuable for all people, providing broad social and emotional support, pastoralists' networks are broadly invaluable. They provide access to many critical material and information resources, including forms of insurance to manage risk. Ultimately, pastoralists turn to their social networks when they encounter problems, especially economic ones. Also, pastoralists' social networks undergird common property regimes on which communal natural resource management is

based. Correspondingly, changes to these social networks can mean changes in how individuals and groups manage resources and problems, across scales.

However, despite the similar roles that livelihoods and social networks can serve, little is known about how shifting livelihoods impact the structure of social networks, and how changing networks can affect individuals' and groups' capacities to respond to different types of challenges.

Importantly, pastoralist livelihood diversification and social networks each have many causes and consequences. My goal here is not to address all the factors that may drive, or respond to, these factors, but to focus narrowly on the relationship between the two, holding all else constant.

Livelihoods, social networks and technology

A widely used framework for examining small-holder economic activity and diversification, for both pastoralists and other groups, is the rural livelihoods approach (Ellis, 2000; Scoones, 2009). It is defined as the "process by which rural families construct a diverse portfolio of activities and social support capabilities in order to survive and improve their standards of living" (Ellis, 1998, 4). Among pastoralists, diversification can take several forms including the adoption of agriculture, wage-labor migration, off-farm employment, mining, and other activities (Berhanu et al., 2007; Liao et al., 2015; Majekodunmi et al., 2017; Woodhouse and McCabe, 2018).

Much of the scholarship on pastoralist diversification has focused on it antecedents (Fratkin, 2001), including market integration (Little, 2003; McPeak et al., 2011), land fragmentation and privatization (Homewood, 2004; Galvin et al., 2008; Galaty, 2013), NGO-led development (Igoe, 2003), climate change (Herrero et al., 2016), violent conflict (Bollig, 2016), biodiversity conservation (Homewood et al., 2009; Baird and Leslie, 2013) and changing cultural norms (McCabe et al., 2010). Studies have also examined the consequences of diversification, especially it's impacts on fertility (Hampshire and Randall, 2000) livestock management (McCabe et al., 2010), information exchange (Baird and Hartter, 2017), economic inequality (Majekodunmi et al., 2017), nutritional status (Galvin et al., 2015), and reciprocal exchange (Baird and Gray, 2014). Importantly, much less is known about the consequences of diversification for social network structure and function.

At their core, social networks are important conveyors of both material and information resources. In many parts of the Global South, a critical aspect of social networks has been culturally prescribed reciprocal exchange of material goods, such as gift-giving and informal lending (Mauss, 1967; Befu, 1977; Stark, 1999). Generally, these types of exchanges are viewed as key mechanisms within social groups to spread risk, smooth consumption, build trust, promote cooperation and support collective action (Iyer, 2021). However, as groups engage with markets and diversify their livelihoods, scholars have observed declines in these exchange practices (Baird and Gray, 2014; Kasper and Mulder, 2015; Caravani, 2019). Concurrently, the roles of social networks in facilitating information exchange, have been supercharged by the rapid adoption of mobile phones, which create new spatially heterogeneous opportunities for groups to access, exchange, and create information (Asaka and Smucker, 2016; Debsu et al., 2016; Parlasca, 2021).

New technologies, especially those that support the rapid exchange of information and materials, greatly shape the context in which social networks may be transitioning. Mobile phones, for example, have been lauded as transformative tools to improve livelihoods and social connection (Parlasca, 2021). Growing access to phones means that rural groups are gaining opportunities to develop their livelihoods, reduce information search and transaction costs, and benefit from improved market efficiency (Aker and Mbiti, 2010). Pastoralists use phones to share information about forage and water, livestock health, and nearby predators (Butt, 2014; Lewis et al., 2016; Baird and Hartter, 2017). Nonetheless, few studies, have examined the transformative effects of phones on rural social networks, individualism, collective action and risk management within developing groups (Palackal et al., 2011).

Also, phones are not the only technologies transforming rural areas. The rapid growth of physical infrastructure, including roads and access to electricity, is strengthening groups' capacities to produce and distribute material resources (Greiner et al., 2021). Taken together, burgeoning digital and physical infrastructure characterize the context in which social networks are transitioning.

Conceptual framework

To extend these ideas towards a flexible, social network transition model that illustrates the evolving interrelationships between livelihoods and types of exchange within pastoralist societies, I leverage further insights from livelihoods scholarship and integrate them with ideas from social network analysis and strength of weak ties theory.

Granovetter's Strength of Weak Ties theory (SWT) provides a foundation for this framework. This sociological theory states that an individual's weak ties confer a greater diversity of information and stronger economic opportunities than their strong ties (Granovetter, 1973). In this way, weak ties provide a particular type of social capital or value that is distinct from the value of strong ties. Despite the popularity of this theory across disciplines, little has been written about how: 1) networks within pastoralist societies transition from a preponderance of strong ties to preponderance of weak ties; and 2) what the strengths and weaknesses of weak ties may be in these contexts.

To apply SWT theory to examine the effects of changing livelihoods, I highlight two related but distinct fields of scholarship: the rural livelihoods approach (Ellis, 2000), described above, and social network analysis (SNA) (Borgatti et al., 2013). From the rural livelihoods perspective, households construct diverse livelihoods by mobilizing forms of capital (i.e., human, social, physical and natural). From the SNA perspective, household decision makers (i.e., egos) are embedded in relationships (i.e., links, ties, or edges) with other individuals or groups (i.e., alters) each exhibiting various characteristics (i.e., attributes). Applications of the livelihoods approach have often focused on the *effects* of social capital on livelihoods. Alternatively, SNA has focused more on the *causes* of social capital by examining how it is constructed by, and distributed through, social networks, though rarely in pastoralist settings (Roth, 2016).

Social capital is commonly understood as a type of value produced by social networks (Adger, 2003). As noted above, networks produce social capital by facilitating the exchange of material and information resources. Classic examples of these basic functions may be borrowing from a neighbor or reaching out to the friend of a friend for a lead on a new job. Beyond this, these connections serve to build trust and facilitate reciprocity between individuals and groups. Ultimately, networks of trust and reciprocity are strengthened through repeated interactions and become: 1) the places people turn to when they need resources and 2) the basis for collective action within communities.

It follows that different types of social capital would stem from different types of social networks. In fact, scholars have distinguished between "bonding" and "bridging" capital and networks. According to social capital scholar Robert Putnam, "some forms of social capital are, by choice or necessity, inward looking and tend to reinforce exclusive identities and homogenous groups. . . Other networks are outward looking and encompass people across diverse social cleavages. . . Bonding social capital is good for undergirding specific reciprocity and mobilizing solidarity . . . Bridging networks, by contrast, are better for linkage to external assets and information diffusion" (2000, 22–23). Furthermore, groups that possess both types of capital are generally better able to adapt to change than primarily bonded groups (Patulny and Lind Haase Svendsen, 2007; Cofré-Bravo et al., 2019; Mathews, 2021).

Throughout the Global South many groups have homogenous, dense, strongly bonded social networks. These networks help households and communities to spread risk and manage uncertainty by facilitating the exchange of important materials and information between strong social ties. Traditional reciprocal exchange is exemplary of the ways in which social networks can transfer resources within networks to manage problems (Mauss, 1967; Thompson, 1971). Despite the value of bonded networks, groups in developing areas have begun managing risk more individually. This market-based trend towards privatization and individualization has occurred in several ways, including privatization of commonly held land (Thompson et al., 2009; Nelson et al., 2010; Sundstrom et al., 2012), increased investments in human capital (e.g., education) (Fratkin et al., 1999; Little et al., 2009; Baird, 2015), and livelihood diversification including urban migration (May and Ikayo, 2007; McCabe et al., 2014). These new activities, which are often associated with pastoralist sedentarization (Fratkin and Roth, 2005; Ikeya and Hakubutsukan, 2017; Fox et al., 2019), typically require new materials and new types of information and often bring households into contact with new individuals and groups (Baird and Hartter, 2017).

One intended outcome associated with increased individualization is a greater capacity to manage problems or crises independently. Among Maasai in northern Tanzania, Baird and Gray found that livelihood was associated with a decline in customary reciprocal exchange, including gifts, loans, and collective restocking, which respondents noted had customarily only been used when people had problems (2014). Elsewhere, diversified households were better able to withstand certain small shocks that affect just one of their activities (Wu et al., 2014; Lenaiyasa et al., 2020; Mohammed et al., 2021). Conversely, one potential *unintended* outcome of individualization may be a general weakening of bonded networks (as reciprocity declines) and also groups' capacities for collection action at larger scales, especially to manage group-level shocks.

The social network transition model

Figure 1 illustrates a conceptual model of the causes and consequences of a social network transition for pastoralist groups. The *causes* (Panel A) are organized within four stages wherein livelihood diversification (LD) drives changes in social network structures (i.e., from more bonded networks to more bridged ones) and functions, specifically the exchange of material and information resources, or inter-household exchange (IHE) and information diversity (ID). The *consequences* of this transition (Panel B), which are loosely aligned with the four stages, are viewed in terms of individuals' and groups' capacities to respond to different types of shocks.

In Stage 1, households' networks are comparatively homogenous and dense. Network members are ethnically, culturally, and/or economically similar to each other. For example, members may draw much of their income from a single dominant livelihood activity (i.e., LD is low), [acknowledging that pastoralists have long maintained other economic activities including exchange with other groups (Bollig, 2016)]. Dense connections are the primary avenues for the exchange of materials and information. Correspondingly, reciprocal material exchange to build relationships and spread risk is common (i.e., IHE is high).

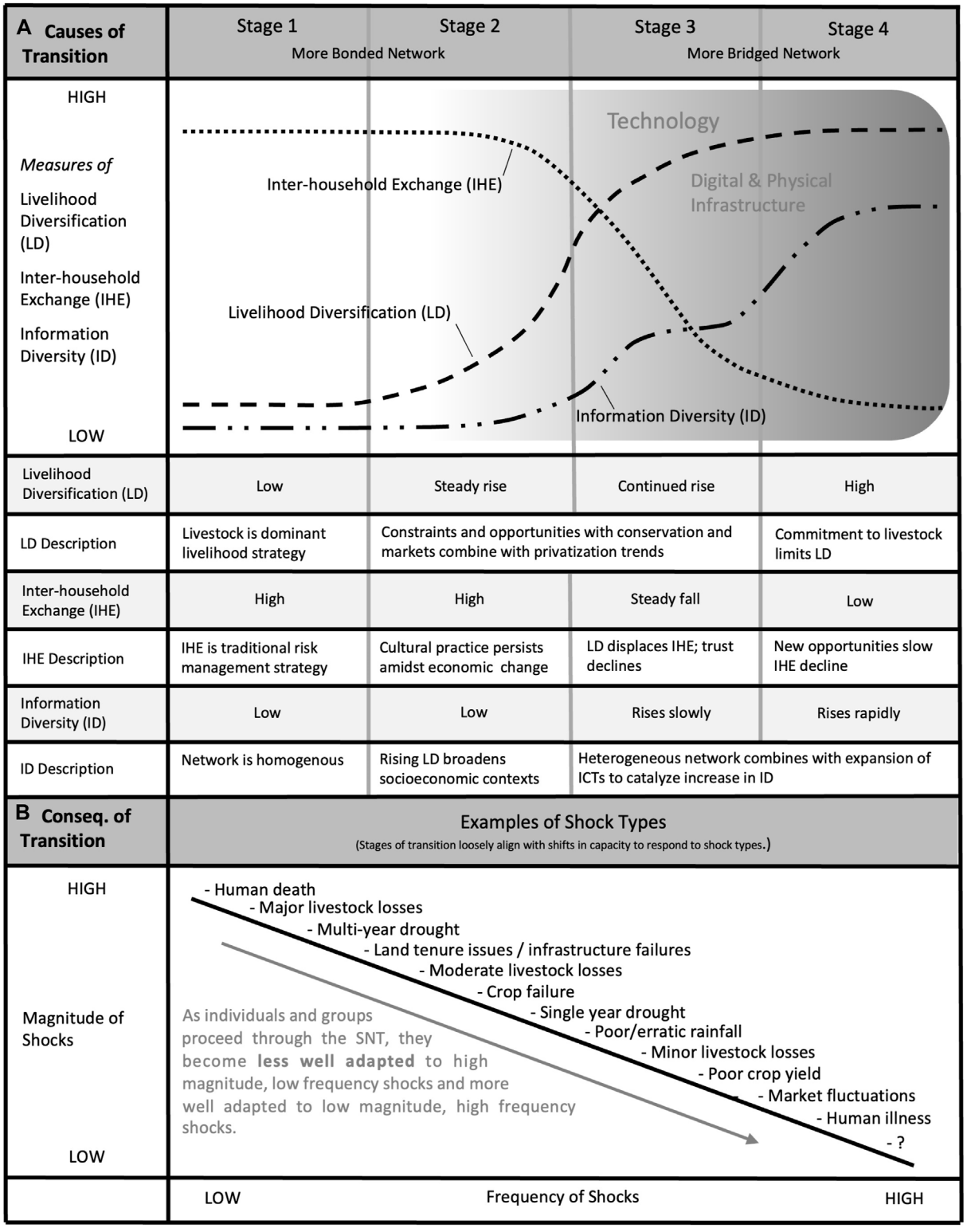

FIGURE 1
Conceptual model of causes **(A)** and consequences **(B)** of a pastoralist social network Transition (SNT) from more bonded to more bridged social networks driven by livelihood diversification and mediated by inter-house exchange and information diversity.

Information exchange, measured in terms of information *diversity* (which can be defined as the number and relative abundance of types; including types of information and communication partners), is limited by the network's homogeneity (i.e., ID is low). This "bonded" network may be well adapted to high magnitude/low frequency shocks like major livestock losses and multi-year drought (see Panel B).

In Stage 2, households begin to embrace alternative economic strategies in response to new constraints and opportunities associated with various shocks and shifting norms (i.e., LD increases). Shocks may include new policies that take resources out of production (e.g., expansion of protected areas), new digital and physical infrastructure, and/or increased market integration. However, economic strategies may shift more quickly than longstanding socio-cultural norms. Correspondingly, customary patterns of social organization, reciprocity and communication may persist despite economic shifts. During this period, diversified households may begin to manage certain small problems independently. Also, LD gives rise to news types of shocks that may be lower in magnitude, but greater in frequency like land tenure issues, infrastructure failures, and crop failures (see Panel B).

In Stage 3, diversified households continue to broaden and develop their social contexts through interactions with other groups, especially through new economic activities, including different land uses and urban migration, bringing them into contact with new people with different backgrounds and perspectives (i.e., ID begins to increase). During this period, diversified members increasingly manage smaller problems independently (e.g., erratic rainfall, minor livestock losses, poor crop yield) using cash from market-based activities (see Panel B), minimizing livestock sales. Previously, un-diversified households relied on social networks for support through traditional inter-household exchange (IHE) often meted out in livestock. Now, diversified households call on customary support networks less frequently (as LD increases, IHE decreases).

In Stage 4, historical and contemporary forces create tensions that limit certain changes and promote others. First, culturally engrained norms, especially surrounding livestock, impose limits on economic diversification (i.e., LD stabilizes). Also, new opportunities and new perspectives engender innovations in the use of traditional exchange mechanisms, which limit their decline (i.e., IHE decline slows). These innovations may include new types of exchange, exchange materials, terms of exchanges, exchange parties, or circumstances that warrant non-market exchanges. Lastly, new technologies and infrastructures, especially mobile phones, accelerate new weak ties within increasingly heterogeneous social networks resulting in rapid increases in the types of information exchanged (ID increases rapidly). Ultimately, more bridged social networks help households to prospect for information and opportunities, which serves diversified livelihoods and can help address smaller problems, like market or environmental fluctuations (see Panel B).

Taken together, increased livelihood diversification and the attending decrease in material reciprocity exchange (i.e., IHE) and increase in information diversity (ID) described in Stages 1 through 4, characterize a broad, and likely unidirectional, transition from a more "bonded," homogenous social network characterized by strong social ties to one that more resembles a "bridged," heterogeneous network where a smaller proportion of social ties are "strong" and a greater proportion are "weak."

Importantly, bonded and bridged social networks are not mutually exclusive—both are present throughout, but the ratio of bonded to bridged social ties shrinks as the transition progresses.

One significant consequence of this transition may be shifts in groups' abilities to respond to different types of shocks (i.e., resilience). Panel B (Figure 1) shows how shock frequency and magnitude are inversely related and provides examples along a continuum from high magnitude/low frequency to low magnitude/high frequency. As groups transition from more bonded to more bridged networks, they may become better adapted to high frequency shocks (e.g., human illness, market fluctuations, minor losses) and perhaps less well adapted (i.e., less resilient) to high magnitude shocks (e.g., land disputes, severe drought, major livestock losses) that require broad trust and collective action to address. In this way, both the strengths *and weaknesses* of weak ties are called into question.

Discussion

This conceptual model of a social network transition provides an adaptable framework to guide future research and development in support of pastoralist communities amidst diversification. It builds on several longstanding areas of scholarship and highlights three variables (LD, IHE, ID) that together are hypothesized to drive pastoralist social networks from more homogenous, bonded structures towards more heterogenous, bridged ones. Last, it presents potentially important consequences of this transition, specifically a shift towards greater household-level resilience to high-frequency/low-magnitude shocks, and reduced community-level resilience to low-frequency/high-magnitude shocks. In essence, this model illustrates how diversification, can lead to a type of social change, which plays out in environmental systems often characterized by low-frequency/high magnitude shocks—marginal environments where longstanding patterns of pastoralist mobility and social organization are well adapted. In this way, pastoralist social network transitions may ultimately undermine the sustainability of pastoralist systems.

Alternatively, these transitions may strengthen pastoralism where economic diversification supports livestock-based traditions (McCabe et al., 2010; Achiba, 2018), where

networks of reciprocal exchange adapt to new economic conditions (Baird and Gray, 2014; Little, 2021), and where bridged social networks do not displace bonded ones (Baird et al., 2021). Despite some evidence of these adaptations, other trends point to the steady erosion of traditional pastoralist institutions (Galvin, 2009; Caravani, 2019; McCabe et al., 2020).

Two shortcomings of this model are that: 1) much of the pastoralist scholarship on which this model is based focuses on male activities; and 2) the model is agnostic about inequality. First, it's unclear how diversification may affect pastoralist women's social networks. In many cases, women have taken on new roles including agricultural and market-based activities (Wangui, 2014; Smith, 2015) and gained access to household decision-making (Baird et al., 2024). However, despite access to mobile phones, women's abilities to forge new weak ties and gather new information may be limited by their husbands (Summers et al., 2020). Also, while women do practice informal exchange with other women (unpublished data), it's unclear now this may be affected by diversification. Much more research is needed here.

The causes and consequences of inequality within pastoralist groups are enduring questions (Borgerhoff Mulder et al., 2010), which I do not seek to address here, as mentioned above. However, inequality does matter in this context. Poor households may be forced to diversify whereas rich household may do so to simply to spread risk. But how diversification affects longstanding pastoralist inequality is much less clear and should be examined further.

Data availability statement

The original contributions presented in the study are included in the article. Further inquiries can be directed to the corresponding author.

Author contributions

TB wrote the manuscript.

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Conflict of interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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