Power Relations and Knowledge Linkages among Actors in the Groundnuts Seed Value Chain in Central Tanzania

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Abstract

Interdependence among actors enhances value chain functioning as it not only closely links them, but also enables them to engage with each other across the chain to form a network. The network created through these actors' involvement and interdependence creates a necessary condition for adoption and diffusion of incentives for the value chain development and stability. In the groundnut seed value chain, less is known like in other crops' value chain less is known on issues related to power relations and dynamics that can be assessed in levels and dimesnions of knowledge, material and income. This study aimed to assess the power relations and knowledge linkages among the actors in the groundnut seed value chain in central Tanzania. The specific objectives of the study were to identify the actors involved, their roles, and the influence and importance of power relations in the knowledge aspect. The study used a qualitative approach and a cross-sectional design. The primary data were collected through focus group discussions and key informant interviews, while the secondary data were obtained from records related to the groundnut crop and its value chain from the sampled districts covered by the Tropical Legumes III project. The UCINET software statistical package for network analysis was used to analyze the data collected. The study reveales that there is a number of actors at the village and district levels, some of whom were found in both levels.Further, power relations among these actors are revelead through centrality measures, emphasizing the significance of ties and linkages in shaping knowledge exchange dynamics. The findings speak volume on the role of influential actors at both levels, with implications for information flow, decision-making, and the overall success of the groundnuts seed value chain. The study also found that the number of ties that the actors had in the groundnut seed value chain affected their knowledge linkages, as well as their influence and power over others. The study identified that NGOs, CBOs, local government, researchers, and traders had higher influence and importance in knowledge linkages than other actors at both levels. The study recommended prioritizing the inclusion of less powerful and influential actors and involving important stakeholders in interventions targeting power relations through innovation platforms.

Keywords: Actors, value chain, power, relation, knowledge, groundnut

Introduction

Globally, value chains have been looked at as a vehicle by which new forms of production, technologies, logistics, labour processes, organisation relations and networks are introduced (Trienekens, 2011). This has been the positive outcome of globalisation intensifying the necessity of having a commodity, product or service chain that involves multiple engagements. Based on pricing and cost structure in value adding-activities, value chains consist of producers, input suppliers, operations, processors, retailers and buyers that all play part in bringing a product or service from its conception to the final market (Kumar and Pradesh, 2016). The general aim is and has always been to add value while creating and strengthening a competitive advantage that leads to mutual benefits for all actors involved in the value chain.

The involvement of different actors and their respective activities in sequence has been a useful way to understand how the world of production, buying and selling in terms of marketing works. This is because the product or service involved is brought from its

simple to a complex form (Cudderford, 2014). Just like other value chains in other sectors, agricultural value chains consist of actors and their respective activities that improve products while linking commodity producers to processors and markets (William *et al.,* 2014). These value chains perform best when actors in a particular value chain cooperate to produce higher-quality products and generate more income for all participants along the chain. As opposed to the simplest kinds of value chains in which producers and buyers exchange only price information, the inter-relationship amongst them involves decision making processes for the value chain of the commodity they are involved in (Norton, 2014).

Interdependence among actors enhances the functioning of the value chain as it is not only closely linking them, but also enables them to engage with each other across the chain. The network created through actors' involvement and interdependence has been a necessary condition for the adoption and diffusion of incentives for value chain development and stability (Delloit, 2013). On the other hand, interdependence and involvement among actors are highly influenced by power exerted in their relationships and decision making that all contribute to the capacity of effective participation. Defined as the ability to influence others, power could be derived from various sources including positional authority, professional status, knowledge and skills, control over resources and physical abilities (Barasa *et al.,* 2016). Thus, actors in the value chain, regardless of the levels, space and interests of their interaction; exert power over each other in decision making, in acquiring information and in enhancing or influencing others (Van Lieshout *et al.,* 2017). The results of power change amongst actors in a value chain could contribute to increased productivity and its benefits since the latter depends on a well-designed, linked network of actors and their roles.

The groundnut value chain in developing countries is highly associated with input and output market constraints as opposed to the developed countries (Darlagen and Phiri, 2019). According to the International Trade Centre (ITC), China is the leading groundnut producer in the world contributing 41% of the total groundnuts produced globally (ITC, 2015). African countries contribute approximately 35% of the total groundnuts produced globally. Nigeria is the leading country in Africa as it contributes around 7% (FAOSTAT, 2017; Katundu *et al.,* 2012) of the total groundnuts produced in the region followed by Senegal, Sudan, Malawi and Tanzania. In 2015, Tanzania contributed to approximately 5% of the total groundnuts produced in Africa (Daudi *et al.,* 2018). It is evident that the most common attribute of all best groundnuts producing countries is a performing groundnuts seed value chain (Elias, 2018).

Crop production, as a vital node in the value chain, depends on the material, knowledge and income inputs that are provided by other chain nodes for its optimal stability. However, the groundnut seed value chain in Tanzania has been underperforming compared to other seed crops, due to various factors. One of these factors is the low level of knowledge inputs and linkages among the actors in the groundnut seed value chain, which leads to instability and underperformance of the groundnut crop (Mwalongo *et al.,* 2020). Another factor is the power r*elation*al and interplay that exist among the crop's chain actors, which affect their decision making, information access, and influence exerted over others. The power interplay and relations among the actors can have a negative impact on the production and marketing of the groundnut crop, as well as on the equity and sustainability of the value chain. While acquiring quality inputs, such as certified seeds, could help address some of the production and marketing challenges, there is also a high need to understand and address the constraints associated with the power and knowledge aspects among the actors in the groundnut seed value chain. However, there is a lack of empirical evidence on how power and knowledge are related and distributed among the actors in the groundnut seed value chain, and how they affect the performance and outcomes of the value chain. Therefore, the objective of this study was to identify the actors involved in the groundnut seed value chain, their roles, and the power relations and linkages in the

knowledge aspect among them.

The Concept of Power Relations in a Value Chain

In global value chains, power can be defined as the degree of control over something. It is a fundamental aspect of examining the chains and production networks (Gereffi *et al.,* 2005). From a broader theoretical perspective, the power involving coercion and control is explained as an incentive taken by an actor to indirectly or directly compel or impose certain will on another actor in a particular set-up (Dallas *et al.,* 2017). According to the world economic forum, relations disintergrated by a common interest set the tone of any human interaction. Since it is used in value chains, the extent of power possessed by actors in any value chain is based on the actors' access to resources and control that determines the level of acceptance and expectation of the power distributed and used amongst themselves (Guo, 2014). Explained with different dimensions that include visible and invisible, the relational power interplay can be conceptualized as both structural and relational. While the structural perspective of power relation explains how intrinsic characteristics of specific actors exert power over others to instil change or attain a certain goal, relational perspectives of power interplay explain how power is mobilized and exercised (Choksy, 2015). These include decision making, awareness of the actors' rights, ideologies adopted, values and behavioural relations with others. Thus the concept of power relational interplay applies to this study in the sense of how actors have control over information accessing and knowledge sharing thus affecting the relations among actors. Also, the concept gives a connection to how the value chain actors through knowledge sharing enhance their linkages with other actors or ensure they benefit in the value chain set-up.

Groundnuts Production and Seed Value Chain in Tanzania

Groundnut crop has been among the dominant crops in the semi-arid parts of Tanzania. While it has been produced in both small and large scales, the crop has been dominant in Tabora, Shinyanga, Dodoma and Mtwara Regions. The crop is grown for both food and income generation whereby the number of households involved has increased in number over years (URT, 2018). While production of the groundnuts crop in Tanzania has had peak results, currently, the production trend has been falling. In Tanzania, the Annual Agricultural Sample Survey for 2017 indicated that despite the groundnuts being highly produced in the semi-arid areas there has been a gradual fall in its overall production. The production trends traced from 2008 shows that the annual production increased from 340 770 to 810 000 tonnes in 2012, to 1.13 million tonnes in 2015 but gradually falling to 216 433 tonnes in 2017 (URT, 2018). The decline in production can be attributed to production constraints, with drought being one of the challenges. This has altered the improvement of the living standards of the rural poor (Owusu-Adjei *et al.,* 2017).

The economic advantage of groundnuts has not been with production alone, but also its final products that depend on the value addition process on the products or inputs, that are associated with the crop itself for nutritional and economic purposes (Mwatawala and Kyaruzi, 2019). Such products and inputs include the seeds used in the production of the crop. The seed systems can either be formal or informal but it is a fact that the formal seed system for most crops has proven to be more advantageous (Kiambi and Mugo, 2016). It is proven so since the formal seed system has contributed over half of the quality crops produced, including groundnuts in countries where groundnuts production is accelerating. The groundnuts seed value chain depends highly on its actors which has been the case for all crops as explained in the Tanzania Seed Sector Assessment (ASARECA, 2014). Like any other seed crop chain, the groundnuts seed value chain depends on a better linkage of actors (ICRISAT, 2019).

Actors in the Groundnut Seed Value Chain

Agricultural crops value chain including the groundnuts crop value chains encompasses a range of activities performed by actors that are required to bring a product or service from its raw state to end-use. The actors involved

include input suppliers, primary producers (farmers), wholesalers (agents and traders) processors, extension officers, research institutions, manufactures, wholesaler, retailers and the government (Okpaire, 2019). These actors are subsequently involved in the crop seed value chains too although most of them fit on the production node of the particular crop value chain. This is because the seed fit in the production node due to being one of the inputs in production. In the groundnuts seed value chain, actors such as seed producers, seed certifiers, distributors, processors, the government, and consumers are prominent. Other actors that fit in the groundnut seed value chain are also prominent in the general crop value chain but only differentiated by linkages (Stein and Barron). Through these linkages that can be vertical or horizontal, actors perform their different activities with respect to their positions, power, space and motives as individuals or organisations (Emana and Nigussie, 2011). This has led to a successful establishment of platforms that create room to discuss challenges and constraints facing them and how they can be addressed simply because through a correlated range of activities, actors must be supported by outward services from designated identities to make them effective (Hellin and Meijer, 2006) and keeping the value chain functional but also ensure effective linkages (Bitzer, 2015).

Theoretical Framework

The study is guided by the actor interface theory that explains and argues that power relations in a structural set-up tend to fracture social systems along interfaces that differentiate one group from another based on their power differences. The theory sheds knowledge on the discontinuities, linkages and interactions associated with actors with different rationalities in a social situation (Gerharz, 2018).

This structural approach defines the structure, autonomy and rationalities of local actors and how these actors are shaped by changing relations and unequal power interplays. As such, it paves the way to understanding the aspects of knowledge linkage and power relations among actors in the groundnut seed value chain. The interfaces occur at points where varied and conflicting social fields or life-worlds intersect, forming the stage where power is manifested (Barasa *et al.,* 2016). Focusing on the groundnut seed value chain, the theory can be used to explain how power relations among actors affect the performance of the chain but also shed light on how power possessed by actors through influence and importance lead to relation changes across the value chain.

Despite the theory's importance in guiding this study, it is constrained by the fact that it is more focused on solving discontinuities among actors and not linkage since it is based on the actors' behaviour (Hebinck *et al.,* 2001). Since the study aim was to determine knowledge linkage between actors with respect to their power relations in the groundnut seed value chain, data collection based on the number of relations and ties with actors was crucial. This helped in the identification of the nature and extent of power among actors that can be used to define the continuity or discontinuity of that particular tie among actors as a remedy to the constraints associated with the theory and improvement of the groundnuts seed value chain as well.

Materials and Methods Methodology

The study was carried out in Kongwa and Kiteto Districts of central Tanzania embedded within the innovation platforms established as part of the Tropical Legumes III project. The innovation platforms aimed to improve and build groundnuts seed value chain in Tanzania (ICRISAT, 2019). In theory, platforms enable the members to articulate their needs and work together to achieve a common goal on equal terms. Kongwa and Kiteto Districts were purposely sampled because they are found in the semi-arid zone and are said to be the most agricultural productive districts in the regions of Dodoma and Manyara respectively (URT, 2016). Kiteto District has 30 196 agricultural households in the region involved in smallholder agriculture and 28% of its land area is under agricultural activities while Kongwa District, on the other hand, has 37 852 households involved in agricultural production (URT, 2016).

This study adopted a cross-sectional research design. This study design facilitates

the assessment of different groups of people with specific characteristics and it allows data collection at a single point in time fairly fast (Toledo-Pereyra, 2012). The study employed qualitative research methods whereby primary data were collected through focus group discussion and semi-structured interview with key informants guided by a combination of key aspects of the ego-centric and full network approaches to analyze the power relations and knowledge linkages among the actors in the groundnut seed value chain. These approaches complement each other and provide a more comprehensive understanding of social networks or systems than using one approach alone. Secondary data was obtained from records related to the groundnut crop and its value chain from sampled districts covered by the Tropical Legumes III project in Kongwa and Kiteto Districts. These helped to acquire in-depth information and dissect the extent of relations and ties amongst actors that would explain the power they possess in terms of influence and importance.

The study population constituted of members from three clusters: i) Research (participants from ICRISAT, TARI Hombolo and Makutupora), ii) at village level, 4 FGDs conducted in Mlali and Moleti; and iii) at district level with innovation platform members drawn from Kongwa and Kiteto. These were identified from the portfolio of key stakeholders who are members of the Kongwa and Kiteto innovation platforms. The heterogeneous purposeful sampling technique was used to select key informants to obtain a range of cases with relevant knowledge on the groundnut seed value chain. 12 Key informants involved researchers from TARI Hombolo and Makutopora, Village leaders from Mlali and Kongwa villages, and members of the innovation platform from the Kongwa and Kiteto Districts.The selection criteria was the involvement and comphrension of the key aspects of the groundnuts seed value chain nodes within the innovation platforms established as part of the Tropical Legumes III project. The innovation platforms aimed to improve and build groundnuts seed value chain in Tanzania.

Mlali and Moleti villages were purposively sampled from Kongwa and Kiteto Districts. Focus group discussions (FGDs) with the identified actors within the innovation platform from Kongwa and Kiteto District in the ICRISAT portfolio were conducted to understand who are the key actors, what are existing interrelationships between these various actors, their interests and the sort of influence each has in the interaction web. Social network data was collected using a Net-Map method using a novel social network mapping method that included an assessment of actors' influence and goals (Hauck *et al.,* 2013). The homogenous purposive sampling technique was employed to obtain the FGD participants. In total, four FGDs were conducted in the entire study area with each comprising between 8-10 participants from which the data collected involved content analysis. The same procedure was used to analyse data collected during semi-structured interviews. The number of participants guaranteed efficiency to gain enough insights on several issues of importance in the study (Nyumba *et al.,* 2018). Secondary data was obtained from reports, journals, government publications and other records related to groundnut crop and its seed value chain from sampled districts offices and the ICRISAT Tropical Legume III project. Using UCINet and NetDraw for social network analysis data related to a actors identified and their immediate connections were input into UCINet for Centrality measures anlysis and and subgroup analysis to identify key nodes and understand local dynamics. Results from UCINet were then exported and visualized in NetDraw, allowing for the representation to enable interactive exploration and customization of the network visualization, providing a comprehensive and visually intuitive understanding of social network dynamics. This integrated approach facilitated the interpretation and communication of findings from social network analysis.

Results and Discussion

Actors in the Groundnuts Seed Value Chain and their Roles

The study divulges a web of actors with different relationships distinguished by levels and activities they engage themselves in. Despite their distinguishing roles in the value

chain, these actors are separated by the levels they fit in the chain, i.e. the district level and the village level. It was also found that some actors fit in both levels (i.e. district and village) as shown in Table 1, due to horizontal linkages among actors. According to Stein and Baron (2017), this kind of linkages plays a vital role in ensuring cooperation is maintained. At the village level in Mlali and Kongwa, a group of eight actors were identified. These included; farmers who are the owners of the production process and manage farm level processes of production, middlemen and traders who link the product of these processes to the consumer or processor. According to Stiring *et al*. (2013), traders and middlemen play a vital role in ensuring a growing production and demand to emerging and existing markets while farmers are obliged to satisfy the consumers demand. Other actors were extension officers who offer agronomic and market related information support to farmers in the production process through capacity enhancement to identify and engage with appropriate markets ; organisation such as Non-Government Organisations (NGOs) and Community-Based Organisations (CBOs) that facilitate productivity through networking and collaboration among other actors. These Organisations play the role of facilitating a multi- stakeholders' platform that in turn ensure players involved interact (De-Janvry *et al.,* 2019). Other actors were village leaders; researchers and middlemen. Furthermore, the study revealed that actors at the village level were fewer compared to those at the district level. According to Mmasa and Msuya (2012), fewer chain actors at a particular set-up affect the performance of the chain since there will be inadequate information sharing and decision making due to fewer actors.

While researchers link academic outputs for improvement in production, extension officers

Table 1: Actors and their roles in the groundnuts seed value chain at the village level

Actors at the village level	Roles
Farmers	• Manage the farm level process that involves producing, packing and delivering to middlemen, traders, or processors
Extension Officers	• Help farmers enhance productivity.
	• Helping farmers organize and benefit from economies of scale
.	• Build farmers with the capacity to identify and engage with appropriate markets.
NGOs and CBOs	• Marketing farm produces.
.	• Facilitating productivity through capacity enhancement
	• Networking and collaboration of farmers and other actors
Village Leaders	• Understand the social issues in a village set up.
	• Mandated with organizing farmers for technology dissemination, adoption and information sharing at the village level.
Middlemen	• Link farmers with buyers (processors/consumers) Buy the farmers' produce to make a profit.
Researchers	• Generating new knowledge on better production practices for farmers.
	• Giving information to other actors on market requirements and from the research field.
	• Transfer of innovative information to actors involved in the value chain
Traders	• Link producers with markets or buy farmers' produce.

play a vital role in production by ensuring the build the farmers capacity through agricultural advisory services and middlemen link farmers and markets or traders. The advisory services are important to ensure production is improved (Ferris and Irwin, 2016) while markets links ensure middlemen play an intermediary role through market channels they have with bulk buyers. This acts as a form of security to farmers when they have bigger produce to sell (Chigusiwa *et al.,* 2013).

At the district level, as shown in Table 2 above, an increased number of actors was observed due to the increase in activities involved and coverage of the area. The identified actors involved agro-dealers who play a role in input distribution and increase export and distribution of income across the boundary set-up and agro-processors who vittaly play a value addition role by generating higher production volumes, increasing export and distribution of income across boundary set up. According to the report by IFDC (2011), agro-dealers are important in the chain as the chances of input access to farmers are intensified by their existence in the chain set-up. The agro-processors whether big or small expand production by improving quality if produces.

The Local and Central government play a supportive role in the chain as it was also found in the district level. The support is found through research, quality control policy enforcement, infrastructural improvement and developing strategies and laws that aim to improve production and other activities along the chain (Nicholson, 2019).

The climate department plays a vital role as it shares meteorological information for crops production including the groundnuts crop. Climate assessment is an important attribute to the production node (Mwongera, 2019), in the value chain hence the importance of the climate department at the district level. It is through the identified level that actors involved tend to share and have access to the same information hence exchange the same experiences and solve the same problems through linkages (Lee and Tkachi-Kawasaki, 2018). The identified actors fall in the chain adhering to the nodes of the chain as shown below in Figure 1.

Table 2: Other actors and their roles in the groundnuts seed value chain at the district level

Actors at the district level	Roles
Central Government	• Creates and passes laws, policies aimed to enhance production, markets, infrastructure and agricultural development
Local Government	• Enforce the policies, laws and tax collection set by the central government
Consumers	• End-users of products and services produced/offered by all actors in the chain
Agro- dealers	• Distribution of agricultural inputs that include seeds, fertilizers, equipment and fertilizers.
Agro-processors	• Introduce innovation and entrepreneurship skills. Generating higher production volumes. Increasing export and distribution of income across boundary set up
Climate Department Officials	• Share weather broadcast important for producing, transporting of produces to other actors.

Power Relations and Knowledge Linkage among Value Chain Actors

The study findings suggest that power relations exist among actors in the groundnut seed value chain, particularly in the exchange of knowledge. These power dynamics are closely tied to the number of ties an actor maintains with other actors in the network. Figure 2 provides a display the incoming and outgoing ties, representing the flow of knowledge among different actors. While higher degrees, indicate

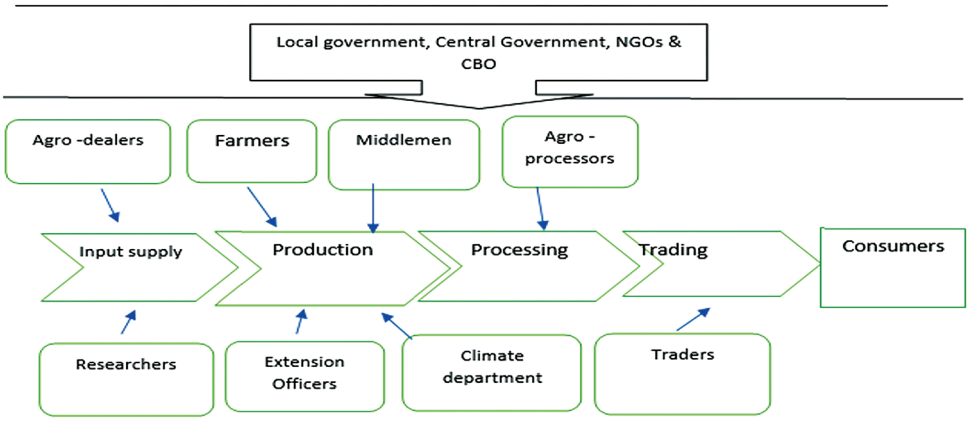

Figure 1: The value chain map of identified actors in the groundnuts seed value chain

more ties, signifying increased influence and importance within the network, the underscoring significance of strong connections for knowledge exchange is also proven among identified actors at the village level. This aligns with the observation in the text that at the village level, farmers and extension officers have a higher number of both ingoing and outgoing ties compared to other actors, making them powerful influencers in knowledge exchange.

The concept of ties and their impact on power relations is further supported by the Falayi *et al.* (2020) who highlights the role of multi-relational ties among actors in enhancing the network structure. In this context, actors with diverse connections are better positioned to facilitate the diffusion of knowledge. Nohrstedt and Bodin (2019) furtherly explainis that actors sharing similar attributes are more likely to collaborate which is the case for actors with higher incoming and outgoing ties. This collaboration is crucial for building strong ties and, consequently, influencing the flow of knowledge within the groundnut seed value chain. The dynamics illustrated in Figure 2, with arrows and density representing linkages among actors, further emphasize the central role of ties in maximizing the diffusion of knowledge at the village level. The centrality of ties and power relations in shaping the knowledge exchange dynamics within the groundnut seed value chain is dependent on the number of ties an actor has as shown in the figure where actors with higher in/out degrees /ties, such as farmers and extension officers, emerge as powerful influencers, facilitating the efficient flow of knowledge. This also explain the level of power actors with less ties have in the value chain set-up in terms of influence and importance on the knowldege aspect. This emphasizes the importance of multi-relational ties and collaboration in enhancing network structures and influencing power relations in knowledge exchange processes

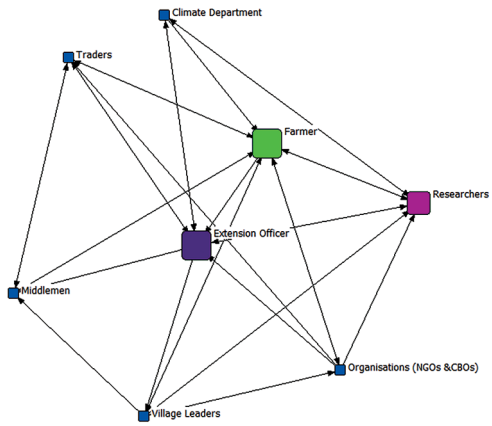

Figure 2: Knowledge linkage interactions among actor at the village level

On the other hand, the linkage of actors at the drictrict level is illustrated in the linkage map using the Netdraw software to show the number of linkages and level of importance and influence using the node sizes. The results show that farmers, climate department, extension officers and village leaders had higher outdegree/ outgoing ties with other actors depicting them to be influential actors in the village set up as the

result of interactions among these actors (Fig. 2).

According to Snijders *et al.* (2013), the joint participation of actors goes together with interactions that can either be one or two-node network. At the same time, the middlemen in Mlali Village exerted a higher number of ingoing ties with other actors. Apart from middlemen, farmer and extension officers showed a relatively higher number of ingoing ties too hence showing a level of importance compared to other remaining actors. This is an indication that extension staff in Mlali are viewed as very important, an implication that the level of agricultural activities in this village is very high and recquires high demand for agriculture-related services as well. This is an important aspect in the actor social networks since it is through these relationships that potential partners interact to exploit benefits of scope and economies of scale, resulting in pooled benefits from multiplex ties (Ferriani *et al.,* 2013).

At the district set-up, it was observed that the number of actors increases as well as the number of ties/linkages too. Figure 4 illustrates the number and extent of ties among actors at the district level. From the actors identified in the groundnuts seed value chain at the district level, NGOs, CBOs, local government, researchers, transporters, traders and agro-dealers had a higher number of outgoing ties with other actors. This is an indication of influence due to a higher level of interrelationship in knowledge transfer among the actors, thus a multi-directional flow of information that forms a basis for knowledge diffusion and feedback mechanism. It is argued that ties dictate interactions and increased interaction result to knowledge sharing that is an output of innovation (Huang and Li, 2020). At the same time, traders, researchers, framers, NGOs, CBOs, consumers and transporters showed a higher number of incoming ties in that order hence showing the extent of the need for information from other actors to support their activities within the value chain. To provide evidence to this, a platform member in the key informant interview argued that;

"..... we are too close to the community and non-government organisations that devote their efforts to ensure we are educated and with knowledge regarding proper nutrition to our kids and one of the crops they emphasize on is groundnut crop. The information they commonly share goes beyond nutrition inasmuch as the present seed varieties, agronomic practices and so forth. Their presence supplements the extension officers and the local government efforts" (Innovation Platform Key informant Interview on 17th July 2020 at Kongwa District).

Actors with larger node sizes have a higher level of influence and importance compared to other actors, while actors with smaller node size have no much control along with the value chain set-up. According to Pereira *et al.* (2016), the interrelationship among actors is dependent on the origin of influence that determines the level of interactions and social dependencies among actors. Since there was no difference in the number of actors identified at the district level (Kongwa and Kiteto) as it was at the village level (Mlali and Moleti), the interaction Figure 3.

Extent of Power Linkages among Actors in the Value Chain

Power linkages among actors in the groundnuts seed value chain were assessed based on two centrality measures, i.e. Degree and Betweenness that were both performed using UCINET software. These centrality measures betweenness, indegrees and outdegrees were used to identify actors' powers in terms of who is influential, important and peripheral. Besides, they were used to determine the direction of linkage among actors in terms of knowledge in the value chain as shown in Table 3.

The insights derived from the centrality measures in Table.3 are substantiated by the study's findings, specifically emphasizing power dynamics within the groundnuts seed value chain. Farmers and emerge as influential actors at the village level, as indicated by their high betweenness centrality among all identified actors at the village level. This underscores their ability to powerfully interconnect various actors within the village setup which is justified by the number of ties they have hence a higher normalized outdegrees and indegrees. The higher normalized indegree and outdegree

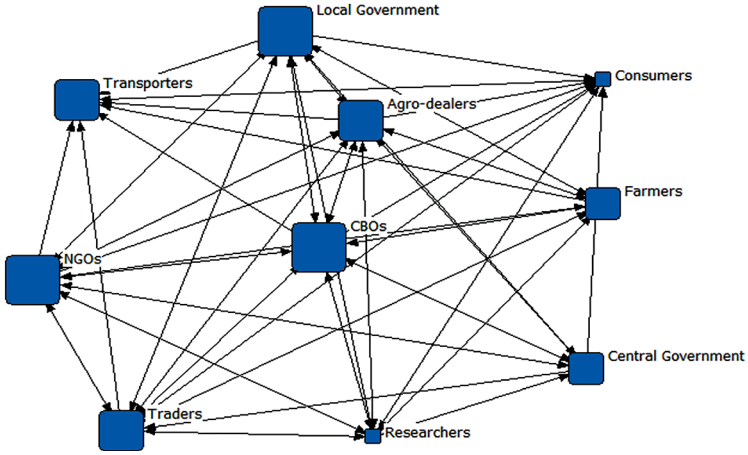

Figure 3: Knowledge linkage interactions among actor at the district level

values further highlight the extent of their power, emphasizing their importance and influence within the village for other actors where by . Alarcão and Neto (2016) support this, noting that actors with high centrality measures are more likely to receive and share knowledge, underlining the pivotal role of these actors in information exchange.

"...we highly depend on the relations we have despite some of us being found in remote areas. The few times that we come together basically under arranged farmers and other stakeholders' platforms, knowledge is shared regarding the challenges and opportunities that

Table 3: Centrality measures on power linkages among actors in the groundnuts seed value chain

Level		Normalized Indegree	Normalized Outdegree	Normalized Betweenness
Village	Farmers	85.724	85.724	28.770
	Climate			
	Department	42.987	28.615	16.468
	Researchers	52.976	71.458	26.825
	Extension Officers	77.432	75.432	21.67
	NGOs & CBOs	17.423	28.615	1.587
	Traders	42.987	57.196	3.056
	Village leaders	42.987	42.987	3.452
	Middlemen	28.615	27.189	1.270
District	NGOs	88.889	100.000	2.216
	CBOs	88.889	100.000	2.216
	Local Government	88.889	100.000	2.216
	Researchers	100.000	88.889	4.563
	Traders	100.000	88.889	2.216
	Transporters Argo-dealers	77.778	88.889	0.827
	Farmers	88.889	88.889	1.587
	Central Government	44.444	77.778	0.000
	Consumer	88.889	44.444	0.628

are within the common activities we do despite the objectives we differently have. Of course, the level of information we share differs due to the financial muscle differences between us. Traders and organisations seem to be informed than us" (Innovation platform members focus group discussion, 13th July, 2020 at Mlali Village).

In the district setup, NGOs, CBOs, traders, researchers, and Local Government exhibit heightened values of indegrees and outdegrees, surpassing those of other actors. These elevated centrality values point to a higher level of influence in knowledge generation and exchange linkages at both district and village levels. This finding is supported by a platform member's statement during a key informant interview, highlighting the importance of relations and knowledge sharing among actors. Notably, traders and organizations are perceived as more informed, emphasizing their significance in the knowledge-sharing network.

This heightened influence of key actors is instrumental in fostering social interactions, leading to improvements in the value chain and its successful functioning (Lowitt *et al.,* 2015). In contrast, middlemen within the groundnut seed value chain are identified as less important or influential, lacking connections or betweenness in knowledge linkage. The role of middlemen in service provision is acknowledged, but their negative perception for building assets for themselves underscores their weakness in knowledge transfer and influence within the seed value chain. Todo et al. (2016) highlights that weak ties among crucial actors like middlemen hinder the diffusion of information and knowledge. This observation aligns with the understanding that middlemen's role in the seed value chain, particularly concerning quality seed, is minimal compared to their more substantial role in the grain value chain, primarily focused on food grain.

Conclusions and Recommendations

The study concludes that there is a difference in influence and importance among actors in the groundnuts seed value chain which defines the extent of power possessed by identified actors in the study area. The variations observed in relations among actors dictate the extent of knowledge relations while the extent of knowledge highly matches with the number of ties the actor has. This indicates that actors that have a higher number of ties are more influential as opposed to those that have a less number of ties. Furthermore, the value chain set-up level contributes to the knowledge linkages since it dictates the number of actors involved. Variation in ties among actors observed shows to be high at the district as opposed to the village level as the result of the number of actors present in both levels.

It is therefore evident that there is greater knowledge linkage among actors at the district level compared to village levels due to the number of ties observed. Several actors including NGOs and CBOs are influential and important in knowledge transfer/brokering making them more powerful than other actors. However, it is important to ensure all actors are important and influential at their node of influence for the stability and performance of the crops value chain. This can be achieved by ensuring the inclusion of all actors in the innovative platforms developed regardless of their contribution.

While the study clearly shows the knowledge linkages and explains the nature and extent of power relations in the chain set-up, it contributes to the guiding theory by its findings. If the highlighted constraints are worked upon, improved and continued linkages emerge as a result. It is with these findings, actors' roles in all levels need to be incentivized to increase the number of linkages in the knowledge aspect. These linkages aspect improvement coupled with other likages aspects such as income and material linkages among actors results in an improved and functional groundnut seed value chain.

It is evident that some of the actors are not well integrated into the groundnut seed value chain and the innovation platform. Thus efforts are needed to address this gap towards ensuring competitiveness and benefits to all actors in the knowledge aspect of the value chain. It is therefore imperative to pay attention to knowledge linkages by incentivizing actors for interconnectedness, cohesiveness and collective action. This has far-reaching effects

in improving the weak groundnut seed value chain translating to securing livelihoods. It is therefore recommended that these innovative platforms are extended further and are made more inclusive to ensure that the actors at the national level are included. This contributes to technology adoption and diffusion herein referred to as improved varieties and quality seed

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