

Mapping of beef cattle value chain actors in selected states of North-West Zone, Nigeria

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Target Audience: *Beef Cattle Farmers, Beef Cattle Traders, Butchers, Beef Marketers, Government.*

Abstract

This study was aimed at mapping of the various actors of the beef cattle value chain and their functional roles. A multi-stage sampling technique was employed in the selection of the respondents. A sample size of 576 value chain actors consisting of 120 beef cattle farmers, 60 beef cattle traders, 36 butchers, 60 raw beef marketers, 60 processed beef marketers and 240 consumers. The study made use of primary data which were obtained through the use of a computer-aided personal interview (CAPI) version of survey instrument rather than a paper-based questionnaire. Data were collected on production, marketing and consumption components of beef cattle value chain activities. Descriptive statistics was used to analyze the data. The results revealed that beef cattle value chain actors do not perform only one primary value chain activity but perform other value chain activities as secondary activities. This multiplicity of functions carried out by some of the beef cattle value chain actors implies that the beef cattle value chain is not a linear and straightforward chain where each actor is specialized in one activity. It can be concluded that beef cattle value chain activities involve a complex interrelationship in the activities carried out by the different actors in the physical flow of beef from farm to fork. It is therefore recommended that government should intervene in the area of linking actors in the value chain to prospective markets in order for the actors to benefit from the various activities.

Keywords: *Actors, Value Chain Mapping, Consumers, Beef Cattle Farmers, Butchers*

Description of Problem

Livestock production accounted for 1.8% of the GDP and 6.9% to the agricultural GDP of Nigeria in 2018(1). However, the livestock subsector's contribution is under represented largely because of the under development of livestock value chains and greater emphasis on crop value chains among other factors (2). Livestock value chains such as the beef cattle value chain, entails the full range of activities required to bring beef to the final consumers passing through the different phases of production, processing and delivery (3).

The life cycle of production, distribution, consumption and recycling of a product (a physical good or a service) involves a series of discrete and linked activities which enables us to identify and plot each of these discrete links in the chain. Mapping value chain helps to

identify where, how, why, and by whom value is added and created along the chain, as well as how changes could result in improved performance (4). Therefore, value chain analysis goes beyond behavioral assessments at the individual participant level by examining the nature of vertical linkages between suppliers and buyers (e.g. contracts between farmers and processors) as well as horizontal linkages between agribusinesses of the same type (e.g. farmer associations).

Value chain mapping helps to obtain a clear understanding of the sequence activities and the key actors and relationships involved in the value chain. This exercise is carried out in qualitative and quantitative terms through graphics presenting the various actors of the chain, their linkages and all operations of the chain from pre-production (supply of inputs) to

industrial processing and marketing (5).

In the face of dwindling oil revenue and the urgent need for diversification of Nigerian economy by unlocking the potentials of agriculture, agricultural value chains offer a good platform for such diversification (6; 7; 8). This is especially for the under developed livestock value chains such as beef, dairy, poultry, pig, sheep and goat value chains as envisioned under the Agricultural Transformation Agenda (ATA) (2011 – 2015) and reinvigorated in the Agricultural Promotion Policy. More recently, a National Livestock Transformation Plan (NLTP) (2019 – 2028) approved by the National Economic Council of Nigeria seeks to build on and take to a new level the broader goals of the APP (9). In order to examine these issues raised, the specific objectives were to:

- i. identify the various value chain actors in the study in area;
- ii. link the various actors of beef cattle value chain and
- iii. analyze the effectiveness of information flow and the strength of relationships among beef cattle value chain actors in the study area.

Materials and Method

Description of the study area

The study was conducted in Kano, Kaduna and Katsina states of North-West, Nigeria. The north-west comprises of Jigawa, Kano, Katsina, and Kaduna, Zamfara, Sokoto and Kebbi states. According to the 2006 population census, the total population of the zone is estimated at 35.7 million with an average density of 103 persons per square kilometer (10). The projected population of the zone in 2018 is about 47.5 million, based on an annual growth rate of 3.2%. The north-west zone is known for livestock production activities such as cattle, goat, sheep, poultry etc. The zone produced over half of the entire cattle in the country in the national agriculture sample survey with 9,892,240 cattle heads representing 52.4% of cattle in Nigeria (11).

Sampling procedure and sample size

Six categories of respondents (value chain actors) formed the sample for this study. These are beef cattle farmers, beef cattle traders, butchers, raw and processed beef marketers (wholesalers, retailers, *suya* producers, *kilishi* producers, *danbun nama* producers) and consumers. Multi-stage sampling technique (two stage sampling) was employed in the selection of the value chain actors. The selection of the sample for each actor was carried out in the following manner.

Beef cattle farmers: In the selection of beef cattle farmers, six Local Government Areas (LGAs) were purposively selected (two from each state) based on their prominence in cattle production (LGAs that have several communities involved in cattle farming), availability of cattle markets and availability of abattoirs. Secondly, twelve villages were purposively selected (two from each LGA) on the basis of high availability of pastoralists and agro-pastoralists. Thirdly, ten beef cattle farmers were randomly selected in each of the villages to give a sample size of 120 beef cattle farmers derived from a list of cattle farmers obtained in the villages with the assistance of extension agents and the community leaders. Equal sample size was used due to lack of information on the population of beef cattle farmers.

Beef cattle traders: In the selection of cattle traders, one cattle market in each of the 6 LGAs was randomly selected to give a sample of 6 cattle markets and a list of cattle traders was obtained from the cattle traders associations in each of the markets. Ten cattle traders in each of the markets were randomly selected to give a sample size of 60 cattle traders. Equal sample size was used due to lack of information on the population of beef cattle traders.

Butchers: In the selection of butchers, one abattoir in each of the 6 LGAs was randomly selected to give a sample of 6 abattoirs and a list of butchers in each abattoir was elicited with the assistance of the leaders of the

abattoirs. Six butchers per abattoir were randomly selected from the list of butchers in each abattoir to give a sample of 36 butchers. Equal sample size was used due to lack of information on the population of the butchers.

Raw and processed beef marketers: In the selection of beef marketers, 10 raw beef marketers (wholesalers and retailers) and 10 processed beef marketers (*suya* producers, *kilishi* producers and *danbun nama* producers) were randomly selected in each of the 6 LGAs to give a sample size of 60 raw beef marketers and 60 processed beef marketers derived from a list of raw and processed beef marketers compiled with the assistance of extension agents and the beef marketers associations. Equal sample size was used due to lack of information on the population of the actors in their respective market segments.

Consumers: In order to ensure a more balanced representation of beef consumers, LGAs with higher urban dominance were included in the sample for beef consumers. This is because meat consumption is more prevalent in urban centers with much higher income earning consumers relative to less urban or rural centers. Therefore, non-inclusion of urban residents could constitute bias to the results for beef consumers. Two LGAs from the metropolitan centres of the three states were included in the sample for beef consumers, which gave a total sample of 6 LGAs for the beef consumers. For the selection of beef consumers in the rural areas, two LGAs from the three states were included in the sample for beef consumers which gave a total sample of 6 LGAs for the beef consumers. Secondly, twelve villages were purposively selected two from each LGAs. A list of households is generated in each of the 12 villages with the help of extension agents and community leaders. Ten households were randomly selected from each village to give a sample of 120 households in the rural areas. For the selection of beef consumers in urban areas, 30 households were selected from four wards in each of the six LGAs to give a sample

of 120 households. The total sample size of the beef consumers was 240 consumers. Overall, the total sample size of the beef cattle value chain actors employed in the study was 576 actors.

Data collection

The study made use of primary data which were obtained through the use of computer-aided personal interview (CAPI) version of survey instrument rather than paper-based questionnaire.

Analytical technique

Descriptive statistics

Descriptive statistics such as mean, percentages and flow charts were used to achieve the objective of the study. A 5-point Likert-type scale was used to achieve part of the objectives and to measure the value chain actors' perceptions about effectiveness of information flow. The 5-point Likert scale was described as Strongly Agreed (SA), Agreed (AG), Neutral (N), Disagreed (DA) and Strongly Disagreed (SD) with a weight of 5, 4, 3, 2 and 1. For each indicator, a weighted mean was obtained as follows:

$$WM = \frac{[(fSA * 5) + (fA * 4) + (fN * 3) + (fDA * 2) + (fSD * 1)]}{N} \dots 1$$

Where:

WM= Weighted mean of the perception scores

f = Frequency of responses

Values of 5, 4, 3, 2 and 1 = Attached weights

SA, AG, U, DA and SD = Perceptions of strongly agree, agree, neutral, disagree and strongly disagree about effectiveness of information flow

N = Sample size

Decision rule

Based on this perception analysis, the mean(s) for all indicators were then categorized as follows;

If the mean score fell between 1.0 to 1.4 is classified as Strongly Disagree,

If the mean score fell between 1.5 to 2.4 is classified as Disagree,

If the mean score fell between 2.5 to 3.4 is classified as Undecided/Neutral,

If the mean score fell between 3.5 to 4.4 is classified as Agree and

If the mean score fell within 4.5 to 5.0 is classified as Strongly Agree (SA).

Results and Discussion

Beef cattle value chain actors and their functional roles

Input suppliers

The input suppliers are relevant in beef cattle value chain as they make available all factor inputs such as calves, feeds (grass, legumes, concentrates feed, mineral mixtures), drugs, machinery and implements (feeders, knives, ropes, weighing scale, plastic bags, cooking materials, packaging materials) along the value chain in the right place, time, form and quantity required by cattle farmers and other key actors along the value chain. This is in consonant with the findings of (12), who reported that input suppliers in beef cattle value chain supply diverse inputs and are connected to various value chain actors. The input suppliers who serve the value chain actors in the study area mostly operate as retail outlets rather than the direct manufacturers of the inputs.

The results presented in Table 2 shows that the market structure of the input suppliers in the beef cattle value chain in the study area is basically a pure competitive market, where many suppliers are involved in the selling of inputs to the various actors. The inputs that the suppliers sell are generally not patented to them and can easily be sold by all input suppliers' implying that patent right is not a barrier to entry. Also, there are no stringent legal requirements that can limit entry and exit. However, the start-up capital may be prohibitive to some would-be input suppliers who have no capital base, and this can act as a barrier to entry. The inputs that the suppliers sell are mostly homogeneous products but

sometimes with some elements of product differentiation through packaging and branding in the case of inputs such as feeds and drugs. In most parts of the study area, there are many input suppliers and this limits the tendency for collusion to increase prices of inputs. On the other hand, there is the tendency for an input supplier to act as pure monopoly when the input supplier is the only supplier in a given geographical location such as a rural community and the supplier is selling a vital product such as cattle drug, which is not readily available within the geographical location. Therefore, a supplier can exhibit some level of monopoly power in selling a highly desirable input. There was no perfect market information and hence, the input suppliers always seek for information about prices of inputs, new products, demand from consumers, credit facilities and other market information.

Beef cattle producers

The beef cattle producers in the beef cattle value chain engage in series of activities of putting all factor inputs such as land, calves, labour, feeds, drugs and implements together for the production of beef cattle. The beef cattle producers consist of pastoralists, agro-pastoralist and ranchers and are linked to various actors who purchase cattle from them. The producers often keep the cattle as a store of wealth and only the ranchers are highly market-oriented cattle producers. Furthermore, the agro-pastoralists also keep cattle for animal traction during cropping seasons. The producers mostly get their calves from their existing stocks while some buy from other farmers. The results in Table 1 show that most (92.7%) of the cattle farmers in the study area were not involved in secondary value chain activities. This implies that majority of the cattle farmers in the study area only perform the function of rearing cattle in the value chain and do not undertake further beef cattle value chain functions.

The results presented in Table 2 showed that there is little or no barrier to entry for those aspiring to engage in beef cattle production and the only barrier is start-up capital to purchase calves. In terms of exit, there is absolutely no barrier to exit. The product (cattle) of the cattle producers is homogeneous with no element of differentiation and hence, they are price takers. There was little or no form of vertical or horizontal integration as a way of increasing production efficiency, lowering cost or increasing profit margins. There was no perfect market information available to the cattle producers and they often seek for information about cattle health, cattle nutrition, prices of inputs, potential customers, credit facilities and other market information. The market structure of the beef cattle producers in the beef cattle value chain of the study area can be considered as a pure competitive market.

Beef cattle traders

The beef cattle traders perform a vital role in the marketing of live cattle from the cattle producers to raw beef marketers, processed beef marketers and sometimes to consumers and other traders. Cattle traders performed secondary beef cattle value chain activities besides their primary function of buying and selling cattle to other value chain actors. A larger proportion (55%) of the cattle traders performed secondary beef cattle value chain activities besides their primary function of buying and selling cattle to other value chain actors as shown in the results presented in Table 1. This implies that some of the cattle traders engage in vertical integration, which could be backward integration (cattle production, input supply) and forward integration (butchery, raw beef marketing and processed beef marketing). This further indicates the interrelationships in the functional roles of the actors in the value chain, which is in consonance with the interdependency among beef value chain actors as posited by (13).

The market structure of traders as shown

in Table 2 indicates that the beef cattle traders operate in a pure competitive market, where many traders are involved in the selling of cattle to the various actors. Entry and exit into the market are not prohibited by factors such as patent right and stringent legal requirements. However, the capital required to engage in cattle trading may be prohibitive and this can act as a barrier to entry. The cattle that the traders sell are generally homogenous and this implies that they are price takers. There was no perfect market information available to the cattle traders and they always seek for information about prices of inputs, prices of cattle in different markets, demand, supply, credit facilities and other market information.

Cattle butchers

The beef cattle butchers perform the function of slaughtering cattle in abattoirs, private slaughter slabs or in their residence. They perform additional functions such as separating the meat from the meat offal and bone, washing the meat and meat offal and undertaking preliminary processing of the meat into different sizes. Before slaughtering of cattle in abattoirs, the cattle are often inspected by health officers as indicated by butchers who operate in abattoirs. The results in Table 1 show that 72% of the butchers in the study area perform the primary function of slaughtering cattle while others engage in secondary value chain activities. This implies that some of them are involved in vertical integration by integrating backward or forward in the value chain. The butchers largely integrate forward into selling of raw beef to consumers. This agrees with (14) who reported that butchers in Ogun state perform a range of activities in the slaughtering process (slaughtering, pumping cow, skinning, washing and splitting) and equally perform other activities outside the slaughtering of cattle. The results in Table 2 show that the market structure for butchers is that of pure competitive market, where there are many butchers, no barrier to entry and exit and no full market knowledge. The butchery

service that they offer is not differentiated and they are price takers. They seek for information regarding prices, potential

customers, and other market information in the value chain.

Table 1: Distribution of value chain actors based on their participation in secondary value chain activities.

Actors	Frequency	Percentage
Cattle farmers (n=120)		
Participate in secondary chain activities	10	8.3
Do not participate in secondary chain activities	110	92.7
Cattle traders (n=60)		
Participate in secondary chain activities	33	55
Do not participate in secondary chain activities	27	45
Butchers (n=36)		
Participate in secondary chain activities	10	28
Do not participate in secondary chain activities	26	72
Raw beef marketers (n=60)		
Participate in secondary chain activities	40	67
Do not participate in secondary chain activities	10	23
Processed beef marketers (n=60)		
Participate in secondary chain activities	24	40
Do not participate in secondary chain activities	36	60

n = number of respondents

Raw beef marketers

The raw beef marketers consist of beef marketers who prepare standard cuts of meat for sale in wholesale and retail open-air market outlets as well as meat shops and supermarkets which leads to utility of form. However, majority of the raw beef marketers operate in retail open-air markets which is consistent with the findings of (15) on beef marketing in Edo state. Some raw beef marketers buy live cattle and slaughter it to provide standard cuts of meat to processed beef marketers and consumers while other raw beef marketers buy raw beef in bulk and sell to processed beef marketers and consumers. The results in Table 1 show that majority (67%) of the raw beef marketers in the study area integrate vertically into other value chain activities in the beef cattle value chain such as trading, butchering and processed beef marketing. This implies that a large proportion of the raw beef marketers are involved in vertical integration

(integrate backward or forward in the value chain). The market structure for raw beef marketers as shown in Table 2 is that of pure competitive market where there is relatively high number of buyers and sellers of a homogenous product (raw beef). There is essentially no barrier to entry and exit. The only notable barrier to entry is the start-capital involved in the business. There was no perfect market information available to the raw beef marketers and they always seek for information about prices of inputs, consumer demand, prices of live cattle in different markets, market charges, prices of cold storage, credit facilities and other market information.

Processed beef marketers

The processed beef marketers comprise of restaurants, hotels, eateries and processed meat vendors and they perform the primary function of processing beef into the different forms

desired by consumers and thereby add utility of form. The processed meat vendors especially for shish kebab (*suya*) are more predominant in the study area and cosmopolitan in other parts of Nigeria (16 and 17). Other popular products of processed meat vendors in the study area include dried meat (*Kilishi*) and Shredded meat (*Danbun Nama*). Majority (60%) of the processed beef marketers in the study area as shown in Table 1 were not involved in secondary value chain activities such as cattle production, trading, butchering and other activities. Therefore, only few of the processed beef marketers involved in vertical integration especially integrating backward into raw beef marketing.

The results presented in Table 2 show that the market structure for processed beef marketers in the study area is a pure competitive market, where many processed beef marketers are involved in the selling of processed beef to consumers. Entry and exit into the market are not prohibited by factors such as patent right and stringent legal requirements and only the capital required to engage in processed beef marketing can be considered as a barrier to entry. The products of processed beef marketers are homogenous, and this implies that they are price takers. There was no perfect market information available to the processed beef marketers and they always seek for information about prices of inputs, consumer demand, market charges, prices of cold storage, credit facilities and other market information.

Beef consumers

The beef consumers in the study area consist of urban beef consumers and rural beef consumers who are linked to various value chain actors, and they consider beef a vital source of animal protein. Consumers purchase beef in different forms such as raw beef or processed beef but frozen beef is not readily available to consumers. In addition, some

consumers purchase live cattle especially as a group of consumers or cooperatives during festive periods, slaughter the cattle and then share the meat. This allows the group to benefit from economies of scale. The beef consumers in the study area largely have access to open-air market outlets for raw beef which is not in tandem with global best practices on safety and quality beef delivery (18) and often predisposes beef to infestation by flies (14). Only few urban beef consumers have access to meat shops and supermarkets for the purchase of raw beef, which offers more hygienic retail outlets. The consumers usually do not have access to information on the source of beef (whether it is actually from a cattle or other animals such as horse, camel, donkey, etc.) and the source of live cattle (the producer of the cattle) except for those who purchase live cattle directly from the producer during festive periods. Therefore, there is absence of traceability information systems in the value chain. In addition, consumers often do not have access to information on the health status of the live cattle before slaughter.

Value chain support services providers

The value chain service providers (secondary actors) in the study area provide essential services such as financial services, extension services, veterinary services, transportation services, market linkage and cold storage services to most actors along the chain. However, financial services are mostly from informal organizations such as associations or cooperatives of the actors as most of the actors have limited access to financial services such as credit facilities from formal institutions such as banks. The roles of the value chain service providers in the chain cannot be over emphasized because of their involvement with various primary actors throughout the chain in ensuring that the actors play their respective roles effectively.

Table 2: Summary of market structure for key beef cattle value chain actors

Key value chain actors	Barriers to entry and exit	Nature of products	Degree of integration	Market information
Input suppliers	There was little or no barrier to entry. No barrier to exit	Mostly homogenous products and some elements of differentiation	There was little or no market integration	No perfect market information. Seek information on prices and market conditions
Beef cattle producers	There was little or no barrier to entry. No barrier to exit	Homogenous products (are price takers)	There was little or no market integration	No perfect market information. Seek information on prices and market conditions
Traders	There was little or no barrier to entry. No barrier to exit	Homogenous products (are price takers)	There was vertical integration	No perfect market information. Seek information on prices and market conditions
Butchers	There was little or no barrier to entry. No barrier to exit	Homogenous products (are price takers)	There was vertical integration	No perfect market information. Seek information on prices and market conditions
Raw beef Marketers	There was little or no barrier to entry. No barrier to exit	Homogenous products (are price takers)	There was vertical integration	No perfect market information. Seek information on prices and market conditions
Processed beef marketers	There was little or no barrier to entry. No barrier to exit	Homogenous products (are price takers)	There was vertical integration	No perfect market information. Seek information on prices and market conditions

Beef Cattle Value Chain Links

Every agricultural value chain entails a combination of several links that connects the value chain actors in the movement of a product from farm to fork. Given this context, the results presented in Figure 1 show that the beef cattle value chain in the study area entails several interlinked activities performed by different actors in the supply of inputs, provision of support services, production, marketing and final consumption which indicates interdependency between actors and processes in the value chain. The chain involves a complex interrelationship in the activities carried out by the different actors in the physical flow of beef from farm to fork (production to consumption) as shown in Figure 4.1. This finding is in line with the finding on beef value chain in different parts of Nigeria (19; 3; 20) and in other parts of Africa (21; 22).

Specifically, Figure 1 shows that the beef cattle value chain begins with the input suppliers, who are linked to the farmers and other chain actors. The cattle farmers who consist of pastoralists, agro-pastoralists and

ranchers rear the cattle and sell to traders, raw beef marketers, processed beef marketers and sometimes directly to consumers. The marketers in turn sell the cattle to raw beef marketers, processed beef marketers and sometimes directly to consumers. The cattle from the farmers and traders often end up in abattoirs and private slaughter labs/home slaughtering where the services of butchers are engaged in slaughtering the cattle. After slaughtering, the raw beef marketers sell directly to processed beef marketers and consumers or move the meat to meat shops, open air market wholesalers and/or open-air market retailers where processed beef marketers who consist of restaurants/hotels and processed meat vendors purchase the raw meat. The processed beef marketers undertake full processing of the raw beef for final consumption by urban and rural consumers. Some of the value chain actors are not restricted to a single value chain activity but rather integrate vertically into other value chain activities. This could be due to the actor's desire to achieve economies of scale in value addition activities, improve their

competitiveness and expand their income generation (23). The vertical integration in the study area is consistent with the findings of (24) on vertical integration in Zambian beef cattle value chain. The multiplicity of functions carried out by some of the beef cattle value chain actors implies that the beef cattle value chain is not a linear and straightforward chain where each actor is specialized in one activity. Therefore, the links between the value chain actors are also not linear from the input supplier to the final consumer but rather involves overlapping links. Apart from the primary links between the key value chain actors, there are links to other vital actors in the value chain. These links to the actors who provide services such as financial services, extension services, veterinary services, transportation services, market linkage and cold storage services to almost all the value chain actors.

Effectiveness of Information Flow among Beef Cattle Value Chain Actors

Apart from the flow of product or service, the effective flow of information among actors is essential in agricultural value chains because it facilitates the product flows directly and indirectly, allows for better decision-making among value chain actors and overall efficient operation of value chains (25). In this regard and consistent with empirical value chain studies (26; 27; 28), it is important to assess the perception of the key beef value chain actors on the effectiveness of information flow in the beef cattle value chain and the nature of relationships.

The results in Table 3 show the beef cattle value chain actors perceptions on effectiveness of information flow in the value chain in terms of generation of information, timeliness of information and feedback on information received or transmitted as implemented in previous studies (26; 27; 28). The estimated overall

mean scores for generation of information, timeliness of information and feedback on information received or transmitted were 4.5, 4.1 and 3.5 respectively. The estimated mean scores suggests that there was effective information flow within and between the value chain actors based on the perceptions of the various actors, particularly with respect to generation of information. In other words, information that can facilitate product flow and services in getting beef to final consumers can be accessed and shared within and between the value chain actors. The source of information can be the various value chain actors, extension agents, farmer groups, cattle traders associations, beef marketers associations, print and electronic media.

Strength of Relationships among Beef Cattle Value Chain Actors

The results presented in Table 3 also show the strength of relationships among the various beef cattle value chain actors in terms of cost reduction, improved operational performance and improved capacity building consistent with empirical findings of (26; 27; 28). The estimated overall mean scores for cost reduction, improved operational performance and improved capacity building were 4.1, 3.3 and 4.1 respectively. The estimated mean scores indicates that the value chain actors agreed that there are series of interactions within and between the value chain actors, which ensures that beef gets to the end point of the value chain in the right form, place, time and quantity desired by the consumers. This implies that the relationship among the actors is quite strong. This supports and complements the results on the interlinked activities of the beef cattle value chain actors as presented in Figure 1. Despite the challenges the actors face in the value chain, the series of interactions among the actors

offer opportunities on ways to reduce costs, improve operational performance and improve capacity building of the value chain actors. These interactions include information sharing on prices of inputs in

different markets and different locations, demand and supply of beef value chain commodities, access to credit facilities and training opportunities about beef value chain related activities and many others.

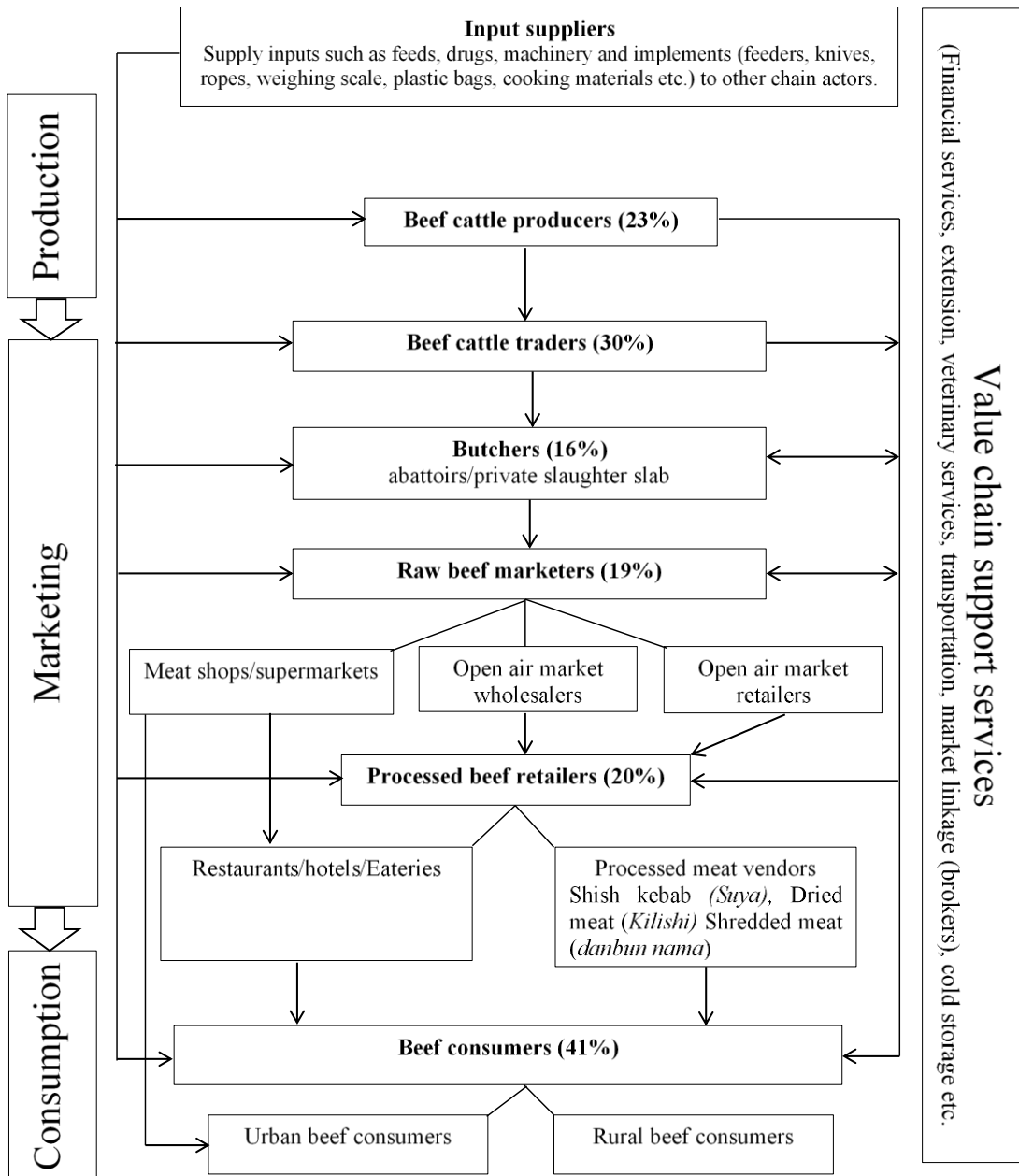


Figure 1: Map of beef cattle value chain in the study area showing the percentage of total respondents.

Table 3: Effectiveness of information flow and the strength of relationships among beef cattle value chain actors

	Specific chain Activity indicator	Beef cattle producers	Cattle traders	Raw beef marketers	Processed beef marketers	Mean score
Information flow						
1	Information generation	4.6	4.1	4.6	4.8	4.5
2	Timeliness	4.1	4.3	3.3	4.5	4.1
3	Feedback	3.4	3.7	3.1	3.6	3.5
Strength						
1	Reduced cost	3.9	3.3	4.4	4.8	4.1
2	Improved operation	3.6	3.0	3.9	2.6	3.3
3	Improved capacity	4.2	4.4	3.3	4.4	4.1

Note: The mean score is measured on a 5-point Likert scale.

Conclusion and Application

1. The results of the mapping of the beef cattle value chain actors and their functional roles in the study area revealed that beef cattle value chain actors do not perform only one primary value chain activity but perform other value chain activities as secondary activities.
2. This multiplicity of functions carried out by some of the beef cattle value chain actors implies that the beef cattle value chain is not a linear and straightforward chain where each actor is specialized in one activity.
3. The chain involves a complex interrelationship in the activities carried out by the different actors. It is therefore recommended that It is therefore recommended that government should intervene in the area of linking actors in the value chain to prospective markets in order for the actors to benefit from the various activities.

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