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Value Chain Analysis of Enset (*Ensete ventricosum*) in Dawuro Zone, Southern Ethiopia

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ABSTRACT

Introduction: Enset is a native food security crop in Ethiopia; and it has been served as emergency food crop in Vietnam during second world war. The crop is commonly used as staple food, and raw material for domestic and high-tech industries. Despite such opportunities, its production is declining due to introduction of new cereals, recurrent droughts and pests. There is also limited research conducted to address challenges.

Methodology: Purposive sampling was used to select samples and three separate semi-structured interview schedules were used to collect data from producers, traders and consumers, accordingly. Tobit regression model was run to analyze market supply and intensity of market participation. Porter's Value Chain Analysis tool was used to map the value chain.

Result: Minimum and maximum number of enset trees harvested per year per household was 24 and 144, respectively; this was similar to National average. 34.75% of respondents consumed enset as alternative food due to skyrocketing prices of latter crops. Eight and seven marketing channels were observed in enset and bulla market, respectively.

Recommendation: to ameliorate decreasing production and to increase farmers' market participation, training should be given on enset value chain; intention should be done on integrated disease and pest management.

Keywords: actors, Dawuro, enset, value chain, tobit

1. INTRODUCTION

Ethiopia has diverse agro-ecological and climatic conditions which is suitable for production of various root and tuber crops including *enset* (*Ensete ventricousoum*). *Enset* plays vital roles in food security for more than 20 percent of population living in central, south and southwestern part of Ethiopia [2]. It is one of the native food security crops in Ethiopia; and it has also served as emergency food crop in Vietnam during second world war [9,13].

As a multipurpose crop, every part of *enset* is used for various purpose; and farmers in Ethiopia described it as 'a crop of everything'. *Enset* is used as food, feed, cloth, fuel wood, construction material and container (Barrett *et al.,* 2008) [12]. *Kocho, amicho,* and *bulla* are the major products obtained from *enset* plant. *Kocho* is the main product of the crop and which is consumed after baking in form of pancake. The bread prepared from fermented *enset* is known as called known as *kocho*-bread, which is commonly served in restaurants with kitfo (traditional Ethiopian food prepared from chopped red meat mixed with spiced butter). *Amicho* is non-fermented corm of *enset* plant, which is consumed after boiling like other root and tuber crops. *Amicho* is mostly consumed during shortage of food abd it is a solidified byproduct obtained from pulverized leaf sheaths and corms of *enset* plant. *Bulla* is the most expensive of all products of *enset*; and traditionally it served on holidays and different cultural occasions [12].

Enset is used as industrial starch to serve as raw material for domestic and high-tech industries of paper, adhesives and local medicines of bone fracture, diarrhea and placenta discharging from humans and livestock [12]. *Enset* is also used as opportunity along its value chain where millions of actors were benefiting [4,11].

Despite such opportunities, production of *enset* has been declining in Dawro zone due to introduction of new cereal crops, recurrent droughts, land scarcity, long maturation period coupled with devastating disease and pests. The local knowledge of the zone on the use and management of *enset* has not been studied exhaustively and also not well documented.

Similarly, poor marketing and institutional services like lack of credit, transport facility and limited extension services have affected *enset* production. But these effects accompanied by social institutional demographic and infrastructural challenges were not well studied for *enset* at study area. Despite, *enset* importance in improving welfare of farmers through household income, food security, poverty reduction and promotion of nutritional status, the role of actors' role is not well distinguished. Likewise, share of benefit along the chain is not well identified in the study area. In addition, there is less institutional support for producer and limited organization among *enset* value chain actors performing different activities from design of *enset* to production, decorticating, transporting and marketing. However, there is limited research conducted to address existing challenges in the study area. Thus, this study is aimed to identify value chin actors and their functions along the chain; and to examine shares of actors along the chain.

2. RESEARCH METHODOLOGY

2.1. Description of study area

The study was conducted at Mareka and Loma Districts of Dawuro Zone where total population respective districts was 145,955 and 109,192 people, respectively. With proportion of 49.2% and 50.56% of male population groups, respectively. Similarly, 6 kebele[1] out of 34 in Mareka and, 14 kebeles out of 34 in Loma Districts were major *enset* producing kebeles, respectively (CSA, 2012). Mareka district is situated between 6^009" and 7^021' N Latitude and 37^001' E and 37^026' E Longitude and its altitudes ranges from 1360-2541 m above sea

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[1] Kebele is the lowest administration level in in public governance of Ethiopia

level; while Loma District lies between 6⁰56' N - 7⁰ 36' N Latitude and 36⁰ 34' E–37⁰ 64' E longitudes [7,9].

2.2. Sampling technique

2.2.1. Farmers sampling

Five stage sampling procedure was applied to select *enset* farmers, where first, purposive sampling was used to select two districts of Dawro zone. Then, in second stage, by using simple random sampling six kebeles were selected from high, medium and low *enset* producing areas. Subsequently, determination of sample size is resolved by means of Cochran (1963) at third stage. Then at fourth stage, probability proportional to size is used to select representative number of farmers to be taken from each PAs. Finally based on sampling frame collected from each PAs, systematic random sampling is used at fourth stage to select sample respondent farmers

$$n = \frac{N}{1+Ne^2}$$ Where n= required sample size; N= Total population; and e= margin of error

2.2.2. Trader sampling

57 traders were purposively selected based on their market participation and amount of capital invested in *enset* product marketing.

2.2.3. Consumer sampling

Individual consumers and hotel owners were purposively selected where 21 hotel owners and 45 household respondents were included in the survey.

Simultaneously, a total of four focus group discussions were made with model farmers, Kebeles representatives, traders and DAs to draw points of interventions and to assess internal weakness and strength of actors along the value chain.

2.3. Source of Data and Method of Data Collection

Three separate semi-structured interview schedules were used to collect primary data from producers, traders and consumers, accordingly. Secondary data from office reports, published and unpublished materials used to make primary data collection more specific and examine alternative perspective of original question. Primary data were collected to know to whom farmers are selling, cost incurred for production, flow of information, flow of product along the chain, product outlet, institutional services acquired.

2.4. Method of data analysis

Porter's Value Chain Analysis tool was used as approach to map value chain towards identifying five forces commanding the competition and to describe rivalry among existing firms. It was also used to reveal bargaining power of suppliers and buyers; and to see substitute products.

M4P (Making market work better for the poor) Tool book was used for analysis of value chains. The tool book has eight practical value chain analysis tools that can be used to analyze different dimensions of value chains.

Based on the M4P tool book, the mapping was conducted based on the following framework. Hence the analysis of the value chain is conducted in the following five steps:

Step 1: Describing and defining *enset* food products

Step 2: Identifying actors

Step 3: Mapping major processing steps

Step 4: Mapping the value chain

Step 5: Analyzing market margin share

2.5. Econometric analysis

Tobit regression model was run to analyze factors affecting market supply and intensity level of their participation. This censored regression model, is designed to estimate linear relationships between variables where observed amount of *enset* is product output Yi* and that is actually sold in market was used as relevant proxy for intensity of market participation. The attention on the level of participation would enable to identify factors influencing household market participation. Sindi (2008) [10] jointly determined the quantity supply and level of participation in *enset* market. The models

assume a normal distribution with constant variance Greene (2003)[6] and have specified as shown in the formula below:

$$yi = x_i{}'\beta + \varepsilon_i, \varepsilon_y \sim N(0, \sigma^2)$$

where $yi = 0$ If $yi* \leq 0$;

$yi = 1\ yi*$ If $yi* > 0$

yi = Amount of *enset* supplied to market: i.e. farmers market participation between 0 and 1.

x_i= Explanatory variables affecting the dependent variable

β= Vector of factor explained value of dependent variables market participation and level of participation

ε_i = error terms, which is assumed to be normally distributed

3. RESULT AND DISCUSSION

3.1. Actors and their function

Enset **processing**: 37.5%, 27.6% and 34.9% farmers were involved in processing *enset* for better price, to amend product quality and to get both better price and quality, respectively. This result is in line to Degu (2012) [3] who said farmers were motivated to get involved in *enset* business for various reasons including their price and quality.

Quantity of production and consumption: minimum and maximum amount of *enset* trees harvested per year per household was 24 and 144, respectively; and the average amount of *enset* produced per year per household was 38.51 qt; and this was similar to the National average 35qt/ha per year per household.

74.3% of respondents supplied *enset* to markets while 25.7% was consumed it at home. Hence, households who produced larger quantity *Kocho* have supplied their surplus product to markets indicating production of larger quantity of product has positively influenced participation in *enset* marketing. From the processed *enset* 31% *kocho* and 92% of *bulla* was supplied to markets; and the rest was consumed, indicating that these are the factors affecting supply to market and consumption at home, respectively.

Enset **production per household:** maximum and minimum quantity of *kocho* produced per plant per year was 110 and 50 kilograms, respectively. From this lot, five kilograms of *bulla* was being produced per week per household via value addition process where 35.5%, 10.6% and 35.5% of respondents were challenged by lack of credit, distance to market and both lack to credit and value addition experiences, respectively.

Consumers preference: 34.75% of respondents prefers to consume *enset* as alternative food to cereals to which its prices is skyrocketing these days; and 16.01% of farmers preferred to use *enset* for drought tolerance. But 11.82% of respondents liked *enset* for its fiber for making ropes and mats. 26.34% of respondent preferred *enset* for its healing ability of wounds and treating of breakages and fractures of bones. 12.08% of farmers prefers eneset for providing shades to their coffee.

4.2.2 Value Chain Governance

Actors in *enset* value chain was involved in different activities (wholesale, retail, assembly etc) but based on their major activity, market participants were categorized into different categories. Hence, 53 percent of respondents reported retailing was principal functions in the chain. But this link is negatively influenced by wholesalers and collectors who influenced retailers and producers by controlling price. Thus, *enset* farmers lacked appropriate market information and thus they were aching from less bargaining power. As a result, power irregularity was central in the value chain governance where 55% of producers sold their product by the price offered by traders. Thus only 20% of producers were granted themselves to bargain to sell with negotiation.

3.2. *Enset* Marketing Channel

The analysis of marketing channels could intend to provide a systematic knowledge of the flow of goods and services from its origin of production to final destination (Negash, 2011).

The survey result showed that, eight marketing channels were observed in the study area. From which producer- retailer - consumer channel was the largest one identified in the study (48%). All chains in study area start with production stretches to consumption where input suppliers were involved to boost value addition along the chain. Here, smallholder farmers with average land holding of 0.5 hectares per household have dominated the production levels.

I. Producer and Consumer: Through this market channel, about 11.5 % (209.07 Qt) of *kocho* was marketed during the period as data collection. This channel was third important channel during the trading according to volume and it was a relevant channel to the producer to get a good price from producers without intermeddlers and good for consumers in term of price.

II. Producer, Retailer, and Consumer: Through this market channel about 48% (872qts) of *kocho* was marketed during the period of the survey. This is the first important channel in which more of produce pass through it. In this channel, retailers perform better by direct contact with producer and selling the produce to the consumer and obtain a better share of profit by gathering more amounts from producer and trading it to the near market consumers.

III. Producer, Local collector, Wholesaler and Consumer: With this channel, about 19% (347.7qts) of *kocho* was marketed during the period. In this, channel a large amount of *kocho* sold to the consumer and it is the second existed in the study area.

IV. Producer, Wholesaler, Retailer and Consumer: In this channel, about 14% (138.8qts) of *kocho* was marketed during the period. It is the fourth important channel in term of volume of produce pass through it.

V. Producer, Local collector and Consumer: In this channel, about 2% (34.7qts) of *kocho* marketed during the period. This is the seventh-important channel less amount of produce pass

through it. In this, channel wholesalers perform better by collecting the produce from local collectors and selling the produce to out of zonal markets and get better profit.

VI. Producer, Wholesaler, and Consumer: With this channel, about 1.4% (24.81qts) of *kocho* marketed during the survey period. This channel is the last channel in term of volume pass through it.

VII. Producer, Wholesaler, and Out of zonal markets: With this channel, about 5.8% (109.63qts) of *kocho* marketed during the period according to study data. This is the fifth important channel with this all produce pass through out of zonal markets. While more benefit shares to wholesalers directly contacting the producers and selling out zonal markets.

VIII. Producer, Local collector, Wholesaler, Retailer and Consumer: With this channel, about 4.5% (81.2qts) of *kocho* marketed during the period as collected. This is the sixth important and longest channel with this, less amount of produce pass through it and more of intermediaries are there until the product reaches to the consumer.

3.3. Bulla market channel

Seven marketing channels were identified for *bulla* market were producers, retailers and consumers carry largest volume of the produce, followed by producers, local collectors' wholesalers. From the total 184 Qt produced in 2019 169 qt was supplied to local and terminal market and apart from this 54.7 Qt traded to out of zonal market Jimma, Wolayita, and Shashemene. While the reaming amount flow through the identified marketing channels to consumers and hotel owners

I. Producer and Consumer channel: 18.5% (30.5qts) of *bulla* marketed during the study period and this channel was the third important channel in term of volume and it was a relevant channel to the producer to get a good price from producers without intermeddlers.

II. Producer, Retailer, and Consumer channel: this is the first important channel where

39.2% (67.07qts) of *bulla* marketed during the period of the survey. This is the first important channel more of produce pass through it. In this channel, retailers perform better by direct contact with producer and selling the produce to consumer

III. Producer, Wholesaler, and Consumer channel: this is channel, which is least significant by contributing 2.5% (4.18qts) of *bulla* pass through it.

IV. Producer, Wholesaler, and Terminal markets: this is the fourth important channel where 14 % (23.7qts) of *bulla* was marketed during the period. In this, channel wholesalers perform better by direct contact with producer and selling the produce to out of zonal markets and get better profit.

V. Producer, Local collector, Retailer and Consumer channel: this is six channels which contributed 2.27 % (3.85qts) of *bulla* to the marketed during the period. This is the last channel less amount of produce pass through it and high amount of intermediary.

VI. Producer, Local collector, Wholesaler and Terminal market: This is the second –most important channel where 18% (31qts) of *bulla* was supplied to market. In this, channel wholesalers perform better by collecting the produce from local collectors and selling the produce to out of zonal markets and get better profit.

VII. Producer, Local collector, Wholesaler, Retailer and Consumer: This is the fifth important and longest channel which assisted for supply of 5% (10qts) of *bulla* to market during the period. With this, less amount of produce passes through it and high numbers of intermediary.

4. Conclusions and Recommendation

4.1. Summary and Conclusion

Enset value chain in the study area is twined with weak marketing cooperation where farmers were less acquainted to *enset* value addition, and market information. This reason and the weak bargaining power of farmers made them principal price takers and have. Most of the traders who have been participating in *kocho* and *bulla* marketing were running their business without license. Simultaneously, among different factors which stalled *enset* value chain, lack of improved technology, absence of disease resistance variety, absence of training on value addition themes and lack of *enset* extension service, poor access to market, unattractive product price to producer, lack of credit facility and low arrangement of market organization were the major settle back in product marketing.

The share of benefit distribution among *enset* value-chain actors is different from producer to the retailers. The profit share of producer is less than 26% of *kocho* and 25.95% of *bulla* which is less than traders. The distribution of benefit along *enset* value-chain actors varies across different marketing channel where gross marketing margin of producer in channel was is 100% depicting that producers were directly selling *kocho* to consumers at a better price without interruption of intermediaries. Wholesalers get the highest marketing margin at channel IV, III and VI with value of 67%, 63%, and 40% respectively. The lowest share of gross margin for the farmer was registered at channel VII which accounted 39%. The retailers got highest gross marketing margin at channel II and V and lowest at marketing channel VII.

4.2. Recommendations

Based on the result of this study the following points are recommended

- to ameliorate the decreasing production and thereby increase market participation of farmer, awareness creation on *enset* value chain should be given; and integrated disease and pest management should be in place

- From factors affecting *enset*, access to market information, access to transport, price and consumer preference had positive implications and they should be maintained

- joint probability of choosing outlet was only 2.29% and it was unlikely for farmers to choose four outlets simultaneously. Hence, since all four outlets choices were not profitable for farmers, they choose the important outlets to maximize utility.

- However, the joint probability not to choose all market outlets was 5.43%. This implies that the household less likely to fail without choosing one market outlet at a time by assuming the need for conducting institutional services to choose outlets that maximize the benefit of farmers.
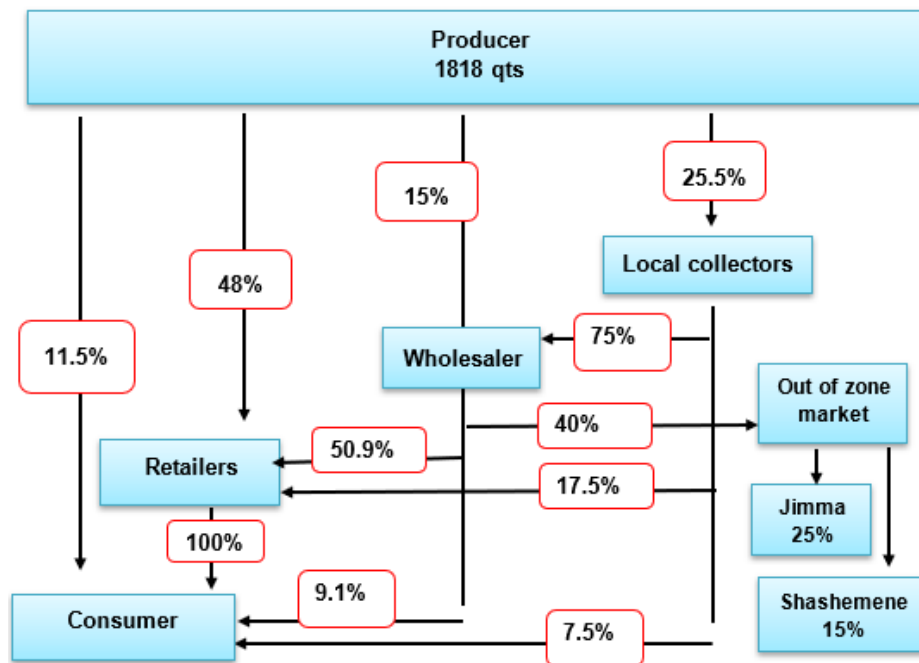

Figure 1: Value chain map of *enset* at study area

Source: Survey result

1. Producer → Consumer (209.07 qt)

2. Producer → Retailer → Consumer (872 qt)

3. Producer → Local Collector → Wholesaler → Consumer (347.7 qt)

4. Producer → Wholesaler → Retailer → Consumer (138.8 qt)

5. Producer → Local Collector → Consumer (34.7 qt)

6. Producer → Wholesaler → Consumer (24.8 qt)

7. Producer → Wholesaler → Out of Zonal Market (109.63 qt

8. Producer → Local Collector → Wholesaler → Consumer (81.2 qt)

Figure 2: *Kocho* Marketing channel in the study area

Source: Own survey result, 2019
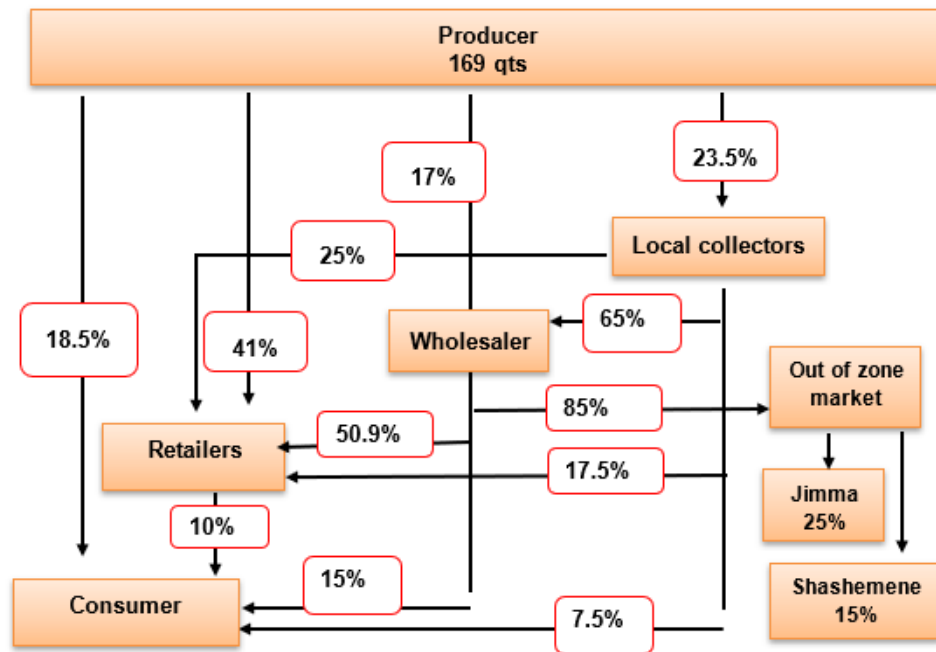
1. Producer ➜ Consumer (30.5 q)

2. Producer ➜ Retailer ➜Consumer (67.07 qt)

3. Producer ➜ Wholesaler ➜ Consumer (4.18 qt)

4. Producer ➜ Wholesaler ➜ Out of Zone (23.7 qt

5. Producer ➜Local Collector ➜ Retailer ➜Consumer (3.85 qt)

6. Producer ➜Local Collector ➜ Wholesaler ➜Out of Zone (31 qt

7. Producer ➜Local Collector ➜ Wholesaler ➜ Retailer ➜ Consumer (10 q)

Figure 3: *Bulla* marketing channel in study site

Source: Survey result

5. REFERENCES

[1]. Cochran, W. G. (1963). Sampling Techniques, 2nd Ed., New York: John Wiley and Sons, Inc.

[2]. CSA,1012 Southern Nations, Nationalities, and Peoples Region Archived November 13, 2012, at the Wayback Machine.

[3]. Degu, G. (2012). Experiences on *Enset* Technology Dissemination and Value Chain Analysis.*In*: Mohammed Y. and Tariku H. (eds.). *Enset* research and Development Experience in Ethiopia. Proceeding from *Enset* National Workshop held in Wolkite, Ethiopia, 19-20 August, 2010.

[4]. FAO (2010). Global Forest Resources Assessment 2010 Country Report Ethiopia. Food and Agriculture Organization (FAO), Rome, Italy.

[5]. Gebremedhin W/Giorgis; EndaleGebre; KifluBedane; Bekele Kassa. 2001. Country Profile on Potato Production and Utilization: Ethiopia. Ethiopian Institute of Agricultural Research, Holetta Agricultural Research Centre, National Potato Research Program.

[6]. Greene, W. (2003). Econometric Analysis.Fifth Edition. Prentice Hall, New Jersey.

[7]. Lomba, Y.L., 2015. Production objectives, breeding practices and selection criteria of indigenous goat in Loma District, Southern Ethiopia.Global Journal of Animal Scientific Research, 3(2).

[8]. Mendoza, M.S. and Rosegrant, M.W., 1995. Pricing conduct of spatially differentiated markets. PricesProducts and people: Analyzing agricultural markets in developing countries, pp.343-360.

[9]. Seifu, G.M. (1996). *Enset* Research in Ethiopia: 1976-1984. *In*: Tsedeke A., Clifton H., Steven, A.B. and Seifu G.H. (eds). *Enset -Based Sustainable Agriculture in Ethiopia*. Proceeding

from the International workshop on *Enset* held in Addis Ababa, Ethiopia, 13-20 December 1993.

[10]. SINDI, J. (2008): Kenya domestic horticulture subsector: What drives commercialization decisions by rural households? Unpublished M.Sc .Dissertation. Michigan City, Michigan State University, USA

[11]. Temesgen M., Bizuayehu T., Marcello C.and Mario E.,2014. Indigenous knowledge, use and on-farm management of *enset* (*Enset* eventricosum(Welw.) Cheeseman) diversity in Wolaita, Hawassa University, School of Plant and Horticulture Science, Hawassa, Ethiopia.

[12]. Tenaye, A. and Geta, E., 2008, March.Analysis of vulnerability and determinants of *enset* production in Wolaita, Southern Ethiopia. In International Symposium on Underutilized Plants for Food Security, Nutrition, Income and Sustainable Development 806 (pp. 663-668).

[13]. Tesfaye AWiersum KF, BongersF (2010). Spatial and temporal variation in crop diversity in agroforestry home gardens of southern Ethiopia.Agrofor syst.78:309-322.JournalofEthnobiology and Ethnomedicine. 18to the School of Graduate Studies in Addis Ababa University in Partial

[14]. Tsedeke K, 2011.Agro-ecologic mapping of livestock system in smallholder crop-livestock mixed farming of Wolaita and Dawuro districts, Southern Ethiopia, Areka Agricultural Research Center, P.O. Box 79, Areka, Ethiopia

[15]. UNIDO (United Nations Industrial Development Organization) (2009). The impact of Global Economic & Financial Crises on the Ethiopian Dairy Industry