ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES
DEPARTMENT OF ECONOMICS

AN ANALYSIS OF DEMAND FOR BEEF WITH A FOCUS ON QUALITY AND SAFETY IN ADDIS ABABA CITY, ETHIOPIA

BY

SAMUEL AMARE ADMASSU

A thesis submitted to
the School of Graduate Studies of Addis Ababa University
in partial fulfillment of the requirements for the
Degree of Master of Science in Economics

Addis Ababa
September, 2007

ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES

"An Analysis of Demand for Beef with a Focus on Quality and Safety in Addis Ababa City, Ethiopia

By

Samuel Amare

Approved by the Board of Examiners:

Dr / M. Tabbard **Advisor**	**Signature**
Berhanu Adenew **Examiner**	**Signature**
Dejene Aredo **Examiner**	**Signature**

Table of contents

List of Tables

Acknowledgement

I take this opportunity to express my sincere thanks to my advisor Dr. Mohammad A. Jabbar, Agricultural Economist and Project Leader, International Livestock Research Institute (ILRI), who advised me taking lots of his valuable time in giving critical and constructive comments.

My heart-felt thanks are extended to Dr. Asfaw Negassa, Market Economist, ILRI, for helping me a lot by providing his professional advice, comments and suggestion throughout the preparation of the thesis.

Thanks are also due to ILRI staffs for their unreserved co-operation and technical assistance.

I would like to thank many other people whose name is not mentioned here but I would like to acknowledge that this thesis would not have been completed without their direct or indirect help.

Abstract

Conjoint analysis was applied to asses the part worth of beef quality and safety attributes using a cross sectional data from a stratified sample of 300 households in Addis Ababa city collected in June 2007. The software used for estimation is SPSS 15. Results show that fat content, freshness, neatness of meat shop and personnel, abattoir stamp and price are significant quality and safety attributes that consumers use in their beef purchase decisions. Interactive variables like family size, religion, age, schooling, stay in Addis Ababa and martial status are also found to significantly influence quality and safety perceptions. On the other hand some variables such as sex of meal planners are found to have insignificant role in quality and safety perception. The result further indicates that income has a great role in influencing people perception regarding safety and quality of beef. The result of the study could be used for designing safety and quality standard for local wet market.

Key words: Beef demand, Quality and safety attributes, conjoint analysis, Addis Ababa

I. Introduction

1.1 Background on beef quality and safety

It is not uncommon to hear that Ethiopia has the largest livestock population in Africa. The paradox is that the economic contribution of this huge wealth is not exploited to its full potential. There are various reasons for the poor performance of the sector. Export is an important potential income source but one of the most important constraint is lack of quality and safe products. As this sub- sector does not fulfill the quality and safety requirement that the consumers (both domestic as well as foreign) demand, we are not able to generate adequate wealth from the sub-sector. The market set up in the country is such that farmers will sell what so ever product they produce. The product of sellers is not geared towards the consumers' needs and preferences. In other words, consumers' preferences are not taken into account while raising live animals by cattle breeders. As a result the sector is not functioning as one normally expects given the livestock population Ethiopia has.

Research on demand for product quality and safety is rather scarce in Ethiopia. The demand for beef in Ethiopia is an almost untouched research topic. This entails a need to conduct research to investigate consumers' perception of beef quality and safety. Yin (1994) encouraged researchers to make every effort to produce an analysis of the highest quality. In order to accomplish this, he presented four principles that should attract the researcher's attention. These are to show that the analysis relied on all the relevant evidence, to include all major rival interpretations in the analysis, to address the most significant aspect of the case study, and to use the researcher's prior expert knowledge to further the analysis. Since there is hardly any earlier work on the demand for quality and

safety in Ethiopia, a Participatory Rapid Appraisal was conducted first to have familiarity with consumers' quality and safety perceptions before undertaking a more elaborate study.

1.2 Problem Statement

The meat sector, especially the fresh meat sector has been one of the least analyzed food sectors in Ethiopia. Limited works have been carried out in order to research into the characteristics of different groups of consumers, their perceptions of beef quality and those aspects that worry them more (e.g., infection of parasites like tape worm, cholesterol, neatness). Identifying the consumer perception of quality and safety and knowing what the consumer demand in terms of meat quality and safety is important as improvements in the product's quality is the ultimate objective. Improvements that do not have effects in the consumer's perceived quality will not have any commercial effect and neither a positive effect. For that reason, it is of great importance to gather knowledge of this perceived quality and of the extent to which consumers will be willing to pay for better quality.

In the country, there are no standards for beef quality and safety suitable for local context. As a result the work will help refine official standards on quality and safety for regulatory purposes based on local empirical information rather than hypothetical western norms which can't be enforced and have no real relevance for the level of economic development in the country.

Various studies have shown that markets for agricultural products are rapidly changing in Africa with supermarkets expanding rapidly. These niche markets demand higher quality products which are currently largely supplied by large scale farms and processors and

imports. Small and medium scale enterprises and smallholder farmers that supply them find it difficult to penetrate the niche markets because they do not understand and fail to meet the safety, quality and quantity of products demanded.

Consumers' incomes are also improving leading to expansion of demand for quality and safety by middle and high income consumer segments. Tourist hotels have to supply consistently high quality products to their clients. These market segments are part of an expanding niche market that requires value added meat products. Concern with public health risks posed by inferior quality food coming on to the market is now also getting attention.

Lack of clear national policies to formulate and enforce quality standards so that producers are paid based on quality and grades further suppresses the drive by meat dealers to pay particular attention to quality matters and on innovation in the entire value chain. The result of this deficiency is that producers often try to sell what they produce rather than producing and selling what is demanded by the market. Marketing agents and small scale processors struggle to market inferior quality products which find it difficult to penetrate conventional and niche markets that demand high quality and safe products.

Shortage of high quality meat products limits consumption and may push prices up while un-graded products of similar quality may be perceived poorly and paid low. The sale of non-standardized raw meat by farmers leads to low incomes, which do not resonate with investment in agriculture and hence perpetuating poverty.

In general, lack of quality and safety measures reduces the potential income that could be generated from the sector.

1.3 Objectives of the Study

The main objective of this paper is to study consumers' perceptions about beef quality and safety attributes. The specific research objectives are:

1. To identify beef quality and safety criteria and indicators perceived and used by consumers and to rank them. The relative importance of each identified attributes will also be ranked.
2. To assess if there is existence of seasonality in beef demand
3. To assess consumer willingness to pay for better quality attributes of beef

1.4 Hypotheses

Hypothesis to be tested are the following:

1. In the absence of official standards, informal standards for quality and safety do exist. Consumers have good perception on these informal standards of quality and safety of meat products. This is revealed through price differential for the different attributes of beef that indicate quality and safety. Hence, improvement in quality and enhancing the safety provisions will enhance the demand for meat.

2. There is no major change in beef consumption. But changes are now introduced for different beef types with the emergence and popularity of supermarkets.

3. Beef demand is seasonal.

1.5 Significance of the Study

Sinha (2001) pointed out that the more substantial part of the existing body of research on demand with a focus on quality and safety deals with developed market while studies pertinent to developing markets have been rather scarce. Research on demand for meat which emphasize on quality and safety aspect is not yet done in Ethiopia. Even though the knowledge on the pattern of demand for food quality and safety is very important to the country, no empirical study has been carried out in the Ethiopian context. However knowing the demand pattern for quality and safety and the elasticity of demand for quality and safety are important for sound policy making for impact on the development of the sector.

There is both domestic as well as foreign demand for beef quality and safety. This paper attempted to show if there is existence of domestic demand for beef quality and safety. The information on the existence of demand for beef quality and safety will motivate both large and small scale producers to think in that direction in their production decisions and reap the benefits associated with it. Consumers will also benefit as they will get what they demand at cheaper price than imported ones.

This paper tries to incorporate the effect of quality in the shop, eating quality perception, safety concerns, other quality concerns, use of abattoir stamp and trust in information on demand for meat apart from other usual determinants of meat demand.

Consumer behavior towards food is characterized by changing preferences. This especially applies to meat. In order to get an insight into meat consumption behavior, the process of quality and safety perception and the attitudes towards meat, a consumer survey was

conducted and a conjoint analysis was performed to assess the demand for beef quality and safety.

The paper tries to address issues like, what information with respect to which attribute they know best? How are these attributes linked together? The study focuses on the quality and safety aspect of beef demand and tries to analyze what kind of demand exist for the quality and safety attributes.

The study gave due emphasis for quality and safety aspects. But this does not mean that other important variables that may affect demand were neglected. As a result the study is comprehensive in terms of coverage and originality.

The research output will therefore be valuable since it is both original and very important for policy makers, wholesalers, retail traders and farmers who need to know and address what their consumers really need.

The result of the study can be used as the basis for formulating domestically accepted standard for beef quality and safety. In the Ethiopian context there is no domestic standard so far applicable for local markets. The ISO standard may not be applicable and scaling it down to the domestic level may not be practical for enforcement at local market as the level of development of the society has a great role in consumer's perception of quality and safety. The quality and safety requirement changes as the level of development of the society changes. What is safe and quality now may not be safe and quality after some years. Therefore, standards have to be developed based on current needs and perceptions on quality and safety and updated as the society and the economy progress.

1.6 Organization of the thesis

The thesis is organized as follows. In chapter two, extensive literature (theoretical and empirical) review has been conducted so as to guide the reader through the past research in the area and outline the main contribution of this study. In chapter three, model specification elaborates on the regression model to be tested empirically. Moreover, details on sample type and sampling strategy are discussed. This part gives an extensive overview of the input data for the study and examines the properties of the data type and the remedy taken to ascertain the representativeness of the data. In chapter 4, analyses of the results are presented. It articulates and interprets the findings of the research. Finally, in chapter 5, concluding remarks and possible suggestions are provided based on the findings of the study.

2. Literature Review

2.1 Conceptual Review

2.1.1 An overview

Consumers are becoming increasingly concerned with the quality, safety and production attributes of their food (Caswell, 1998). For example, in developed countries, food quality and safety have been an issue for the past decades in the public debate, in food policy, in industry, and, last but not the least, in research. There are several reasons for these concerns. First, a variety of food related problems has directed public attention to food safety issues. Second, increasing parts of the general public have become interested and often critical with regard to certain ways of producing food (both at the farm level and at the processing level). Third, consumers in developed countries have become more demanding, more critical, and more fragmented in their food choices. This leads to a situation where quality differentiation of food products (both vertically and horizontally) has become necessary in order to satisfy consumers (Grunert, 2005). The same concern is equally applicable for consumers in developing countries but the problem is that their worries are weakly addressed by politicians, policy makers, market suppliers and researchers.

The history of an agribusiness indicates its innovativeness mostly aimed at obtaining homogeneous quality and low production costs. In the food processing industry a mere price competition is not necessarily the most attractive business strategy. But with increasing global competition on food markets results in continuous entrance of new competitors. As a result old competitors have to catch up on their competencies in efficient production and quality control. In such a situation, more fragmented, heterogeneous and

dynamic consumer demand creates opportunities for those producers and value chains that are willing to take the risk to differentiate their products. As a result, many sectors in agribusiness these days compete not only on efficiency and quality control, but on adding value (Grunert, 2005).

Adding value is a customer-oriented concept. Producers only add value to food products only if their customers actually perceive these products as having more quality, utility or value. The prominence of the concepts of quality and safety in agribusiness is thus driven by all actors in the marketplace. And it is not surprising that research has followed suit.

2.1.2 Streams of research on food quality and safety

There are three main streams of research on food quality and safety. The first is dealing with consumer demand for quality and safety, the second is on provision of quality and safety, and thirdly on consumer perception of quality and safety (Grunert, 2005).

The first stream examines to what extent certain quality and/or safety improvements correspond to consumer preferences in the sense that they result in consumer willingness to pay for the added quality or safety features. Willingness to pay for extra qualities can be analyzed based on actual consumer demand and resulting prices, for example based on scanner data, leading to shadow prices for certain quality attributes. For products not on the market, or when actual demand data is not available, consumer willingness to pay can be measured using methods such as contingent valuation or experimental auctions.

The first stream deals with the demand side while the second deals with the corresponding supply side. Providing added safety and/or differentiated quality may require changes in the organization of agricultural and food production, mainly with regard to governance structures of value chains.

In situation where quality and safety cannot be addressed at the final processing level, but have to pervade the whole value chain, relationships among value chain members may have to change. Food safety is a good example. It is closely linked to the traceability issue and often leads to closer links among value chain members. When quality is already differentiated at the farm level, new forms of contractual arrangements between farmers and processors may be called for. The difficulties of making such arrangements, especially in co-operative organizations, have been discussed widely in the literature (Grunert, 2005).

The above two streams of research together constitute the traditional economic approach to dealing with quality and safety issues. Currently, a third stream has been added which deals with the question of how quality and safety is perceived by consumers, and how these perceptions influence consumer decision-making. Consumer preferences are thus not only regarded as being revealed in their demand, but their formation in interaction with the supply of goods becomes a separate area of inquiry. Thus, this stream of research can be seen as a link between supply and demand, as it is the perception of the supply of goods that leads to the demand for these goods.

There is an abundance of ways in which the term quality has been defined. There is general agreement that quality has an objective and a subjective dimension. Objective quality refers to the physical characteristics built into the product and is typically dealt

with by engineers and food technologists. Subjective quality is the quality as perceived by consumers. The relationship between the two is at the core of the economic importance of quality. It is only when producers can translate consumer wishes into physical product characteristics, and only when consumers can then infer desired qualities from the way the product has been built that quality will be a competitive parameter for food producers (Grunert, 2005).

In the subjective realm we can distinguish between two schools of thought about quality. The first one is the holistic approach. It equates quality with all the desirable properties a product is perceived to have. The second one is the excellence approach. It suggests that products can have desirable properties that consumers, in their own language, may not view as part of quality. In food, convenience is an example. Consumers may say that 'convenience goods are generally of low quality', even though they regard convenience as a desirable property of food products (see, e.g. Zeithaml, 1998; Olsen, 2002).

It follows from the holistic approach that food safety is part of food quality, at least to the extent that consumers believe food safety to be a desirable property. Safety may, however, be different from other quality aspects in the way it affects consumer decisions.

2.1.3 Approaches on food quality perceptions researches

Research on food quality perception and its impact on consumer food choice have employed a variety of different approaches. The most notable ones are the means–end approach, expectancy value approaches, economics of information approaches, and satisfaction/dissatisfaction approaches (Grunert et al., 1996). It proposes two major

dimensions along which we can analyze food quality perception: a horizontal and a vertical dimension.

The horizontal dimension is a time dimension. It distinguishes quality perception before and after purchase. It takes up the well-known distinction between search, experience and credence qualities. The implications on consumer's ability to assess quality before purchase, after purchase, or not at all, and the implications this has for the basis on which consumers will infer quality given the information at hand is also taken in to account. It also integrates research on consumer satisfaction and dissatisfaction, which rests on the basic assumption that the extent of confirmation or disconfirmation of pre-purchase quality expectations will determine consumer satisfaction and repurchase probabilities (Oliver, 1980).

The vertical dimension deals with inference-making. It deals with how consumers infer quality from a variety of signals or cues, and with how consumers find out which properties of a food product are desirable by linking them to basic motivators of human behavior (Grunert, 2005). It integrates the means–end approach to the analysis of quality and quality perception research based on the concept of quality signals. It tries to answer, for example, what motivates consumers to buy one food product rather than another? This issue has been dealt with in the means–end approach to consumer behavior (Reynolds and Olson, 2001). The basic assumption of means–end theory is that consumers are not interested in products per se, but in what the product is doing for them (i.e. in the self-relevant consequences of the product). This approach is related to the Lancaster approach to analyzing consumer demand. Whether a consumer finds a product attractive is supposed to depend on the extent to which this consumer can link his perception of the product's

characteristics to self-relevant consequences and values. Such links are called means–end chains, because they are chains of subjective associations where the product is a means to achieve ends as defined by the consumer.

When asking consumers in an open-ended interview what they regard as food products of good quality, the answers always radiate around four central concepts. The first is taste (and other sensory characteristics), the second is health, the third is convenience, and fourthly, for some consumers, process characteristics such as organic production, natural production, animal welfare, GMO-free, etc. (Brunso et al., 2002).

Placing these concepts in a means–end chain context, food quality, as perceived by consumers, becomes an intermediate concept. It is more abstract than concrete product attributes such as fat percentages, color and packaging. In other words, from the means–end perspective quality is a bridging concept.

Means–end researchers have mostly applied a technique called laddering to study how consumers mentally link product characteristics to more abstract quality dimensions and from there to life values. As noted by Grunert (2005), numerous studies employing this method have been reported in the food area (e.g. Grunert and Grunert, 1995; Nielsen et al., 1998; Bredahl, 1999; Jaeger and MacFie, 2000; Valette-Florence et al., 2000; Bech-Larsen, 2001; Grunert et al., 2001; Miles and Frewer, 2001; Fotopoulus et al., 2003; Russell et al.2004).

The process of inferring quality from characteristics of the product and from other information at hand has been studied from various angles. In economics, the term market

signal is usually used, whereas studies in marketing and adjacent areas often employ the term quality cues. In addition, a distinction between intrinsic and extrinsic cues is usually made. Intrinsic cues refer to physical properties of the product while extrinsic cues refer to everything else (Olson and Jacoby, 1972).

Consumers' judgment of quality under uncertainty, where a product purchase situation is characterized mostly by experience and credence qualities, is common to the above approaches. Inference-making in the quality perception process is one of the more mysterious areas of consumer behavior. The literature abounds with more or less well documented cases of strange inferences. In the food area, for example, consumers are known to use color and fat content of meat as an indicator of taste and tenderness, organic production as an indicator of superior taste of vegetables, and animal welfare as an indicator of more healthy products. But these inferences from an objective point of view may be questionable.

Theoretical knowledge in understanding these processes is still quite limited. Researchers have not advanced notably beyond the Sorting Rule Model (Cox, 1967), which said that consumers prefer cues that they believe to be predictive of the quality they want to evaluate and confident in using it. Many consumers, for example, believe that information about breed, age of animal, and slaughtering date are predictive of taste and tenderness of a piece of meat but few consumers feel confident in using them, i.e. making the right inferences based on this type of information (Selnes and Troye, 1989). As a result, consumers end up making inferences based on cues with which they feel confident, such as color of meat and visible fat content, even though they may be aware of the fact that these characteristics are not always highly predictive of taste and tenderness. The concept

of confidence in inference-making is thus strongly linked to knowledge and expertise of the consumer (Selnes and Troye, 1989).

This may be related to information asymmetry but just giving consumers more information will not reduce asymmetry when consumers do not feel confident about using the information. Among the broad range of applicable extrinsic cues, three have received special attention in the food area as possible quality indicators (Grunert, 2005). First, brands (for example in case of Ethiopia, *Karaloo* beef), second, cues related to product origin (for example in case of Ethiopia, *Harar* beef), and thirdly, quality labels. The role of brands is extensively documented in the marketing, management and economics literature. The classic economic argument is that brands influence purchase to the extent that they reduce risk and communicate the positioning of the product to the consumer (Erdem and Swait, 1998). More psychologically oriented approaches have supplemented this by the notion that brands will have associations that are strong, favorable and unique in the mind of the consumer (Keller, 1993; Krishnan, 1996).

Both types of approaches imply that brands become powerful cues for consumers when the consumers actually find them predictive of the quality of the product. When a brand is used for quality inference, a brand becomes a valuable asset for the manufacturer owning it. A special phenomenon in the food area is the recent rise of retailer brands (also called private labels or own labels) as an alternative to the traditional manufacturer brands (Laaksonen and Reynolds, 1994; Burt, 2000).

In principle retailer brands can serve as quality cues to the consumer in the same way as manufacturer brands. However, the comparative lack of a brand history and the historical

association of retailer brands with generic products and low-price alternatives results in consumers' association of it as a cue indicating low rather than high quality. In terms of consumer behavior, such information is a special case of country-of-origin cues, which have been subjected to comprehensive research for several decades (Verlegh and Steenkamp, 1999). Research on country-of-origin effects has established that consumers may use origin information as a quality cue (e.g. van der Lans et al., 2001; van Ittersum et al., 2003).

Two types of mechanisms can be responsible for this (Johansson, 1989). First, consumers may use the cue to link the product to knowledge on the region of origin, which may be relevant for forming a quality evaluation (for example, butter from *Sheno* in case of Ethiopia). Second, consumers may use this cue during repeat purchases of the product to re-identify a product, the quality of which they found satisfactory. This process may be especially relevant when the product does not carry a strong brand. It follows from both mechanisms that origin information will have no effect on quality evaluations when consumers have no knowledge about the region of origin, when the quality of the product is not in fact experienced as desirable by the consumer, and/or when we are dealing with trial (as opposed to repeat) purchases.

A quality label is a fuzzy category that covers many different things. Quality labels can be awarded by manufacturers, groups of manufacturers, retailers, government bodies, and independent organizations, for example, consumer associations. The criteria for awarding the labels can be very strict or almost non-existent. Some labels refer to very specific qualities, such as the labels indicating organic production, whereas others are intended as general quality information or labels.

Many food quality labels probably do not function as quality cues at all. Consumers ignore the information because they do not feel that the labels are predictive of any quality dimensions they are interested in. As a result consumers feel more confident in using other cues (e.g. Gurunert, 2005). In those cases where quality labels are used, there is ample evidence that consumers misinterpret their meaning or make inferences that go far beyond what the label was intended to communicate (Parkinson, 1975; Beltramini and Stafford, 1993; Verbeke and Viaene, 1999). There is a broad range of other labels that primarily fulfils a public policy function, such as nutritional labels (Verbeke, 2005a).

In a market dealing with differentiated quality, the question of cue usage and inference-making is crucial for the functioning of markets. Products with differentiated qualities need to communicate these qualities to consumers in a way consumers can make inferences that will be predictive of the quality experienced later. Otherwise, consumers will either not buy the quality-differentiated product, or their demand will be limited to trial purchases.

The horizontal dimension of perceived quality refers to how quality perception changes over time. The major distinction to be made here is quality perception before and after purchase. Most aspects of food quality are either experience or credence characteristics. Because experience qualities can, by definition, be evaluated with high certainty after the purchase, the expectations about these qualities formed based on cues can be confirmed or contradicted. Confirmation or disconfirmation of expectations is the major determinant of consumer satisfaction and of consumer intent to repurchase the product or not (Oliver, 1997).

Whether quality expectations will be confirmed depends, obviously, on how good the consumer was in predicting the quality based on the cues at hand. Given the discussion about inference-making above, it may not come as a surprise that consumers are often not especially good at predicting quality, with disconfirmation of expectations and dissatisfaction as a consequence. For example, consumers in a study took visible fat as the main cue for evaluating quality, inferring that more visible fat means lower quality. Actually, higher degrees of intramuscular fat lead to more taste and tenderness, which explains the unexpected results (see also Bredahl et al., 1998; Verbeke et al., 2005).

Credence qualities are of increasing importance in food products. Most health-related and process-related qualities belong to this category. For credence qualities, the perception of quality after purchase will still be based on making inferences from cues. These cues can be the same as before purchase. But new cues may become available, and the perceived quality may change. After purchase, the consumer may have been exposed to new information questioning the credibility of the information processed before the purchase. Sometimes, cues emanating during food preparation or consumption process play a role. For example, the evaluation of the healthiness of meat rises after the purchase, because the fat that was visible at the point of purchase (and was used as a cue in evaluating healthiness) melts off during preparation.

The distinctions before and after purchase is of course a simplification. Most food products are bought several times, and many are bought continuously over extended periods. Quality perception may change across the whole range of purchases. It is usually assumed that the biggest change occurs in connection with the first purchase, because in the trial purchase quality expectations are necessarily based on informational cues only.

The first purchase will then lead to the first actual experience with the product, which may lead to fundamental changes in the perception of quality. When purchasing the product for the second and subsequent times previous own experiences will play a role in forming the quality expectations making it more accurate. But changes may still occur for a variety of reasons. Learning may occur with regard to how to handle the product, resulting in better quality experiences. The situation in which the product is consumed may change, which may have an impact on the experienced quality (Grunert, 2005).

When consumers are variety-seeking, a positive quality perception may wear off over time. For credence qualities, the quality perception can always change when new information about the quality becomes available. The dimensions that constitute quality in the mind of the consumer, and especially their weights, may change over time as well. Most notably, there may be a tendency that those quality dimensions that are amenable to own experience will, over time, acquire a greater weight. Whereas taste and healthiness, for example, may have equal weight in the pre-purchase phase, taste may be given a higher weight in the period during and after consumption, because it has now been experienced, whereas healthiness is still abstract and information-based. Through time there is a danger that credence qualities lose out to experience qualities, because the latter are constantly fed by own consumer experience, whereas the former are not. This problem is especially severe for functional foods, where the credence characteristic is the major selling point (Bech-Larsen and Grunert, 2003; Frewer et al., 2003; Verbeke, 2005b).

Food products are usually consumed after cooking. The home production process and not the product itself determines the quality perceived during and after consumption and, hence, consumer satisfaction. There is reason to believe that there may be many instances

in which the home production process is more important for the overall quality experience than the quality of the product itself. For example, the best piece of meat can be ruined by frying it too long, and a good cook can prepare a delicious meal even from a less attractive piece of meat. Relatively little is known on the relative influence of these factors, and especially about the role of cooking skills.

In general the quality that consumers associate with a food product is often not equivalent to this objective quality evaluation (Scholderer and Bredahl, 2004). For consumers, quality is a subjective concept whose association is based on psychological processes (Steenkamp, 1990). Consequently, consumers' cognitive structures of knowledge in memory are a key factor in developing a useful understanding of consumer behavior and demand (Olson and Reynolds, 1983). Hence, consumers' perception and evaluation of quality must be analyzed, because although users' individual perceptions can be measured, the individual perceptions can differ among users (Grunert et al., 1996).

This entails the need for standardization. The study of consumer's food quality perception is one of the most complex areas in the research into consumer's behavior. Nowadays, there are numerous researches carried out to determine consumers' preferences related to quality and food safety (for example, in cheeses, the studies of Bernabeu et al., 2004; Murphy et al.,2004; and in olive oil, Garcia et al., 2002).

As a result of food quality and safety related problems, consumers feel more concerned with food quality and safety, demanding more transparency in the food-chain and more information on the diverse qualitative characteristics of foods, for example, nutritious value, origin, way of production, etc. (Ventura-Lucas,2004). Nowadays, traceability and food safety are subjects very present at the point of purchase. Consumer evaluates and

pays for this perceived quality, whereas the food industry is more interested in a quality which is oriented to the product, process and quality controls (Brunso et al., 2002).

Safety has also to be defined in clear cut way so as to avoid confusion with quality and whether we mean genetically safe or bacterially safe, cholesterol safe. Food safety can be defined in a broad or in a more narrow way (Ritson and Mai, 1998). In the narrow sense, food safety can be defined as the opposite of food risk, i.e. as the probability of not contracting a disease as a consequence of consuming a certain food (such as most Ethiopians fear about contriving tape worm while eating raw meat). In the broad sense, food safety can be viewed as also encompassing nutritional qualities of food and more wide ranging concerns about the properties of unfamiliar foods (such as many European consumers' uneasiness about genetically modified food). Some people associate safety with the trust they have on the seller.

As with food quality, we can distinguish objective from subjective food safety. Objective food safety is a concept based on the assessment of the risk of consuming a certain food by scientists and food experts. Subjective food safety is in the mind of the consumer. It is widely acknowledged that objective and subjective safety (or risk) deviates in many cases. Until recently, such deviations were mostly regarded as a nuisance that has to be tackled by better consumer information and education. More recently (and in the light of the failure of attempts to educate consumers to become amateur food scientists) this attitude has given way to recognition of the necessity to deal with consumers' perceptions of risk and safety as they are (Frewer et al., 2005).

2.1.4 Is safety just another dimension of quality?

The holistic definition of food quality as everything a consumer would find desirable in a food product would suggest yes, as safety certainly is a desirable quality of food. However, qualitative studies of food quality perception suggest that safety is not uppermost in consumers' minds when they are asked to describe their own view of food quality (Brunso et al., 2002). This may suggest that perceptions of food safety affect consumer food choice in ways that are different from perceptions of the other dimensions of quality we have distinguished above.

It seems that safety perceptions play a role predominantly in two ways. First, in situations where major safety problems are perceived (the so-called food scares, such as BSE), risk perceptions can come to dominate all other considerations in food choice and lead consumers to avoid certain categories or brands for some time, until the situation has returned to normal (Burton and Young, 1996). Safety perceptions in this sense act as a 'sleeping giant' that does not enter quality perceptions under normal circumstances, but can have sweeping effects at times of crisis. Second, consumers apply safety considerations to certain production technologies. Consumers perceive the use of certain production techniques as unsafe, and they develop negative attitudes towards the use of these technologies. Such attitudes can be powerful forces in the marketplace, which both industry and regulators take seriously (for example genetically modified food production). Such issues are discussed by Bredahl (2001), Burton et al. (2001), Grunert et al. (2003) and others.

Three phenomena can be mentioned here regarding safety perceptions. First, self-imposed risk is more acceptable to consumers than technology-based risk. Thus, although meal

preparation at home is, by objective standards, much riskier than meal production in a factory, consumers tend to perceive ready-made meals as more dangerous than meals they have cooked themselves. The perceived risk is amplified when new and unknown technologies are used. Second, although consumers can usually appreciate the risk associated with their own handling of food in general terms, they believe that the probability of being hit themselves by a problem is lower than the probability of the average consumer being hit by the same problem. This is known as 'optimistic bias'. Finally, familiar risks are perceived as less severe than unfamiliar ones (Fischhoff et al., 1978; Slovic, 1987, Frewer et al., 2005).

Food safety is a major topic for public policy. Regulatory responses have been in two categories. The first refers to the enforcement of common standards for food safety, which has no immediate impact on consumer food choice, but is debatable in terms of economic efficiency when consumer preferences for safety are assumed to be heterogeneous. The second refers to attempts to provide transparency and encourage consumers to form their own judgments on food safety, supported by mechanisms of public participation, consumer education, and consumer information instruments such as labeling (Caswell and Mojduszka, 1999; Ritson and Mai, 1998).

In habitual purchases, the actual trade-off between perceived quality and perceived price is replaced by recalling the result of an earlier trade-off and just repeating the decision made there. Also, many food buying decisions may not involve a lot of conscious thought at all, but may be guided by a strong component of automatic, unconscious information processing (Grunert, 1996). As a result of habitual and perhaps even automatic purchasing, new products that are on the shelves may simply not be perceived by consumers, i.e. do

not even enter their choice set when shopping. It may take a special marketing effort, such as in-store displays, free samples, etc., to break through the barriers of habitual behavior and make consumers aware that a new product with an improved quality exists (Adaval and Monroe, 2002).

The mechanisms of price information processing and habitual purchasing have implications for the interpretation and validity of willingness-to-pay (WTP) measures. First, market transaction based WTP methods cannot account for the fact that many of the products in the analysis will not have entered their choice set because of habitual buying. Thus we do not measure WTP for the quality characteristic in general, but only for the quality characteristic given the marketing effort to make the quality improved product enter consumers' choice set. Second, no matter whether contingent valuation, experimental auction or conjoint analysis is used for analysis of quality preference, it may contain an element of forced exposure, where consumers are made aware of the product they are supposed to bid for.

This is a clear deviation from the real-world shopping situation, where consumers have the option of simply ignoring the new product. Moreover, the price information processing to which we encourage consumers in a willingness-to-pay measurement task may differ considerably from what occurs in a real-world setting. This is because price involvement may be inflated in tasks that obviously deal with prices, leading to more conscious deliberation about willingness to pay compared with a real-world shopping situation. In addition, we know from price information processing research about the role of reference prices in forming opinions about what is a good or a bad price (Winer, 1986; Briesch et al., 1997). However, with new or even hypothetical products, consumers may not have

reference prices, and may use a variety of heuristics to establish usable anchor points. Only recently have we begun to see studies that try to understand the kind of information processing that consumers engage in when confronted with willingness-to-pay tasks for hypothetical products (e.g. Fischer, 2003).

We should also briefly note that the trade-off between price and quality can function in different ways. Generally, a lower price can compensate for a lower quality, but the degree to which the decision is based on this type of compensatory reasoning may vary a lot (Bettman et al., 1998). Consumers may have an acceptable price range for certain goods and make tradeoffs only within that range, or they may have indispensable requirements for some products (for example, that beef have to be free from BSE), where the absence of these requirements cannot be compensated for by a lower price.

In this, attempt is made to review some of the major issues relating to how consumers perceive quality and safety in food, and how this turns into consumer demand. Consumers want to get the best quality at the lowest prices—but finding out what the best quality is may not always be a straightforward task, and even providing consumers with more information may not solve the problem, as the information may be ignored or misinterpreted. Public policy is often based on the assumption that more information is better, both to improve daily decision-making and in situations of crisis, but researches imply that more information may not only be without effect, but may in some cases increase confusion and consumer concerns (Grunert,2005).

However, the complexities and challenges are not only on the demand side. Producers face similar problems: they have to perceive and interpret the signals that come from

reference prices, and may use a variety of heuristics to establish usable anchor points. Only recently have we begun to see studies that try to understand the kind of information processing that consumers engage in when confronted with willingness-to-pay tasks for hypothetical products (e.g. Fischer, 2003).

We should also briefly note that the trade-off between price and quality can function in different ways. Generally, a lower price can compensate for a lower quality, but the degree to which the decision is based on this type of compensatory reasoning may vary a lot (Bettman et al., 1998). Consumers may have an acceptable price range for certain goods and make tradeoffs only within that range, or they may have indispensable requirements for some products (for example, that beef have to be free from BSE), where the absence of these requirements cannot be compensated for by a lower price.

In this, attempt is made to review some of the major issues relating to how consumers perceive quality and safety in food, and how this turns into consumer demand. Consumers want to get the best quality at the lowest prices—but finding out what the best quality is may not always be a straightforward task, and even providing consumers with more information may not solve the problem, as the information may be ignored or misinterpreted. Public policy is often based on the assumption that more information is better, both to improve daily decision-making and in situations of crisis, but researches imply that more information may not only be without effect, but may in some cases increase confusion and consumer concerns (Grunert,2005).

However, the complexities and challenges are not only on the demand side. Producers face similar problems: they have to perceive and interpret the signals that come from

Market valuations are infrequent because of the inherent information problems associated with the attributes (Henson and Trenll 1993, Kensey 1993).Consumers have even more difficulty in judging the level of safety in the products they buy and consume. Quality signaling (especially labeling) can transform credence attributes into search attributes allowing consumers to judge quality before purchasing (Casawell and Mojduska 1996).

The above conceptual review mainly reflects the situation in the developed countries where there are official food standards, brands, labeling and other forms of information that consumers have access to and may use in differentiating quality and safety and use them in purchase decisions. The situation in the developing countries is quite different due to unstandardised products being sold in the market, absence of standards and their enforcement where they exist. Yet consumers and other actors in the supply chains are likely to use informal standards, and quality and safety criteria and related indicators in their buying and selling decisions and actions.

2.1.5 Gap in knowledge about quality and safety in Africa

The same concern so far discussed is equally applicable for consumers in developing countries but the problem is that their worries are weakly addressed by politicians, policy makers, market suppliers and researchers.

The demand for meat in Africa is showing an increasing trend. As indicated by Delgado et al. (1999) population increases and anticipated increase in incomes in developing countries including Africa have led to projections that demand for livestock products will continue to out strip supply by year 2020. Attempts to deal with quality enhancement are

also observed. In recent years a lot of efforts have been dedicated towards increasing productivity of livestock. This is particularly evident in the Eastern Africa region where smallholder dairy farming has been improved substantially (Ngigi, 2003) but without corresponding improvements in the market orientation of smallholder dairy farmers in some areas (Louga, 2004) or value additions to exploit high quality and develop appropriate market governance and institutions (organizations, practices, rules and procedures, norms and standards for quality and safety). The improvements require innovative market linkages and addressing specific consumer demands for quality and diversity of meat and at a competitive price.

Despite these attempts, there are limited value added agricultural products in most Eastern and Central Africa countries due to lack of innovative product development and diversification to meet needs of various market segments. There is limited empirical literature on how producer and market agents in traditional or in formal markets respond to consumer demand for meat quality and safety requirements and what step may be taken to improve market innovations to address these concerns (see Karugia, 1997). Indications are that quality care and sound supply chain management are rapidly becoming key features for market access and competitiveness (Reardon et al, 2003 and Reardon and Barret, 2000)

The meat industries in developing countries are characterized by many scattered smallholder producers who sell predominantly their live animals directly to consumers or the products are handled by market intermediaries with or without any formal processing before delivering it to consumers, who increasingly expect the food they consume to be safe and of high quality.

In most countries of East and Central Africa, agricultural products are not graded and this constitutes a barrier to profitable agricultural product marketing and value addition by various intermediaries such as agricultural producers, traders, processors and consumers. This is most apparent in case of livestock products. With regard to live cattle, sheep and goats, markets are based on visual assessment rather than established grades. These results in unpredictable quality of meat destined for different internal and export markets and less remunerative prices for producers (Jabbar and Benin, 2004, Ayele et al, 2005). As a result of lack of quality and safety standards, the sector is open for stiff competition to imports.

2.2 Methodological Review

2.2.1 Data type and variables used in demand analysis

Most food consumption analysis of cross sectional data derives from traditional consumer demand theory, where demand is a function of own price, the price of substitutes and complements, income and household size. This traditional specification is then commonly augmented with socioeconomic variables as proxies for household and taste characteristics (see, West and price, 1976;, Becker, 1976; and Lancaster, 1966).

The inclusion of both quantities consumed and expenditures can then be used to derive commodity price information. The use of socioeconomic variables, to augment the more traditional money income specification of household food expenditure functions from cross section data, has been increasingly accepted (Price et al., 1980).

The literatures on demand for meat have different forms in terms of the variables included in the model. The oldest literature on the demand for meat treat the quantity demanded as

a function of price of the meat under interest, price of related commodities and income. Later researchers tried to incorporate socioeconomic and demographic factors as variables besides price, price of related goods and income. The more recent ones are giving due emphasis to quality and safety aspects besides issues discussed above (Henson and Traill, 1993).

In terms of the econometric model usage too, there is a great difference between the older works and the recent ones. In the former works concerns about model specification related errors are minimum. In the recent ones we can see that authors are more worried about model specification and try to give reasons as to why they choose the model and also the merits and demerits of the selected model. They are more worried about the functional form and use various tests in order to justify the type of models that they selected (Bodkin and Hsiao, 1996).

If care is not taken in choosing appropriate econometric model, predictions which do not satisfy the budget constraint will arise. But there are no clear cut guidelines that will aid in choosing the correct functional form. Researchers use common sense, interest in specific analysis, computational convenience and goodness of fit criteria.

There are also differences in terms of the data used in the study. Some authors use time series data while others use cross sectional data. In estimating income elasticities, the use of household level micro data is a good way of avoiding the aggregation problem. However, the use of household micro data on detailed commodities is complicated by the econometric problem, which arises when some households have zero consumption of one or more of the items considered. For example, Cox et al. (1984) in their study for

household demand for fresh potatoes specified a model of household fresh potato consumption incorporating prices, income, family size and other socio economic variables. The demand is estimated by maximum likelihood Tobit procedure. The effects of functional bias due to non-purchasing households are evaluated and decompositions of the Tobit elasticities are performed for various subgroups of the data.

To estimate the influence of a number of socio-demographic variables on household consumption, traditional consumption theory assumes that consumption units (households) attempt to maximize utility from the services of goods purchased in the market place subject to a money income constraint he/she has. However, numerous non-market socio-economic factors such as family size, age/sex composition, education, occupation and life cycle affect demand. The relevant socioeconomic characteristics of the household include occupation of the household head, degree of urbanization, region or geographic location, number of meals consumed, season, life cycle proxies such as age of the household head, sex and education of the meal planner, religion, number of children etc. The researchers incorporate all the variables in the regression and omit insignificant variables in line with the principle of partismony (Gujarati, 2004; Cox et al, 1984).

2.2.2 Interpretation on coefficient and model types used

The interpretation of the coefficients and the elasticities which results from Tobit analysis is different from the traditional one due to the correction for possible functional bias. In addition, the use of one form or the other might have implications that are either highly restrictive or inconsistent with theoretical consideration or actual experience. For example, a log form implies the income and price elasticites of demand for meat are constant at any

level of income and price. On the other hand, a linear form implies that the income elasticities of demand for meat is rising and tend towards unity if it is less than one. Commodities that are luxuries become necessities when per capita income increases. Meat is a luxury good to people who are poor than those who are rich. The income elasticity of demand for beef is expected to be high at low income and will decline as the income level rises although the absolute value of consumption expenditure rise as income goes up. Hence as the income elasticity of demand for meat should be falling rather than rising, the linear form is not the appropriate model.

Two models to correct zero consumption are Heckman's two step model and dichotomous choice model and the standard Tobit estimator. These estimators are very useful in case there is zero expenditure by households for a particular commodity which will not be estimated by the usual OLS method.

When error terms of a system of equations are contemporaneously correlated and the set of explanatory variables is not the same in each equation, classical least square (OLS) is not an efficient method of estimation for correlated systems of linear equations. In reduced form, Zeller's two stage estimation procedure is appropriate. In this procedure, an estimate is first made of the error terms, variances and covariances based on the residuals derived from an equation by application of OLS. Then in the second stage these estimates are used to construct the Aitken estimator of the regression coefficient in all equations.

Deaton and Muellbaur (1980a; 1980b) developed a flexible demand system called the "almost ideal demand system" (AIDS). The advantage of the AIDS model is that it automatically satisfies the aggregation restriction and with simple restriction homogeneity

and symmetry can be imposed (Moschini, 1998). The concept of a flexible demand system is extremely useful for estimating a demand system with many desirable properties. In addition, the non-inear Engel curves of the AIDS model imply that an increase in income will lead to decrease in the share of income allocated to a particular commodity, as well as a decrease in the income elasticity of that good when it is less than one. However, the AIDS model may be difficult to estimate because the price index is not linear in terms of parameters estimated. Owning to its simplicity, the linear approximate almost ideal demand system (LA/AIDS) is popular for empirical studies.

It is also sound to incorporate willingness to pay models like the Contingent Valuation Method (CVM) as it can be applied to our case more easily than others. Several studies have used contingent valuation (as the consumers do not actually buy the product) and choice experiment models to measure consumers' willingness to pay for specific quality attributes. In their design, these studies have benefited from lessons learned in the large literature on contingent valuation of the environmental goods (Buzby et al., 1995).

To apply the CVM model the researcher generally present consumers with two goods, one similar to the product already on the market and one with a new or different feature, e.g., an enhanced safety feature (e.g. low risk). Elicitation techniques are often used to ask the consumers' willingness to pay for the safer products. Other studies have used experimental auction market to measure the same willingness to pay. The researcher has to teach the interviewees about the benefit of eating quality and safe product. The benefit of eating safe food is the cost of illness which entails losses of income and leisure, pain and suffering.

Belzer and Theroux (1995) and Cropper (1995) questions on the reliability of contingent valuation and experimental market approaches for valuing food safety. The first doubt is

how effectively a survey instrument or experimental market design can convey relative risk to consumers. For example, if the consumer is offered products with different levels of bacteria contamination or even risk of illness, how will he or she judge relevant risk of the product? Thus to avoid problems related to lack of awareness of the risk require the surveyor to both educate and ask for a value (Buzky et al, 1995; Fox et al. 1995, Lin and Millon 1995). And second doubt is the problem of aggregation and the effectiveness of the budget constraint. If a consumer is willing to pay, for example, 30% more of a given income level for a tape worm free beef, does that mean that he or she would be willing to pay 30% more to gain similar levels of enhanced safety over all food budgets at all income levels? What if that extrapolation yields unbelievable expenditure figure?

Despite these difficulties and irregularities we can learn a great deal about consumer valuation from these studies. Of particular importance is the impacts of the types and quality of risk information consumers have on their valuation of enhanced food quality

Empirical studies have found a range of willingness to pay levels for enhanced as compared to the regular products. For example, using contingent valuation, Lin and Milon (1995) found that on average consumers said they would be willing to pay from $0.72 to $0.90 more for a dozen of ousters with reduced risk levels, assuming a $4.00 current price for ousters on the market. In another contingent valuation survey, Buzby et al. (1995) found that on average consumers said they were willing to pay from $0.19 to $0.69 more per grape fruit with reduced risk from pesticides, depending on the elicitation method used, giving an initial price of $0.50 per grape fruit.

Researchers at Iowa State University used experimental auction markets in several related studies to measure willingness to pay for products with enhanced features. Fox et al. (1995), for example, found that participants in an auction, depending on the regions of the consumer, would on average pay from $0.43 to $0.93 to upgrade a chicken sandwich they already posed to one that offered a reduced risk of getting salmonellas.

Conjoint analysis is particularly important to sort out the relative importance of safety and quality attributes of products including beef, the subject of this study. As a result, conjoint analysis may be a more appropriate tool as this study is basically concerned with pinpointing the relative importance of quality and safety attributes.

Conjoint analysis was first developed for, and primarily applied in, marketing studies of consumer goods in developed economies. Adaptation of it to beef quality and safety analysis in a traditional marketing system poses particular problems which require several modifications to the standard methodology. Thus, researchers must take great care to design a survey that provides clear and unambiguous information about the choices that the respondents are asked to make. The basic properties of the technique will be discussed in the next chapter.

3. Methodology

3.1 General properties of conjoint technique

Conjoint analysis is usually adopted by marketing firms to evaluate potential attributes of new products and to determine the optimal mixture of multilevel attributes included in those products (Lee and Hatcher, 2001). For a conjoint analysis, the researcher creates the product profiles composed of selected attributes including price and attribute levels, and ask respondents to rate, rank or evaluate those various product profiles. The virtue of conjoint analysis is that it asks the respondents to make choices in the same fashion as the consumer presumably does by trading off features, one against another.

Using conjoint analysis, the researcher can answer questions such as: whether a product attribute is important or unimportant to the consumer? What product attributes is most or least desirable in the consumer's mind? What is the market share of preferences for leading competitor's products versus an existing or proposed product? Answers to these questions are of crucial importance in the design and launch of successful products (SPSS, 2005).

The characteristics of the product are described in terms of its factors and levels. The factors are the general attribute categories of the product, such as fat content, color, leanness, marbling, and price. In other areas of data analysis they are commonly known as the independent variables. The factor levels (also called features) are specific values of the factor for a particular product, such as high, blackish red, lean, birr 36. In other areas of data analysis, these are the values of the independent variables.

For each case presented to the subjects, one factor level is listed for each factor in the study. The total number of cases needed to represent all possible combinations of factor levels is thus equal to the number of level of factor 1 times the number of levels of factor 2 times the number of levels of factor n. The advantage of conjoint analysis is lower cost (less expensive) and less variance (more precise) due to the repeated measure design. The disadvantage is that it is not focusing on the value of a specific attribute, but evaluates a product with several attributes as a choice. Comparison of single attributes is rather rare. It also limits the number of product profiles because of respondents' difficulties in rating more than a few product profiles. Change in an attribute level is also being restricted as adding more levels makes product profiles complicated for easy comparison (Louviere et al, 2005).

The obvious problem with this is that if profiles, or cards are included for every possible combination of levels, these are too many profiles for the combination of levels, these are too many profiles for the subjects to rank or score. The total number of profiles resulting from all possible combinations of the levels may become too great for respondents to rank or score in a meaningful way. For these reason, frequently only a subset of all possible profiles is used in the experiment. The subset called an orthogonal array is a type of design in which only the main effects are considered and interactions are assumed to be negligible (SPSS, 2005).

If there is other information on the respondents, such as background demographics, one might be able to identify market segments for which distinct products can be packaged. In conjoint analysis studies, the researcher assumes that the product being evaluated can be defined in terms of a few important characteristics. It is further assumed that when a

consumer makes a decision about such a product, the decision is based on trade offs among these characteristics. The purpose of a conjoint analysis is to estimate utility scores, called part worth, for the characteristics. Utility scores are measures of how important each characteristic is to the respondent's overall preference of a product (Louviere et al, 2005).

Output from a conjoint analysis includes importance ratings of attributes, part worth estimates showing preferences for attribute alternatives and correlations relating product rankings from the conjoint model with observed rankings.

The utility scores analogous to regression coefficients are called part worth and can be used to find the relative importance of each factor. They are captured by the procedure through a set of regressions of the rankings or scores on the profiles. Since they are expressed in a common unit, the part worth scores can be added together to give the total utility of combination of attributes. The Pearson's R and the Kendall's tau Statistics displayed at the bottom of each subject's output is another indication of how well the model fits the data. They are correlation between the observed and estimated preferences. As such, these coefficients should always be very high (SPSS, 2005).

Even though it is true that estimation improves as the number of profiles increases, information is not really lost by omitting some combinations. This is because once we have part worth (utilities) for each factor level; we can use them in the prediction equation for those combinations that the subject did not evaluate. One restriction on the number of profiles is that it must sufficiently exceed the number of factors to allow for error degree of freedom.

The size of the sample in conjoint analysis studies varies greatly. Cattink and Wittink (1982) reported that the sample size in commercial conjoint studies usually ranges from 100 to 1000, with 300 to 550 most typical range. As always sample size should be large enough to ensure reliability.

3.2 Specification of the General Model

In this study, an empirical investigation employing both descriptive analysis and modern econometric analysis techniques were conducted to answer the research objectives. Caution was taken in sample selection as well as in specifying the method. The study used standard and appropriate methods and sample selection techniques.

The survey is based on data derived through face to face interviews using structured questionnaire. The sample was defined at household level to interview people who are mainly responsible for shopping for their household who we may call meal planers. The sampling method applied was stratified random sampling.

The survey-based approach allowed to present respondents with enough choices so that their preferences were sufficiently investigated, but without overloading them with too many choices or too much information about each choice. When there is information overload, survey respondents tend to simplify the evaluation process by ignoring less important characteristics or by ignoring the levels themselves, especially when they have to evaluate profiles with a large number of levels (Green and Srinivasan, 1990). The potential for information overload is intensified in applications of the technique in developing countries.

In conjoint studies, beef profiles can be presented to respondents in verbal descriptions augmented by cards. Verbal descriptions use sentences in which each trait level is described in a brief line item fashion. Verbal and paragraph descriptions are convenient, straightforward and inexpensive.

In this study, beef profiles (descriptions of hypothetical beef presented in an attribute by attribute format) were used to elicit ratings. The number of profiles used in a conjoint study depends on the number of attributes and levels of each attributes that are used. Empirical studies have shown that respondents have difficulty evaluating profiles defined on more than six characteristics (Green and Srinivasan, 1990).

Two stages were involved in the survey design. The first was comprised of the five attributes of quality and safety which were individually ranked as most important during a PRA. These are : freshness, hygine of the shop and personnel, fat content, abattoir stamp and price (PRA will be explained in detail in section 3.1.4) , while in the second stage, respondants were asked to reveal the level of preferences for all attributes identified in the PRA.

Given that four attributes have two levels and price having three levels, there are $4^2*3=$ 48 possible beef profiles for each experimental design in a full factorial design, which makes data collection difficult. The number of profiles could be reduced to a manageable size using an orthogonal or fractional factorial design which treated all attributes as independent and precluded collinearity between them in an empirical model (Mackenzie, 1993). The use of this approach resulted in a randomized selection of 12 profiles for beef (SPSS, 2005). The method for derivation of these profiles are discussed later.

The assumption is that the utility an individual derives from choosing a given beef quality is a function of the fat content, freshness (colour), price, stamp from abattoir, place of purchase and the individual's socio-economic background. Since utility is not directly observable, a choice variable representing ratings or rankings of beef quality is used in empirical work in place of utility. The choice variable is related to utility as follows:

$R = 1 \quad \text{if} \quad 0 < U < \gamma 1$

$R = 2 \quad \text{if} \quad \gamma 1 < U < \gamma 2$

.

.

.

$R = \omega \quad \text{if} \quad U > \gamma\omega\text{-}2$

Where U is the unobservable utility levels, R's are the preference ratings and γ's are the threshold variables or cut-off points linking the respondents' actual preferences with the ratings. Using the choice variable, the empirical model takes the following general form:

$$R = \alpha + X\beta + Y\lambda + e$$

where R is a vector of preference ratings (0, 1, 2,....n), X is a vector of non-stochastic variables capturing the levels of attributes, Y is a vector of non-stochastic variables capturing the interaction between the levels of attributes and consumer's background, β is a vector of marginal utilities for the levels of attributes, λ is a vector of marginal impacts of the interaction between the levels of attributes and individual's background and e is a disturbance term. The marginal values β and λ are estimated from observations on R, X and Y. When the dependent variable is discrete (i.e., like ratings, preferred choice), a

discrete choice estimator is appropriate (Greene, 1990; Sy et al., 1997). Consumers with the same estimated λ have similar preferences, and would make up one segment of the market. Thus, estimates of λ can be used to assess preferences across households to determine if a segmentation approach to quality improvement is warranted.

It is common in conjoint analysis to use an effect-coding procedure for categorical independent variables. In an effect-coding the usual (0, 1) dummy system is replaced by a (-1, 1) system for two attributes levels where -1 is used for the variables that are normally excluded in order to avoid the dummy trap during the estimation. When there are three attributes levels a (-1, 0, 1) system is used. The use of effect-coding generates estimates that measure the marginal change in the dependent variable as a result of a unit change in the independent variable (Pedhazur, 1982). Effect-coding also implies that the sum of the estimated coefficients of a group of variables (e.g., all the levels of a given attributes) is constrained to be equal to zero (Jain et al., 1979; Pedhazur, 1982). This in turn implies that the estimates of the variables that were not used in the regression can be computed as the negative of the sum of the estimated coefficients of the level of attributes that were used in the estimation.

Conjoint analysis is derived from Lancaster's theory of demand (Lancaster, 1971), which posits that the consumer value the quality of product attributes at his disposal through the purchase of a commodity. The utility an individual will derive from consuming a given beef is a function of the characteristics of a given beef and the individual's socioeconomic background. Symbolically:

$U_i = U(Z_i)$

Z_i is a vector of the attribute values for alternative i from the choice set at the disposal of the decision maker.

The central theme is that the researcher can catch what the consumer feels consuming observable beef product having specific attributes with a reasonable degree of certainly and unobservable part from the view point of the researcher can be modeled as an error term. Thus we have to design an indirect means of observing the consumer's utility.

$V_i = V(Z_i, P_i, Y) = U(Z_i^*)$

Where:

V_i is indirect utility (which can be proxied by rating of the consumer for the different options)

Z_i^* is the maximum utility from option i that the consumer derives

Y income,

P_i is price of beef of option i

In empirical application a vector of socioeconomic characteristics S is introduced in the function reflecting the variability of tastes across portion of the population to which the model of choice behavior applies:

$$V_i = U(Z_i, P_{i,} Y, S)$$

Defining the exact variables that affect Z_i and introducing the socio economic variables that affect the household's decision in purchasing beef of certain quality and safety, the above equation can be written as

$V_i = U(\text{Fatcontent}, \text{Freshness}, \text{Price}, \text{Hygiene}, \text{Stamp}, \text{Expenditure}, \text{Edump}, \text{Famsz}, \text{Sexmp}, \text{age}, \text{maritalstatus}, \text{Religion}, \text{urban Residence}...)$

Where:

Fat content: the amount of fat contained in the beef. It was defined as low (red meat) and high.

Stamp: A certification from the Municipality on the beef indicating it is free from health problems or threat, which is made before and after slaughtering the animal. It was defined as present (guaranteed) and not present (not guaranteed)

Hygiene: the cleanness of the butcher shop or other sales outlet for beef and beef sellers' neatness or cleanliness. It was defined as clean and unclean

Freshness: The state of length of stay of the beef after slaughtering. It is defined as fresh and non fresh.

Price: Proposed price of beef for the specified profile

Expenditure: the monthly total household expenditure in Birr

Edump: education level of the meal planner in numbers of schooling

Famsz: family size of the household

Sexmp: sex of the meal planner

MartialStatus: Martial status of the household, Married=1, else 0.

Religion: Religion of the household head

UrbanResidence: Duration of residence in Addis Ababa in number of years as an indicator of exposure to urban life

Besides the above OLS model, conjoint regression was employed to evaluate the relative importance of the individual attributes and to know the utility scores of the individual attributes.

3.3 Data Sources

3.3.1 PRA and Results

No grade or standard established for fresh meat quality and safety in Ethiopia by concerned government authorities suitable for local markets were found though standards for export purpose exist. There is also no research work which attempted to establish grade for fresh meat. Due to this, it is difficult to relate consumers' perceptions with any established grades or standards to see if there are divergences or similarities between consumer perception and official standard. As the study is new in its kind in the country, and no official grades and standards for beef exist to solicit consumer willingness to pay for different quality and safety attributes, it was necessary to gather relevant information on consumer perception on quality and safety before actually conducting the formal questionnaire based survey to solicit consumer willingness to pay for different product profiles based on quality and safety criteria. To this end the Participatory Rapid Appraisal (PRA) is highly helpful. This strategy is quite important as it enables to get quick overview of consumer perception on quality and safety of beef that will be valuable in designing the final questionnaire.

The participatory rapid appraisal was basically conducted to asses the consumers' perception on quality and safety of beef and to have a good strategy in sample size and distribution decision for the formal survey. Some of the observations that were derived from the PRA work are presented below.

For understanding the consumer preferences, about 200 consumers were briefly interviewed at various places (70 at homes, 50 at butcher shops, 50 at eating places and 30

at supermarkets) to understand their perception about meat quality and safety. This large sample is taken so as to have adequate knowledge on how different individuals at different places and with different income categories perceive and value quality and safety. The researcher took sufficient care to capture household perceptions of all income classes in the PRA. To this end, data from the CSA economic establishment survey was used to define income groups.

Respondents indicated colour (also include fat content), price, place of purchase (also include sale turnover), absence of gristle (fatty meat is lean but there are also red lean meat), marbling, and freshness (also include smell) as qualitative criteria for meat quality. According to the PRA, the quality perception about meat differs from person to person. Some say fatty meat is of high quality while others say red meat is great. As a result, different parts of the same carcass have different quality perception depending on the individual preference. The quality difference is also revealed depending on the purpose for which the meat is utilized. The meat used for making *Kitfo* is preferred if it is red, tender and lean. Meats with gristles are preferred for making sauce. For *Tibs* red one with some fat is preferred. While purchasing meat in butcher shop, customers do not worry about the origin of the cattle as it is difficult to verify or identify the origin at that point. But some butchers are known for their specialty in selling beef of cattle from a certain locality (e.g. some butchers sell *Harar* beef). Consumers preferred that the meat product should not stay more than two days on the shelf. Most of the consumers preferred one day of shelf life for the meat.

Most of the consumers do not believe that price is a strong indicator of quality. They thought that they can identify the quality of meat by physical observation than by price.

But most of the time quality meats are a bit expensive than others. Therefore, price could also be taken as an indicator for quality.

Regarding safety they raised the following issues. Although they do not ask about safety at the point of purchase, the consumers usually go for shopping in those outlets which can provide evidence or assurance about health of the animal immediately before slaughtering from the stamp of the slaughter house. Consumers are also worried about tape worm presence in the meat. They can avoid this scare through buying beef from a dealer who can present assurance for his product being checked up before and after slaughter by presenting official stamp. They also give importance to the butcher's own neatness and the neatness of the butcher house.

Some households commented that they purchase meat in super markets because they believe that the product is safer than that from the butcher house. Many commented that it would be nice if the butchers placed their meat in refrigerated glass container as the current way of keeping meat is not safe as it is exposed to dusts, flies and so on. Most also are concerned about the way of meat distribution from the abattoirs and the dress of the meat deliverers to butcher shops. According to the consumers, the working clothes of the abattoir meat handlers are supposed to be neat (though blood stain could be there temporarily, they should be regularly cleaned to avoid creating germs on the dresses).

The meat demand in Addis Ababa is seasonal. The sale turn over is small in the major fasting seasons. Households belonging to Orthodox Christian religion do not consume meat in fasting seasons. The households exhibit no consumption in fasting seasons but relatively high consumption over a long time after the fasting season is over. It is also

observed that most of the butcher houses are closed during Wednesdays and Fridays which are weekly fasting days of the Christian households. Poultry, sheep meat and meat products are the major sources of meat for most households.

Most individuals say they will pay 10-15% more on the current price if the meat product they are going to purchase is guaranteed of high quality and free from health threat like tape worm. The guarantee will be used as a legal claim by the consumers if the seller defaults. The current price of beef is on average Birr 34 per kilograms.

Regarding packaging most of the purchasers do not bother. But some like it to be packed in plastic materials instead of magazines and other papers. Although the Ministry of Health prohibits packing in papers like magazine, some butchers do not seem to follow this regulation.

In some butcher houses the sale turn over is very high while in majority cases, the sale turn over is low. In places where the sales turn over is high the meat quality is very high and the price too is higher. Consumers go long distances to buy beef where they perceive the quality to be superior. This reveals that consumers have a strong demand for better meat quality and safety. The willingness to pay higher prices for beef quality and safety indicates that there exists a demand for beef quality and safety. Individuals who can not afford to buy high priced superior quality meats or those who are discouraged by rare availability of such butchers go to places where the meat quality and safety is inferior.

In summary, the most important combined quality and safety criteria as perceived by majority of the consumers consulted, after careful removal of overlapping attributes, are as

follows: fat content, freshness, place of purchase (hygiene of personnel and premise), stamp from abattoir, and price.

3.3.2 Design of the Detailed Survey

Having the PRA result as an initial condition, a well structured questionnaire was developed to capture the relevant variables necessary for the study. A conjoint card was prepared that depicts pictorial representation of the various beef type scenario options or profiles for the different attribute levels. The profiles generated above were prepared in a card format putting colored pictures for each individual attributes. This procedure facilitates easy transfering of the ideas of each profile which in turn improves the quality of the data collected. Table 3.1 below shows the selected product profiles generated with SPSS conjoint orthogonization. This facilitated the explanation to consumers what the scenarios really are.

Table 3.1 : conjoint orthogonal design for beef in Addis Ababa market

Profile	Official stamp	Hygiene	Fat content	Freshness	Price (Birr/kilo)	Desirability
1	Present	Clean	Low	Fresh	38	
2	Present	Unclean	High	Not Fresh	34	
3	Absent	Clean	Low	Fresh	38	
4	Absent	Unclean	Low	Not Fresh	38	
5	Present	Clean	High	Fresh	38	
6	Absent	Clean	Low	Fresh	34	
7	Absent	Unclean	Low	Fresh	34	
8	Present	Unclean	Low	Fresh	28	
9	Absent	Clean	High	Fresh	38	
10	Absent	Unclean	High	Fresh	38	
11	Present	Clean	Low	Not Fresh	38	
12	Absent	Clean	High	Not Fresh	28	

Source: Orthogonallization with SPSS conjoint 15.

3.3.3 Sample Size, Sample Selection Strategy and Data Collection

Representative consumers were selected via multistage random sampling method. The 183 *Kebeles* (Villages) in the ten sub cities of Addis Ababa has been classified by Central Statistics Authority (CSA) according to major income brackets of the inhabitants and the approximate household numbers in each *Kebele* has also been enumerated.

According to the economic establishment survey (CSA, 2004), which utilized the former *Kebele* classification makes the economic study on the households in the 183 *Kebeles*

possible. In this survey, each *Kebele* is classified as high, medium and low income according to qualitative indicators mentioned below. Qualitative indicators are utilized as households have a tendency to understate the exact amount of income they have. As a result proxies like the type of house, proximity to better roads, congestions, the type of fence and the extent of isolation of the household from the neighboring one is utilized. Accordingly the classification of the *Kebeles* in the three major categories is described below. Note that the classification is based on living condition as a proxy of income, not income directly.

High income households: households which own villas or buildings with one or more floors having its own garden, their living condition is not in congested conditions, have good roads in and out of the house, and all in all the general situation of the individuals could be judged as higher .

Low income households: Households that do not have its own premise, their living condition is congested, they do not have access to good road in and out of the house and all in all the life style of the individuals can be judged as lower.

Medium income households: If the households are not included in higher or in the lower income groups and the life style of the households is not exposed to danger of health and other social problems due to housing conditions.

According to the Central Statistics Authority economic establishment survey, 50% of Addis Ababa's households are categorized as low income households while 44% are medium income and the remaining 6% as high income households. Thus, in order to get a

representative sample for the city as a whole in our study of household demand behavior, it is necessary to give high quota for low income and medium income households and give smaller one for high income households. The stratification of households will aid to avoid the trap of omission of some households (specially the richer one as they compose of the smaller proportion) which in turn may introduce a bias in our estimates and hasty generalizations.

The distribution of households in a specific *Kebele* by income groups is not unique. Most of the time all the three type of households is nested together in the same *Kebele*. As a result it is difficult except in some cases to find households in a given *Kebele* belonging to having only one income group. As a result the study classified *kebeles* on the basis of the majority of the households' income conditions. According to these criteria there are 82 *kebeles* dominated by low income households, 57 *kebeles* dominated by medium income households and 6 *kebeles* dominated by high income households, others have an even mixture of income groups. Hence in our sample we considered only *kebeles* dominated by low, medium or high income groups. Some *kebeles* are inhibited by approximately the same proportion of low–medium or medium-high or low- medium- high income households. Such *kebeles* were excluded from the present sample without causing any bias from sample selection problem as our aim was to get representative samples from the three income groups.

From the 82 *kebeles* dominated by low income households' six *kebeles* were selected randomly. From the 57 medium income dominated *kebeles*, 4 *kebeles* were selected randomly. From the six high income dominated *kebeles*, 2 *kebeles* were randomly selected. After the selected *kebeles* were identified, individual households were selected using systematic sampling having a reference household as a starting point and then

selecting the next household at certain interval, the interval being dependent on the total number of households in the selected area and the number of households to be selected from that area. Through such process, 25 households were selected randomly from each *Kebele*. Accordingly, the total sample size was 300.

Data were collected in June 2007 on the sample households, The survey was specifically targeted at households since they are the ones who would purchase the beef and will benefit by any improvement scheme. The questiionnaire includee questions on household characteristics, meat purchases and consumption behaviour, household food expenditure and purchase outlets, and beef profiles for rating scores (a copy of the questionnaire is shown in Appendix ...). Special care was taken to collect data on the product profile scoring. To prevent mistakes like overvaluation of attributes presented in the upper part of the profile cards, all the five attributes and their levels were first introduced to the intreviwee. Response elicitation began with the enumerator explaining verbally the meaning of the levels of attributes represented. Then the respondent was asked to explain his (her) understanding of the levels of attributes. This procedure took 15 to 30 minutes. These preliminary explanations were necessary to ensure that the attribute names provided the information that was intended in the survey. After considering all 12 profiles, respondents would evaluate each profile by assigning value that would reflecte his (her) preference. Ratings of profiles were recorded using a pre-prepared questionnaire. After that the interviwee was given 12 product profile cards and asked to rate them according to their preference on a scale ranging from 1 to 10, where 10 means the most desirable quality for the respondent's consumption, 1 the least desirable, and ratings 2 to 9 represented desirability between the two extremes.

3.4 Empirical result presentation

3.4.1 Descriptive Statistics

Descriptive statistics techniques will be used to make some inferences that could be evident from the data without actually doing rigorous econometric analysis. A descriptive statistics will be used, for example, to indicate how much of different meat products of specific characteristics consumers consume, and on average (with specific magnitude) how much the consumers are willing to pay more for safe and quality beef. Moreover average consumption of beef, beef substitutes, frequency distribution of market outlet chosen, relative budget share of beef etc will also be summarized.

It is useful to know which quality and safety attributes consumers give priority to. There is a summary of ranking on the consumer perception for the different beef quality indicators. It enables us to know which attribute of beef have a higher power in signaling quality of beef. Similarly, beef safety concerns of consumers will be determined for the ranking of different product types.

Where important, some results have been shown for three income groups as well as for the entire sample. In this case low, medium and high income groups were defined based on total household income data derived from the survey questionnaire as follows.

Low income = monthly household income less than 2000 Birr

Medium income= monthly household income 2000-4999 Birr

High income = month household income 5000 Birr or over

3.4.2 Econometric Model

End results obtained through OLS regression and conjoint analysis will be presented on a table format in a way easier for the reader to understand. Then appropriate explanations were given on the meaning of the figures presented on the table.

4. Results and Discussion

4.1 Descriptive Analysis

Average family size for the sample was 5.2 ± 1.7. The mean age of the respondents was 41.05 ± 13.30. Around 80.3% of the meal planners were females with a mean schooling of 9.95 ± 5.1 years indicating the dominance of females as meal planners of the Addis Ababa households. Nearly 21.3% of the meal planners were unemployed while the rest were employed in various sector of the economy including own business. About 50% were Amhara by ethnicity while the remaining 50% was composed of various other ethnicities. Almost 68% of the respondents were followers of Orthodox Christianity while the remaining 32% were Muslims, Protestants and others.

Total monthly quantity of beef consumed by the average household surveyed was 6.2 kg while the total monthly expenditure on it on average was Birr 132.03 (table 4.1).

Taking the whole year including non-meat consumption months (due to fasting), the annual beef consumed per capita is 10.80 kg. Of course, if only the non-fasting months were considered, average consumption per time unit (say per day or week) will be much higher. From here it is easy to understand that the beef consumption is very small even in the main urban centre in the country compared to the low income countries standard. From 1997 to 2001 developed countries consumed a consistent level of 77kg of meat per capita annually; developing countries struggled to maintain a diet with only 25kg of meat per capita annually. More specifically, while the United States had an average meat intake of over 120kg per capita annually Ethiopians remained slightly below the meat intake of all low-income countries consuming 9kg per capita annually (FAOSTAT in Avery, 2004). This is also quite surprising as Ethiopia is one of the countries in Africa with large number of cattle population.

Table 4.1 Average beef consumption levels and related statistics.

	Mean	Std. Deviation
Family Size	5.2	1.7
Total monthly quantity of beef consumed per household in kg	6.2	4.7
Total monthly expenditure on beef in Birr per household	132.03	125.98
Total monthly value of other meat, fish and eggs per household	124.23	117.17
Duration of a year when meat is eaten in days	202.44	23.60
Annual quantity of beef consumed at home in kg per household	51.4	43.6
Per capital monthly beef consumption in kg	1.3	1.0
Per capita annual beef consumption in kg	10.8	9.8

Source: Field survey 2007

The monthly expenditure on other meat, fish and eggs on average by the sample households was birr 124.23 (Table 4.1). The break down by components shows that among other meat, the lions share is taken by sheep meat. Sheep is consumed by purchasing live sheep for home slaughter as well as a ready made one from butchers on a kilogram basis. Eggs, goat meat, fish, chicken (local and hybrid) also constitute significant portion of households' expenditure on meat. The consumption of pork and pork products is very small and negligible. This may be due to faith related factors (Table 4.2).

4.2 Average consumption of other meat than beef and related statistics per household

Meat types	Number of sample households purchased	% Sample households purchased	Expenditure/month /household, Birr	Std. Deviation
Chicken(Local & hybrid)	65	21.7	15.37	43.95
Eggs	187	62.2	30.74	49.29
Fish	49	16.3	11.65	34.07
Goat meat	16	5.3	5.68	33.10
Hybrid chicken	5	1.7	3.46	20.06
Pork and pork sausage	6	2.0	0.51	6.02
Sheep meat	71	23.6	60.28	130.78
None	90	30.0	0.0	

Source: Field survey 2007

Significant proportions of the household (83%) did not introduce any new meat type in their purchase basket in the last 10 years. However some households began introducing new meat items while some others have abandoned items previously consumed (table 4.3). New beef items introduced in shopping basket are beef fillet (3% of the sample households), steak (1%), veal (0.7%), goat meat (2.3%), *Kitfo* beef (0.6%), beef for *Tibs* (2.3%) and pork and pork sausage (1%). Products previously eaten but abandoned now are cattle organs (2.3% of the sample households), pork and pork sausage (1%), sheep meat (1%) and goat meat (0.7%).

The product attributes of the new meat items introduced that are liked by the consumers are good taste (45.9%), low fat content (32.4%) and reasonable price (13.5%) (Table 4.4).

There are various reasons for introducing and abandoning meat products. Reasons for introducing are as follows: increase in household income (27.3%), availability of the product (36.4%), and awareness of the good characteristics of the product (21.2%). Reasons for abandoning are affordability (27.8%), bad quality (44.4%), health risk (16.7%) and not available (11.1%) (Table 4.5).

Table 4.3 Meat products introduced and abandoned in the last decade

Products	Introduced new product		Abandoned product previously consumed	
	Number of households out of the total sample	% of total sample	Number of households out of the total sample	% of total sample
Beef fillet	9	3.0	-	-
Beef steak	3	1.0	-	-
Goat meat	7	2.3	2	0.7
Veal	2	0.7	-	-
Beef for *Tibs*	7	2.3	2	0.7
Pork and pork sausage	3	1.0	3	1.0
Beef for *Kitfo*	2	0.7	-	-
Beef	-		1	0.3
Cattle organs	-		7	2.3
Sheep meat	-		3	1.0
Sub-total	33	11	18	6

Source: Field survey 2007

Table 4.4 Attributes of the new introduced products liked by consumers

Attributes of introduced product	Number of households	% of total sample
Good taste	15	45.5
Reasonable price	4	12.1
Longer shelf life	2	6.1
Low fat	11	33.3
Other	1	3.0
Total	33	100.0

Source: Field survey 2007

Table 4.5 Reason for introducing and abandoning new meat products

Reasons for introducing new products	Number of households	Percent	Reasons for abandoning products consumed earlier	Number of households	Percent
Higher income	9	27.3	Can not afford	5	27.8
Change in religion	1	3.0	Not available	2	11.1
Availability	12	36.4	Bad quality	8	44.4
Lower price	3	9.1	Health problem	3	16.7
Awareness	7	21.2			
Good quality and safety	1	3.0			
Total	33	100		18	100

Source: Field survey 2007

Among the different beef cuts, beef for *wot* comprises the significant portion of purchase. The average households consume about 4 kg per month of this product with a mean expenditure of about 124 birr. Beef for *Kitfo, Kurt, Tibs*, minced beef and beef mixed with bone are also consumed widely (table 4.6). The study also observed that beef sausage, beef T-bone, steak and veal are now being introduced in to the market and some high income households are consuming them. Given the absence of gristles in veal compared to beef (which is matured), veal will soon be a popular beef type. This has advantage for actors on both sides of the market. Consumers will get lean red meat while producers can save money by reducing cattle feed expenses as they are going to slaughter them when they are young.

4.6 Average consumption of different beef cuts and related statistics

Product types	% Sample households purchased	Quantity consumed per month, kg		Expenditure per month, Birr	
		Mean	Std. Deviation	Mean	Std. Deviation
Beef for *Wot*	80.3	3.9	2.7	123.89	87.05
Tibs	40.3	1.3	1.7	44.63	62.34
Minced beef	8.0	0.5	1.4	16.76	45.83
Kitfo	12.7	0.4	1.1	15.24	37.31
Kurt	9.0	0.2	0.8	6.25	22.00
Beef mixed with bone	4.0	0.2	0.9	7.06	33.23
Beef T bone	1.7	0.1	0.3	1.62	9.74
Veal	1.0	0.1	0.4	1.86	14.02
Beef sausage	1.0	0.9	0.6	1.50	11.56
Beef steak	0.7	na	na	0.77	9.13
Cattle organ	2.3	na	na	1.10	5.92

Source: Field survey 2007

Relative share of beef in total meat expenditure is 62%, in total food expenditure is 18% and in total household expenditure is 12% as calculated from the entire sample. This result is comparable to the estimates shown in Avery (2004). In 1987, meat consumption composed of 51 percent beef, 19 percent sheep, 14 percent goat, and 15 percent poultry (MapZones in Avery, 2004). The break down by income groups reveals that absolute value of expenditure on beef increase as income level increase but the relative share of beef in total meat, entire food expenditure and total expenditure declines significantly as income level increase (Table 4.7).

Some consumers buy meat from more then one outlet. Market outlet widely visited while purchasing beef is butcher in local wet market for the total sample. Special butcher shops are the dominant outlets for low income segments. Supermarkets are frequently visited by high income segments (Table 4.8). Special butcher shops are isolated small butcher shops in different parts of city along main roads and even on feeder roads near main residential areas while butchers in local wet market are are located near each other in designated section of a large market. Supermarkets are now having rising market share, especially among the higher income consumers, as people are becoming more concerned about beef safety. With the rise in awareness of people about safety there is a brighter future for supermarkets to be major outlets for beef purchase. Note that some households might have purchased beef from only one outlet but others have used more then one.

Table 4.7 Relative share of beef expenditure by income group

Total monthly expenditure in Birr by item	Total sample	Low income	Medium income	High income
	Mean (Sd)	Mean (Sd)	Mean (Sd)	Mean (Sd)
Beef	132.03 (125.98)	97.60 (127.50)	139.68 (119.34)	159.42 (137.92)
Other meats (including eggs and fish)	124.47 (170.41)	33.80 (79.3)	128.29 (155.43)	255.93 (232.34)
Non meat food items	615.91 (594.02)	291.3 (133.3)	575.59 (348.42)	1283.61 (1064.27)
Entire food items	872.42 (632.38)	422.73 (166.93)	843.57 (371.15)	1698.96 (978.25)
Entire non food items	650.00 (927.31)	136.10 (75.46)	544.11 (432.19)	1860.42 (1673.03)
All items (food and non food)	1522.42 (1460.36)	558.83 (200.57)	1387.68 (655.21)	3559.37 (2467.14)
Household budget share				
Meat in total food expenditure	0.31 (0.24)	0.27 (0.26)	0.34 (0.23)	0.31 (0.25)
Meat in total monthly expenditure	0.20 (0.17)	0.20 (0.20)	0.21 (0.16)	0.16 (0.15)
Beef in the entire food expenditure	0.18 (0.16)	0.21 (0.21)	0.18 (0.14)	0.12 (0.11)
Beef in the total meat expenditure	0.62 (0.34)	0.79 (0.28)	0.60 (0.33)	0.44 (0.32)
Beef in the entire monthly expenditure	0.12 (0.12)	0.15 (0.16)	0.12 (0.10)	0.06 (0.06)

Figures in the brackets are standard deviations

Source: Field survey 2007

Table 4.8 Market outlet where beef is bought by sampled households by income group

Outlet	Percent of households with in the group			
	Total sample	Low income	Medium income	High income
Producer gate	1.3	0.0	1.0	1.2
Butcher in local wet market	90.3	59.7	94.0	74.1
Supermarket	13.7	0.0	11.2	53.9
Special butcher shop	59.5	72.7	57.0	18.4

Source: Field survey 2007

Reason for selecting the outlet of beef purchase is most of the time closeness to home (Table 4.9). But better quality and safety, price and trustworthiness are also reasons for choosing outlets. From this fact we can easily depict that if supermarkets are available near to house there will be ample opportunities for them to have potential customers. Some households go far distance to find supermarkets to buy safe meat.

Table 4.9 Reason for choosing a market outlet

Reason	Number of households from the total sample	Percent of total sample
Known/trustworthy	81	27
Lower price	74	24.6
More product choices	15	5.0
Better Quality and Safety	99	33.0
Closer to my home	222	74.0
Hygienic	3	1.0
Others	1	0.3

Source: Field survey 2007

beef twice a month with 2 meals being consumed from the last purchase. Beef is consumed being cooked as a main ingredient, roasted or in raw form. The average purchase price of beef per kg was 31.34 Birr taking into all types of beef. Beef for *kitfo, kurt* and fillet is the most expensive overall, though standard deviations indicate wide variation within each beef type, so differences among beef types may not be significant. This is partly due to the fact that meat price, especially beef price, is highly controlled in the Addis market by the meat supply chain. Break down by income groups show slightly higher prices paid by higher income groups for all meat types, especially for *kitfo*, *kurt* and fillet but overall such differences may not be significant as standard deviations are quite high (Table 4.10).

Table 4.10: Average price by type of beef cuts by income group

Beef cut types	Total sample	Low income group	Medium income group	High income group
	Average price, Birr	Average price, Birr	Average price, Birr	Average price, Birr
Wot	30.17(3.86)	29.5(3.9)	30.2(3.8)	30.6(3.5)
Tibs	31.65(4.95)	30.4(5.5)	31.8(4.8)	33.1(4.7)
Kitfo, kurt and fillet	34.46(5.25)	32.0(4.7)	33.4(8.3)	35.1(3.6)
Average	31.34(4.71)	29.9(4.5)	31.6(4.5)	32.0(5.5)

Figures in the brackets are standard deviations

Source: Field survey 2007

The peak meat consumption month is April according to 80.4% of the respondents followed by October (7.4%). On the other hand, the beef consumption goes down in the month of March (81.9%). There are also some households who exhibit constant trend in

their beef consumption (Table 4.11). As shown from the table, meat consumption in Ethiopia is too seasonal. Majority of the households consume meat for only 180 days. Due to low availability of beef in butcher shops on major orthodox fasting days, non-orthodox believers also have minimum beef consumption in those months. The month of February and March are months when beef consumption is minimum due to Easter fasting. April is a month when beef consumption reaches the climax.

Table 4.11 Peak and off peak meat consumption months

Meat consumption peak month	Percent	Meat consumption off peak month	Percent
April	82.0	March	83.7
September	3.3	July	2.3
October	7.7	Constant trend	10.7
Constant Trend	3.7	Other months together	3.3
Other months together	3.3		
Total	100		100

Source: Field survey 2007

Reasons for high consumption in the indicated months are festival (89.7%) and cold season (7.7%). Reasons for low consumption on the other hand are fasting (89%), decrease in household size (5.3%) and product unavailability (3.7%) (Table 4.12).

Table 4.12 Reasons for high and low beef consumption

Reasons for high consumption	Percent	Reasons for low consumption	Percent
Festival	89.7	Fasting	89.0
Increased household income	0.3	Lower household income	1.3
Lower prices	0.3	Decrease in household size	5.3
Increase in household size	2.0	Product not available	3.7
Cold season	7.7	Higher price	0.7
Total	100		100

Source: Field survey 2007

Only 7.1 % of the respondents keep livestock in the form of either cattle, sheep, goat or chicken or a combination of them, and the remaining 92.9% do not posses livestock.

From the total sample households 38.3 % do not consume away from home. Nevertheless beef is consumed away from home in variety of forms. From the household members consuming meat outside home, the beef *Wot* was consumed by 29%, beef *Tibs* by 32.7%, *Kitfo* by 30%, sheep meat (in the form of *Tibs or Wot) by* 18.7% of the households (Table 4.13).

Beef consumed away from home is consumed in variety of ways. It could be consumed raw (23%), roasted (42.8%), and cooked as main ingredient (31.1%) and in some other forms (Table 4.14).

Table 4.13 Beef consumption away from home by product type

Product type	Number of households out of the total sample	Percent of total sample
Beef for *Wot*	87	29.0
Beef for *Kurt*	41	13.7
Beef for *Tibs*	98	32.7
Beef for *Kitfo*	90	30.0
Cattle organ	13	4.3
Goat meat	3	1.0
Sheep meat(mutton\lamp)	56	18.7
Chicken	14	4.7
Fish	23	7.7
Eggs	35	11.7
Other	19	6.3

Source: Field survey 2007

Table 4.14 Forms of beef consumption away from home

Form consumed	Number of households out of the total sample	Percent of total sample
Raw	110	36.7
Roasted	205	68.3
Cooked as main ingredient	149	49.7
Cooked as secondary ingredient	5	1.7
Compliment with other food	10	3.3

Source: Field survey 2007

The total monthly expenditure on beef away from home by average household is 68.19 Birr while that of other meats is 18.58 Birr for the entire sample. The figures show significantly higher away from home consumption expenditure as income level rise and the highest monthly expenditure on meat is for beef (Table 4.15).

Table 4.15 Aggregate beef consumption away from home by income group

Type of meat consumed	Total sample	Low income	Medium income	High income
	Average expenditure, Birr	Average expenditure, Birr	Average expenditure, Birr	Average expenditure, Birr
On beef	68.19 (94.30)	30.53(59.01)	76.20(102.72)	99.44(91.20)
On other meat and fish	18.58(46.5)	3.69(14.29)	24.90(56.40)	19.42(33.70)
On all meats and fish	86.77(122.73)	34.22(64.24)	101.09(139.15)	118.85(105.51)

Figures in the brackets are standard deviations

Source: Field survey 2007

Regarding the general market outlet for purchase of food items, local market is the major one. Local grocery stores, supermarkets, street vendors and kiosks are also visited while purchasing food items (Table 4.16).

Reason for selecting market outlet is various. But getting all items required in the outlet, distance of the outlet from home and prevalence of reasonable price are the dominant ones (Table 4.17).

Table 4.16 General market outlet for buying food items

Market outlet	Number of households	Percent
Local grocery store	14	4.7
Supermarket	23	7.7
Street vendors	5	1.7
Kiosk	23	7.7
Local market	185	61.6
Atkilit Tera (Piazza)	50	16.6
Total	300	100.0

Source: Field survey 2007

Table 4.17 Reasons of selecting an outlet for food purchase

Reasons	Frequency	Percent
Nearest one	88	29.3
Reputable one	3	1.0
One with variety of products sold	84	28.0
One that sell fresh products only	32	10.7
One with reasonable price	91	30.3
Other	2	0.7
Total	300	100.0

Source: Field survey 2007

Going for shopping when necessary was practiced by over half of the respondents and the next most important is the once weekly purchasing of beef. The percent of non scheduled purchasers declined across income groups while once weekly purchaser increase as income level rise (Table 4.18).

Table 4.18 Frequency of purchasing food items for consumption by income group

	Total sample	Low income	Medium income	High income
Purchase frequency	Percent	Percent	Percent	Percent
Daily	1.7	2.6	1.1	2.1
3-4 times a week	4.3	3.8	4.0	6.3
Twice weekly	13	10.4	14.3	12.5
Once weekly	26.0	14.3	28.0	37.5
As necessary	55.0	68.9	52.6	41.6
Total	100	100	100	100

Source: Field survey 2007

Regarding the purchase and decision about the food items to be eaten at home, spouses are most of the time the responsible ones. According to different authors (e.g. Verbeke, 1999), women constitute the larger part of those responsible for food purchases within the household in Ethiopia and in many other countries. Without data about the profile of the consumers and buyers of beef, it was judged to be reasonable to focus on the universe of the study to women over 17 years of age who eat and buy beef (in some cases males were also interviewed if they have household related information). But household heads, daughters or servants may also be a meal planner in rare occasions (Table 4.19). From here we can also learn that a number of household heads are now becoming concerned on household chores in addition to outside works. This is a positive indicator of awareness of gender equality by the male counterparts.

Table 4.19 Person responsible for deciding a market outlet and food items to be purchased for the household

Meal planner	Number of households	Percent
Household head (male or female)	48	16.0
Female spouse	190	63.3
Spouse and household head	28	9.3
Daughter	34	11.3
Total	300	100.0

Source: Field survey 2007

The most important attributes of beef quality perceived by the sample households are freshness and fat content. Regarding safety, abattoir stamp was the most important

indicator to the consumers followed by hygiene of premise of the butcher shop and also meat sellers. Price is found to express quality and safety to a certain extent.

Nearly half of the households believe that the beef they purchase is safe and of good quality but 64% are willing to pay for quality and safety enhancements indicating that there is a gap between what they expect and what is available in the market (Table 4.20). Proportion of household satisfied with quality and safety of current purchase of beef and willingness to pay for better quality and safety enhancements increase as income level increase. This again indicates the existence of demand gap for quality and safety between consumers, higher income groups being a niche market.

Table 4.20 Perception and willingness to pay (WTP) for quality and safety enhancements by income group

Perception on purchased beef	Percentage of households saying yes within in the group			
	Total	Low income	Medium income	High income
Safety	48.3	41.6	48.6	58.3
Good quality	44.7	39.0	44.0	54.2
WTP for improvements on beef				
Safety	63.7	53.2	63.4	81.3
Good quality	63.7	50.6	64.0	83.3

Source: Field survey 2007

Although quality and safety criteria were mentioned separately by some sample households, as explained above, in most cases there was overlap between the two. In some studies in developed countries, relative importance of beef attribute was assessed through

the pick any scaling technique, where respondents were confronted with a list of twelve fresh beef attributes (e.g Verbeke, 1999). The attributes used in the present study were based on participatory rapid appraisal result, and on the exploratory qualitative research, and included freshness, amount of fat, neatness of premise, stamp from abattoir and price representing both quality and safety as it was difficult to identify sets of attributes separately for quality and safety. Among quality and safety criteria freshness, abattoir stamp, fat content, hygiene of premise and personnel, and price are mentioned in that order. Respondents were asked to rate on one to ten scale 12 beef profiles each composed of different levels of the above attributes as shown earlier.

Freshness was rated 8.9 on a one to ten scale by average household for the total sample. On the same scaling the rating for abattoir stamp was 7.2, for fat content 7.6, for hygiene of premise and personnel 7.8 and for price 6.9. Segmentation into income groups shows difference in rating of attributes across income groups and among attributes. For low income households abattoir stamp is less important. Stamp is of higher importance for high income groups. Hygiene is rated high by the higher income group. The importance of price as quality indicator increases with increase in income level (Table 4.21). Considering the entire sample, price was the least important indicator of quality and safety to the purchases of beef. However, if the standard deviation for each attribute score is considered, it will appear that there is really no difference between the first four criteria, only the price lies at a little lower in rank. This indicates that all five of these attributes are considered simultaneously by consumers in assessing quality and safety.

Table 4.21 Ratings for quality and safety attributes on a one to ten scale by income group

Rating for	Total	Low income	Medium income	High income
	Average rating	Average rating	Average rating	Average rating
Freshness	8.9(1.4)	8.9(1.1)	9.0 (1.4)	8.7(1.5)
Stamp from the abattoir	7.2(2.5)	5.7(3.2)	7.5(1.9)	8.6(1.4)
Fat content	7.6(1.8)	7.3(2.0)	7.7(1.8)	8.0(1.6)
Hygiene of premise and personnel	7.8(1.9)	7.2(1.9)	7.8(1.8)	8.5(1.7)
Price	6.9(1.9)	6.3(1.9)	7.0(2.0)	7.5 (1.4)

Figures in the brackets are standard deviations

Source: Field survey 2007

4.2 Econometric Analysis of importance of quality attributes in buying decisions

4.2.1 Conjoint Analysis Results and Discussions

It is common to estimate the preference functions in conjoint analysis by ordinary least squares regression (Smith, 2005). Research has shown that the prediction power of this technique is often quite similar to more complex techniques like Logit, Monanova, Linmap etc. but the results of OLS are easier to interpret (Oppewal and Vriens, 2000).

In this study, first, investigation was made on the relative importance of each attribute with a conjoint analysis technique. This technique will enable us to compare the relative importance of attributes, the total utility of the different beef profiles. Then for purposes of identifying other determinants of demand for beef besides quality and safety (like demographic and social variables), OLS regression was made. The results are presented as follows.

To estimate the part worth and relative importance of product attributes, the SPSS conjoint analysis was performed with SPSS 15. In interpreting the results it is necessary to note that the absolute values of the attributes do not have any economic meaning as we are interested on ordinal utility. Hence the important thing here is the ordering of the values. Higher values give high utility while lower values gives low utility and the negative ones indicate lower or reduced utilities (Louviere et al, 2005). The results are shown in Table 4.22. The results obtained from the conjoint analysis were statistically reliable as both Pearson's R and Kendall's tau statistics are highly significant at a probability of less than 1%.

Table 4.22: Part worth of beef quality and safety attributes

Attributes and levels		Entire Sample		Low income groups		Medium income groups		High income groups	
		Utility Estimate	Std. Error	Utility Estimate	Std. Error	Utility Estimate	Std. Error	Utility Estimate	Std. Error
Stamp	Absent	-1.04	0.22	-0.89	0.11	-1.07	0.24	-1.17	0.33
	Present	1.04	0.22	0.89	0.11	1.07	0.24	1.17	0.33
Hygiene	Unclean	-1.12	0.32	-0.86	0.16	-1.14	0.35	-1.49	0.47
	Clean	1.12	0.32	0.86	0.16	1.14	0.35	1.49	0.47
Fat	Low	0.60	0.27	0.35	0.14	0.62	0.30	0.83	0.40
	High	-0.60	0.27	-0.35	0.14	-0.62	0.30	-0.83	0.40
Freshness	Non fresh	-1.02	0.33	-1.20	0.17	-0.97	0.36	-0.90	0.49
	Fresh	1.02	0.33	1.20	0.17	0.97	0.36	0.90	0.49
Price	Low price (28)	-0.10	0.37	0.12	0.19	-0.12	0.41	-0.34	0.55
	Medium (34)	0.00	0.00	.000	0.00	0.00	0.00	0.00	0.00
	High price (38)	0.10	0.37	-0.12	0.19	0.12	0.41	0.34	0.55
(Constant)		4.48	0.32	4.627	0.16	4.49	0.35	4.20	0.47
Pearson's R		0.99***		.99***		.99***		.99***	
Kendall's tau		0.93***		.93***		.93***		.93***	
Kendall's tau for holdouts		0.33		.33		.33		.33	

*** Significant at 1%.

Source: Field survey 2007

Freshness, official stamp and hygiene were modeled as linear more meaning higher utility for presence of preferred conditions. That means the utility that the consumers get

increases as the beef becomes fresh, have official stamp and served in hygienic place by neat personnel. On the other hand price and fat content were modeled as linear less as people get less marginal utility when they pay higher price and when the beef they buy is fatty. Note that assuming more or less will not have any effect on the calculation but SPSS will indicate the inconsistency of the assumption through generating reversals. An increase in the number of reversals indicates the assumptions made are wrong. In this study the reversal is relatively small except for price which reveals the assumptions made with respect to different attributes about direction of consumer preference is quite consistent.

The part worth of official stamp was 1.04 when present and -1.04 when absent for the overall sample. From the breakdown by income group high income groups are relatively sensitive to the presence of official stamp which is indicated by the high coefficient associated to it. But in general the overall result is in line with our initial expectation. Absence of official stamp is regarded as lack of assurance for disease freeness or health of the meat which will lead to reduced utility to the consumers. This is because people need to be safe from potential health risks due to presence of tape worm. The message that the stamp passes to the consumers is that the beef is free from health risks like tape worm or any other parasites. Relatively small value for low income class for stamp may be that the low income categories consume meat in a cooked form, so do not worry too much about presence of tape worm while the higher income categories consume in variety of forms including eating raw.

For hygiene the part worth is 1.12 when the personnel and the premise are clean and -1.12 when it is unclean for the entire sample. From the breakdown by income group, the high income segments are highly sensitive to hygiene while the low income segments are

relatively less sensitive. This sensitivity might be the reason for frequent purchase of beef in supermarkets by the rich segments as supermarkets are the most hygienic outlet for the product. But generally speaking households, irrespective of their income category, will derive higher utility when they buy beef from clean places.

Fat content has a part worth of -0.60 for high fat beef for the entire sample. But the relative dissatisfaction with high fat is more in case of higher income segments. The reason may be that while beef is among the few sources where the poor get fat, the high income segment on the other hand could consume fat in variety of ways and hence are too much sensitive to the presence of it on the beef they bought due to health reasons, such as high cholesterol. But in general high fat beef give lower utility to consumers and may affect purchase decisions.

Freshness has a part worth of 1.02 for fresh beef for the entire sample. A break down of the sample into income classes reveals that the low income groups are highly sensitive to freshness while the high class segments are less sensitive. This is because the rich buy beef mostly from the supermarkets infrequently where it is kept frozen and may also preserve at home in fridges while the low income segment buys from ordinary butchers frequently for consumption on same days. As butchers do not have mechanism to preserve the beef for longer period in fresh form, their buyers, who are mostly the low income, demand it to be fresh. But in general, freshly sold beef will add additional utility for consumers and hence enhance purchase decisions.

Price has a part worth of -0.10 with a standard error of 0.37 which indicates that price is not an important determinant of quality and safety. The break down into income segments

also reveals that price is less important as an indicator of quality and safety, which is in line with the finding in the PRA (Table 2.22). But the positive sign indicates that for some consumers high price is an indicator of quality. This is probably because these consumers do not have adequate information before hand about the quality of beef they are buying, though they observe the beef physically and may have some perception or expectation about quality but may not be able to verify or validate at the time of purchase. As a result they tend to believe that price differential is merely due to quality differentials which they can't verify on the spot. Hence some consumers tend to believe that given two products of similar attributes but different prices, more preference is given for the one with higher price. This weak inference about quality based on price could have been solved if there were official standards defining quality which could be verified or observed from, from example, labeling, than locally followed conventional way of judging quality and safety. But in general the low coefficient coupled with high standard error shows that price as a weak indicator of quality.

Results of Table 4.22 can be used to estimate the total utility one would get from consuming a beef of a certain profile as it is calculated based on the assumption that utility from different attributes is additive. Profile one for example will give a total utility of 3.9 to the consumer. From here it is easy to note that profile 1 is the most preferred profile while profile 4 is the least preferred one (Table 4.23). But here it must be noted that profiles with negative total utilities does not mean the profiles are undesirable by the consumers. What it implies is that they are less preferred to higher valued or scored profiles.

The relative importance of individual attributes is shown in table 4.24. According to the conjoint result output, the relative importance of attributes for the total sample in a

descending order is as follows: freshness, hygiene, stamp, price and fat content. From the table we can see that in a decision on purchase of beef as derived from the entire sample, 23.5% of the weight is given on the freshness of the beef, 23.4% on hygiene of premise and personnel of seller shop, 18.9 % on the presence or absence of abattoir stamp, 17.6% on price and the remaining 16.6% on the amount of fat contained in the beef. But for higher income segment, hygiene is given the highest weight in the purchase decision while in the low income group freshness is given the dominant weight. For middle income group, freshness and hygiene are equally important.

Table 4.23 Calculated total utility of the 12 profiles ranked by consumers

Profile	Official stamp	Hygiene	Fat content	Freshness	Price (Birr/kilo)	Total utility
1	Present	Clean	Low	Fresh	38	3.9
2	Present	Unclean	High	Not Fresh	34	-1.7
3	Absent	Clean	Low	Fresh	38	1.8
4	Absent	Unclean	Low	Not Fresh	38	-2.5
5	Present	Clean	High	Fresh	38	2.7
6	Absent	Clean	Low	Fresh	34	1.7
7	Absent	Unclean	Low	Fresh	34	-0.5
8	Present	Unclean	Low	Fresh	28	1.4
9	Absent	Clean	High	Fresh	38	0.6
10	Absent	Unclean	High	Fresh	38	-1.6
11	Present	Clean	Low	Not Fresh	38	1.8
12	Absent	Clean	High	Not Fresh	28	-1.6

Source: Field survey 2007

Table 4.24: Relative importance Values of quality and safety attributes

Attribute	Entire sample	Low income group	Medium income group	High income group
	Importance value	Importance value	Importance value	Importance value
Freshness	23.5	26.0	23.1	21.1
Hygiene	23.4	20.1	23.8	27.5
Stamp	18.9	18.4	18.8	20.2
Price	17.6	18.9	17.5	16.0
Fat content	16.6	16.7	16.9	15.2
Total	100	100	100	100

Source: Field survey 2007

This ordering, especially the least weight given to fat content in purchase decision (in the entire sample as weil in all income groups), is contrary to common belief that Ethiopian consumers have high preference for high fat beef. However, the profiles for beef were prepared for beef in general with out regard to specific cut and form of consumption. In reality, when overall beef consumption is considered, preference for high fat content may be low but for a specific cut of beef for a specific form of consumption, for example, raw beef consumption, high fat may still be preferred, which was not separately captured in the analysis.

4.2.2 OLS Regression Results and Discussions

Besides the conjoint analysis discussed so far, OLS estimation was also done for identifying determinants of beef demand including quality attributes which provide implicit utility as well as buyer characteristics. In this analysis households rating for the 12 profiles were separately used as a dependent variable. The explanatory variables were quality and safety attributes for the 12 profiles for each household and other socioeconomic variables for the household, which were repeated as observations alongside ratings for the 12 profiles. The levels of attributes were entered in the data set using effects coding, whereby a binary variable (such as official stamp and hygiene) is assigned (-1, 1) and variables with three levels were coded as (-1, 0, 1). Socio-economic variables like sex are coded as dummy. This type of coding normalizes the resulting regression coefficients and allows for easier comparison and interpretation of coefficients. To have clear view on variations across income segments, the function was estimated for the entire sample as well as for three income groups- low, medium and high- defined as earlier.

Explanatory variables that were included in the regression analysis are official stamp, hygiene, fat content, freshness, price, family size, duration of residence in Addis Ababa, sex, age, number of years of schooling, martial status and religion. Household expenditure was included as an independent variable in all the equations but was found to be non significant so was dropped. The regression coefficients are estimated on the assumption that individuals' utility or rating is comparable despite individuals' differences in knowledge, interpretation and levels of understanding. To avoid the initial individual differences and to bring their understandings and interpretation to equal levels, attempt was made to inform them on the meaning of attributes before asking for their opinions and rating, as discussed in section 3.

Results of the OLS regression are presented in table 4.25. Many of the major explanatory variables have been found to be significant at less than 1%. Below is explanation of the variables that were found to be significant in the regression.

Table 4.25 Results of OLS regressions on attribute ratings

Variables	Entire sample	Low income group	Medium income group	High income group
	B Coefficients	B Coefficients	B Coefficients	B Coefficients
(Constant)	5.12*** (0.28)	5.4*** (0.52)	5.69*** (0.45)	3.12* (1.6)
Official stamp (yes=1)	0.80*** (0.04)	0.74*** (0.06)	0.82*** (0.05)	0.86*** (0.09)
Hygiene (clean=1)	1.11*** (0.04)	0.98*** (0.06)	1.11*** (0.05)	1.33*** (0.10)
Fat content (high=1)	-0.31*** (0.04)	-0.21*** (0.06)	-0.32*** (0.05)	-0.44*** (0.09)
Freshness (fresh=1)	1.14*** (0.04)	1.15*** (0.07)	1.10*** (0.05)	1.26*** (0.10)
Price (high=1, else =0)	-0.20*** (0.05)	-0.45*** (0.09)	-0.17** (0.07)	0.10 (0.13)
Price (med=1, else=0)	-0.19* (0.11)	-0.50*** (0.19)	-0.20 (0.15)	0.33 (0.30)
Sex (male=1)	-0.06 (0.07)	-0.07 (0.17)	-0.13 (0.11)	0.10 (0.23)
Age (yrs)	-0.01*** (0.00)	-0.01 (0.01)	-0.02*** (0.01)	-0.01 (0.01)
martial status (married=1)	-0.13* (0.09)	-0.13*** (0.03)	0.02 (0.03)	0.03 (0.06)
Religion (Orthodox=1)	0.24*** (0.09)	0.26 (0.19)	0.22* (0.12)	0.15 (0.20)
family size (number)	0.08*** (0.02)	0.01 (0.04)	0.15*** (0.03)	0.08 (0.05)
Schooling (yrs)	-0.01 (0.00)	0.00 (0.01)	-0.02 (0.01)	-0.05** (0.02)
Duration of stay in Addis	0.00 (0.00)	0.00 (0.01)	0.00 (0.01)	0.02** (0.01)
N	3600	2040	960	600
R Squared	0.65***	0.65***	0.68***	0.67***

*** Variable significant at 1%, ** Variable significant at 5% and * Variable significant at 10%

Source: Field survey 2007

The regression coefficient associated with official stamp is positive and significant at less than 1% in all classifications, but more weight is given by higher income segments. This indicates people give more preference for beef with official stamp, which is an indication that they are concerned about the safety of the beef they purchase. In the PRA stage too, these concern by consumers was identified where they expressed their opinion on safety issues of beef related problems like tape worm. They can to some extent avoid this concern by purchasing beef from a butcher whose cattle is slaughtered from a known abattoir whom they believe can present official stamp for it.

The regression coefficient for hygiene of the butcher house and the butcher himself is found to be positive and significant at less than 1%, but more weight for it is given by the high income segments. This means that hygiene is one of the determinants of demand for beef and beef purchase decision is made by looking at the neatness of the butcher house and the butcher himself. All households (although the degree differs) give value to the neatness of the premise and the personnel while they purchase beef.

The beta coefficient associated with fat content is negative and significant at less than 1% and more weight is given by high income segments. This means that presence of high fat negatively affect purchase decision. This reveals that people are now becoming increasingly sensitive to the presence of fat in beef. Majority (surprisingly even low income households) choose beef with less fat. For low income households, one may argue that they prefer fatty beef but the result is the reverse most probably because this people are more worried about high medical expense of accumulated cholesterol through eating fatty beef. But the low coefficient for the low income segment indicates that although there is a concern for high fat, the concern is not that high as these groups have few

sources to get fats relative to the high income segments. Note that the high preference over red meat may be reversed if beef was presented based on type and form of consumption given Ethiopian's preference for a fatty raw meat for raw consumption. In this study beef utilized for all purpose was presented for rating.

The coefficient for freshness of the beef is positive and is significant at less than 1%. This means people derive more utility from fresh beef as compared to the non fresh one which in turn affect purchase decision positively. The preference over the fresh beef is justifiable given most butchers do not have refrigerators for nightly store and beef is usually presented on open shelf, which is liable to contamination to foreign matters and flies.

The beta coefficient for price is negative but significant at less than 1% for the entire sample, but found to be insignificant for high income segments. The result indicates that low income segments are sensitive to price. High income segments on the other hand are less sensitive to price and are willing to pay high for good quality beef than low income groups. Some households, typically high income groups, some times believe that higher price is an indication of good quality. This is particularly true as beef products do not have official standard for the local market context.

The coefficient for family size is positive and significant at less than 1% for the entire sample. The coefficient for medium income group is significant at 1% while for low and high income groups it is insignificant. This indicates that family size determines the marginal utility one derives from eating beef given he is in medium income group.

The beta coefficient for respondents' religion (orthodox being the reference) is positive and significant at less than 1% for the entire sample while it is insignificant for low income and high income segments. This means that orthodox followers derive more utility than others if they are medium income households. For orthodox households, meat eating months are festival seasons after the difficult fasting seasons are over. The medium income categories enjoy the festival by having ample foods to eat including beef as a major item. The coefficient for low income becomes insignificant because they are income constrained households to buy beef in non fasting seasons. For these groups, festival and fasting seasons may be the same while for the rich their consumption demand goes beyond eating meats. Religion is also the factor that generates seasonality in beef consumption in Ethiopia.

The beta coefficient for age of the meal planner is negative and significant at 10% for the entire sample. It is significant at 1% and negative for medium income groups while being insignificant for low and high income groups. The implication of this is that young meal planners from medium income households tend to have less marginal utility from beef consumption than their older counterparts. This may be because old households tend to have more children in the household which in turn increases the household utility derived from beef.

The beta coefficient of marital status is negative but significant at 10% for the entire sample. It is significant and negative for low income group while it is insignificant for medium income group and high income group. This means that married meal planners from low income groups tend to get less marginal utility from beef than the unmarried ones. The reason may be that beef is a luxury product at low income level. Married meal

planners introduce varieties like vegetables and other non meat food items at cheap expenses as there is going to be division of labour in the household. Hence introducing beef which may shake monthly budget of the household will decreases the utility derived from beef. Married meal planners are more organized and hence will buy beef on a schedule basis (like once in two week etc). Unmarried planners of low income groups having expended more of their time working for a living usually choose food items that can be prepared more easily, beef being one of the items.

Number of years of schooling and duration of residence in Addis Ababa are found to be insignificant for the entire sample. Break down into income segments reveals that schooling has a negative coefficient significant at 5% while duration of residence in Addis Ababa is positive and significant at 5% for the high income segments. The reason may be that as the level of education increases for the high income segments they may have ample information that they will get better nutrition with lower health threats from other food staffs. As a result they tend to get less marginal utility from beef consumption. Positive coefficient on duration of residence variable indicates that degree of urbanization has a positive impact on marginal utility gained from beef if the household is from higher income segment.

Sex of the meal planner was insignificant for the entire sample as well as for the income groups.

5. Conclusion and recommendation

5.1 Conclusion

From the study various conclusions could be derived. One important thing is that, despite the absence of official grades and standards; there exist a local informal standard in the beef market which depends up on the cut type, quality and safety criteria as perceived by consumers. The second one is the low level beef consumption per capita.

The beef demand in Addis Ababa is seasonal. The demand for beef goes down significantly in major Orthodox Christianity fasting seasons. The introduction of new beef items in the market is slow and few. But currently veal, fillet, steak and T bone are introduced through the supermarkets and their demand is rising.

From the study, one can conclude that introduction of safety and quality in the entire beef chain (as ignoring the issue at any stage of the chain affect the result of the entire chain) has a significant value addition and is desirable by both sellers and buyers. People are willing to pay higher price if the beef quality is improved and priced higher or they increase their quantity of beef purchase if the price of improved quality product remains constant. In both cases it is advantageous for the sellers as they will get more profit and for the buyers as they get what they demand.

The different quality and safety criteria used by consumers according to the study are abattoir stamp, hygiene of premise and personnel, fat content, freshness and price. These attributes have high influence on determining the purchase decision and utility one gets from consuming beef and their relative importance vary across income levels. Concerns

about quality and safety and willingness to pay higher prices for products that can address such concerns are higher among higher income consumers. But it should not be forgotten that other variables like age of the meal planner, religion and family size have their own impact in affecting the purchase decision and utility from beef consumption.

There are methodological challenges assess demand for food quality and safety in a situation where there is no official grades and standards for quality and safety definition. Capturing consumer perception and interpreting them require careful consideration and use of appropriate techniques. In this study a Participatory Rapid Appraisal (PRA) was conducted first to identify criteria and indicators that consumers use in differentiating quality and safety in beef, and those results were used for more formal survey to collect quantitative data collection for statistical analysis. The results of the PRA and statistical analyses of formal survey data showed that these were complementary methods collecting and interpreting data for the situation existing in Ethiopia. Further, PRA results were confirmed by more formal statistical analysis indicating that, in a situation where time and resources are limited, carefully conducted PRA is a robust technique to assess criteria and indicators for food quality and safety.

5.2 Recommendation

The following recommendations are made based on the study results:

1. It is advisable to formulate quality and safety standards for beef suitable for domestic market. The criteria and indicators currently informally and privately used by consumers can be a basis for defining official grades and standards. This will be a legal basis for sellers to substantiate their price differences. Further it will

encourage producers to produce cattle aiming at fulfilling the criteria demanded in the market.

2. Health and hygiene of the butcher shops and sellers is a major concern of the consumers and from the point of view of public health management, steps should be taken to ensure that the standard is maintained by all butchers.
3. It is advisable to have fresh beef in ordinary butcher shop in order to ensure quality and safety. Instead of having more beef for sale and have some left over at the end of the day it is better for sellers to estimate equivalent amount of beef supply in relation to the demand.
4. Red beef with less fat is the most favored beef by consumers though there may be specific demand for fatty beef for specific uses. Butchers have to target cattle purchases that are raised to fulfill this criterion through having cattle raised by being fed appropriate feed.
5. Creating awareness among the consumers about the newly introduced beef items like veal, fillet, steak and beef T bone will increase consumer utility. These products are introduced but the awareness is not created about the special characteristics of these beef items.
6. More systematic studies should be conducted on demand for quality and safety in food commodities – beef as well as other foods- in order to develop consistent locally suitable grades and standards and update them continuously to suit the changing situation in the economy and the society.

References

Adaval, R. and Monroe, K. B., (2002),Automatic construction and use of contextual information for product and price evaluation, *Journal of Consumer Research* 28:572–588.

Ayele, G., Jabbar, M.A., Teklewold, H., Mulugeta, E., and Kebede, G.,(2005), Seasonal and inter-market differences in prices of small ruminants in Ethiopia, *Journal of Food Products Marketing(USA)*, 12(4): 59-77.

Avery, A., (2004) Red Meat and Poultry Production and Consumption in Ethiopia and Distribution in Addis Ababa, Borlaug-Ruan World Food Prize Intern, International Livestock Research Institute Addis Ababa, Ethiopia.

Baker, J.S., (1976), The economic approach to human behavior, Chicago: Chicago University Press.

Bech-Larsen, T. and Grunert, K. G., (2003), The perceived healthiness of functional foods: a conjoint study of Danish. Finnish and American consumers' perception of functional foods, *Appetite* 40: 9–14.

Bech-Larsen, T. (2001), Model-based development and testing of advertising messages: a comparative study of two campaign proposals based on the MECCAS model and a conventional approach. International Journal of Advertising: *The Quarterly Review of Marketing Communications* 20: 499–519.

Becker, T, Benner,E. And Glitsch,K., (2000),Consumer perception of fresh meat quality in Germany, *British Food Journal*, Volume 102, pp 246-266.

Beltramini, R. F. and Stafford, E. R., (1993), Comprehension and perceived believability of seals of approval information in advertising, *Journal of Advertising* 22(3): 3–13.

Belzer, R.B. and Theroux, R.P., (1995), criteria for evaluating results obtained from contingent valuation method, In Casawell J. A.(ed), Valuing food safety and nutrition, Westview press, Boulder, CO pp. 341-62.

Benner, M., Linnemann, A. R., Jongen, W. M. F. and Folstar, P. (2003), Quality function deployment (QFD): can it be used to develop food products? *Food Quality and Preference* 14: 327–339.

Bettman, J. R., Luce, M. F. and Payne, J. W. (1998), Constructive consumer choice processes. *Journal of Consumer Research* 25: 187–217.

Biemans, W. G. and Harmsen, H. (1995), Overcoming the barriers to market-oriented product development. *Journal of Marketing Practice: Applied Marketing Science* 1(2): 7–25.

Bredahl, L. (2001). Determinants of consumer attitudes and purchase intentions with regard to genetically modified foods: results of a cross-national survey. *Journal of Consumer Policy* 24: 23–61.

Bredahl, L. (1999), Consumers' cognitions with regard to genetically modified food, Results of a qualitative study in four countries, *Appetite* 33: 343–360.

Bredahl, L., Grunert, K. G. and Fertin, C. (1998), Relating consumer perceptions of pork quality to physical product characteristics, Food Quality and Preference 9: 273–281.

Briesch, R. A., Krishnamurthi, L., Mazumdar, T. and Raj, S. P,(1997), A comparative analysis of reference price models. *Journal of Consumer Research* 24: 202–215.

Brunso, K., Fjord, T. A. and Grunert, K. G. (2002), Consumers' food choice and quality perception, MAPP working paper 77, Aarhus: Aarhus School of Business.

Brunso, K., Ahle Fjord, T., & Grunert, K.,(2002), Consumers' Food Choice and Quality Perception, Working paper N° 7.

Burt, S. (2000). The strategic role of retail brands in British grocery retailing. *European Journal of Marketing* 34: 875–890.

Burton, M., Rigby, D., Young, T. and James, S. (2001),Consumer attitudes to genetically modified organisms in food in the UK, *European Review of Agricultural Economics* 28: 479–498.

Burton, M. and Young, T. (1996), The impact of BSE on the demand for beef and other meats in Great Britain, *Applied Economics* 28: 687–693.

Buzby J.c.,Skes, J.R., and Ready, R.C (1995) using contingent valuation to value food safety: a case study of grape fruit and pesticide residues, In Casawell J. A.(ed), Valuing food safety and nutrition, Westview press, Boulder, CO, pp 219-56.

Caswell, J. A. and Mojduszka, E. M. (1999), Using informational labeling to influence the market for quality in food products. *American Journal of Agricultural Economics* 78: 1248–1253.

Caswell, J. A. & Modjuzska, E. M. (1996), Using Informational Labeling to Influence the Market for Quality in Food Products. *American Journal of Agricultural Economics* 78: 1248-1253.

Cattin P., and Wittink, D.R.,(1982), Commercial use of conjoint Analysis: A survey, *Journal of marketing* 46 pp. 44-53.

Cox J.L., Zimmer R.F. and Chavus, J.P., (1984), Household demand for fresh potatoes: A Disaggregated Cross Sectional analysis, *Western jornal of agricultural economics*, 9(1) pp 41-57.

Cox, D. F. (1967), The sorting rule model of the consumer product evaluation process, In D. F. Cox (ed.), Risk Taking and Information Handling in Consumer Behavior, Boston, MA: Graduate School of Business Administration, Harvard University, 324–369.

Cropper, M.L., (1995), Valuing food safety: which approaches to use? In Casawell J. A.(ed), Valuing food safety and nutrition, Westview press, Boulder, CO pp. 207-20.

CSA (2004),Central Statistics Authority of Ethiopia, Economic Establishment Survey, Unpublished data.

Deaton, A., and Muellbauer J.,(1980b). Economics and Consumer Behavior, Cambridge: Cambridge Univ. Press.

Deaton,A., & Muellbauer, J., (1980a) An almost ideal demand system, *American Economic Review*, 70, 312–336.

Delgado ,C., M. Rosegrant, H. Steinfield, S. Ehui and C. Curbois (1999), Livestock to 2020: The next food revolution, Food, agriculture and the environment Discussion Paper 28, IFPRI/ FAO/ ILRI, International Food research institute, Washington Dc.

Erdem, T. and Swait, J. (1998),Brand equity as a signaling phenomenon, *Journal of Consumer Psychology* 7: 131–158.

FAOSTAT, (2004), Food and Agricultural Organization of the United Nations, from FAOSTAT on-line database,

http://faostat.fao.org/faostat/default.jsp?language=EN&version=ext &hasbulk=0.

Fischer, A. (2003), Decision behaviour and information processing in contingent valuation surveys, PhD dissertation: Berlin.

Fischhoff, B., Slovic, P., Lichtenstein, S., Read, S. and Combs, B. (1978). How safe is safe enough?, A psychometric study of attitudes towards technological risks and benefits, *Policy Sciences* 9: 127–152.

Fotopoulus, C., Krystallis, A. and Ness, M. (2003), Wine produced by organic grapes in Greece: using means-end chains analysis to reveal organic buyers' purchasing motives in comparison to the non-buyers, *Food Quality and Preference* 14: 549–566.

Fox, J.A, Shogia, J.F., Hass, D.J and Kliebenstein, J.B (1995), Experimental auctions to measure willingness to pay for food safety, In Casawell J. A.(ed), Valuing food safety and nutrition, Westview press, Boulder, CO pp115-28.

Frewer, L., Fischer, A., Scholderer, J. and Verbeke, W. (2005),Food safety and consumer behavior. In W. M. F. Jongen and M. T. G. Meulenberg (eds), Innovation of Food Production Systems: Product Quality and Consumer Acceptance. Wageningen: Wageningen Academic Publishers.

Frewer, L., Scholderer, J. and Lambert, N. (2003).Consumer acceptance of functional foods: issues for the future, *British Food Journal* 105: 714–731.

Garcia, M., Aragonés, Z. & Poole, N. (2002), A Repositioning Strategy for Olive Oil in the UK Market, *Agribusiness*. 18 (2): 163-180.

Green, P.E., Srinivasan, V(1990), Conjoint Analysis in Marketing: New developments with implications for research and practice, *Journal of Marketing* pp. 3-19.

Grunert, K. G., Larsen, H. H., Madsen, T. K. and Baadsgaard, A. (1996),Market Orientation in Food and Agriculture. Boston, MA: Kluwer.

Grunert, K. G., Lahteenmaki, L., Nielsen, N. A., Poulsen, J. B., Ueland, O. and Astrom, A. (2001), Consumer perceptions of food products involving genetic modification: results from a qualitative study in four Nordic countries, *Food Quality and Preference* 12: 527–542.

Grunert, K. G., Bredahl, L. and Scholderer, J. (2003), Four questions on European consumers' attitudes to the use of generic modification in food production. Innovative Food Science and Emerging Technologies 4: 435–445.

Grunert, K. G. (1996), Automatic and strategic processes in advertising effects, *Journal of Marketing* 60(4): 88–101.

Grunert, K. G. and Grunert, S. C. (1995), Measuring subjective meaning structures by the laddering method: theoretical considerations and methodological problems, *International Journal of Research in Marketing* 12: 209–225.

Gujarati, D.N.,(2004), Basic Econometrics, 4ed., Tata McGrew Hill Publishing Company Limited, New Delhi.

Henson S., and Traill B.,(1993), the demand for food safety, Market imperfections and the role of government, *Food policy*, Vol. 18, No. 2 pp. 152-62.

Henson, S. & Traill, B. (1993), The demand for food safety, Market imperfections and the role of government. *Food Policy* 18: 152 – 162.

J. A. Casawell (1998) Valuing the benefits and costs of improved food safety and nutrition, the *American jornal of Agricultural research economics*, 42:4, pp. 409-24.

Jabbar, M.A. and Benin, S., (2004),Trader behavior and transaction costs: live animal marketing in Ethiopia, Paper presented at a work shop on improved land management and agricultural market development in the Ethiopian highlands, Addis Ababa, Ethiopia,23pps.

Jaeger, S. and MacFie, H. J. H., (2000),Incorporating 'health' into promotional messages for apples: a means-end theory approach, *Journal of Food Products Marketing* 6(2):57–78.

Jain A.K., Acito, F., and Malhotra, V.,(1979), A comparison of the internal validity of alternatives parameter estimation methods in decompositional multiattribute preference models, *Journal of marketing research* 16, pp. 313-322.

Johansson, J. K. (1989), Determinants and effects of the use of 'made in' labels. International Marketing Review 6: 47–58.

Karugia, J.T., (1997), Quality Factoring the value of beef in Kenya: an assessment of relevant attributes and alternative methods, PhD Theses, Dept, Rural Economy, Edmonton, Canada.

Keller, K. L. (1993). Conceptualizing, measuring, and managing customer-based brand equity, *Journal of Marketing* 57(1): 1–22.

Kinsey J., (1993), GATT and the economics of food policy, *Food Policy*, Vol. 18, No. 2 pp. 163-76.

Klaus G. Grunert, (2005), Food quality and safety: consumer perception and demand, *European Review of Agricultural Economics* Vol 32 (3) pp. 369–391.

Krishnan, H. S. (1996),Characteristics of memory associations: a consumer-based brand equity perspective, *International Journal of Research in Marketing* 13: 389–405.

Laaksonen, H. and Reynolds, J. (1994), Own brands in food retailing across Europe, *Journal of Brand Management* 2: 37–47.

Lancaster, K. (1966),A new approach to consumer theory, *Journal of Political Economy* 74 (2):132–57.

Lancaster, Kelvin (1971), Consumer Demand: A New Approach, New York: Columbia University Press.

Lin, C.J and Millon, W. (1995), Contingent valuation of health risk reductions for shellfish products, In Casawell J. A.(ed), Valuing food safety and nutrition, Westview Press, Boulder, CO, pp. 83-114.

Louviere, J.J., Eagle, T.C, and Cohen S.H, (2005) Conjoint Analysis: Methods, Myths and Much More, censoC Working papers No. 05-001.

Luoga W., (2004), effect of Market Access on diary performance and market orientation of smallholder farmers in Rungwe District, Mbeya, Msc Theses, Department of animal science, Sokoine University of Agriculture.

Mackenzie J.,(1993), A comparison of conjoint preference models, *American journal of agricultural economics* no. 65 pp. 593-603.

MapZones, (2004), Country's profile: Ethiopia: Plants and animals, from http://www.mapzones.com/world/africa/ethiopia/animalindex.php.

Miles, S. and Frewer, L. J.(2001). Investigating specific concerns about different food hazards, *Food Quality and Preferences* 12: 47–61.

Moschini (1998); Consumer expectations of the quality pork produced in sustainable outdoor system, Project No. 03/04 ISSN 09072101.

Murphy, M., Cowan, C., Meehan, H. & O'Reilly, S. (2004), A conjoint analysis of Irish consumer preferences for farmhouse cheese, *British Food Journal*,106 (4): 288-300.

Nielsen, N. A., Bech-Larsen, T. and Grunert, K. G. (1998),Consumer purchase motives and product perceptions: a laddering study on vegetable oil in three countries, *Food Quality and Preference* 9: 455–466.

Oliver, R. L. (1997). Satisfaction: a Behavioral Perspective on the Consumer. Boston,MA: Irwin/McGraw-Hill.

Oliver, R. L. (1980). A cognitive model of the antecedents and consequences of satisfaction decisions, *Journal of Marketing Research* 17: 460–469.

Olsen, S. O. (2002). Comparative evaluation of the relationship between quality, satisfaction, and repurchase loyalty, *Journal of the Academy of Marketing Science* 30: 240–249.

Olson, J. C. and Jacoby, J. (1972),Cue utilization in the quality perception process,Third Annual Conference of the Association for Consumer Research, Chicago, IL7. 167–179.

Oppewal, H. and Vrien, M. (2000), Measuring perceived service quality using conjoint experiments, *International journal of bank marketing*, Vol. 18 No. 4 pp. 154-169.

Parkinson, T. L. (1975),The role of seals and certifications of approval in consumer decision-marketing, *Journal of Consumer Affairs* 9: 1–14.

Pedhazur, E.J. (1982), Multiple regression in behavioral research: explanation and prediction, second edition, Holt, Rinehart and Winston, New York.

Price D.W, D.Z. Price and D.Z. West (1980), Tradition and nontraditional determinants of household's expenditure on selected fruits and vegetables, Washington State University, Collage of Agricultural Research Center, Scientific paper No. 5420.

Reardon, R. and Barret, C.B., (2000), Agro industrialization, globalization and international development: an overview of issues, patents and determinants, *Agricultural economics* 23 pp 195-205.

Reardon, T, Timmer C.p., Barret, C.B. and Berdegue, J.,(2003), The rise of supermarkets in Africa, Asia and Latin America, *American Journal of Agricultural economics*, 5 pp. 1140-46.

Ritson, C. and Mai, L. W. (1998),The economics of food safety, *Nutrition and Food Science* 98: 253–259.

Scholderer, J., Nielsen, N.A., Bredahl, L., Claudi-Magnussen, C. & Lindahl, G. (2004) Organic Pork: Consumer quality perceptions, The Aarhus School of Business, MAPP Project paper N° 02/04.

Selnes, F. and Troye, S. V. (1989),Buying expertise, information search, and problem solving, *Journal of Economic Psychology* 10: 411–428.

Slovic, P. (1987), Perception of risk. *Science* 236: 280–285.

Smith, S.M. (2005), Conjoint Analysis Tutorial http://marketing.by/htmlpages/tutorials/ conjoint.htm.

Steenkamp, J-B. (1990): Conceptual Model of the Quality Formation Process, *Journal of Business Research*, 21, 309-333.

Sy, H. A., Faminow, M.D., Johnson G.V., and Crow G., (1997), Estimating the values of cattle characterstics using an orderd probit model, *American Journal of Agricultural Economics* no 79(2), pp. 463-476.

Valette-Florence, P., Sirieix, L., Grunert, K. G. and Nielsen, N. A. (2000), Means-end chain analyses of fish consumption in Denmark and France: a multidimensional perspective, *Journal of Euromarketing* 8: 15–27.

Van der Lans, I. A., van Ittersum, K., De Cicco, A. and Loseby, M. (2001), The role of the region of origin and EU certificates of origin in consumer evaluation of food products, *European Review of Agricultural Economics* 28: 451–477.

Van Ittersum, K., Candel, M. J. J. M. and Meulenberg, M. T. G. (2003), The influence of the image of a product's region of origin on product evaluation, *Journal of Business Research* 56: 215–226.

Ventura-Lucas, M.R. (2004), Consumer perceptions and attitudes towards food safety in Portugal. 84th EAAE-Seminar Food Safety in a dynamic world. February 8-11, The Netherlands.

Verbeke, W., de Smet, S., Vackier, I., van Oeckel, J., Warnants, N. and van Kenhove, P.(2005). Role of intrinsic search cues in the formation of consumer preferences and choice for pork chops, *Meat Science* 69: 343–354.

Verbeke, W. and Viaene, J. (1999), Consumer attitude to beef quality labeling and associations with beef quality labels, *Journal of International Food and Agribusiness Marketing* 10: 45–65.

Verbeke, W. (2005a), Agriculture and the food industry in the information age, *European Review of Agricultural Economics* 32: 337–358.

Verbeke, W. (2005b), Consumer acceptance of functional foods: socio-demographic, cognitive and attitudinal determinants, *Food Quality and Preference* 16: 45–57.

Verbeke, W & J. Viane (1999), Beliefs, attitude and behavior towards fresh meat consumption in Belgium: Empirical evidence from a consumer survey, *Food Quality and Preference*, 10 (6), 437-445.

Verlegh, P. W. J. and Steenkamp, J.-B.,(1999),A review and meta-analysis of country-of-origin research, *Journal of Economic Psychology* 20: 521–546.

Winer, R. S. (1986), A reference price model of brand choice for frequently purchased products, *Journal of Consumer Research* 13: 250–256.

Yin, R.,(1994). *Case study research: Design and methods* (2nd ed.). Beverly Hills, CA: Sage Publishing.

Zeithaml, V. A. (1998). Consumer perceptions of price, quality, and value: a means-end model and synthesis of evidence, *Journal of Marketing* 52(3): 2–22.

Annex

Questionnaire

ASARECA DAIRY AND MEAT PRODUCTS MARKETING

PROJECT

AAU/SUA/CVL/EIAR/KARI/KEBS/ILRI

EXPLOITING MARKETS FOR DAIRY AND MEAT PRODUCTS' QUALITY AND SAFETY

A Collaborative ASARECA Research Project
By
Addis Ababa University (AAU), Department of Economics, Ethiopia
Ethiopian Institute of Agricultural Research (EIAR), Ethiopia
Sokoine University of Agriculture (SUA), Tanzania
Central Veterinary Laboratory (CVL), Tanzania
Kenya Agricultural Research Institute (KARI), Kenya
Kenya Bureau of Standards (KEBS), Kenya
International Livestock Research Institute (ILRI), Kenya and Ethiopia

QUESTIONNAIRE FOR DAIRY AND MEAT PRODUCTS QUALITY AND SAFETY CONSUMER SURVEY IN TANZANIA, ETHIOPIA, AND KENYA

DATE __ __/__ __/_07 TIME STARTED _____ TIME ENDED _____

NAME OF ENUMERATOR _____CODE [_____]

COUNTRY _____

CITY_____ _____

AREA/ESTATE NAME _____HOUSEHOLD CODE [_____]

REVIEWED BY: 1. _____
2._____

SCHEDULE 1: GENERAL INFORMATION REGARDING THE HOUSEHOLD

1.1/. Respondent's name_____

1.2/. Complete address: _____

1.3/. E-Mail:_____ **1.4/. Telephone/ Cell phone**_____

1.5/. Respondent's relationship to the household (hh) head [_____] code

RELATIONSHIP TO HOUSEHOLD HEAD

1 = Household head	2 = Spouse	3 = Son	4 = Daughter	5 = Daughter-in-law	6 =son-in-law	7 = grand child
8 = Niece	9 = Nephew	10 = House help (maid or boy)	11= Grandparent	12 = Other (specify)_____		

1.6/. Respondent's ethnic origin [_____] code

ETHNIC ORIGIN

11 = Amhara	12 =Oromo	13 = Tigre	14 = Guragie	15 = Harari	6 = Other (Specify)_____	17 = Afar	18. Somali	19. Wolaita	20 =Dorzie_____

1.7.1 Respondent's religion [_____] code

RELIGION

1 = Protestant	2 = Catholic	3 = Muslim	4 = Hindu	5 = Other (specify)	6. Orthodox	7. Non believer

1.7.2. If Orthodox, do you abstain from meat consumption during any fasting [Yes\No][ ]Code Yes=1 , No=0

1.7.3 If the answer is yes to Q1.7.2, Which fasting do you observe? Put √ in the appropriate boxes

Wednesdays and Fridays	Easter Fasting	Christmas Fasting	Filseta Fasting	Sene Fasting	Other Fasting (Name it)

1.8/. Number of years the respondent has lived in this city or urban area [_____] Code

NUMBER OF YEARS

Count

1.9/. Give details of household members (including HH head) living permanently on the compound (including non relatives but living and eating with the household)

Relationship to head of household (code)	**Sex** (code)	**Age** (years)	**Number of years of schooling** (years)	**Primary activity** (code)	**Marital status** (code)
Household head = 1					

*Person is in permanent residence if he/she sleeps in the house a majority of nights per week

Relation Ship to head of Household

1 = Household head	**2 = Spouse**	**3 = Son**	**4 = Daughter**	**5 = Daughter-in-law**	**6 =son-in-law**	**7 = grand child**
8 = Niece	**9 = Nephew**	**10 = House help (maid or boy)**	**11= Grandparent**	**12 = Other (specify)_____**		

SEX			**AGE**		**NUMBER OF YEARS OF SCHOOLING**
1= Male	**2=Female**		**Count**		**Count**

PRIMARY ACTIVITY

0 = Unemployed	**1 = Own farm work**	**2 = Salaried Employment**	**3 = Business / trade**	**4 = Labour**	**5 = Retired with pension**
6 = retired without pension	**7 = Pupil student**	**8 = Civil service employee**	**9 = Professional / Private employment**	**10 = Other (specify) _____**	

MARITAL STATUS

1 = Married	2 = Single	3 = Divorced	4 = Living together	5 = Not applicable (< 18yrs)	6 = Widow / widower

SCHEDULE 2: CONSUMPTION OF MEAT AND DAIRY PRODUCTS

A. PURCHASE OF LIVESTOCK PRODUCTS FOR CONSUMPTION AT HOME IN THE LAST 30 DAYS

2.1/. Point of purchase of the various LIVESTOCK products: Where did you get the following meat products when you purchased them last time?

Meat and meat products consumed in the last 30 days	How many days ago from today was this product last purchased?	Market outlet where product was last purchased (code)	Main reason why this market outlet was selected (code)	Distance from home to market (km)	Unit of purchase (code)	Total no of units / quantity purchased (count)	Price per unit purchased (eg Birr/kg)	How many times did you purchase this meat or meat product in the last 30 days (count)	How many meals did you consume from last purchase? (count)	Form in which product was consumed (code)	How many meals did you consume in the last 30 days (count)
1 Beef for Wot											
2 Beef fot Tibs											
3 Beef for Kitfo											
4 Beef for Kurt											
5 Beef fillet											
5 Beef steak											
6 Beef T-bone											
7 Beef mixed with bone											
8 Beef sausage											
9 Goat meat											
10 Sheep meat (mutton/lamb)											
11 Local chicken											
12 Hybrid chicken											
13 Veal											
14 Fish											
15 Pork											
16 Pork sausage											
17 Eggs											
18 Cattle organ											
19 Minced Beef											
20 Other (specify)											

MARKET OUTLET / SOURCE OF PRODUCT

1=Own production	2=Producer gate	3=Home delivery	4=Street vendor	5=Corner shop	6=Butcher in local market	7=Supermarket	8=Grocery store	9=Special butcher shop	10=Not consumed	11=Other(specify)

MAIN REASON WHY THIS MARKET OUTLET WAS SELECTED

1 = Known / trustworthy	2 =Lower price	3 = More product choices	4= Better quality and safety	5 = Closer to my home	6 = Hygienic	7= Other(Specify)_____

UNIT			FORM IN WHICH MEAT PRODUCT WAS CONSUMED					
1 = Count	2= Kg	3 = Others (specify)	1 = Raw	2 =Roasted	3 = Cooked as main ingredient	4= Cooked as secondary ingredient	5 = Complement with other meals	6 = Other(Specify)

B. HOME PRODUCTION AND LIVESTOCK PRODUCTS CONSUMPTION IN THE LAST 30 DAYS

2.2 /. Did your household keep any livestock in the last year? [_____] code **If YES, respond to 2.3; if NO, proceed to 2.4**

0 = NO	1 = YES

2.3/. Home rearing/sales of livestock (other than dairy animals and dairy products – see item 2.8 below)

Livestock	No. kept or quantity produced in the last 12 months (count)	Number or quantity sold or given away in last 30 days (count)	Type (unit) of livestock or livestock product sold or given away (code)	Price or value per unit of last livestock or livestock product sold or given away (Birr)	Buyer type / sold to whom? (code)	Quantity retained for home consumption in the last 30 days (count)	Form consumed (code)
Cattle							
Sheep							
Goat							
Local chicken							
Hybrid chicken							
Eggs							
Pigs							
Other (specify)							

TYPE OF LIVESTOCK OR LIVESTOCK PRODUCT SOLD OR GIVEN AWAY

1 = Adult male	2 = Adult female	3 = Young stock	4 = Count (for eggs)	5 = Other(Specify)_____

BUYER TYPE

1 = Neighbour	2 = Middlemen	3 = Farmer group	4 = Co - operative	5 = Other(Specify)_____

FORM IN WHICH MEAT PRODUCT WAS CONSUMED

1 = Raw	2 =Roasted	3 = Cooked as main ingredient	4= Cooked as secondary ingredient	5 = Complement with other meals	6 = Other(Specify)_____

UNIT

1= Count	2= Kg	3 = Others (specify)_____

2.4/. Consumption situation comparison of meat products over 10 years and now

What meat products are consumed now but not 10 years ago?				What meat products were consumed 10 years a go but not now?	
Product Type Consumed (code)	Most important attribute of the product (code)	Most important reason for change in consumption (code)		Product type not consumed (code)	Most important reason for not consuming (code)

PRODUCT TYPE

1 = Beef fillet	2 = Beef steak	3=Beef T-bone	4= Beef mixed with bone	5 = Beef	6 = Goat meat	7 = Sheep	8 = Chicken	110. Beef for tibs	112. beef for kurt	15. organs
10 = Fish	11 = Pork	12 = Pork sausage	13= Eggs	14 = Other (specify)	9 = veal	111. Beef for wot	113. beef for kitfo	16. minced beef		

ATTRIBUTES OF NEW PRODUCT

1 = Good taste	2 = Reasonable price	3 = Longer shelf life	4 = Low fat	5 = Availability (convenience)	6 = Other(Specify)_____

REASON FOR CONSUMING PRODUCT NOW

1=Higher income	2=Change in religion	3=Availability	4=Lower price	5=Awareness	6=Improved quality and safety	7=Proximity to source point	8=Other(Specify)_____

REASON FOR NOT CONSUMING PRODUCT NOW

1 = Can not afford	2 = Not available at purchase spot	3 = Point of purchase too far away	4 = Bad quality	5 = Too expensive	6 = Other(Specify)_____

2.5/. Consumption comparison by month and the reasons

Month of the year meat products consumed most			Month of the year meat products consumed least/none	
Month (code)	Reason for high consumption (code)		Month (code)	Reason for not consuming (code)

MONTH

1=January	2=February	3=March	4=April	5=May	6=June	7=July	8=August	9=September	10=October	11=November	12=December

REASON FOR HIGH CONSUMPTION

1 = Festival	2 = Increased household income	3 = Lower prices	4 = Doctor's recommendation	5 = Increase in hh size	6 = Other(Specify)_____

REASON FOR LOW CONSUMPTION

1 = Unaffordable	2 = Low house hold income	3 = decrease in hh size	5 = Other (specify)

2.4/. Consumption situation comparison of meat products over 10 years and now

What meat products are consumed now but not 10 years ago?				What meat products were consumed 10 years a go but not now?	
Product Type Consumed (code)	Most important attribute of the product (code)	Most important reason for change in consumption (code)		Product type not consumed (code)	Most important reason for not consuming (code)

PRODUCT TYPE

1 = Beef fillet	2 = Beef steak	3=Beef T-bone	4= Beef mixed with bone	5 = Beef	6 = Goat meat	7 = Sheep	8 = Chicken	110. Beef for tibs	112. beef for kurt	15. organs
10 = Fish	11 = Pork	12 = Pork sausage		13= Eggs	14 = Other (specify)	9 = veal	111. Beef for wot		113. beef for kitfo	16. minced beef

ATTRIBUTES OF NEW PRODUCT

1 = Good taste	2 = Reasonable price	3 = Longer shelf life	4 = Low fat	5 = Availability (convenience)	6 = Other(Specify)_____

REASON FOR CONSUMING PRODUCT NOW

1=Higher income	2=Change in religion	3=Availability	4=Lower price	5=Awareness	6=Improved quality and safety	7=Proximity to source point	8=Other(Specify)_____

REASON FOR NOT CONSUMING PRODUCT NOW

1 = Can not afford	2 = Not available at purchase spot	3 = Point of purchase too far away	4 = Bad quality	5 = Too expensive	6 = Other(Specify)_____

2.5/. Consumption comparison by month and the reasons

Month of the year meat products consumed most			Month of the year meat products consumed least/none	
Month (code)	Reason for high consumption (code)		Month (code)	Reason for not consuming (code)

MONTH

1=January	2=February	3=March	4=April	5=May	6=June	7=July	8=August	9=September	10=October	11=November	12=December

REASON FOR HIGH CONSUMPTION

1 = Festival	2 = Increased household income	3 = Lower prices	4 = Doctor's recommendation	5 = Increase in hh size	6 = Other(Specify)_____

REASON FOR LOW CONSUMPTION

1 = Unaffordable	2 = Low house hold income	3 = decrease in hh size	5 = Other (specify)

SCHEDULE 3: INFORMATION ON CONSUMPTION/EXPENDITURE ON MEAT AND MILK PRODUCTS AWAY FROM HOME

3.1/. Consumption/Expenditure on meat and meat products taken away from home in the last 30 days

Meat and meat products consumed in the last 30 days	**How many days from today did a household member consume this product away from home?**	**Form consumed (code)**	Unit of consumption (Code)	**Total no of units / quantity consumed (count)**	**How many times member(s) of this household consume this meat or meat product away from home in the last 30 days (count)**	Average expenditure per meal (Birr/meal)
1 Beef Wot						
2 Beef Kurt						
3 Beef Tibs						
4 Beef Kitfo						
5 Beef fillet						
6 Beef steak						
7 Beef T-bone						
8 Beef mixed with bone						
9 Beef sausage						
10 Goat meat						
11 Sheep meat (mutton/lamb)						
12 Chicken						
13 Veal						
14 Fish						
15 Pork						
16 Pork sausage						
17 Eggs						
18 Organs(stomach, liver etc) and intestine						
19 Other (specify)						

FORM IN WHICH MEAT PRODUCT WAS CONSUMED

1 = Raw	2 =Roasted	3 = Cooked as main ingredient	4= Cooked as secondary ingredient	5 = Complement with other meals	6 = Other(Specify)_____

UNIT

1= Count	2= Kg	3 = Others (specify)_____

SCHEDULE 4: INFORMATION ON CONSUMPTION/EXPENDITURE ON OTHER FOOD ITEMS CONSUMED AT HOME

4.1/. Consumption of other food items

Item(s)	Total value of items consumed in the last 30 days, that were purchased (Birr)	Total value of items consumed in the last 30 days, that were produced at home (Birr)
1.Cereals (Teff, Maize meal, wheat flour, bread, miliet, sorghum, etc)		
2.Other staples (Enset flour etc)		
3.Edible oils, fats, etc		
4.Sugar and accessories (Sugar, tea, coffee, milo, cocoa, etc)		
5.Salt, spices		
6. Beans and other pulses		
7. Roots and tubers (Sweet potatoes, Irish potatoes, etc)		
8. Végétales (Cabbeges, tomatoes, onions, carrots, spinach, etc.)		
9. Fruits (Bananas, oranges, apples, pineapples, water melon, etc.)		
10. Refreshment (Biscuits, snacks, soft drinks, etc.)		

SCHEDULE 5: GENERAL M ARKET OUTLETS

5.1/. Which type of market outlet do you visit most frequently for food purchases? [_____] (Code)

1 = Local grocery store	2 = Supermarket	3 = Street vendor	4 = Kiosk	5 = Local market	6 = Other (specify)

5.2/. Why do you visit this market frequently? [_____] (Code)

1 = Nearest one	2 = Reputable one	3 = One with more variety of products sold	4 = One that sells fresh products only	5 = One with reasonable price	6 = Other (specify)

5.3/. How frequently do you visit this market? [_____] (Code)

1 = Daily	2 = 3-4 times a week	3 = Twice weekly	4 = Once weekly	5 = As necessary	6 = Other (specify)_____

5.4/. How close to your home is the nearest market outlet? [___] km

5.5/. Who makes the decision on which market outlet to use to purchase household food? [_____] (Code)

1 = Household head	2 = Spouse	3 = Both	4 = Other (specify)

5.6/. Who makes the decision on what food items to purchase in the household? [_____] (Code)

1 = Household head	2 = Spouse	3 = Both	4 = Other (specify)

SCHEDULE 6: PERCEPTIONS AND WILLINGNESS TO PAY (WTP) FOR QUALITY AND SAFETY ATTRIBUTES

A. PERCEPTIONS AND WILLINGNESS TO PAY (WTP) FOR BEEF QUALITY AND SAFETY

6.1/. What are your two (2) most important product attributes or concerns about the quality of raw/fresh beef?

6.1.1_____

6.1.2_____

6.2/. What are your two (2) most important product attributes or concerns about the safety of raw/fresh beef?

6.2.1_____

6.2.2_____

6.3/. Do you believe that raw/fresh beef purchased at your local market outlet is safe for consumption? [_____] (Code)

0 = NO	1 = YES

6.4/. Are you willing to pay more than current price for your raw/fresh beef if safety can be improved and/or guaranteed? [_____] (Code)

0 = NO	1 = YES

6.5/. Do you believe that the raw/fresh beef purchased at your local market outlet is of high/good quality? [_____] (Code)

0 = NO	1 = YES

6.6/. Are you willing to pay more than current price for your raw/fresh beef if quality can be improved? [_____] (Code)

0 = NO	1 = YES

6.7/. Give the household's rating for different types of attributes for raw/fresh beef (rate each cell out of 10 points: **1=lowest rating, 10=highest rating**

Raw/fresh beef	**Beef quality and safety attributes, and price**				
	a	b	c	d	e
	Official stamp or labelling	Hygiene of premises and personnel	Fat (marbling)/texture)	Colour/Freshness	Price
Rating					

6.8 The following scenarios present beef options with bundles of quality and safety attributes of beef. State consumer desirability of each option below, with its attendant set of bundled attributes

Scenario	Official stamp	Hygiene of premises and personnel	Fat (marbling)/texture)	Freshness/Colour	Price (Birr\kilo)	Desirability (1=highly undesirable; 10 = highly desirable)
1	Present	Clean	Low	Fresh/red	38	
2	Present	Unclean	High	Not Fresh/pale	34	
3	Absent	Clean	Low	Fresh/red	38	
4	Absent	Unclean	Low	Not Fresh/pale	38	
5	Present	Clean	High	Fresh/red	38	
6	Absent	Clean	Low	Fresh/red	34	
7	Absent	Unclean	Low	Fresh/red	34	
8	Present	Unclean	Low	Fresh/red	28	
9	Absent	Clean	High	Fresh/red	38	
10	Absent	Unclean	High	Fresh/red	38	
11	Present	Clean	Low	Not Fresh/pale	38	
12	Absent	Clean	High	Not Fresh/pale	28	

SCHEDULE 7: HOUSEHOLD INCOME AND EXPENDITURES

7.1/. Please indicate an estimate of your monthly total food expenditure:_____ (Birr)

7.2/. Please indicate an estimate of your monthly total non-food expenditure:_____ (Birr)

7.3/. In which of the following groups do you estimate **your total household income**, from all working members, business income, pensions and remittances from elsewhere? [_____]

1 = Less than 500 Birr per month
2= 500 – 1000
3= 1000 – 2000
4 = 2000 – 3000
5= 3000 – 5000
6 = 5000 – 10000
7 = More than 10000

SCHEDULE 7: HOUSEHOLD INCOME AND EXPENDITURES

7.1/. Please indicate an estimate of your monthly total food expenditure:_____ (Birr)

7.2/. Please indicate an estimate of your monthly total non-food expenditure:_____ (Birr)

7.3/. In which of the following groups do you estimate **your total household income**, from all working members, business income, pensions and remittances from elsewhere? [_____]

1 = Less than 500 Birr per month
2= 500 – 1000
3= 1000 – 2000
4 = 2000 – 3000
5= 3000 – 5000
6 = 5000 – 10000
7 = More than 10000

DECLARATION

I, the undersigned, declare that this thesis is my original work, has not been presented for a degree in any other university. All the resources of materials used for the thesis have been duly acknowledged.

Declared by:

Name: Samuel Amare Admassu

Signature: _____

Date: 31/10/07

Confirmed by:

Name: Dr. Mohammad A. Jabbar (ILRI)

Signature: _____

Date: 31/10/07

Place: Addis Ababa University