

1 **Original Research Article**

2 **Value Chain Analysis of Small Ruminant in Tahtay Adyabo District,**
3 **Tigray, Ethiopia**

4

5 **ABSTRACT**

6 This study was aimed at evaluating value chain of small ruminant in Tahtay Adyabo District
7 of Tigray Region. The data were collected from both primary and secondary sources. Primary
8 data were collected from a randomly selected 138 sample households, 26 traders, 5 butchers, 7
9 hotels/restaurants and 11 consumers interviewed through a semi-structured questionnaire and
10 from key informant interview. The value chain analysis revealed that the major actors in the
11 district being input suppliers, small ruminant producers, farmers, collectors, small traders,
12 large traders, hotels/restaurants, butchers and consumers. Office of Agriculture and Rural
13 Development, Dedit Credit and Saving Institution, NGO (Save the Children) and Shire-
14 Maitsebri Agricultural Research Center are main supporting institutions. In the study area the
15 governance of the small ruminant value chain is buyer driven and there are no producers and
16 buyers cooperatives. Therefore effort should be made to establish farmers' cooperative and
17 collective action of farmers to lower transaction costs to access inputs.

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19 **Key words:** Actors, Ethiopia, Small ruminant, Value chain

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21 **1. INTRODUCTION**

22 Ethiopia is endowed with huge livestock resource, natural resource and diverse agro-
23 ecological zones suitable for livestock production. These potentials make the country
24 prominent repository for animal genetic diversity [8].

25

26 Ethiopia has 29.33 and 29.11 million sheep and goats population respectively. From the total
27 small ruminant population 99.8% of the sheep and nearly all goat population of the country are
28 local breeds [3]. They are important components of the livestock sub-sector and sources of

29 cash income, meat, milk, wool, manure and saving or risk distribution for smallholders in
30 different farming systems and agro-ecological zones of the country [14, 5 6]. Moreover, due to
31 their high fertility, short generation interval, adaptation in harsh environment and their ability
32 to produce in limited feed resource they are considered as investment and insurance [15].

33

34 Demand for Ethiopian sheep and goat meat has dramatically increased after market promotion
35 by development projects in close collaboration with the government. This has created an
36 opportunity for sheep and goat producers to sell more animals at better prices [10]. The
37 increase in international demand for meat in general and the high demand for sheep and goat
38 meat in the Middle East are another incentive for sheep and goat production in the country [7].
39 As the country development is characterized by rise in income, combined with rapid
40 population growth of major cities in general, the demand for meat products with quality as
41 well as value-added products such as special meat cuts is increasing as ever [9].

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43 Due to limited value addition in the livestock sector, exports remain dominated by live
44 animals, thus hampering the sector's potential to ease high unemployment in rural and urban
45 areas [9]. Value chain analysis is essential to explain the connection between all the actors in a
46 particular chain of production and distribution and it shows who adds value and where, along
47 the chain. It helps to identify pressure points and make improvements in weaker links where
48 returns are low [11].

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50 Tigray region has suitable agro-ecology for small ruminant production. There are about 4.2
51 and 1.8 million goats and sheep population respectively in the region [3]. Small ruminant
52 production has significant contribution for household income, as source of food (meat and
53 milk) and manure in the region. Tahtay Adyabo District is one of the potential areas for small
54 ruminant production and marketing. The District has 158,418 goat and 32,433 sheep
55 population [12]. Different actors are participating along the chain of small ruminant in the
56 district. Even though, the study area is the center of production of small ruminant and have
57 access to domestic markets, research regarding evaluation of small ruminant value chain has
58 not been conducted which can guide stakeholders to be able to use the potential of the resource

59 optimally. Therefore objective of the study is to analyze the value chain of small ruminant in
60 the study area.

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62 **2. METHODOLOGY**

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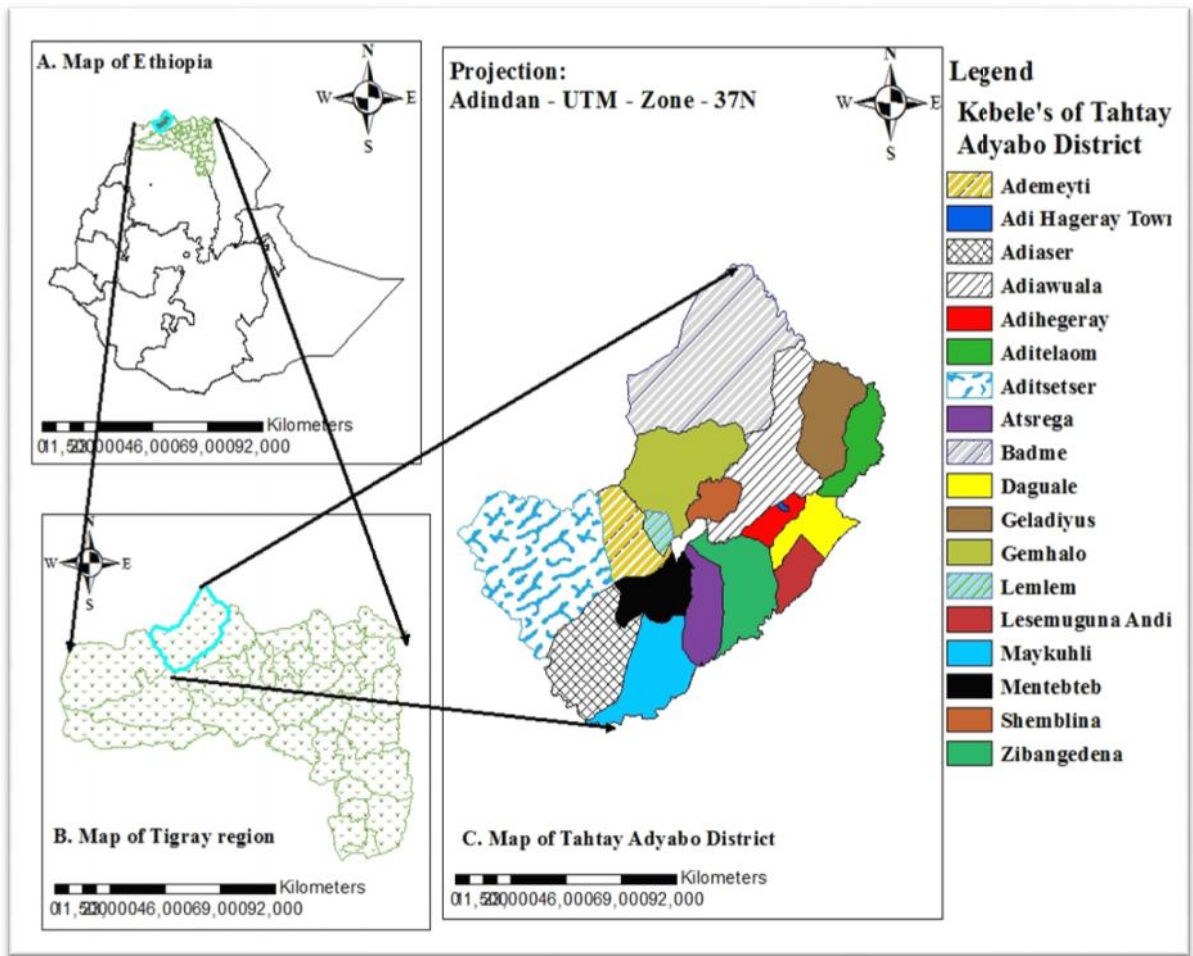
64 **2.1 Study area**

65 Tahtay Adyabo District is one of the eight district found in north western Zone of Tigray
66 Regional State. The district is composed of 17 rural kebeles and 1 urban kebele. Tahtay
67 Adyabo District is located about 405 kilometers from Mekelle and 95 kilometer from Shire-
68 Endaslase Town, the capital of North Western Zone of Tigray Region. It is bounded by the
69 District of Laelay Adyabo to the east, Kafta Humera and Eritrea to the west and, Asgede
70 Tsimbla to the south and Eritrea to the north. Geographically, it is located between $37^{\circ}21'13''\text{E}$
71 to $38^{\circ}10'33''\text{E}$ longitude and $14^{\circ}31'34''\text{N}$ to $14^{\circ}51'42''\text{N}$ latitude [13].

72

73 The district has total population of about 100,958, of which 50,924 and 50,034 were males and
74 females respectively [2]. The district has area coverage of 253,655 hectare out of which
75 60,017 hectare is crop land, 42,778 hectare is covered by forest and the rest is homestead and
76 wasteland. The average annual temperature of the district is 31°c and found at an elevation of
77 800-1500 meter above sea level [12].

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79

80 **Figure 1: Map of Tahtay Adyabo District (Arc GIS)**

81

82 **2.2 Sampling Procedure and Sample Size**

83 Multi-stage random sampling technique was used to select representative small ruminant
 84 producer kebeles and sample households. In the first stage, out of 18 kebeles of the district 10
 85 small ruminant producer kebeles were purposively selected based on the level of production.
 86 In the second stage, from the 10 small ruminant producer rural kebeles, four sample kebeles
 87 namely Adi-Aser, Gemhalo, Mentebteb and Zban-Gedena were selected randomly. In the third
 88 stage, total of 138 sample households were selected randomly using probability proportional to
 89 population size-sampling technique based on [1] formula.

90
$$n = \frac{z^2 p(1 - p)}{e^2}$$

91 Where,

92 n is the sample size

93 p is the estimated proportion of small ruminant producers from the total population

94 $Z = 1.96$ and $e = 0.05$

95

$$96 \quad n = \frac{1.96^2 \times 0.9(0.1)}{0.05^2} = 138$$

97

98 For this study, data from traders were also collected. The sites for the trader surveys were
99 market towns in which a good sample of small ruminant traders are available. A total of 6
100 large traders, 12 small traders and 8 collectors were randomly selected constituting a total of
101 26 traders from Sheraro, Tekeze, Adi- Hageray and Shmelba markets. Furthermore, 5
102 butchers, 7 hotels/restaurants and 11 consumers were interviewed from the district by selecting
103 randomly.

104

105 **2.3 Data Collection**

106 The study used primary and secondary data. Primary data were collected using informal and
107 formal surveys. The formal survey was undertaken through formal interviews with randomly
108 selected farmers using a pre-tested semi-structured questionnaire The informal survey used
109 key informants interview and visual observations. Specific checklists were used to guide key
110 informants interviews. The secondary data were collected from Central Statistical Authority
111 (CSA), Office of Agriculture and Rural Development (OoARD), and other sources.

112

113 **2.4 Data analysis**

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115 The following steps of value chain analysis were applied to this study

116

117 Mapping the value chain: - involves understanding the characteristics of the chain actors and
118 the relationships among them including the study of all actors in the chain, the flow of small
119 ruminants through the chain, the destination of domestic sales. This information was obtained
120 by conducting surveys, and key informant interviews as well as by collecting secondary data
121 from various sources.

122

123 Emphasizing the governance role: - within the concept of value chain; governance is the
 124 structure of relationships and coordination mechanisms that exist among chain actors. By
 125 focusing on governance, the analysis identified actors that may require support to improve
 126 capabilities in the value chain, increase value added in the sector and correct distributional
 127 distortions. Analyses of vertical and horizontal linkage of smallholder small ruminant
 128 producers with each other and with other actors were identified.

129
 130 Following the above procedure, the main aspects of small ruminant value chain analysis was
 131 done by applying qualitative analysis. First, value chain actors were identified, and then value
 132 chain map of small ruminant was drawn which depicts the structure and flow of the chain in
 133 logical clusters. This exercise was carried out in qualitative terms through graphs presenting
 134 the various actors of the chain, their linkages and all operations of the chain from supply of
 135 inputs to consumption.

136
 137 **3. Results and Discussion**
 138 **Results of demographic and socio-economic characteristics of sample households**

139
 140 Table 1: Demographic and socioeconomic characteristics of samples (categorical variables)
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Variables	Items	Total sample (n=138)	
		n	%
Sex	Male	112	81.2
	Female	26	18.8
Education	Literate	84	60.9
	Illiterate	54	39.1
Marital Status	Single	3	2.2
	Married	122	88.4
	Divorce	10	7.2
Off/non farm income	Widowed	3	2.2
	Involved	89	64.5

Not involved 49 35.5

142 n is number of respondents.

143 Source: Self computation from survey result, 2015

144

145

146 Table 2: Demographic and socioeconomic characteristics of sample households (continuous
147 variables)

148

Variables	Total sample (n =138)	
	Mean	Sd
Age	44.18	10.39
Family size	5.84	2.08
Experience	10.72	8.56
Land size	2.3	2.16

149 n is number of respondents. Sd is standard deviation.

150 Source: Self computation from survey result, 2015

151

152 **Discussions of demographic and socio-economic characteristics of sample households**

153

154 Demographic and socioeconomic characteristics of the sample respondents are present in table
155 1 and 2. The total sample size of farm respondents handled during the survey was 138. Of the
156 total sample respondents, 81.2% were male-headed households and 18.8% were female-
157 headed. With regards to educational status of sample respondents, 60.9% of the total sample
158 households were literate. Regarding their marital status, 2.2% of the total sample households
159 were single, 88.4% were married, 7.2% were divorced and 2.2% were widows. In addition to
160 the farming activities, 64.5% of the total sample households have also engaged in off/non-farm
161 activities like in petty trading activities and daily labor.

162

163 The average age of sampled respondents was 44 years. The average family size of the total
164 sample respondents was found to be 6 persons. The average years of experience related to

165 sheep and goat production was 10.7 years. The survey result with respect to land holding of
166 the respondents reveals that an average size of land holding per household was 2.3 hectare.

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168 **Small Ruminant Value Chain Actors**

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170 In the study area, small ruminant value chain actors are those individuals who exchange
171 money as well as animals or product, which generally increases in value with each transaction.

172 The primary actors in small ruminant value chain in the study area were input suppliers,
173 farmers, collectors, small traders, large traders, hotels and restaurants, butchers and individual
174 consumers. Small ruminant producers, OoARD, private veterinary pharmacies and NGO (Save
175 the Children) were the main actors and institutions involved in the small ruminant production
176 and input supply activities. Collectors are engaged in buying small ruminant from village
177 markets and sell to small and large traders. Small traders buy small ruminant from producers
178 and collectors and sell to hotels/restaurants, butchers and consumers. Large traders buy small
179 ruminant mainly from collectors and sell to hotels/restaurants and butchers.

180

181 There are also governmental and nongovernmental supportive institutions that support small
182 ruminant value chain directly or indirectly. Value chain supporters or enablers provide
183 facilitation tasks like creating awareness; provide credit, facilitating building strategy and the
184 coordination of support. The main supporters of the small ruminant value chain in the study
185 area are office of agricultural and rural development (OoARD), Office of Trade and Industry
186 (OoTI), District administrations, Dedebit Saving and Credit Institution (DSCI), Shire-
187 Maitsebri Agricultural Research Center (SMARC) and informal credit suppliers.

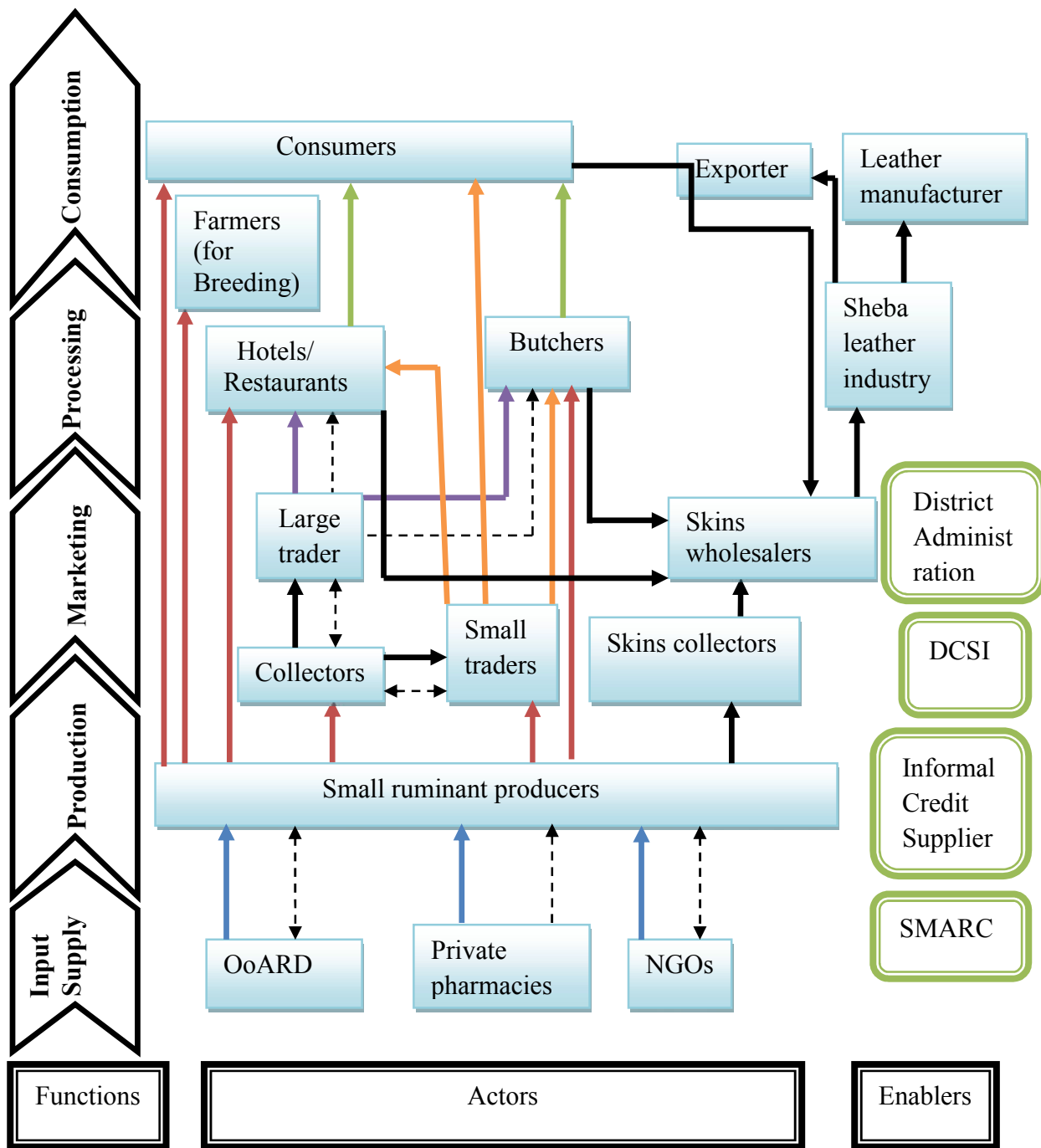
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189 **Value chain map of small ruminant in Tahtay Adyabo District**

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191 The value chain map of small ruminants in Tahtay Adyabo District is depicted in Figure 2.

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Figure 2: Value chain map of small ruminant
Source: self sketch from survey result, 2015

219 Value chain governance

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221 Value chain actors determine the flow of small ruminant and level of prices. In effect they
222 govern the value chain and most other chain actors subscribe to the rules set in the marketing
223 process. In most cases, the business relations between the various operational actors are of free
224 market exchange and uncoordinated.

225

226 In the study area, the general pattern in small ruminant market is for producers to sell to different
227 traders each time they go to the market. Producers do not have any longstanding customer
228 relationship with any of these buyers and they sell their products to anyone they can. Even the
229 most frequent buyers of small ruminant in the markets do not have any contractual supply
230 agreement with producers. This indicates absence of vertical linkage between producers and any
231 buyer in the small ruminant value chain in the district. This is mainly because the production
232 system is not market-oriented and producers are not following demand or the quality
233 requirements of important market actors. As a result, there is low level of transfer of skills and
234 knowledge from the buyers to producers. Overall, the governance of the small ruminant value
235 chain is buyer driven.

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237 The relationship between collectors and small traders, collectors and large traders, small traders
238 and large traders, small traders and hotels/restaurants/butchers, large traders and
239 hotels/restaurants/butchers, small traders and bulk consumers (defense forces) has
240 complementarily of sorts since there is a long-standing mutual relationship between them. These
241 relations are based on trust, without any formal contract. Those actors can sell sheep and goats
242 on credit and also take advance payments without any formal signature. This strengthens their
243 relationship and also provides an opportunity for all actors to expand their business activity.

244

245 In the study area, there are no producers and buyers cooperatives. Farmers lack strong horizontal
246 linkages with each other and cause their poor bargaining power in the market. The horizontal
247 linkages among traders are primarily by the use of common trucks for transportation of sheep
248 and goats to the next level of the market. Since they collect a small number of sheep and goats
249 from different markets, it is not economical to hire a truck on an individual basis.

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4. Conclusions

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252

253 Small ruminant value chain analysis of the study areas revealed that the main value chain actors
254 being input suppliers, small ruminant producing farmers, collectors, small traders, large traders
255 farmers (for breeding purposes), hotels/restaurants, butchers and consumers. Office of
256 Agriculture and Rural Development, Dedebit Credit and Saving Institution, NGO (Save the
257 Children) and Shire-Maitsebri Agricultural Research Center are main supporting institutions. In
258 the study area the governance of the small ruminant value chain is buyer driven and there are no
259 producers and buyers cooperatives. Therefore effort should be made to establish farmers'
260 cooperative and collective action of farmers to lower transaction costs to access inputs.

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