



Livelihood diversification, mobile phones and information diversity in Northern Tanzania



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A B S T R A C T

Throughout the developing world, households are diversifying their livelihood activities to manage risk and improve their lives. Many studies have focused on the material causes and consequences of this diversification. Few, however, have examined how diversifying groups establish new patterns of communication and information exchange with others. This paper examines the relationship between livelihood diversification and information diversity among agro-pastoralist Maasai in northern Tanzania, where new mobile phone use is common. Mixed qualitative and quantitative methods of data collection and analysis are used to (1) describe how Maasai use phones to manage diverse livelihoods; and (2) assess the relationship between livelihood diversification and measures of information diversity, controlling for other factors. The findings indicate that households use phones in ways that support existing activities rather than transform them and that the relationship between livelihood diversification and information diversity is positive, non-linear, and significant.

1. Introduction

A longstanding concern within the scholarship on land-use change is livelihood diversification (LD) by smallholder agricultural and pastoralist groups in rural areas (Ellis, 2000b; Barrett et al., 2001). With LD, households and communities pursue diverse economic strategies to manage uncertainty and improve their lives. Much of the research on LD has focused on its material causes and consequences. Implicit in these studies, however, is the notion that as people engage new economic activities, they come into contact with new groups of people – and new types of information.

Information is a critical resource. It is a key form of social capital, a bulwark against uncertainty, and the foundation of decision-making. And as with other resources, access to information varies. Generally, people acquire and evaluate information through their personal experiences and their social networks. For decades, sociologists and business scholars have studied the relationships between social networks, information, and economic outcomes. Studies have found that diverse networks produce diverse information – and that diverse networks and information are associated with a wide range of positive outcomes from wages and productivity to political success and innovation (Aral and Alstynne, 2011; Page, 2008; Granovetter, 1983; Bruggeman, 2016). Despite these observations from the developed world, we are aware of no studies that directly examine the relationship

between LD and information diversity (ID) in developing contexts. This is especially conspicuous given the ubiquity of information and communication technologies (ICTs), especially mobile phones, throughout the developing world (Itu, 2013).

Mobile phones, now widespread throughout Africa, have been heralded as transformative new tools for social networking and economic development (Clinton, 2012). However, phone adoption has occurred within contexts where deeply engrained social, cultural and economic norms are resilient leading some to question whether new mobile technologies are merely supportive rather than transformative (Donner and Escobari, 2010; Butt, 2014). From this perspective, it may not be that phone use drives land use – but that land use drives phone use.

With this paper, we seek to contribute to the scholarship on rural, pastoralist livelihoods and land use by examining the relationship between LD and ID in an area where mobile phones are becoming commonplace. Here, LD is an *established* mechanism by which rural households become variably connected with new groups and new types of information. Alternatively, mobile phones are important *new* tools to facilitate communication. Following this approach, we use mixed methods to examine how mobile phone-use has been incorporated into diversified pastoralist livelihoods and how LD is associated with diverse modes and types of communication and information exchange. To address these concerns, we focus on four ethnically Maasai, agro-

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pastoralist communities in northern Tanzania where phone use is widespread and indigenous land use faces many challenges.

2. Background

2.1. Conceptual framework

Here we present a conceptual framework that views: (1) information as a key social and economic resource; (2) the distribution of information as a function of social networks and technology; (3) livelihoods as key drivers of social networks; and (4) mobile phones as new technologies to expand and leverage networks and provide access to more types and greater amounts of information, which we refer to as ID.

Within this framework, ongoing LD is viewed as a strategy to promote economic stability by reducing income variance and managing risk individually. One consequence of this strategy is that, by diversifying into alternate economic activities, households are often in need of new types of information, which may not be readily available within their immediate social networks. As a result, households may reach out to new individuals and groups to acquire new types of information. However, in rural, developing communities, there may be many communication barriers. Mobile phones can dramatically reduce these barriers and stimulate new relationships and/or strengthen existing ones. In turn, new information procured in a timely manner, may reduce uncertainty and/or boost the returns to various investments. As described, this conceptualization points to two general research questions:

RQ1. How have Maasai incorporated mobile phones into their diversified livelihoods?

RQ2. For phone users, what are the effects of LD on ID, controlling for other factors?

2.2. Literature

These questions point to two broad areas of research within the contexts of pastoralists and smallholders: (1) livelihood diversification, (2) communication, information diffusion and mobile phones.

2.2.1. Livelihood diversification

For some developing communities, an ongoing issue has been LD. Ellis defines LD as “the process by which rural families construct a diverse portfolio of activities and social support capabilities in order to survive and to improve their standards of living” (1998, 4). Relatedly, LD is viewed as a form of risk management, often to reduce income variability (Baird and Leslie, 2013). Much of the early scholarship on LD examined its antecedents (Ellis, 2000a; Aloblo Loison, 2015). These types of studies have generally focused on push and pull factors (Barrett et al., 2001), including recent attention to environmental factors (Bhatta et al., 2015; Weldegebriel and Prowse, 2013; Mccord et al., 2015; Goulden et al., 2013). These trends, which characterize much of the LD research in agricultural contexts, are also evident in the scholarship on pastoralists and agro-pastoralists (Bollig et al., 2013; Galvin, 2009). In these contexts, studies have identified several drivers of LD, including neo-liberal factors like market integration (Little, 2003), land privatization (Homewood, 2004; Galaty, 1994) and NGO-led development (Igoe, 2003). Other factors like education (Berhanu et al., 2007) and biodiversity conservation (Baird and Leslie, 2013; Homewood et al., 2009) have also been linked to diversification.

Fewer studies have focused on the consequences of LD (Bezu et al., 2011; Bigsten and Tengstam, 2011; Caviglia-Harris and Sills, 2005). Generally, studies of smallholders and pastoralists have found it to have a positive effect on measures of welfare including income, wealth, consumption and nutrition (Aloblo Loison, 2015; Gautam and Andersen, 2016; Dzanku, 2015; Liao et al., 2015). Other studies have identified connections between LD and family size (Hampshire and Randall, 2000), cultural identity (McCabe et al., 2010), social connectedness

(Cassidy and Barnes, 2012), material reciprocity (Baird and Gray, 2014) and environmental change and degradation (Zimmerer and Vanek, 2016; Hao et al., 2015; Ribeiro Palacios et al., 2013). One area that has been under-explored is the effect of LD on patterns of communication and information exchange. This is an important oversight given that LD can lead individuals and groups to engage new activities, new markets, and new ideas.

2.2.2. Communication, information diffusion and mobile phones

Generally, research on issues of communication and information diffusion in rural, developing areas has been narrowly focused. Studies have tended to examine the drivers and outcomes associated with agricultural technology adoption (Doss, 2006). Research in this tradition has recently focused on the effects of social and economic networks on information flows (Van Den Broeck and Dercon, 2011; Sseguya et al., 2012; Rotberg, 2013). Scholars have also begun to examine the role of ICTs as drivers of diffusion and adoption (Mtega and Msungu, 2013; Martin and Abbott, 2011; Aker, 2011).

Indeed, the rapid growth of mobile phones in developing areas has spurred a wave of research on ICTs (Donner, 2008). Studies on phones especially have identified numerous ways in which they are promoting communication and reducing barriers to information, often in urban areas.

Mobile phone coverage has been associated with political violence in Africa suggesting that phones help political groups overcome collective action challenges (Pierskalla and Hollenbach, 2013). Twitter use has been linked more broadly to political participation online and offline (Hopke et al., 2016). In Uganda, mobile money applications have been associated with higher remittances and household consumption (Munyegera and Matsumoto, 2016). And in Kenya, mobile layaway applications have boosted savings for agricultural capital expenses (Omwansa et al., 2013). Hampshire et al. (2015) have documented how young people in Ghana, Malawi and South Africa are using phones in various creative ways to improve access to healthcare. Also in Uganda, the expansion of mobile signal in rural agricultural areas was linked to greater sales of perishable crops (Muto and Yamano, 2009). Martin and Abbot (2011) have described mobile-phone use for women and men in Uganda, showing that adoption occurs for a limited number of key tasks but uses proliferate under varying circumstances. Alternatively, in Kenya, researchers have found that mismatches between the design of an information-sharing application and smallholders' perceptions of phone capabilities undermined adoption (Wyche and Steinfield, 2015).

Very few empirical studies of mobile phones have been conducted among pastoralist groups, a gap that others have noted (Debsu et al., 2016; Butt, 2014). These few studies have tended to focus on specific aspects of pastoralist life including access to technology, interactions with wildlife, and livestock herding and trading. In Tanzania, Msuya and Annake (2013) described patterns of technology access and use among Maasai to identify opportunities for improvement and further development. Also in Tanzania, Lewis et al. (2016) described how phones help Maasai to manage human-wildlife conflict by facilitating information exchange, coordinating group efforts and expediting emergency responses. In Kenya, Butt (2014) compared phone use across types of Maasai herders and types of information, finding that phones can both support and distract herders. Debsu et al. (2016) examined how herders and traders in Ethiopia have used phones to connect. They found high levels of inequality in access to phones and infrastructure, the effects of which were dampened by phone sharing. Research on Fulani pastoralists in Benin (Djohy et al., 2017) has found that mobile phones have stimulated new forms of social connectedness but that economic impacts have been limited. And in Kenya, despite widespread phone use among Samburu pastoralists, Asaka and Smucker (2016) found that phones were not widely used during drought periods. In this context, potential opportunities to use phones to expand social networks, procure information, and manage mobility, were outweighed by the high stakes associated with movements during drought and mistrust

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