ISSN 2310-4090

International Journal of Scientific Footprints

Open Access

Netchain Analysis of Maize and Niger Seed Value Chains and LED in Nekemte and its Hinterlands, Oromia, Ethiopia

Megerssa Tolessa Walo

Institute for Regional Development, University of Tasmania - Australia

Keywords:
Netchain; Local Economic Development; Rural-Urban Linkages; Oromia.

Correspondence:
Megerssa Tolessa Walo. Institute for Regional Development, University of Tasmania – Australia.

Funding Information:
No funding information provided.

Manuscript History:
Received: March 2017
Accepted: April 2017

International Journal of Scientific Footprints 2017; 5(1): 48-77

Abstract

This paper proposes the Netchain approach to analyze rural-urban linkages and local economic development (LED) in Guto Gidda district, Oromia, Ethiopia using maize and Niger seed. The traditional methods of value chain, supply chain and network fail to analyze these multifaceted linkages simultaneously. While value and supply chains analyze linear relationships between a firm and its buyers and suppliers (vertical linkages), networks study relationships among firms with common goals (horizontal linkages). The study draws on empirical data obtained through in-depth interviews with farm households, traders, small-scale manufacturers and agriculture offices in both Nekemte Town and its hinterlands. Results suggest that farmers' inefficient agricultural practices, high costs and limited access to agricultural inputs, and lack or shortage of farmland influenced grain production. Traders/intermediaries dominate the grain marketing at the expense of the farmers. Grain processing is characterized by traditional and small crushers with inadequate capacity, low hygiene and lack of safety standards. Improving farmers' accessibility to affordable input supply and reliable market information; encouraging processors through credit and power supply; and strengthening social capital through mutual trust among the agents stimulates the Netchain and LED.

Introduction

Ethiopia's economy is chiefly agricultural, with more than 80 percent of the country's population employed in this sector. The sector is source of food, industrial raw-materials, and employment opportunities for about 89 percent of the economically active population in Oromia Region (NRSO 2014). The production, processing, and marketing of agricultural products therefore significantly impact the development of the country. Maize is the largest crop by production volume, as well as the single most important crop mostly produced by small-scale farmers in Ethiopia (Rashid *et al.,* 2010). Niger seed is an indigenous oil seed and one of the most popular crops exclusively produced by smallholder farmers for local consumption

2017. The Authors, International Journal of Scientific Footprints
This is an open access article which permits use, distribution and reproduction in any medium, with the condition that original work is properly cited.

in the country. Although recently sesame overtook the first position in terms of volume of production, a very large portion (90 percent in 2011/12 production season) of the sesame is produced for external market which has less contribution to the local economic development (LED) as compared to Niger seed (Geleta & Ortiz 2013).

Vibrant agro-processing industries are central to LED as they generate employment and income, enhance productivity and production, and eventually attain food security through improved value chain. Agro-processing involves turning primary agricultural products into other commodities for the market, which involves the flows of production, people, information and finance between urban and rural areas. In Guto Gidda District, this includes edible oil processing (mainly from Niger seed) and cereal milling which are produced in the rural areas and transported to Nekemte Town for processing. Oil processers are based only in Nekemte Town because the business needs higher capital and electric power to generate the machines. Grain millers are found in both the Town and its rural surroundings as they can operate with lower capital and power which is the characteristic feature of villages in the study area.

Despite the importance of agro-processing industries to LED, evidences show that their contributions in Ethiopia are negligible due to factors such as poor infrastructure, low productivity, lack of stable market, poor agro-processing quality, and under supply of electricity (Mado & Saio 2009). Especially for small-scale farmers, market accessibility for their products is difficult because of lack of precise market information, weak connections with market actors, credit constraints and high transaction costs (Miehlbradt *et al.,* 2005). No empirical data has been collected and analyzed in the study area to identify the problems associated with poor contribution of agro-processing to LED despite the availability of the (small-scale) agro-processing industries. The majority of the residents in both Nekemte Town and its hinterlands are in a poverty cycle all the year round except peak harvest seasons. They have low purchasing powers and are unable to secure food at family levels. The overall agro-processing business in the locality is weak to support LED processes.

When studying grain marketing, two types of linkages (vertical and horizontal linkages) can be identified (Min 2011). The former explains the linkages between farmers and other market actors including traders, processors, and retailers and are best analyzed using value chain (VC) and supply chain (SC) approaches (Ramsay 2005). The latter is concerned with linkages among the actors themselves which are analyzed using network analysis (Powell 1990). Studying rural-urban linkages and LED is a complex and multifaceted process involving the linkages between and among firms and individuals in firms of different sizes and levels. It encompasses the flows of products, people, and information between urban and rural areas that the traditional chain approach fails to analyze by itself. While VC and SC are important mainly in analysing the vertical flows of resources (mostly in a business scenario), network analyzes the horizontal linkages (such as social capital) between and among agents in LED processes. For a full understanding of rural-urban linkages and LED, both of the two linkages have to be analyzed at the same time. This study proposes the use of Netchain analysis using maize and Niger seed as a case study because of its capacity to analyze both the vertical and horizontal linkages simultaneously (Lazzarini *et al.*, 2001).

The principal objective of this article is to analyze the Netchain of maize and Niger seed products and its

implications to LED in Guto Gidda District. Netchain approach enables the analysis and understanding of the interplays between and among key actors in the rural-urban linkages and LED processes where the firms are quite small to a level of one person or one family, and the influence of social relationships on the agro-business is high. It answers key research questions related to factors affecting production and processing of grains and flows of people and information between Nekemte Town and its hinterlands. By doing so, the article draws Netchain maps showing chains of maize and Niger seed products, the relationships between and among producers, traders and processors and flow of information along the different layers of the stakeholders that the traditional chain analyzes fail to do. It makes clear how the Netchain of these products affect LED processes in the study area by focusing on how value is created, where it is destroyed and what factors affect the Netchain. The result of this study will inform LED policy-makers and practitioners and provide a framework for enhancing rural-urban linkages.

Following the introduction, this article will explain in more detail the Netchain approach, and how it differs from other traditional approaches of chain analyzes. The third section describes the study area and methodology applied for the study. The fourth section presents results and discussion on the agro-processing and marketing of maize and Niger seed, factors affecting the Netchain, and Netchain governance in the study area. Lastly, the article concludes that the Netchain approach is a useful way to analyze rural-urban linkages and LED in developing countries as it made possible the understanding of the impacts of the linkages on LED processes when the firms are quite small to a level of one person or one family.

Theoretical Model of the Netchain Analysis

There are wide ranges of approaches scholars affiliated with disciplines including sociology, economic; agribusiness and human geography have so far been using to analyze economic development. These analytical approaches can be categorized under two groups of either vertical or horizontal linkage depending upon their specific interests. Some of these analytical approaches include: VC (Porter 1985; Faße *et al.,* 2009; Trienekens 2011), SC (van der Vorst 2000; Carbone *et al.,* 2009), Networks, (Powell 1990; Schmitz & Nadvi 1999; Murdoch 2000; de Nooy, Mrvar & Batagelj 2005), and Netchain (Lazzarini *et al.,* 2001; Perez & Martinez 2006). This section explains the vertical and horizontal linkages, compares and contrasts the different analytical approaches and justifies why the Netchain is chosen over the others in this study.

Vertical linkage refers to relationships between a firm and its buyers and suppliers. It is concerned with how internal VC of a firm is related to those of its buyers and suppliers (Hergert & Morris 1989; Dekker 2003). It also represents channels for non-financial transactions such as learning, information and technical from one firm to another along the chain, which is important elements of buyer-seller relationships (Choudhary, 2008). Horizontal linkage represents a relationship (formal or informal) among firms performing similar functions. Such linkage is made up of firms that share similar technology or service needs, whether or not they are in same product chain, to reduce transaction costs and generate economies of scale (Campbell 2008). Linkage may also help small-scale producer groups to have strong potential to increase their bargaining power in marketplace, while processors, suppliers and traders may also form their own groups to strengthen their position within industries.

VC, alongside similar approaches like the "filiere" (French origins of the commodity chain), are derived from world systems theory (Raikes, *et al.,* 2000) and first attended to by Porter in the 1970s and 1980s. He studied competitive advantages of firms reflecting the value adding character of business processes within borders of the firms (Porter 1985). A VC is defined as a linked set of value-creating activities all the way from basic raw material sources for suppliers to consumers' end use (Shank 1989). The approach of VC focuses on primary processes, mainly transformation and transaction processes in and across vertically related companies (Trienekens 2011).

Taking the VC approach to economic development involves addressing major constraints and opportunities a business or an industry faces. These activities include facilitating access to cheaper or better inputs, strengthening the delivery of business and financial services, increasing access to higher-value markets or simplifying export licensing (Dempsey & Campbell 2006). This is a purely linear relationship involving actors in designing, producing, marketing and distributing of a good or service. VC is also designed to assist corporate executives to identify the 'value' embodied in those elements and to decide how that value can be enhanced in the interests of building competitive advantage in the firm sector (Porter 1985).

VC approach nonetheless fails to fully analyze the overall linkages between and among firms. It is more interested in vertical linkages whilst overlooking the horizontal linkages. Four limitations of VC analysis are identified: the first is its limit to financial dimension where business value is equal to the turnover of which the costs of activities are deducted. Second, the activities of values in this approach are structured sequentially leading to its third limitation of overlooking the interactions between different activities. Lastly, due to this linear approach, it fails to incorporate feedback that results from the interaction of the VC with external parties (Daaboul *et al.,* 2012).

Broadly speaking, SC focuses on successive stages of value creation in a vertically organized set of firms (Lazzarini *et al.,* 2001). In an attempt to create business relationships along production and distribution chain, Dyer (1997) first applied an integrative approach of SC management (SCM) to study automobile sector in the US and Japan. In recent years, however, researchers and practitioners have recognized the useful application of SCM to the agrifood sector (Perez & Martinez 2007). However, Lazzarini *et al.,* (2001) posit that SC analysis is not well equipped to discuss horizontal relations among suppliers as it focuses on elements related to vertical transactions such as logistic management or the design of contractual arrangements between buyers and suppliers.

VC and SC analyzes have similarities with a slight difference in focus. Both are complementary views of an extended enterprise with integrated business processes enabling flows of products and services in one direction, and of values (as represented by demand) and cash flow in the other direction (Ramsay 2005). The primary difference between the two is that each step in a VC usually adds value to the goods being moved through the chain while the goods moving through a SC may not gain value in the process. However, values can sometimes be thought to operate in both directions when, for instance, suppliers derive value from the financial resources and payment terms that their customers provide, and the customers, in turn, derive value from the delivered products and services (Feller *et al.,* 2006).

Rooted in the sociological science, the concept of

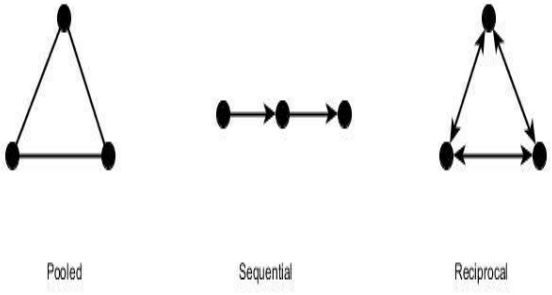
networks also received fundamental support from economics, mathematics and computational sciences to construct a solid and structured framework of social networks and relationships analyzes (Smith *et al*., 2002; Talamini & Ferreira 2010). Network analysis (NA) is concerned with horizontal relationships between firms belonging to a particular industry or groups of industries involving intricate, multifaceted, and durable relationships (Powell 1990). It highlights the nature and extent of the inter-firm relationships that binds sets of firms into larger economic groups (Sturgeon 2001). These relationships include supplier relationships, resource flows, trade association memberships, interlocking directorates, relationships among individual employees, and prior strategic alliances (Gulati 1998).

From the discussion so far, despite the attempts of some scholars like Dekker (2003) to use VC analysis to study inter firm relationships in the UK; recent works indicate the negligible attention of VC and SC to horizontal linkages. Henderson *et al*. (2002) clearly assert the major weakness of 'chain' approach is that it conceptualizes production and distribution processes as being essentially vertical and linear. The reality, however, is that such processes are highly complex network structures involving horizontal, vertical and diagonal relationships with multidimensional and multi-layered frameworks of economic activity. Horizontal linkages could facilitate production and marketing efficiencies and enable the flow of information, learning, resources and benefits between and among firms. These elements, which seem to be missing in both VC and SC analyzes, are crucial in LED and thus these approaches may not fully address the objectives of this study by themselves. Network analysis also misses the vertical integration of industries and thus a combination of horizontal and vertical linkages need to be in place for a comprehensive study of rural-urban linkages and LED processes.

Netchain, after Lazzarini *et al.*, (2001), is a new concept to combine these two approaches together. They define a Netchain as a set of networks comprised of horizontal ties between firms within a particular industry or group, such that these networks are sequentially arranged based on vertical ties and mapping how agents in each layer are related to each other and to agents in other layers. This is done by integrating chain and network analyzes by being cognizant of the complex inter-organizational interdependencies.

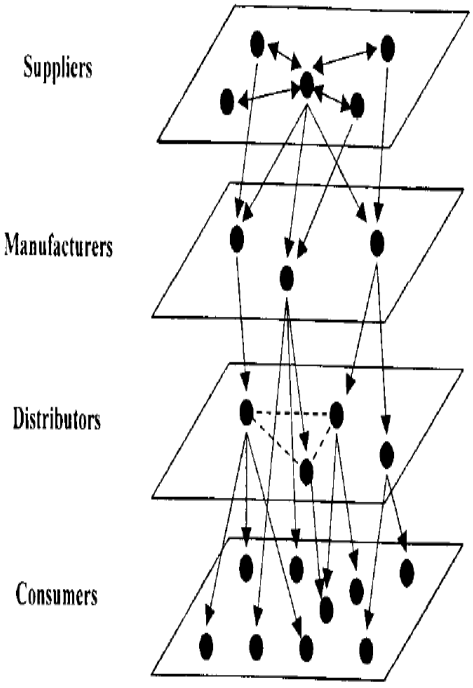
Thompson identifies three types of inter-organizational interdependencies: pooled, sequential, and reciprocal (O'Toole Jr & Montjoy 1984). Pooled interdependence occurs when agencies involved in the organizational activities are asked to provide their own contributions, but do not have to deal with each other to do so. In the sequential interdependence, a series of structural tasks, wherein the output of one unit is the input for the other, is observed. That means one entity cannot start producing its output until it has received the output of the other. Reciprocal interdependence involves a simultaneous ongoing relationship between parties in which each agent's input is dependent on the other's output (Figure 1).

Figure 1 Representation of Types of Interdependence



Based on this typology, Lazzarini *et al.,* (2001) argues that SCs focus on sequential interdependence whereas the pooled and reciprocal interdependencies are represented in the network. For maximum benefit of the values of horizontal and vertical linkages, they suggest the combination of both which can be integrated in the Netchain analysis (Figure 2).

Figure 2 An Example of a Generic Netchain



There are multiple actors in the maize and Niger seed agro-processing in Guto Gidda District. The between and within relationship of farmers, traders, processors and consumers of the products has to be analyzed simultaneously to better understand the agricultural value chins and LED processes. This is particularly important in the context of developing countries where the contributions of social capital in development are also significant. Factors that limit economic linkages between the two areas can also be extracted using this approach. Therefore, the Netchain approach does not appear sectoral in focus (Lazzarini *et al.,* 2001), and thus is relevant to this study. By applying this analysis, crucial elements related to the different kinds of interdependencies at firms or individual levels may not be overlooked.

Netchain Governance and Social Capital

Governance from a network perspective can be defined as informal social systems structures within firms and formal contractual relationships between them (Powell 1990; Jones *et al.,* 1997). Particularly relational contract between firms or parties is important as they involve future profit out of cooperation, sense of obligation and family connections (Campbell 2004) In this article, governance is conceptualised as the means of creating the conditions for effective collaboration in the Netchain, which is concerned with key characteristics such as Netchain partner selection, the type of agreements among Netchain actors, as well as the strategic coordination within the Netchain. The influence of ICT in facilitating information flow along the Netchain is also recognised.

Governance based on trust improves production quality and reduces transaction costs among firms and organisations through trust-based individual relationships (Talamini & Ferreira 2010). At group level also a set of inner rules (also called trust) may

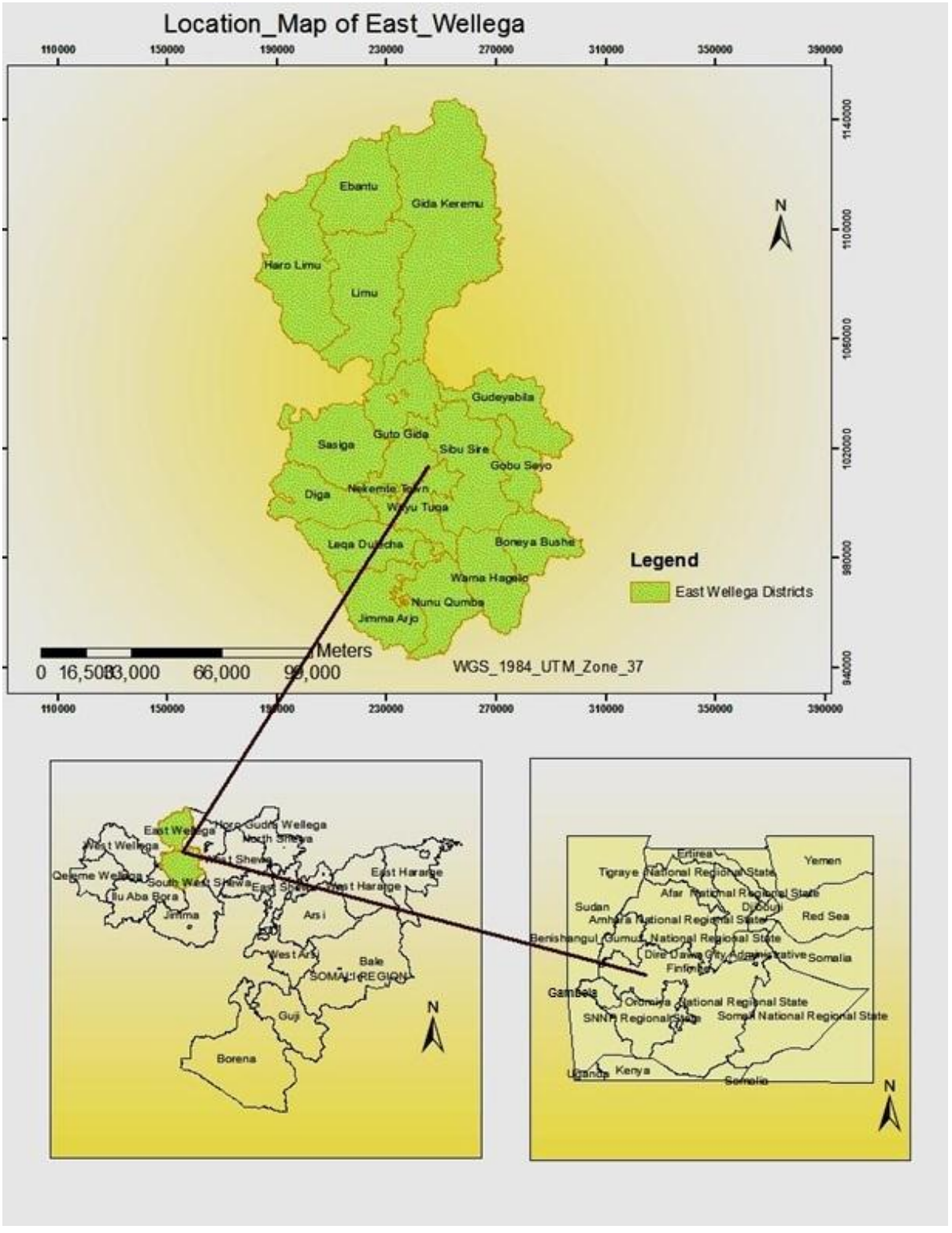
evolve over time in local cooperatives (Bonus 1986) which grows out of experiences one has had with a person or group. Trust entails a prediction about behaviour of an independent actor, and personal interaction generates information about the trustworthiness of other actors that is relatively inexpensive and reliable (Putnam 1993).The influences of farmers' Cooperative Unions in governing the Netchain are also documented in literature. The formation of (reciprocal) interdependencies among farmers in local cooperatives is explained as a consequence of intimate personal knowledge and strong social ties where members are likely to employ joint decision-making and problem-solving to coordinate their activities (Lazzarini *et al.,* 2001).

In this study, the Netchain governance includes all the stakeholders in the agro-processing such as farmers, traders and processors. Farmers (being members of farmers' Cooperative Union) may negotiate market prices with the traders which would save them from exploitation by traders and intermediaries. These local Cooperatives may also provide agricultural inputs in cooperation with district agricultural offices to the member farmers at fair prices. Government agents have a facilitating role in this Netchain where they provide agricultural inputs to the farmers, and regulate prices if there is any price escalation by the traders and processors. This regulation may include setting the range of prices, redistribution of products from surplus to deficit areas and importing products that are in serious shortage in domestic markets.

About the Study Area

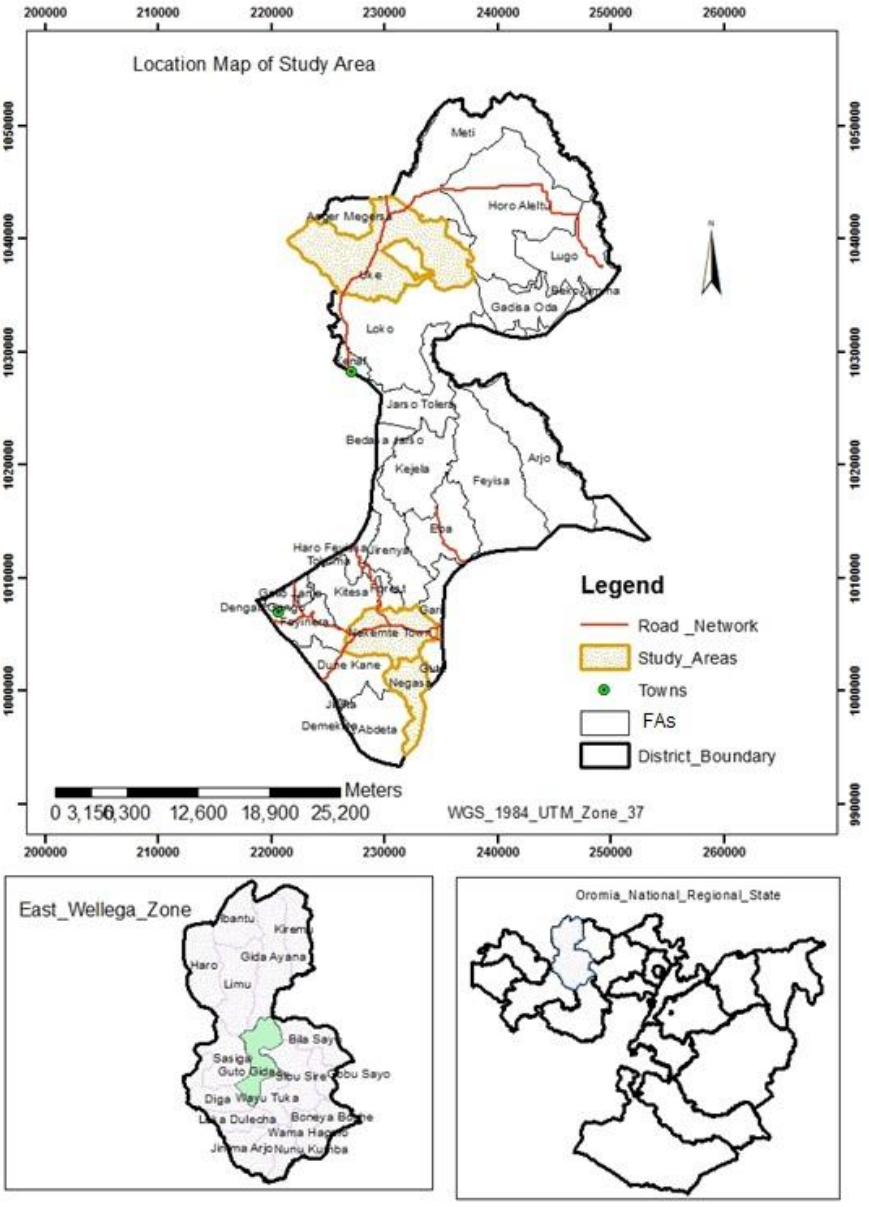
This study was conducted in Nekemte Town and its hinterlands in Guto Gidda district. Guto Gidda district is located in East Wollega Zone of Oromia region in Ethiopia (Figure 3) lying between 08° 59'and 09° 06` N latitude and 37° 51`and 37° 09` E longitude.

Figure 3 Location Map of East Wollega Zone



The district is bounded by Gidda Ayana and Limu districts in the north, Leka Dulecha district in the south, Wayu Tuka and Sibu Sire districts in the east, and Digga and Sasigga districts in the west (Figure 4). From the two Oromia Towns (Nekemte and Asela) included in the sectoral LED program in the country in 2009, Nekemte was chosen for this study because of the dominance of maize and Niger seed production in the surrounding areas which were used to analyze the grains Netchain and LED processes.

Figure 4 Location Map of Guto Gidda District



Guto Gidda district is endowed with a wide range of agro-ecological zones ranging from warm weather in the low altitude areas to cool weather in higher altitude areas, resulting in a favorable environment for the production of different types and varieties of crops. Information obtained from its Finance and Economic Development Office indicates that Guto Gidda district enjoys tropical and sub-tropical climate with mean annual temperature between 16^0c and 31^0c, and annual rainfall between and 580mm and 2200mm. In terms of its soil types, Guto Gidda district is dominated by loam, sand, clay loam, clay and silt with a share of 42.8 percent, 23.09 percent, 16.33 percent, 8.08 percent, and 9.7 percent respectively. It has a total population of 113,168 with the great majority (about 94.4 percent in 2011/12) living in rural villages. There are also small market centres such as Bandira in the Negassa Farmers' Associations (FA) where small-scale traders collect maize and Niger seed products for the nearby bigger markets.

Nekemte Town is serving as the capital of Guto Gidda district and also of East Wollega Zone. It is located at latitude of 9°5′N 36°33′E *and longitude of* 9.083°N 36.550°E, with an average elevation of 2088 metres above sea level. *It is located at a distance of 331 km south-west of Addis Ababa (Finfinne), the capital of Ethiopia.* According to the data from its administration, the total population of the Town was estimated to be 95,088 in 2012. The central statistics of the country projects the population of Nekemte Town to be 115,741 in 2017 (FDRE 2013).

Study Methodology

Netchain is a recent analytical approach in chain relationship studies in different settings where only a few researchers, most of whom are concerned with organizational relationships (Trienekens 1999; Cox *et al*. 2004; Ireland 2004; Althoff, Ellebrecht & Petersen 2005; Storer & Taylor 2006; Cleary 2012; Nijhoff-Savvaki *et al.*, 2012) have practically applied. Netchain (zero level chain linkage as Storer & Taylor 2006 term it) is useful to get an overview of chains and highlights the weaknesses or opportunities to improve the chain performances but fails to provide enough detail to make a judgment on how to solve the problems. Storer & Taylor (2006), therefore, propose a multiple level chain relationship with an addition of details to the Netchain to show the nature of the relationship strengths and operational mapping tools. They used a survey technique of data collection to assess the different organizations, trading volume, and the strength of relationships.

However, this particular study focuses on identifying key individual farmers, traders, processors and local agriculture experts involved in the VC where there is no need for mapping internal relationships among departments and levels of an organization. The production processes are mostly small-scale where the majority of the farmers are subsistent producers. Traders are mostly collectors and intermediaries where the influence of social relationships on agro-business is high. In such societies, looking at the socio-economic relationships between and among individuals and groups gives a good picture of LED processes. This article argues that Netchain is the best approach to use when the aim is to understand rural-urban linkages and LED processes in a locality and when the firms are quite small to a level of one person or one family. Besides, the traditional chain approaches are aimed mainly at understanding commodity chains in a business scenario. Netchain approach in this article, however, goes beyond the business of commodity chain to include the social aspects of the relationship as they are crucial in studying rural-urban linkages and LED

processes in developing countries.

Sampling Methods

This study applied the principle of data saturation and attainment of quality Saunders, Lewis & Thornhill 2009) which a small sample size can achieve. Curry, Nembhard, & Bradley (2009) recommend sample size between 20 and 30, while Kvale (1996) suggests less (between five and 25) for an interview study specially when heterogeneity and saturation are the driving forces of a research. The study provides a basis to understand the roles played by various LED actors to triangulate and generate a detailed and rich data.

The respondents were selected using the snowball sampling technique. The researcher first approached the District's Agriculture Office (DAO) where objectives were intimated and study sites selected. The participants were purposively sampled to provide representative information and valid research conclusions. Uke and Negassa Farmers' Associations (FAs) were chosen because maize and Niger seed products are best grown in these two areas. In the second stage, Development Agents (DAs) of the selected sites were contacted as key informants and also to help in the selection process of informants because they are local experts. Care was taken to include research participants from different backgrounds and attributes such as farm scale (large, medium and small-scales[1]), gender (both males and females) and education. Accordingly, 30 agrarian households[2] (19 males and 11 females), nine traders (five males and four females), five millers (four males and one female), five edible oil processors (all males), and two agricultural extension workers (one from each sex) were interviewed. The names of all interviewees were codified for the purpose of presenting the data commencing with PI (Personal Interview), followed by economic activities and locations of the respondents.

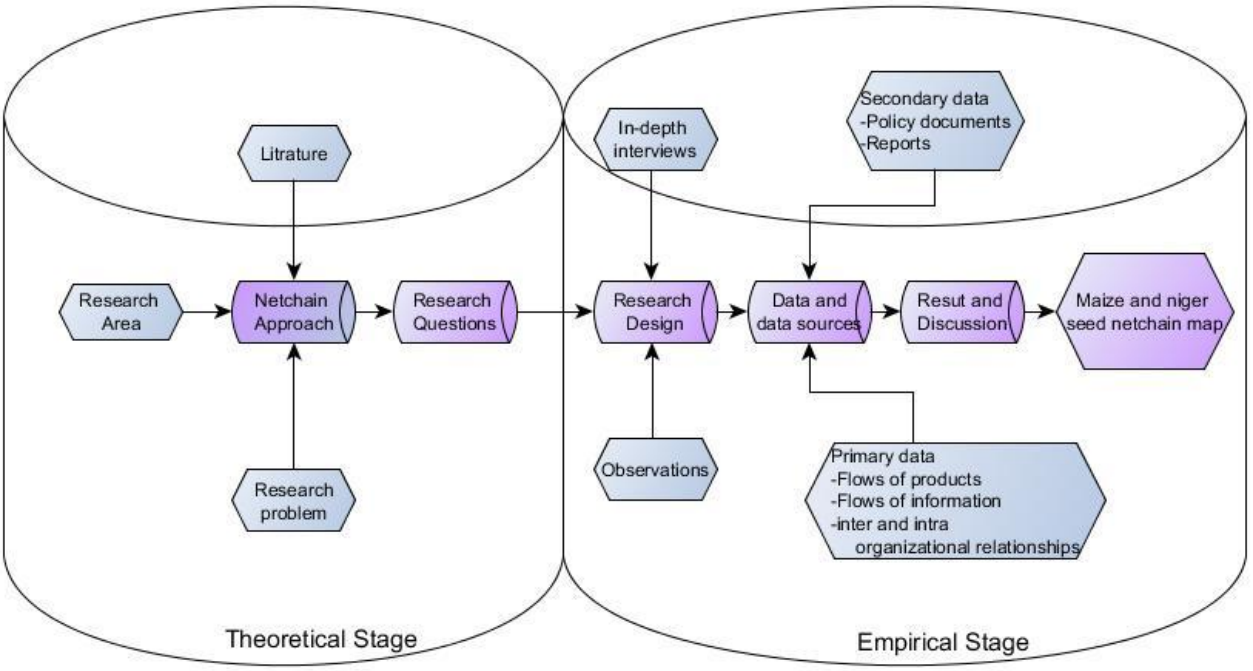
Data Collection Methods

A qualitative approach is used in the mapping of the maize and Niger seed Netchain as the technique better helps in getting participants' perceptions and realities leading to a real understanding of the way in which a particular VC works (Bonney *et al*. 2007; Hellin *et al.*, 2010; Ahenkora 2012; Donovan *et al*. 2013). An in-depth interview and observation technique were applied to collect data related to flows of people, production, and information between the two areas from different perspectives from November 2013 to June 2014. In-depth qualitative semi-structured interviews were used because of its ability to gather information from non-literate participants (Engelmann & Isiaho 2005). The questions were different for different participants. It is a useful tool for collecting information on how the Netchain works and why it works that way (Miehlbradt & Jones 2007). The technique also enhances the capture of both the nature and strength of the relationships at an individual level, to map the chain and eventually to address the research questions Figure 5).

[1] According to the classification of the District's Agriculture Office, on average, large-scale, medium-scale and small-scale farmers are those who own 8 ha, 3 ha and less than 0.5 ha/farmer respectively.

[2] Four of the females and all of the males were household heads

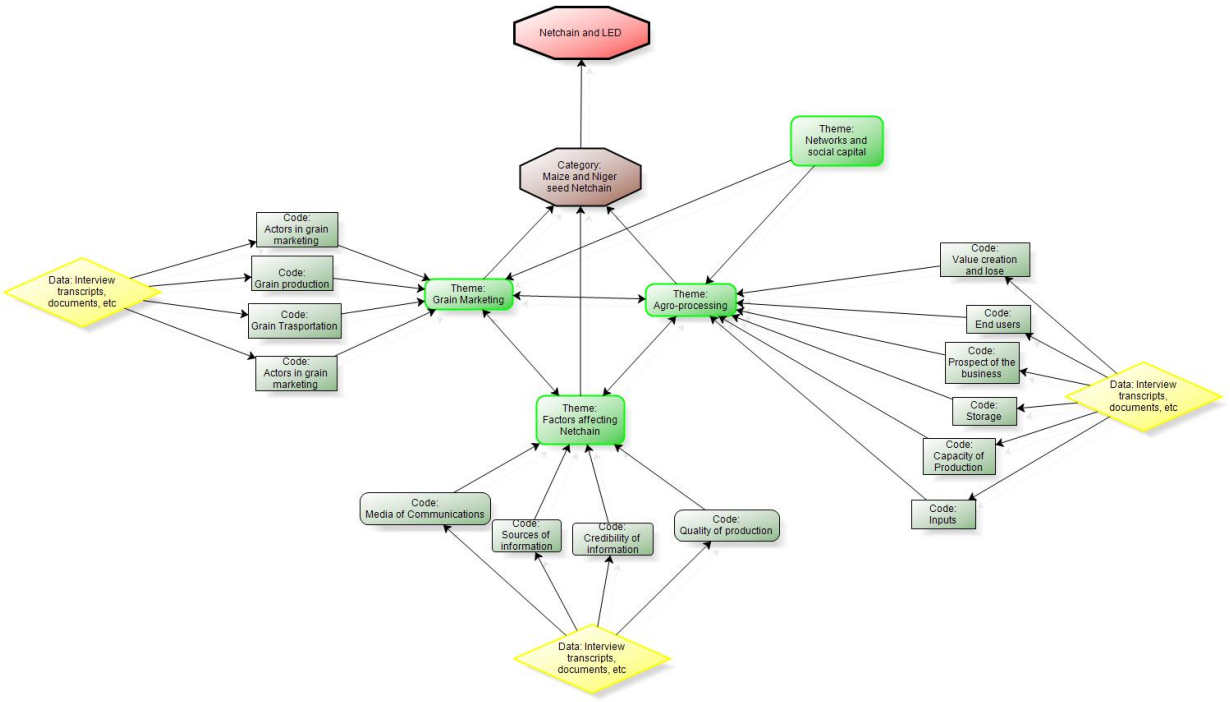
Figure 5 Methodological Map



Data Analysis Methods

Data from the interview and secondary sources were triangulated, converged and analyzed using qualitative methods. Narrative explanations during interviews were tape-recorded and transcribed later during analysis. These audio-recordings were complemented by field notes, which included observations of both verbal and non-verbal behaviors as they occur, and immediate personal reflections about the interview. As Boyatzis (1998) proposes, all the recorded conversations were transcribed verbatim and imported into Nvivo 10 software in which codes were generated from the data, which were later collated to themes to generate a theme 'map'. The themes later became categories for analysis. The theme development was an iterative process where new themes generated and others discarded as needed to keep the research objective in focus (Boyatzis 1998; Heath & Cowley 2004). After the frequent recording cycles, many themes were clustered into categories of higher order abstractions to make sense in the context of the data.

Figure 6 Example of Code and Theme Development Map



Yin (2008) principles of case study analysis including addressing all the evidence and examining major rival interpretations, focusing on the most significant aspects of the case study, and employing the researcher's prior knowledge, were used to further the analysis.

Result and Discussions

Agro-Processing and Marketing of Maize and Niger Seed in Nekemte Town and its Hinterlands

Agro-processing even at the small and cottage industry levels is critically important in the livelihoods of people in developing countries like Ethiopia. It makes a significant contribution to the transformation of the local economy and contributes about 35 percent of the country's agricultural Gross Domestic Product (GDP). It is an important source of paid employment with more than 50 percent share of employment in the overall manufacturing sector (Mado & Saio 2009). In this section, the Netchain of maize and Niger seed is discussed starting from the production, marketing, and processing; and its significance to the livelihood of the people.

Maize and Niger Seed Production

Netchain is an interlinked process where changes in one of its components can affect the whole chain leading to poor Netchain performance and weak LED. For this reason, identifying where a value is created and where it is destroyed is quite important. Production supply to the Netchain is important to keep the Netchain strong and sustainable. However, many factors influence the production capacity of the farmers in Guto Gidda district. In the District, out of 30 farmers interviewed, 20 (67 percent) were small-scale farmers[3] owning less

[3] According to Guto Gidda District agriculture office, on average, large-scale, medium-scale and small-scale farmers own greater than 5 ha, between 1.5- 5 ha, and less than 1.5 ha respectively.

than 1.5 ha of farmland. Large-scale farmers possessing more than seven ha comprised only 10 percent and the rest 23 percent (having two to five hectares) are medium-scale farmers.

Evidence from the Districts Agricultural Office also shows that shortage (or lack) of farmland, low utilization of yield-enhancing technologies and a traditional manual farming system are among the factors influencing the full potential of farmers' production. These conditions often do not support a strong agro-processing sector as it requires large quantities of a consistent supply of quality raw materials. The average farm size (crop area per holding) in Ethiopia in general (0.96 ha) and in Oromia in particular (1.15 ha) is very small by international standards (Headey, Dereje & Taffesse 2014). According to Rashid *et al.,* (2010), about 94 percent of Ethiopian farmers rely on less than five hectares of land, of which 55 percent cultivate less than two hectares.

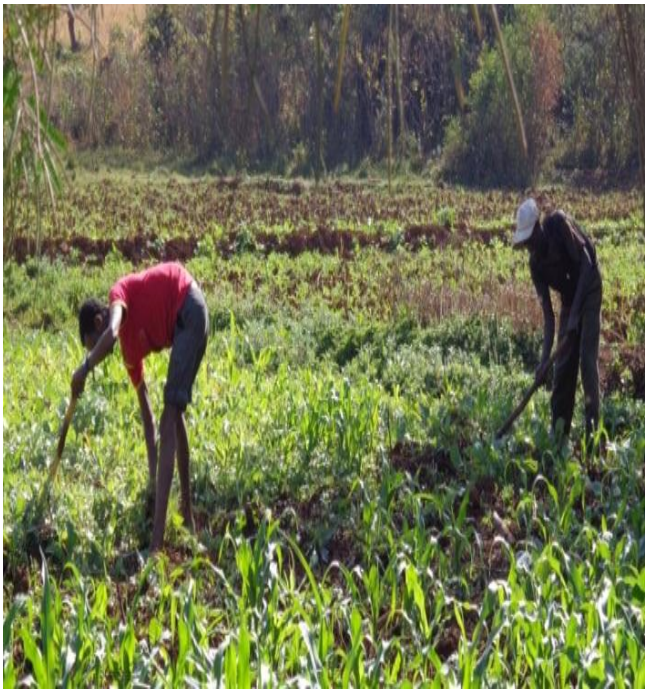
The capacity of production of small-scale farmers is seriously challenged by increasing prices of agricultural inputs including fertilizers and seeds that they are unable to afford. This led to using no or below the required inputs and eventually low yield. The other challenge for the farmers production is the weeds, typically Dodder (a parasitic weed which wraps itself around plants and destroys the plants) attacking mainly Niger seeds. An interview with a farmer in Negassa FA summarizes these problems as follows:

> *We have no ox for ploughing and no money to buy fertilisers and seeds. The government used to loan us fertilizers which we paid later, but now it stopped... Recently, Konchi (Dodder) is becoming another threat to our Niger seed farm. It does not die by manual weeding, rather regenerates* (PI with a small-scale farmer in Negassa FA, 2013/14).

The traditional manual farming system is another cause factor for the low productivity in the District. Particularly in Negassa FA, there is no mechanized farming system using machines for cultivation and harvesting. The farmers use a locally available wooden and ox-drawn plough accompanied by simple hand-held digging sticks and hoes to cultivate the soil (Figure 7). In Uke FA, however, some large-scale farmers[4] use tractors for soil cultivation and whose production (especially maize) is mostly for non-local markets. They transport to other Towns such as Nekemte and Shashemenne, and even to outside the region (Bahir Dar and Dese in Amhara region) where they can get better prices. Most large-scale farmers' problems include decreasing soil fertility, delaying of input supplies and poor seed quality, lack of harvesting machines and bad weather.

[4] Majority of the large-scale farmers are investors usually residing out of the rural Farmers' Associations. The farmers complain that the government confiscated their land under the cover of investment and gave it to the investors where these farmers are forced to perform as daily labourers in the extensive farms.

Figure 7 Small-scale Farmers Ploughing Manually in Negassa FA



The input supply also does not consider the demands or interests of the farmers. The farmers know the characteristics of the soil and the seed variety that best suits to that particular soil type from their long experience in the field. However, the government asks them to buy all seed varieties that it provides regardless of the demands of the farmers. Those who afford to buy the fertilizer therefore, complain lack of fertilizer of their interest. An interview with a farmer from Uke FA illuminates this:

> *…if I need BH-540 maize variety, they insist me to buy Shone variety as well. But we know which seed variety gives better yield and which is not* (PI with a small-scale farmer in Uke FA, 2013/14).

As a result of lack of inputs of interest to them, the producers are reluctant to register for the purchase of those inputs and ended up in subsistent production leading to poor Netchain performance. The efforts of the DAs to help the farmers technically to improve their production are not quite fruitful. An extension worker in Negassa FA reported that she gives continuous follow-up and advice to the farmers on how to use the right seed varieties and the right types and amount of fertilizers, yet still production is not increasing.

In her own words: *'it is a mystery even for me as a professional why there is still low production even for those who use agricultural inputs*'. She blames the district's agricultural office for failing to address the problem despite her frequent reports, while the office criticizes the DAs. This shows that there is little known about the soil characteristics (due to lack of research done on the soil) to identify the best seed variety. Besides, a report from the BoFED of the region discloses other factors contributing to the low productivity in the district including fluctuation of weather condition, land degradation, lack of crop diversification, an insufficient dedication of agricultural expertise, and absence of local research (BoFED,

2013).

There is no input (seed and chemical fertilizers) provision for Niger seed production and consequently, its production is considered as a secondary crop among the smallholder farmers in the district despite its popularity among the farmers in the other parts of the region. It also constitutes 50 percent of Ethiopia's oil seed production (Burnette 2010). This has seriously affected the supply of the Niger seed and eventually the Netchain and LED.

Maize and Niger Seed Marketing

Because of the subsistence production in the district, the farmers have few or no extra grains to sale inhibiting grain marketing, another component of the Netchain. However, in order to buy agricultural inputs, pay land tax, loans, and school fees for their children, and meet other financial obligations, both the small and medium-scale farmers need to sale some of their maize products and much or all of their Niger seed products at farm gates or market centers in Nekemte Town and Uke district Town.

This sale, however, is challenged by the immediate sale of yields after harvest, lack of reliable market information and waste. As the majority of the farmers sale at peak times, the prices significantly decrease in the market and the farmers end up with a low return because there are more supply and less demand during this time. When the farmers sale what they have for the market, the price increases because of low supply. A study on the maize market in Ethiopia shows that 85 percent total marketed volume (60 percent during the first three months and 25 percent in the next three months) is sold during the first six months after the harvest, when prices peak and farmers are left with only 16 percent of the market volume (Rashid *et al.*, 2010). During the lean period, the grain market is usually supplied by a few large-scale farmers and collectors and thus the benefit from higher prices does not accrue to smallholders. Large-scale farmers produce mostly for markets at the locality or beyond.

The grain marketing actors linking the farmers with the processors and consumers include intermediaries, traders (retailers and collectors) and Farmers' Cooperative Unions. These relationships and communications have never been the same throughout the actors and times. They depend upon the need for communication and the type of actor taking part in the relationships. For this, there is a need to have a picture of strengths and attributes of these marketing linkages which can be measured quantitatively and qualitatively (Storer & Taylor 2006). Getting this picture would make easy the mapping of vertical and horizontal linkages simultaneously (Figure 9). In this study, the strengths are quantified using scales ranging from zero (no) to five (excellent) and the attributes are scored qualitatively in different ways as depicted in table 1.

Table 1 Relationship and Communication in the Maize and Niger seed Netchain

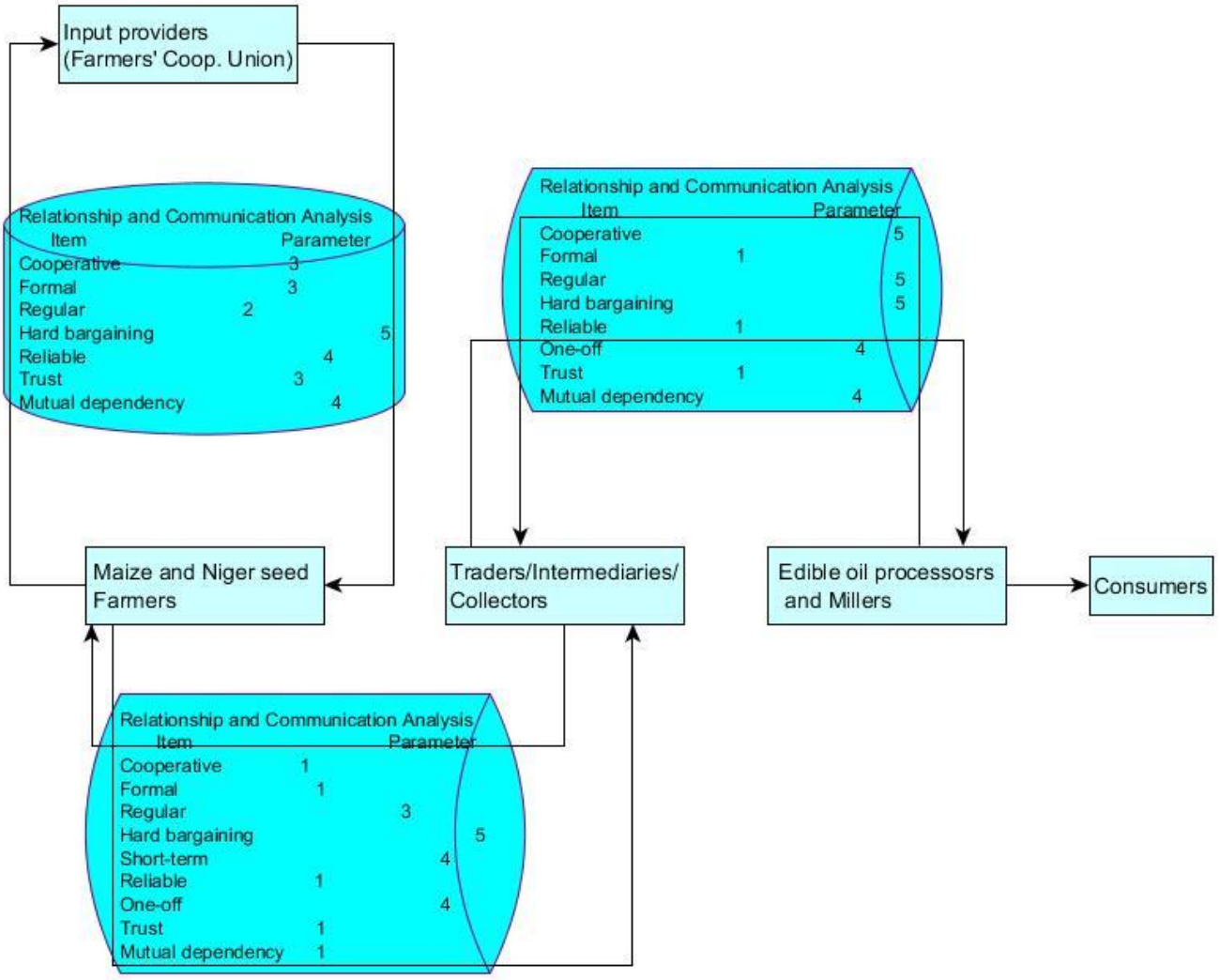
S/N	Relationship and communication	Actors in the relationship and communication	Qualitative parameter	Quantitative parameter
1	Nature of relationship	Farmers, Traders/ intermediaries/ collectors, Processors, Cooperative Union	Cooperative vs Adversarial	
2	Nature of communication	Farmers, Traders/ intermediaries/ collectors, Processors, Cooperative Union	Formal vs Informal	Scale:
3	Frequency of communication	Farmers, Traders/ intermediaries/ collectors, Processors, Cooperative Union	Regular vs Irregular	0- No 1-Very poor
4	Price negotiation	Farmers, Traders/intermediaries/ collectors, Processors	Hard bargaining vs open price negotiation for benefit and risk sharing	2- Poor 3- Fair 4- Good
5	Commitment	Farmers, Traders/intermediaries/ collectors, Processors	Short-term vs long-term transaction	5- Excellent
6	Trustworthiness	Farmers, Traders/intermediaries/ collectors	Trust vs mistrust	
7	Importance of relationship	Farmers, Traders/intermediaries/ collectors	One-off vs continuous (for future transactions)	
8	Power	Farmers, Traders/intermediaries/ collectors	Mutual vs one-sided	
9	Information	Farmers, Traders/intermediaries/ collectors, Cooperative Union	Reliable vs unreliable	

Source: Author's assessment, 2014

Based on the information in the table, the Netchain of maize and Niger seed marketing is shown in figure 8. This diagram shows the agro-processing of the two products emphasizing types and strengths of the inter-group relationships and communications (the intra-group relationship is shown in Figure 9) in the Netchain. The result shows that the farmer-trader grain marketing relationship is adversarial, hard bargaining (price determined by traders), and one-off, and that there is mistrust among others. The communication between the two groups is also represented as informal and irregular. Except for the formal communication between farmers and the Cooperative Union, which is based on the Union's code of conduct, all the information flows along the different groups of the chain are informal. There is also fair social capital (trust) governing the relationship between these two groups, which is very poor between farmers and traders and between traders and processors. This may indicate the need for intervention in the areas of reliable market information provision, participatory price setting and communication infrastructure improvement to make the

entire stakeholder (especially the farmers) beneficiary from the Netchain.

Figure 8 Relationships and Communications Between Different Groups of Netchain Actors



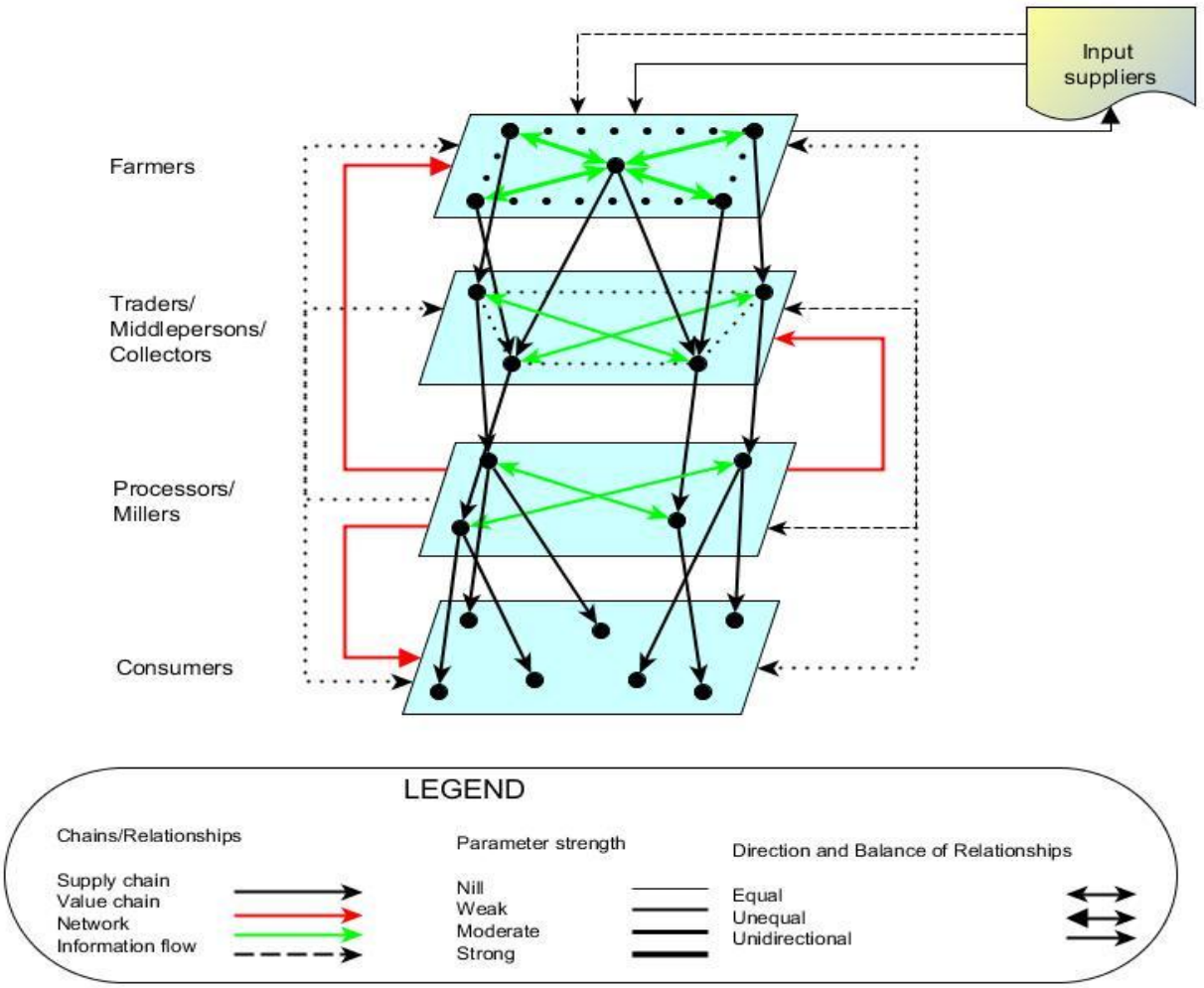
The Cooperative Union in the locality used to collect grains from farmers to later sale at a better price and distribute the profit among the members. But the Union currently appears dysfunctional as they select the type of varieties they buy from the farmers even though it is they who provides the seeds. For instance, the Union provided *Shone* maize variety to farmers in the last production season. Eventually, though, it refused to collect the final product from them claiming the seeds appeared rotten on their tips. The Union complains it will not get a buyer for this particular variety. This shows the Union's failure to support the farmers as it is supposed to.

Figure 9 shows a diagrammatic representation of maize and Niger seed Netchain where the strengths, directions and balances of the vertical and horizontal linkages are depicted simultaneously using arrows of different colors. The traditional chain analyzes fail to show these complex vertical and horizontal linkages in a single

picture. The chains are observed along upstream and downstream flows of people, production, finance, and information between producers, traders, processors and finally consumers. The networks indicate the horizontal interrelationship (i.e., the social aspect which is used as a 'cohesive' device) between and within the members of the Netchain.

The strengths of the linkages in the Netchain are affected by the key actors' access to market information. To get good prices, farmers need reliable and up-to-date market information. Their sources for the information include fellow farmers, friends, traders, and the Cooperative Union. But (small-scale) farmers mostly get market information at the market spots by going over as many scales as they can to sale their products to whoever gives them better prices. These relationships can be explained as *pooled, sequential, and reciprocal* interdependencies (O'Toole Jr & Montjoy 1984). The *sequential* and *reciprocal* interdependencies are represented by single-headed and green double-headed arrows respectively. IT induces horizontal *pooled* interdependence among both buyers and suppliers and is depicted in dashed lines.

Figure 9 Netchain Representations of Maize and Niger seed in Guto Gidda District



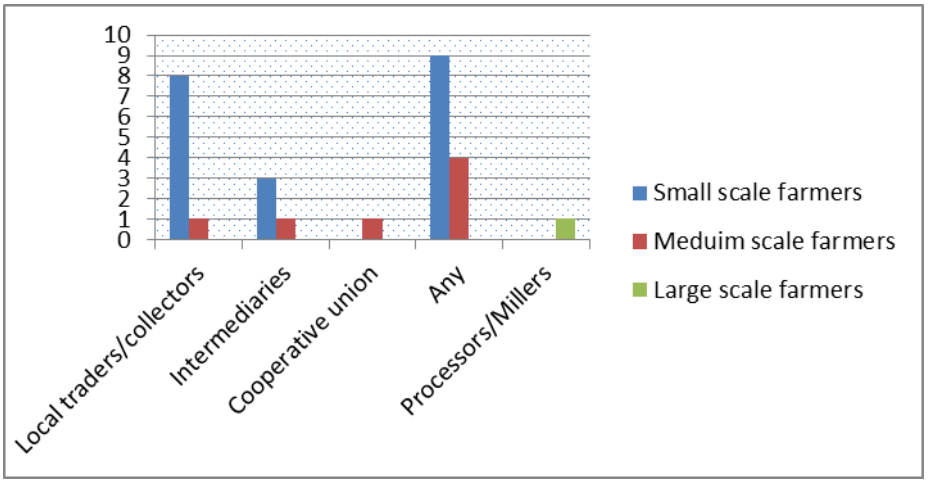
Farmers produce maize and Niger seed and sale them to traders/intermediaries/collectors. They transport their products using donkeys, and mule-pulled carts and by carrying it themselves on their backs. A few farmers make an agreements with traders even before the grain is harvested, in which the traders come to the farm gates and collect the products using their own transport. Processors buy the grain either from the farmers or traders/collectors and produce maize flour and edible oil for consumption. This shows *sequential* interdependencies where direct relationships between firms are organized through serially vertical linkages and the farmers' output is the traders' input, and the traders' output is the processors' input. Nonetheless, in terms of the flow of information, reciprocal relationships are observed in the sense that market-related information flows from one layer to the other and vice versa (Lazzarini *et al.,* 2001). The influence of the mobile telephone has facilitated the communication of the farmers with the rest of the layers in the Netchain strengthening the sequential interdependence (Cleary 2009). However, the majority of the small-scale farmers have no accessibility to this technology as they cannot afford it.

The intra-relationships among the farmers indicate strong *reciprocal* interdependence representing horizontal linkages because of the influence of local government institutions such as development brigades and Cooperatives and indigenous institutions like *Afooshaa*[5] where farmers have regular discussion on how to increase production, share experiences and market information with each other. This developed strong ties among themselves leading to knowledge co-specialization (Lazzarini *et al.,* 2001). Traders (and collectors) also display moderate *reciprocal* relations among themselves at the trader layer because they have informal agreements related to areas from which each of them would limit their procurement activities. In such cases, social norms regulate their business behavior (Cleary 2009). *Pooled* relationship is displayed among the processors as they perform their activities independently with sparse and indirect relationships. But outside the business, they also have strong social ties through their traditional institutions. A well-established institution can change *pooled* interdependence to reciprocal interdependence if there is knowledge exchange among the suppliers. In *pooled* interdependence, agents are more likely to have diverse knowledge and resources that can be brought to the network because agents are usually sparsely connected through weak ties.

Closely scrutinizing the trade relationships, the majority of the small-scale farmers do not need fixed *maamila* (clients) to sale their produces. Most of the trade relationships are a one-off, wherein a better price is more important than the establishment of a relationship for future transactions. As such, 45 percent of the small-scale farmers sale their maize and Niger seed product to anyone of the local traders/collectors, intermediaries, Cooperative Unions or processors/millers. This figure is followed by trading with the traders/collectors (Figure 10).

[5] *Afooshaa* is traditional social institution with the purpose of supporting each other during occasions like mourning and weddings.

Figure 10 Maize And Niger Seed Chain in Guto Gidda District



Farmers are sceptical about their trade relationship with the local traders/collectors and intermediaries as they think the traders cheat them by giving them incorrect market information. An interview with a small-scale farmer in Uke goes as follows:

> *….sometimes traders come from other areas to buy maize from this market offering us good prices. But we do not have an opportunity to directly contact them as the local traders and intermediaries interfere between us to make a profit* (PI with a small-scale farmer in Uke FA, 2013/14).

The local traders and intermediaries distort the market information which significantly affected the farmers' income and the Netchain of the locality. They bridge the farmers to the traders coming from other bordering regions, such as Desse and Bahir Dar in Amhara region. They collect from the farmers (Figure 11.a) and sale to these traders making a profit, which the farmers themselves would do if they had real market information. There is also a power imbalance between the traders and farmers. The farmers have no opportunity to determine the market price.

Figure 11 Maize Collected By Collectors from Farmers and Small Collectors at Uke Local



In the Netchain, local collectors collect grains from the farmers at the market center. In some cases, intermediaries may get into the farm gates and buy from the farmers to self-transport to the market and sale. These people usually get the money from higher order traders/collectors to do the business implying reciprocal relationships among them. But eventually, the collectors have to sale back to them which show the dominating power of the higher-order traders. The collectors store the grains in their warehouses (Figure 11.b) and call the traders (mainly from Nekemte Town) to come and buy which shows benefits sharing among the traders. Niger seed processors also get the Niger seed from the surrounding farmers. Mostly, the farmers sale at the market center in Nekemte Town to the collectors who later sale to the processors. This is because Niger seed is mostly produced by small-scale farmers who produce and sale in small quantity. Sometime, however, the processors buy from the farmers directly.

The only occasion where the intermediaries do not interfere is in the farmer-consumer trade relationship. In this small-scale transaction, both the producers and consumers benefit because there is no commission incurred in between the two. The low-income Town residents directly buy the grains (maize) from the farmers (figure.12.a), clean it themselves (Figure 12.b) and take it to millers (Figure 12.c) for processing; these are usually located close to the marketplaces. This helps the consumers to get the grains processed easily.

Figure 12 Consumers buying maize from farmers, cleaning and milling at one place in Nekemte Town



Not all traders are opportunistic in their trade relationship with the farmers. There are also occasions when traders provide loans to farmers during times of financial difficulties, such as buying fertilizers, which the farmers repay after selling their product. The farmers usually sale their grains to the trader who made the loans to them in difficult times showing the level of trust between them as there is no formal agreement between them. The moral obligation, which is the result of the frequent communication between the farmers and traders, increased the mutual understanding between them (Bonney *et al*. 2007) and strengthened the relationships. Failure to abide by the informal agreement may result in mistrust for another round of lending by the traders.

Social capital is an important element governing the Netchain as an interview with a collector in Uke market center underlines:

> *Usually, farmers entrust their grains to their fellow farmers to unload it with me. Later, they come; we weigh*

> *together and calculate the price as per the day's market price. If they do not like the day's price, they can still keep it for another market day….kindness, good conduct, and trust determine my future business* (PI with a collector Uke market center, 2013/14).

The above script shows the role of trust and social relationships in choosing a trade partner. It also shows how a relationship is maintained for future trade, which helps the traders obtain a continuous supply from the farmers. The traders maintain the relationship through techniques such as honesty as well as lending them cash. These trust-based trade relationships could sometimes grow to the level of friendship like godparents and in-laws.

Maize and Niger Seed Processing

Processing is the third important value-creating element in the Netchain study. Small-scale agro-processing is particularly important in poverty reduction as it builds on local assets such as indigenous knowledge and skills and local natural resources. It also plays a valuable role in LED processes through improving incomes by increasing employment opportunities and thus improving food security through food availability. Maize milling is quite common in both Nekemte Town and rural areas in the district because mills can operate with small investment and in the absence of electric power. Edible oil processors, however, are confined to Nekemte Town as they need bigger investment and associated infrastructure mainly electricity.

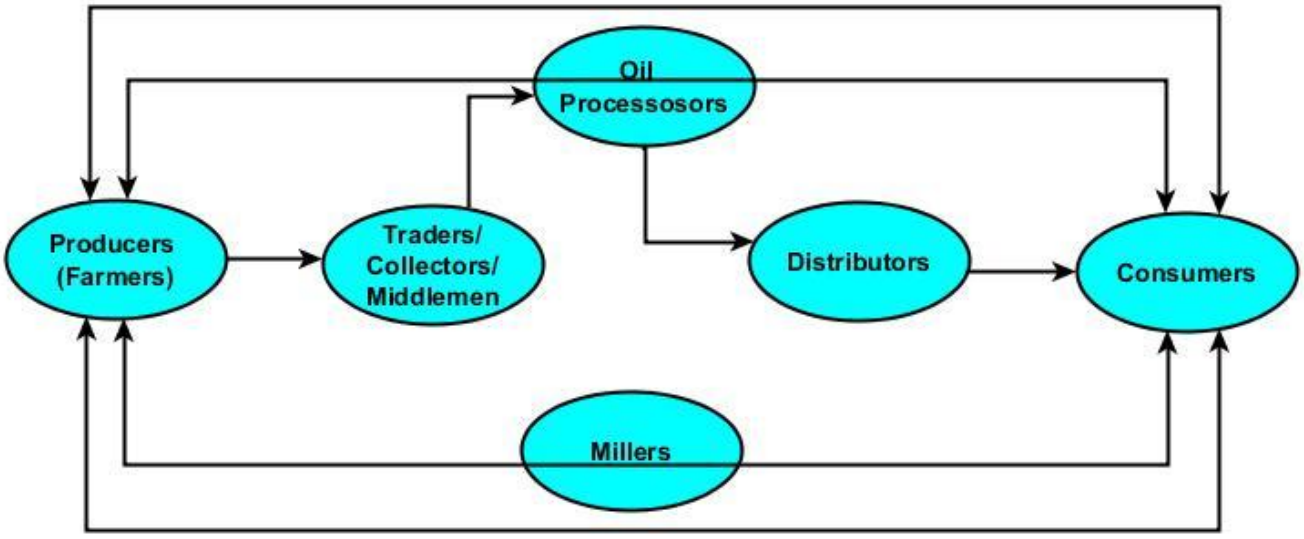
Agro-processing has the potential of strengthening rural-urban linkages for the benefit of both. Strong rural-urban linkages can also stimulate agro-processing, which the processors in Nekemte Town understood. In an interview with a processor concerning the requirement to start a business, he underlined the contribution of the rural-urban mutual interrelationship for his business to start and sustain:

> *….I started doing oil processing after thorough market assessment...This is a mutual benefit. We make profit from the processing, and the farmers get benefit from selling their Niger seed and buying processed oil and its leftovers for their food and animal fodder respectively* (PI with an edible oil processor in Nekemte Town, 2013/14).

Consumers of Niger seed oil come from both rural and urban areas in the district and bordering districts such as Sasiga, Diga, Sire, and Wayu Tuka. From these areas, traders come to buy from the processors in Nekemte Town to later sale at their local market. There are also consumers who directly buy from the stores of the processors. The maize flour is used for making bread, porridge, and *Buddeena* (flat and wide bread) among others. The left over products from the maize processing is used for animal fodder and firewood.

Likewise, Niger seed agro-processing starts from the farmers producing and selling to consumers, traders and processors. There are also licensed traders trading in only Niger seed. These traders sometimes buy/collect and transport to sale at better prices at Addis Ababa (Finfinne) market, the capital city of the country. Processors also buy from the farmers to locally process it into edible oil (Figure 13).

Figure 13 Maize and Niger Seed Processing Chain Map



Edible oil processing is more complex compared to maize milling because there are intermediate role players in the chain, and the processing also needs more care. Consumers usually buy directly from farmers in small amounts to roast and consume. The parched grain of Niger seed can also be crushed at home to make traditional cakes or can be fried or used as a condiment. Whole plants, in the pre-flowering stage, are used as green manure. Extracting Niger oil may include a combination of warming; grinding and mixing the Niger seed with hot water followed by hand centrifugation in a container. It can also be crushed in small cottage expellers (like the one in Nekemte) and large oil mills. Also farmers fattening animals buy the leftovers to feed their cattle (Figure 14).

Figure 14 A Simple Diagram Showing Oil Processing From Niger Seed in Nekeme Town



According to the processors, consumers demand for this locally processed edible oil from the Niger seed is high because of the flavor and quality of the oil. This processing is dominated by traditional and small crushing facilities with inadequate production capacity, low hygiene and lack of safety standards (Figure 15). Lack of appropriate packaging and absence of labeling standards is also another feature of oil processing in the study area. Because of the shortage of supply from the small-scale farmers, the processors are required to produce high stocks of oilseeds during peak production and supply season and store for year-round, operation leading to the high working capital.

Figure 15 Oil Processing in Nekemte Town





Oil processing from Niger seed in the Town is not without challenges. Most of the challenges are associated with frequent power outages, seasonality of supply of Niger seed, financial difficulties and heavy taxes by the government. An interview with a processor concerning the sustainability of the business asserts '*…it is not really profitable, but I will continue the processing'*. The processors do not like the interference of the government to regulate the market price. When the supply of edible oil is low and the local processors are unable to satisfy the consumer demand, the government encourages duty and Value Added Tax (VAT) free import of palm oil which helps the consumers buy at a fair price. This government policy is considered (by the processors) as a bottleneck for the development of the local processing industry as the locally produced oil has not demand that it used to have. The oil they processed is therefore kept in stock without selling. Therefore, when their warehouse is full, they stop processing and sometimes the processing machine remains idle for weeks or months, making the processing business less profitable. However, the local government claims price regulation is important because the local processors have no full capacity to meet the domestic edible oil demands.

Values in value chain study, which is an integral part of Netchain analysis, can be destroyed in many ways and at different stages of the chain. At the post-harvest stage, for instance, the traditional harvesting and storage systems have greatly contributed to the losses in grain quality, affecting the overall Netchain and LED. Maize quality is affected during harvesting and shelling, which is further depreciated by poor storage facilities (Figure 16.a). Farmers use locally made on-farm storage such as *Gombisaa*[6] which may expose grains to different types of damages, including weevil and rodent attacks causing substantial losses of stored

[6] *Gombisaa* is a cylindrical shaped container made up of a timber pole and woven sticks with a flat or conical bottom and roofed with conical thatched grass.

grains. Cleaning of the maize to remove foreign material such as husk, straw, dust, and sand is also done manually (Figure 16.b).

Figure 16 Traditional Storage Facility of Maize and Manual Cleaning in Uke FA



Niger seed is a very sensitive product which needs close follow-up at the time of harvest. The seeds can easily shatter during hot days and thus they have to be harvested early in the morning. Plants are cut by sickle close to the ground, then bundled and stacked in the field to dry for a few days. Following the drying, farmers thresh the seeds by grasping the stalks and beating the seed heads on a traditional threshing ground in the field. In some cases, oxen may be used to tread on the harvested plants in the field. Though tarpaulin or plastic sheets are used for this process, waste is expected as it is done manually which makes it difficult to thoroughly separate the impurities. Besides, there is no technologically supported mechanism of quality control. When buying, traders check the quality of the products by piercing into the sacks of the grains in three randomly chosen parts (at the top, center and bottom), take samples and visually determine the quality, which does nothing apart from basic differentiations such as white versus yellow maize or insect infested versus clean Niger seed. There is no established quality control in the agro-processing.

Summary and Conclusions

This agro-processing is playing a significant role in linking urban and rural areas for the development of the locality. However, the traditional approaches of VC, SC and networks used so far to study these relationships lack simultaneous analysis of the prevailing vertical and horizontal linkages. While the first two are concerned with vertical linkages, networks scrutinize the horizontal linkages. To study rural-urban linkages and LED processes particularly in developing countries where subsistence production and small-scale industries dominate the economy, the significance of capturing both the linkages simultaneously is crucial. Netchain analysis in this study made possible to fill in this gap because it clarified the complex interactions between and among farmers, traders, and processors that influence the livelihoods of the people. It also enhanced the drawing of the maize and Niger seed Netchain map, easing the understanding of the flows of production, people, and information between Nekemte Town and its surroundings. Using the Netchain analysis, it was

possible to identify the bottlenecks hindering the success and sustainability of rural-urban linkages and LED processes in the study area.

The result of this study shows that inefficient agricultural practices; and high costs and limited accessibility of inputs negatively affected the production and processing, and thence the Netchain of agricultural products in the study area. Shortage of farmland is also a critical problem hindering the full potential of the producers where the smallholder farmers suffer from low productivity and ended up in subsistent production. The grain market is dominated by intermediaries distorting prices leading to volatile and unpredictable price structures. Lack of trust between producers and traders is another key constraint. Processing is done using traditional and crushing facilities characterized by inadequate capacity, low hygiene and lack of safety standards. The seasonality of the supply of Niger seed is another bottleneck for the edible oil processing business.

Maize and Niger seed Netchain is also influenced by poor infrastructure to facilitate the Netchain in areas of market information and hard infrastructure linking producers and processors. Market information is crucial in the Netchain as this helps the farmer's sale their products at better prices and get returns from their production. It also helps processors get the required raw materials to process. The low quality of the oil processed shows the lack of sufficient attention from the local government to the sector. There is a general lack of regulatory standards for edible oil processing and maize grain marketing negatively impacting LED. Strengthening the linkages between the Netchain stakeholders (producers, traders and processors) is critical to the success of agro-processing enterprises.

On top of its academic significance, this article may contribute to development policy recommendations to use Netchain approach to analyze rural-urban linkages and LED. This is particularly important in developing countries where there is a strong influence of traditional and indigenous institutions on LED processes. In such societies, social capital plays an important role in their production processes. To get full benefit of the importance of rural-urban linkages to LED, there is a need to implement a policy framework encouraging the Netchain which may include: a) enhancing production by supporting the farmers (particularly small-scale farmers) to produce more through modern agriculture technologies and eventually supporting their livelihoods, b) advancing market information access to all the stakeholders in the chain, and c) extending the basic infrastructure between and within rural and urban areas including road, electric power, and IT among others to accelerate the agro-processing. The current theoretical framework of rural-urban linkages and LED in Ethiopia can be helpful to move forward towards its implementation.

References

[1] Alderete, V & Bacic, M 2012, 'The impact of inter-firm networks on regional development: the case of Mendoza's wine cluster', *Lecturas de Economía*, no. 76, pp. 177-213.

[2] Althoff, G, Ellebrecht, A & Petersen, B 2005, 'Chain quality information management: development of a reference model for quality information requirements in pork chains', *Journal on Chain and Network Science*, vol. 5, no. 1, pp. 27-38.

[3] BoFED 2012, *The National Regional State of Oromiya, Oromiya National Regional State in Brief*, Finfinne, Ethiopia.

[4] Bonus, H 1986, 'The cooperative association as a business enterprise: a study in the economics of transactions', *Journal of Institutional and Theoretical Economics (JITE)/Zeitschrift für die gesamte Staatswissenschaft*, pp. 310-39.

[5] Boyatzis, RE 1998, *Transforming qualitative information: Thematic analysis and code development*, Sage, USA.

[6] Burnette, R 2010, 'The recent introduction of Niger seed (*Guizotia abyssinica*) production in Northern Thailand', a regional supplement to ECHO development notes, no 6, pp. 1-8.
[7] Campbell, R 2008, The Value chain framework Briefing Paper, *ACDI/VOCA, United States Agency for International Development*, New York.
[8] Carbone, A, Galli, F & Sorrentino, A 2009, September, Coordination mechanisms along the supply chain: A key-factor for competitiveness, *113th Seminar, September 3-6, 2009*, Chania, Crete, Greece (No. 57992), European Association of Agricultural Economists.
[9] Choudhary, V 2008, Strengthening Vertical Linkages *Briefing Paper, ACDI/VOCA, United States Agency for International Development.* New York.: USAID.
[10] Cleary, J 2012, Business exchanges in the Australian desert: it's about more than the money. *Journal of Rural and Community Development*, vol. 7, no. 1, pp. 1-15.
[11] Cox, A, Watson, G, Lonsdale, C & Sanderson, J 2004, 'Managing appropriately in power regimes: relationship and performance management in 12 supply chain cases', *Supply Chain Management: An International Journal*, vol 9, no. 5, pp. 357-71.
[12] Dekker, HC 2003, Value chain analysis in interfirm relationships: a field study, *Management accounting research*, vol. 14, no. 1, pp. 1-23.
[13] Dempsey, J & Campbell, R 2006, A value-chain approach to coffee production: linking Ethiopian coffee producers to international markets, *ACDI/VOCA*, viewed 11 October 2013, <http://www. acdivoca.org/site/Lookup/WRSpring06-Page5-7-ValueChainCoffee/$ file/WRSpring06-Page5-7-ValueChainCoffee. pdf.>
[14] Faße, A, Grote, U & Winter, E 2009, Value chain analysis methodologies in the context of environment and trade research, Discussion Paper No. 429, Gottfried Leibniz, University of Hannover, Institute for Environmental Economics and World Trade, Germany.
[15] Feller, A, Shunk, D & Callarman, T 2006, 'Value chains versus supply chains', *BPTrends*, March, pp. 1-7.
[16] Geleta, M & Ortiz, R 2013, The importance of Guizotia abyssinica (Niger) for sustainable food security in Ethiopia, *Genetic Resources and Crop Evolution*, vol. 60, no. 5, pp. 1763-70.
[17] Gulati, R 1998, 'Alliances and networks', *Strategic Management Journal*, vol. 19, no. 4, pp. 293-317.
[18] Headey, D, Dereje, M & Taffesse, AS 2014, 'Land constraints and agricultural intensification in Ethiopia: A village-level analysis of high-potential areas', Food *Policy*, vol. 48, pp. 129-41.
[19] Heath, H & Cowley, S 2004, 'Developing a grounded theory approach: a comparison of Glaser and Strauss', *International Journal of Nursing Studies*, vol. 41, no. 2, pp. 141-50.
[20] Hergert, M & Morris, D 1989, 'Accounting data for value chain analysis', *Strategic Management Journal*, vol. 10, no. 2, pp. 175-88.
[21] Ireland, P 2004, 'Managing appropriately in construction power regimes: understanding the impact of regularity in the project environment', *Supply Chain Management: An International Journal*, vol. 9, no. 5, pp. 372-82.
[22] Jones, C, Hesterly, WS & Borgatti, SP 1997, 'A general theory of network governance: Exchange conditions and social mechanisms', *Academy of management review*, vol. 22, no. 4, pp. 911-45.
[23] Lazzarini, S, Chaddad, F & Cook, M 2001, 'Integrating supply chain and network analyzes: the study of Netchains' *Journal on Chain and Network Science*, vol. 1, no. 1, pp. 7-22.
[24] Mado, T & Saio K 2009, Value Chain Analysis for the Development of Food Systems and Innovative Agro-based Industry in Africa, Sasakawa Africa Association, viwed 26 February 2015, <http://www.saa-safe.org/e-libraries/pdf/other/Value_Chain_in_Food_and _Agro-process_Development.pdf>.
[25] Miehlbradt, A. & Jones, L (2007). "Market Research for Value Chain Initiatives, Information to Action: A Toolkit Series for Market Practitioners.".
[26] Miehlbradt, AO, McVay, M & Tanburn, J 2005, The 2005 Reader - From BDS to Making Markets Work for the Poor, Sixth Annual BDS Seminar - Turin, Italy.
[27] Min, Z 2011, 'Vertical and horizontal linkages with small-scale farmers in developing countries: evidence from China', ***立命館経済 (Ritsumeikan economics)***, vol. 60, no. 3, pp. 438-449.
[28] Murdoch, J 2000, 'Networks—a new paradigm of rural development?', *Journal of Rural Studies*, vol. 16, no. 4, pp. 407-19.
[29] Nijhoff-Savvaki, R, Trienekens, J & Omta, O 2012, 'Building Viable and Sustainable

Regional Netchains: Case Studies of Regional Pork Netchains in Spain, Germany, and The Netherlands', *International Journal on Food System Dynamics*, vol. 3, no. 1, pp. 50-60.

[30] Nooy, W, Mrvar, A & Batagelj, V.2005, Exploratory Social Network Analysis with Pajek. New York, Cambridge University Press.

[31] NRSO 2014, Physical and Socio-economic profile of Oromiya Bureau of Finance and Economic Development, Finfinne: Regional Statistics, Socio-Economic and Physical Study Directorate.

[32] O'Toole Jr, LJ & Montjoy, RS 1984, 'Interorganizational policy implementation: A theoretical perspective', *Public Administration Review*, vol. 44, No. 6, pp. 491-503.

[33] Perez, AMG, & Martinez, MG 2007, 'The agrifood cooperative Netchain: A theoretical framework to study its configuration', *Acta Agriculturae Scand Section C*, vol. 4, no. 1, pp. 31-39.

[34] Porter, ME 1985, Competitive advantage: creating and sustaining superior performance, 1985, Free Press, New York.

[35] Powell, WW 1990, 'Neither Market nor Hierarchy: Network Forms of Organization', *Research in Organizational Behavior, vol.* 12, pp. 295-336.

[36] Putnam, RD 1993, *Making Democracy Work: Civic Traditions in Modern Italy*, Princeton NJ, Princeton University Press.

[37] Raikes, P, Friis J, M & Ponte, S 2000, 'Global commodity chain analysis and the French filière approach: comparison and critique', *Economy and Society*, vol. 29, no. 3, pp. 390-417.

[38] Ramsay, J 2005, 'The real meaning of value in trading relationships', *International Journal of Operations & Production Management*, vol. 25, no. 6, pp. 549-65.

[39] Rashid, S, Getnet, K & Lemma, S 2010, 'Maize value chain potential in Ethiopia: Constraints and opportunities for enhancing the system', Working Paper, International Food Policy Research Institute working paper, USA.

[40] Shank, JK 1989, 'Strategic cost management: new wine, or just new bottles?', *Journal of Management Accounting Research*, vol. 1, no. 1, pp. 47-65.

[41] Storer, C & Taylor, D 2006, 'Chain mapping tools for analysis and improvement of inter-organisational information systems and relationships', *Journal on Chain and Network Science*, vol. 6, no. 2, pp. 119-32.

[42] Sturgeon, TJ 2001, 'How do we define value chains and production networks?', *IDS Bulletin*, vol. 32, no. 3, pp. 9-18.

[43] Talamini, E & Ferreira, GMV 2010, 'Merging Netchain and social network: Introducing the 'social Netchain' concept as an analytical framework in the agribusiness sector', *African Journal of Business Management*, vol. 4, no 14, p. 2981-93.

[44] Trienekens, JH 1999, *Management of Processes in Chains: A research framework*, LUW, Wageningen.

[45] van der Vorst, JG 2000, *Effective food supply chains: generating, modelling and evaluating supply chain scenarios*, Landbouwuniversiteit Wageningen (Wageningen Agricultural University).