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MEASURING THE PERCEPTIONS FOR THE ATTRIBUTES OF QUALITY AND SAFETY IN MILK AND BUTTER:

AN APPLICATION OF CONJOINT TO THE CASE OF URBAN ETHIOPIA- ADDIS ABABA

BY

OSMAN NEGUS

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

(Resource and Environment Economics)

October, 2008

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List of Acronyms

ADLI=Agricultural Development Led Industrialization

AAUAB=Addis Ababa Urban Agriculture Bureau

CAM=Conjoint Analysis Method

CE=Choice Experiment

CEM=Choice Experiment Method

CSA=Central Statistical Authority

CVM=Contingent Valuation Method

CV=Contingent Valuation

DDE=Dairy Development Enterprise

EIAR=Ethiopian Institute of Agricultural Research

FAO=Food and Agriculture Organization

GDP=Gross Domestic Product

HPM=Hedonic Pricing Method

ILRI=International Livestock Research Institute

MSE=Micro and Small Enterprise

OLS=Ordinary Least Square

RMA=Rapid Market Assessment

RP=Revealed Preference

SP=Stated Preference

TCM=Travel Cost Method

TFQM=Total Food Quality Model

WTA=Willingness To Accept

WTP=Willingness To Pay

Abstract

This study measures the perceptions of consumers on quality and safety attributes of milk and butter in urban Ethiopia taking the case of Addis Ababa. The main objective of the study was to identify the major attributes of milk and butter as perceived by consumers. The study has also tried to identify the major socioeconomic and demographic determinants of perceptions for quality and safety of milk and butter. The study is based on a randomly selected 300 households in Addis Ababa. In the analysis, descriptive statistics, conjoint analysis and Order probit model were used. The research indicated that the most frequently purchased milk products are raw fresh milk, packed pasteurized milk and butter. These products are distributed through home delivery, producer gate and corner shop. Among the attributes identified by RMA, hygiene, adulteration and smell in milk; and hygiene, purity and price in butter, were the most preferred attributes in consumers' purchase decision. The result further shows that the demand for quality and safety improvement of milk was relatively price inelastic as compared to butter.

With regard to socio economic factors, however, variables such as sex, number of schooling, family size and duration of stay in Addis Ababa were insignificant, indicating that rating is not affected by gender, level of education, number of years lived in Addis Ababa though income and age were found to be significant . For butter, Age, Sex, Number of schooling, Family Size and Income were significant but the signs of the coefficients of number of schooling and Income were contrary to the expectation.It indicates that, unlike milk. consumers' perception for quality and safety of butter differs across the different socioeconomic and demographic categories of the consumers. It indicates that the younger generations are more concerned about quality and safety of butter. Moreover. female respondents showed more concern compared to the male respondents.

The research gives a clue to producers and regulatory authorities that those factors mentioned above should be taken into account in their decision making process. The findings of the research could further be validated by employing more sample size and /or comparing results of different methodologies.

1. INTRODUCTION

1.1 *Background*

Ethiopia has the largest livestock population in Africa and is ranked to be ninth in the world. The livestock population of Ethiopia is estimated to be 44.3 million cattle, 23.6 sheep, 23.3 million goats, 2.3 million camels, and 14 million cows (CSA, 2004).The livestock sector contributes 12-16% of total GDP, 30-35% of agricultural GDP and to the livelihoods of 60-70% the Ethiopian population (www.fao.org).

In Ethiopia, milk is produced in all the agricultural production systems. The bulk (98%) of the milk is produced in rural areas by peasant farmers who do not have access to market their products at a better price and 83.4% of the total annual milk output is cow milk. Of the total cattle population only about 100,000 are improved genotypes (pure bred and cross bred), which constitute only about 0.3% of the total cattle population. Ethiopia produces about 926 million liters of cow milk per annum (Tsehay Redda, 1998).

In terms of consumption, though Ethiopia has the highest cattle population and the highest land size suitable for cattle breeding, the per capita consumption level is less than that of the neighboring countries (25.6 Kg), which is even lower than the average per capita consumption for Sub-Sahara Africa (26.7 Kg) ((Sendros and Tesfaye, 1998).On the demand side it is estimated that 321,740 tones of milk is needed to meet the standard milk requirement of the residents of Addis Ababa. This is considering FAO's standard of 100litre/biological demand and considering the population of Addis Ababa as per the estimation made by CSA. The existing per capita milk consumption is estimated to be 20 liters per biological demand showing a gap of 80litres/Biological demand.

The above facts show that the sector is underdeveloped and needs special attention of all concerned bodies. The factors that contribute for the underdevelopment of the sector are many and have multidimensional aspects. However, marketing problems related to quality and safety attributes have been identified in this study as one of the major manifestations to the poor performance of the sector.

1.2 Statement of the Problem

The livestock sector in Ethiopia is not well developed. On the demand side, the market size is large and growing mainly due to population growth, urbanization and rising incomes. The population size of Ethiopia was 77.1 million in mid 2007 and is projected to reach 108.7 million with yearly growth rate of 2.76% in 2025(PRB,2008) which makes Ethiopia second in Africa. A study made by Azage and Alemu(1998) also indicate that the number of children under the age of 15 and the number of women at peak child bearing age (20-35) is projected to reach to 59 million and 15 million respectively by 2020.Similarly, the study indicated that urbanization is expected to grow to 29.2% by 2020.The yearly report of Ministry of Finance and Economic Development(MoFED,2007) indicate that GDP of Ethiopia was growing over 10% over the past five years(MoFED,2007).Real GDP is expected to grow by 7.5% and 7.4% in 2008 and 2009 respectively.

The livestock resource is very huge but the potential of the sector could not be tapped. This is due to significant technical and institutional barriers, which continue to limit the benefits of these changes to small-scale producers and market agents. Associated with this is the quality and safety problem. Small-scale producers and market agents have poor handing practices and this will ultimately result in economic loss to the farmers. The problem is that there is lack of information on the consumer's perceptions and their ratings of quality and safety attributes.

Moreover, the decision to buy a food product or not is derived by a comparison of what one expects to get out of the product and what one has to give in order to get it. A consumer, however, does not analyze all elements of food quality and safety consciously; rather, s/he gives an integrated response based on complex judgments made in mind. Food quality and safety is therefore a difficult concept to put into operation because it is not only a property of the food but also that of consumer and his perception of the food (Jongen and Meulenberg, 2005). There is lack of information on what factors influence consumers' ratings or perceptions based on the complex judgments made in mind.

The focus of the study is, therefore, to identify the quality and safety attributes and the socio-economic and demographic factors that influence consumers' milk products buying decision.

The study tries to elicit the perceptions of consumers before they make buying decisions. The study uses quality and safety attributes together with price attributes to elicit preferences of consumers. This information is important for the producers in order to make important production and marketing decisions to meet the quality and safety requirements by the consumers thereby allowing them to exploit the emerging market opportunities. Likewise this information is also useful to other market participants in order to make important business decisions, and for the policy makers to make necessary changes in infrastructure, institutions, regulations, rules, policies which help the various market participants to exploit the emerging market opportunities in the livestock sector.

1.3 *Objective of the Study*

The general objective of the study is to investigate the factors that determine the consumers' buying decisions and analyze their policy implications.

The specific objectives of the study are:

1. Identifying milk and butter quality and safety attributes and their indicators as per the perception of the consumers,
2. Determine consumers' relative importance rating and part worth utilities of milk and butter quality and safety attributes,
3. Determine socio-economic and demographic factors affecting consumers' rating for milk and butter , and
4. Give recommendation based on the findings

1.4 Significance of the Study

The research is intended to provide information on consumers buying behavior, their perception and preferences for quality and safety attributes and to identify major determinants of ratings for the attributes. The beneficiaries from the study include small-scale farmers, small and medium scale enterprises, regulatory authorities, private sector hotels, supermarkets and retail food stores.

The research findings will also add to the empirical literature and will provide a basis for further empirical study on the subject in Ethiopia. The city administration of Addis Ababa, government and non government institutions that have great concern on health issues are also among the beneficiaries from the research findings for their policy formulations.

1.5 Organization of the Paper

This study is organized as follows. Chapter two presents theoretical background of quality and safety and how they manifest in consumer demand or preference. In Chapter two, review of empirical literatures related to quality and safety are also included .The theoretical and methodological framework is described in chapter three in detail. In chapter four empirical model and estimation procedures are described. Chapter five focuses on the development of the conjoint experiment, data collection and survey design issues. The results of descriptive statistics; econometric analysis results and conjoint part worth results are analyzed in chapter six.

Finally, in chapter seven, the main findings of the study along with their policy implications are discussed.

2 CONCEPTUAL FRAMEWORK OF QUALITY AND SAFETY

Grunert (2005) classifies researches done on food quality and safety into three categories. The first type of research deals with consumer demand for quality and safety and it 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 (yet) 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.

According to Grunert (2005), the first stream thus deals with the demand side, 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. Whenever issues of 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.

These two streams of research together constitute the traditional economic approach to dealing with quality and safety issues. More recently, a third stream has been added by Grunert (2005). It 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 mediating between supply and demand, as it is the perception of the supply of goods that leads to the demand for these goods. This paper is of the third type where milk and butter quality and safety attributes and the combinations of their levels are pictorially presented to consumers and consumers manifest their demand for the products by rating them.

2. 1 Quality Perception

The definition of quality depends on the purpose and for whom we are talking. The word "Quality" represents the properties of products and/or services that are valued by the consumer. Quality is meeting the customer's needs in a way that exceeds the customer's expectations or the degree to which something meets or exceeds the expectations of its consumers. If you talk to your customers, then it is whatever he/she says it is what he/she expects from the product or service. Quality is an ever evolving perception by the customer of the value provided by a product. It is not a static perception that never changes but a fluid process that change as a product matures (innovation) and other alternatives (competition) are made available as a basis of comparison(Grunert, 2005).

According to Grunert (2005), quality is classified as 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: 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, will quality be a competitive parameter for food producers (Ibid). In the subjective realm we can, as a gross simplification, distinguish between two schools of thought about quality.

The first one, which we can call the holistic approach, equates quality with all the desirable properties a product is perceived to have. The second, which we can call the excellence approach, suggests that products can have desirable properties that consumers, in their own language, may not view as part of quality. In food, convenience is sometimes named as 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 (Zeithamal, 1998).

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. We can usually assume that this is the case, at least up to a point. Safety may, however, be different from other quality aspects in the way in which it affects consumer decisions.

Researches on food quality perception and its impact on consumer food choice have employed a variety of different approaches, most notably the means–end approach, expectancy value approaches, economics of information approaches, and satisfaction/dissatisfaction approaches. The Total Food Quality Model (TFQM), depicted in Figure 2.1, was an attempt to provide a common framework for these various approaches (Ibid). 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 and its implications for 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 to hand. 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, 1993).

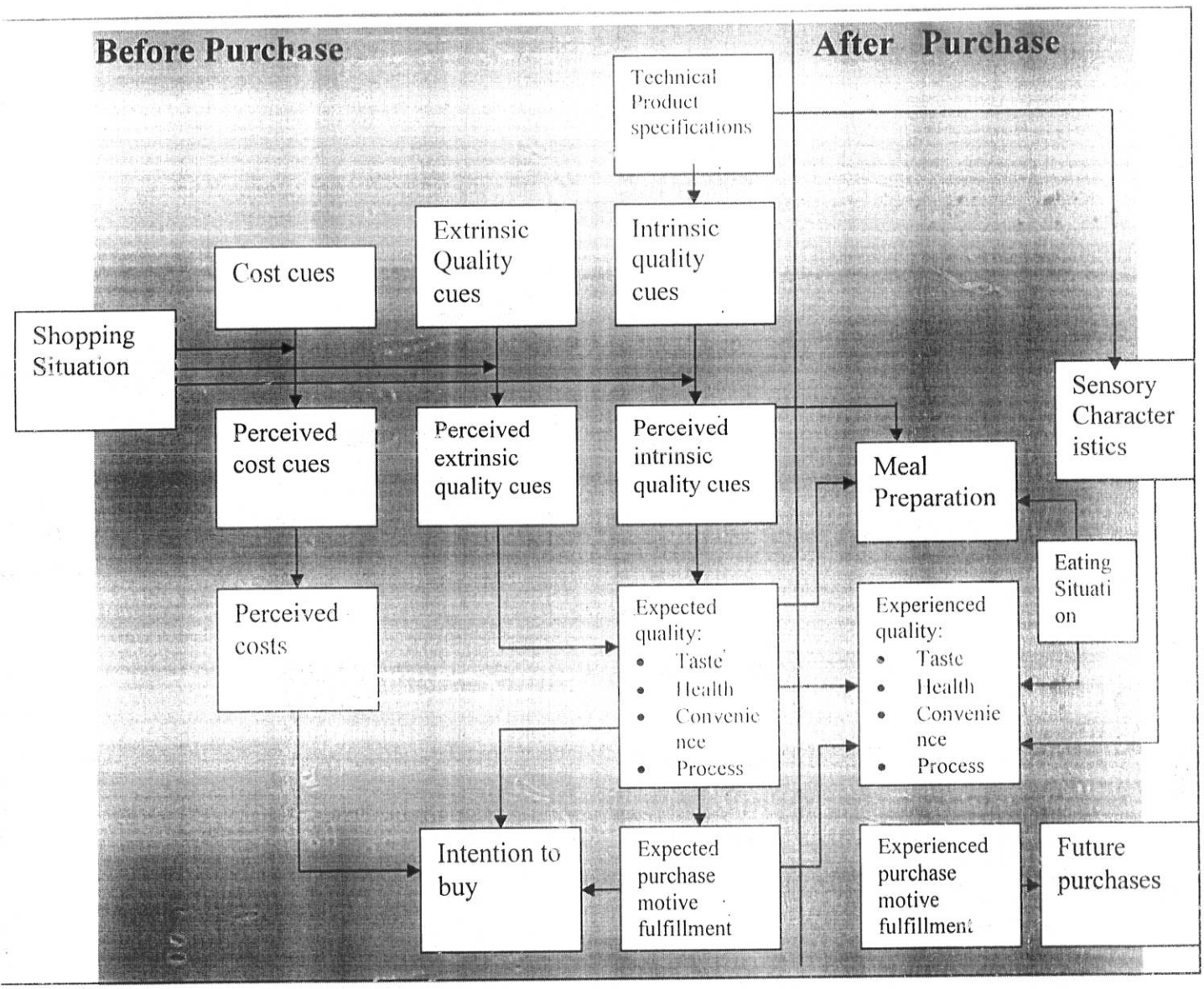
According to the TFQM, quality is not an aim by itself, but is desired because it helps satisfy purchase motives or values. The model therefore includes motive or value fulfillment, i.e, how food products contribute to the achievement of desired consequences and values. Extrinsic cues, such as a label and its information, may, for example, generate expectations about exceptionally high eating quality-giving the consumer a feeling of luxury and of pleasure in life. The values sought by consumers will, in turn, have an impact on which quality dimensions are sought and how different cues are perceived and evaluated. The sequence from cues, through quality, to purchase motives forms a hierarchy of increasingly abstract terms and is the vertical dimension of the Total Food Quality Model (Grunert, 2005).

In the TFQM, the before purchase part, cues are used as a pieces of information to form quality expectations (Steenkamp, 1990 cited in Grunert , 2005).The cues considered are intrinsic as well as extrinsic. The intrinsic quality cues include the physical characteristics of the product and are related to the product's technical specifications, which also include its psychological characteristics, i.e., characteristics which can be measured objectively. The extrinsic quality cues represent all other characteristics of the product, such as brand name, price, distribution, outlet,

packaging, etc. In the model, quality cues can be quite intricate and sometimes appear to be irrational. However, of all cues consumers are exposed to only those which are perceived will have an influence on expected quality. Perceptions on the cues are affected by the shopping situation such as the amount of information in the shop, whether purchases are planned or spontaneous, the presence of time while shopping etc.

Expected quality and expected fulfillment of the purchase motives constitutes the positive consequences consumers expect from buying a food product and are offset against the negative consequences in the form of various costs. The trade-off determines the intention to buy. After the purchase, the consumer will have a quality experience, which often deviates from expected quality, especially when it is based on quality cues with a low degree of predictive power. The experienced quality is influenced by many factors. The product itself, especially its sensory characteristics (in an objective sense, as measured by a sensory panel), the way the product has been prepared, situational factors such as time of day and type of meal, the consumers mood, previous experience, etc. and the expectation itself may also be an important variable in determining the experienced quality of the product (Deliza and MacFie, 1996; Oliver, 1993 cited in Grunert, 2005). The relationship between quality expectation and quality experience (e.g. before and after purchase) is commonly believed to determine product satisfaction, and consequently the probability of purchasing the product again.

Fig 2.1: The Total Food Quality Model (TFQM)



Source: Grunert (2005)

2.2 Safety Perception

According to different sources on the web, safety of food is:

- Protecting the food supply from microbial, chemical (i.e. rancidity, browning) and physical (i.e. drying out, infestation) hazards or contamination that may occur during all stages of food production and handling-growing, harvesting, processing, transporting, preparing, distributing and storing. The goal of food safety monitoring is to keep food wholesome.

  (www.uri.edu/ce/ceec/food/factsheets/glossary.html)

- The degree of confidence that food will not cause sickness or harm to the consumer when it is prepared, served and eaten according to its intended use.

  (www.handwashingforlife.com/us/english/resource_center/glossary.htm)

- Food borne illness or food poisoning is caused by consuming food contaminated with pathogenic bacteria, toxins, viruses, or parasites. Such contamination usually arises from improper handling, preparation or storage of food. Food borne illness can also be caused by adding pesticides or medicines to food, or by accidentally consuming naturally poisonous substances.

  (www.en.wikipedia.org/wiki/Food_safety)

Food safety is a priority for many consumers, there is an expectation throughout society that the food supplied for human consumption is safe and nutritious. This study uses the first definition of safety as the objective of the study is to analyze the perceptions of consumers on safety problems resulting from all sorts of hazards and contaminants mentioned.

3. METHODOLOGICAL FRAMEWORK

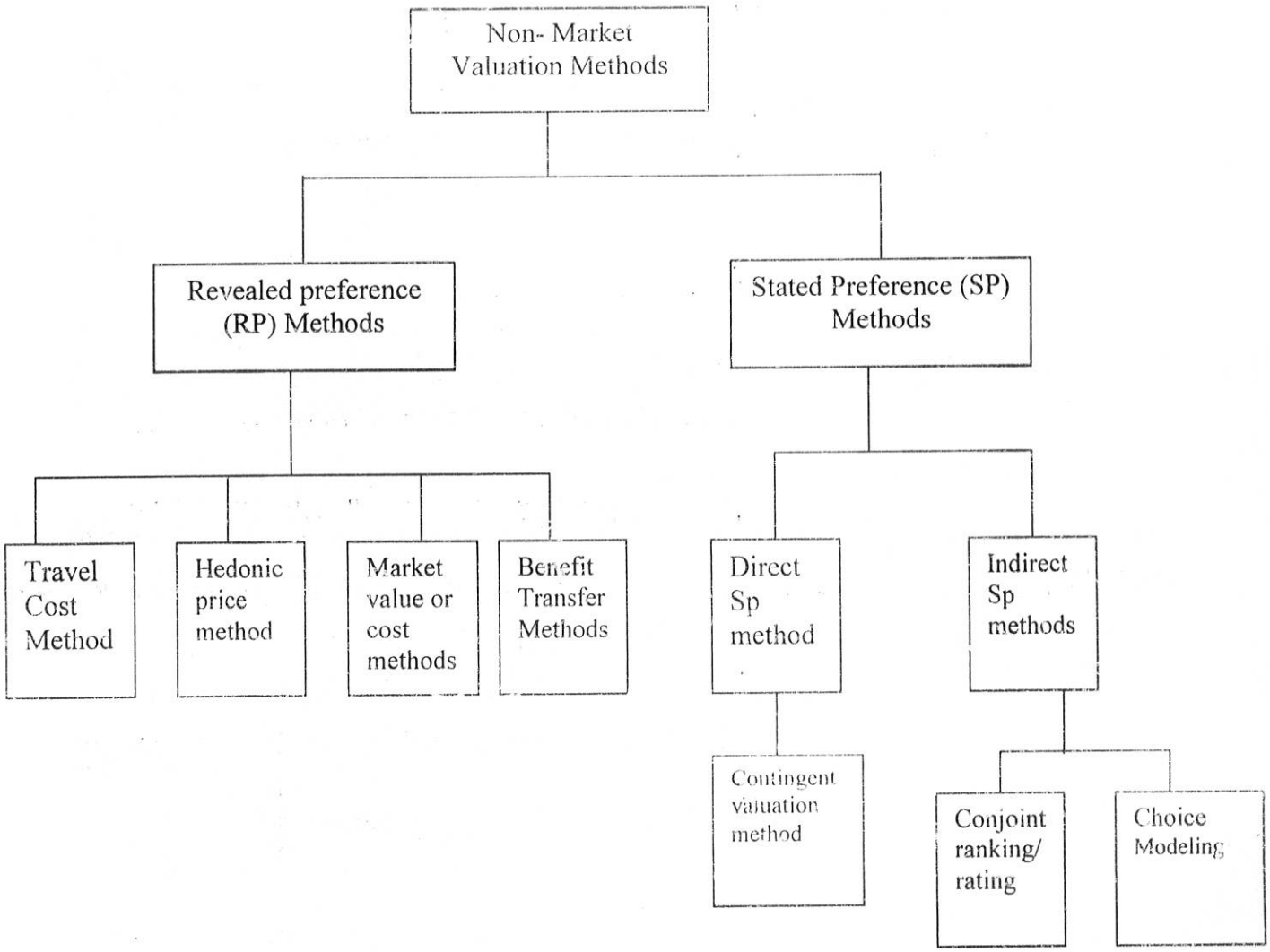
3.1 Valuation Techniques

Valuation of public goods (such as environmental protection, quality and safety assurances, public health services, public transport and other infrastructure projects), which cannot be traded in the market and which have no actual market prices because of market failure, can be done in two ways. The first approach is the revealed preference (RP) approach and the second is the stated preference (SP) approach.

In the revealed preference approach we try to value the good or service indirectly from the observation of individual's behavior in actual or simulated markets. For instance, the value of wilderness area may be inferred by expenditures that recreationist incur to travel to the area. The value of air pollution near a factory can be inferred by analyzing the value of residential houses near the polluting factories. Some of the revealed preference methods that we can use include: Travel Cost Method (TCM), Hedonic Pricing Method (HCM) and Benefit Transfer Method (BTM).

In the stated preference methods values of a good or service are obtained from the respondents by asking them about their preferences using elicitation techniques in hypothetical setting.For instance, we can value the quality and safety concern of consumers by analyzing the values in monetary terms attached by the consumers to the attributes of the product under consideration. Some of the stated preference methods include: Contingent Valuation Method (CVM), Choice Experiments Method (CEM) and Conjoint Analysis Method (CAM).

Figure 2.2: Classification of Non -Market Valuation Methods



Source: Garrod and Willis, (1999)

Since the main objective of the study is to measure preferences of milk and butter based on the perceptions of consumers, we will be using stated preference technique.

3.1.1. Contingent Valuation Method (CVM)

CVM is a method of elicitation of value for a good or service based on hypothetical setting. In CVM respondents are asked their maximum willingness to pay (WTP) to avoid or their minimum willingness to accept (WTA) compensation for changes in goods or services. In CVM, two steps are followed for the elicitation of willingness to pay. The first step is describing the

good or service including the change in the resource to be valued. The second step is devising a mechanism for eliciting the respondent's WTP or WTA. The CVM survey also includes questions about respondents' socio economic, demographic and other characteristics that affect WTP/WTA. Finally, the CVM responses are regressed against the socio economic, demographic characteristics and other explanatory variables identified. The regression equation derived in this way will finally serve to estimate mean/median consumer's surplus. (Perman et al., 1999).

The CVM method is an appropriate model for estimating non-use[1] values. It is fairly simple to apply and quite versatile to apply it in environmental impact. However, it is subject to a number of biases like hypothetical bias (understating WTP in order to free ride), Strategic bias (deliberately overstating/understating true WTP in order to influence the outcome), embedding effects (lowering WTP when the good is valued as part of a more inclusive good or service rather than on its own), information bias (lowering WTP due to in adequate information about the good/service given to the respondent) and survey technique bias (resulting from in appropriate sampling techniques or type of survey such as for instance mail versus face to face).

3.1.2 Choice Experiment

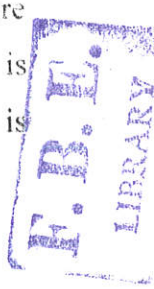
The choice experiment (CE) is an attribute based valuation technique that gives information on the values of people hold for non-marketed environment and social impacts. The advantage of this method is that a single application of CE techniques can produce estimates of value for many alternative policy outcomes. In addition, the composition of those value estimates can be examined through the analysis of the "part-worths" of the component attributes. Whereas Contingent Valuation Method (CVM) is based on a sample of affected people's responses to questions regarding their preferences for one alternative, it is capable of providing estimates of the value of that one alternative. That value estimate is therefore specific to a particular set of circumstances and cannot be "disaggregated" into the contributions made by the individual attributes that combine to constitute the alternative. The ability of CE to provide estimates of multiple scenarios makes it more versatile and cost-effective technique.

[1] Non-use values (sometimes called passive use value or intrinsic value) here refers to value inherent in the good. That is, the satisfaction we derive from the good is not related to its consumption, per se. It includes existence value (a value it has because of its existence such as for example forest, bequest value (value we attach because of importance it has for future generation) and option value (future recreation). See Perman et al., (1999) for detail.

The other benefit of CE is that estimates of value derived from the application of CE at one site are more likely to be valid when "transferred" to another related site. This is because the different circumstances at the transfer site can be taken into account by adjusting the levels of the attributes accordingly. Again, because CVM results are circumstance specific, they do not offer this flexibility. Unlike CVM, CE is not subjected to strategic bias because it is much more difficult for respondents to identify a choice strategy that will influence the results in their favor. In such uncertain circumstances, respondents are more likely to tell the truth.

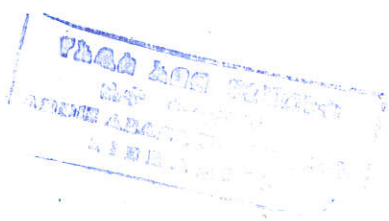
Despite all the above-mentioned advantages, CE is subject to challenges such as the problem of respondent cognition. The choice sets that form the core of CE require respondents to select their most preferred option from an array of alternatives. Each alternative is described using a number of attributes. The amount of information a respondent must assimilate and act upon is significant and in environmental CE, the situation faced by respondents is unfamiliar. This places a significant cognitive burden on the respondent. If this is not carefully managed through questionnaire design and presentation the outcome can be biased.

The other drawback of CE is its complexity. The complexity extends from the questionnaire design to analysis stage. The added complexity, at least during the time when the techniques is being established will add to the cost of application. However, as the technique's application is refined and problem resolved, these cost disadvantages will be diminished.



3.1.3 Hedonic Pricing Method (HPM)

Hedonic pricing hypothesizes that each good can be looked upon as a bundle of attributes x and that a functional relationship $p = F^*(x)$ exists between these attributes and the price p of a good. Hedonic pricing models are useful to assess the market value of goods before they are traded or prices of goods that are not explicitly traded. (An example of the latter: Property tax is often based upon the estimated market value of a property) .HPM has also been applied to find a relationship between the levels of environmental services such as noise levels, water quality or total suspended particle levels and the prices of marketed goods(houses). (Rosen, 1974).



Hedonic pricing models can also be put to fruitful use in conjoint analysis, one of the most widely applied quantitative marketing methods. The aim of conjoint analysis is to predict the utility of a new product. Similar to hedonic pricing, a product is viewed as a bundle of attributes and a mapping between these attributes and the utility represented by the product is constructed. This mapping is called the part-worth function in conjoint analysis. The main difference between conjoint analysis and traditional hedonic pricing is that in conjoint analysis the analyst decides what products (i.e., which combinations of attribute values) to include in the study and these products are not actually traded, but respondents are asked to give their utilities. In summary, a part-worth function is constructed on especially collected respondent data, whereas a hedonic price model is constructed on data obtained from a real market, but both mappings can be used to obtain an estimate of a product that is not explicitly traded or rated. There have been sporadic applications of hedonic pricing in new product development.

The development of hedonic pricing theory is generally attributed to Lancaster (1966), Griliches (1971) and Rosen (1974).In practice the hedonic price function F*(x) is estimated by a model F(x) based on a set {(xi; pi)},i = 1.....N of historical data observations of attribute vectors and prices. Traditional hedonic pricing models are typically linear or box-cox type models. These parametric models have the appealing properties that their parameters are well-interpretable and easy to estimate. However, HPM is only applicable in areas where the property market is well developed and the property owners are aware of the environmental attributes or impacts and take them into account in their assessment of property values. The other drawback of the method is that prices of properties are affected by external factors which are not considered in the hedonic price equation.

3.1.4 Conjoint Analysis

Different individuals have defined conjoint analysis method in different ways. According to Steenkamp (1987) conjoint analysis is a particularly useful technique to quantify and predict the consumer's overall judgment of a product based on its most important attributes. Huber (1987) explains conjoint analysis as a statistical analysis technique that has been used in the field of marketing for almost three decades to quantify consumer preferences for new products and services.

To Hair et al., (1992) conjoint analysis is a multivariate technique specifically used to analyze consumer preferences among a range of products by assessing the utility that consumers attribute to individual product characteristics. Individual consumer's utility, which represents the overall preference or total "worth" of a product, can be disaggregated into "parts worths" for each level of the important product attributes. Mennecke et al., (2006) define Conjoint as a multivariate statistical technique that assumes that consumers will evaluate the value of a product by combining the utility of each of the product's attributes in a combinatorial evaluative process. Tull and Hawkins, (1990) explain that using the conjoint analysis technique makes it possible to calculate the preferences stated by consumers for each level of each attribute or characteristic used in the analysis.

This can be done in such a way that it is possible to make a direct comparison of the individuals from the attributes they prefer. According to Hair et al., (1992) conjoint analysis is used to identify the combinations of the attributes which offer consumers greater utility; to evaluate the relative importance of each product attribute or feature for the consumer's utility or preference, to calculate the market share based on the consumer's evaluation of attributes and their respective levels in the product, to segment the market through the study of consumer preferences and to evaluate market potential or opportunities by exploring unavailable attribute combinations.

In conjoint analysis method it is assumed that products can be defined as a set of product attributes, alternative versions of the same product can be defined as a set of different attribute levels, consumers evaluate the utility of attribute level combinations when making a purchase decision and consumers choose between alternative products and that they trade off attribute level combinations. According to Kutri (2006) conjoint analysis method has five advantages. The first advantage is accuracy because value-creating factors are revealed on individual customer level. Moreover; amount of value will be elicited for attributes' performance levels. Secondly, it is an efficient study of customer value because it defines the product within the research situation, i.e., product preferences are studied during purchasing. It can not be cheated by consumer because importance is not directly asked. Moreover; precise definition of attribute performance levels is given.

The third advantage is that it serves as a basis for pricing by pointing out the price sensitivity and acceptance of customers. The results of conjoint analysis give a good picture about the importance of the different product attributes in creating value for consumers. Using this information, it is possible to develop optimal product configurations or service packages. Models based on the results of conjoint analysis allow predicting the response in the market to changes in existing product configurations (or price) before the actual decision is made. Fourthly, it serves as a basis for market segmentation by allowing the avoidance of misleading effect of "average" option. Moreover, result are valid also on single customer level (micro level).In addition to the segmentation, clustering of consumers is also possible when the sample size is very small. Therefore, it allows companies to analyze the needs of very small customer segments and create attractive value offering. Fifth conjoint analysis method creates simulation model to test customer preferences for alternative products. It helps to make compromises in product development (trade off attributes).Moreover; it combines customer preferences to product attributes with corresponding cost data the profit maximizing configuration.

In general, conjoint analysis virtue compared to many other methods is that it defines precisely the performance level studied product attributes whereby ensuring that respondents and researchers understand the research question more clearly. The situation faced by the respondent is very similar to their actual purchasing situation (Kutri,2006).Despite the above mentioned advantages conjoint analysis method has two disadvantages. The first disadvantage is the assumption that the utility from product's benefits and costs can be simply summed up together. This assumption of compensative value has the disadvantage that higher performance of one attribute compensates the low performance of another attribute. (Green and Srinvansan, 1990).

Conjoint analysis can be especially appealing for mass-customizes and companies embarking on one to one customer relationship strategies. The results of conjoint analysis give a good picture about the importance of different product attributes in creating value for customers. Using this information, it is possible to develop optimal product configurations or service packages. Models based on the results of conjoint analysis allow predicting the response of the market to changes in existing product configurations (or price) before the actual decision is made.

As previously discussed above, another shortcoming of conjoint method (especially the full concept approach) is the small number of product attributes that can be effectively analyzed. To overcome it, a bridging technique can be used (Dahan, Hauser, 2002). To put it simply, bridging means creating several concept card sets, which analyze different attributes, but share a common attribute in every set that makes the results and utility functions comparable. Oppewal and Vriens (2000) talk about a successful example where even 28 products attributes were included to conjoint analysis in four card sets.

3.2 Lancaster Theory of Value

Consumer choice, as per Lancaster theory of random utility, is based on the premise that consumers maximize utility by combining utilities derived from the properties or characteristics of goods rather than from the goods themselves (Lancaster, 1966).According to this theory consumers make their purchase decision by evaluating a good considering all the attributes it is composed of and by comparing it with possible substitutes. They will then choose to purchase a product because of the characteristics it possesses and the services it can provide. The relationship between goods and the characteristics they contain is objective and determined by the utility function which defines the relationship between the preferred characteristics and the goods. The utility derived from each alternative is assumed to be determined by the preferences over the levels the characteristics/services provided by that alternative.

3.3 The Characteristic Theory of Value

The basic assumption in conjoint experiment application is that consumers derive utility from the different characterstics that the good possesses,rather than from the good itself. This assumption implies that a change in one of the characteristics(such as the price)may result in a discrete switch from one good to another will however affect the probability of choosing that specific good on the margin.The charatristics associated with the goods are thus assumed to provide services to the individual(Lancaster,1966).According to the characteristics theory of value,utility is a function of the services provided by the goods.

3.4. EMPIRICAL LITERATURE REVIEW

Demand for quality and/or safety of different food products had been researched by different individuals in different countries using different techniques.

In Darby et al., (2006) conjoint analysis was used to evaluate willingness to pay for characteristics related to locally grown fresh strawberries in Ohio, USA. The Study relied on customer- intercept survey and a choice experiment of food shoppers in a variety of direct markets and traditional grocery stores. They used a random sample size of 530 of which 267 were customers of direct market and 263 were from traditional grocery stores. Conjoint analysis was used to evaluate WTP for characteristics related to locally grown fresh strawberries.

The parameters were estimated with maximum likelihood procedure for a binary probit model. For the conjoint analysis, four attributes were selected in the design of the study. Namely, price, location of production, size/type of production firm and freshness guarantee and all other factors were assumed equal. The researchers had also included socio economic variables, which were expected to play a role in preference variability. The socioeconomic variables were made to interact with the attributes and with each other. Moreover, respondents were asked to identify their reasons for purchasing locally grown foods from a list of options. The list includes freshness, taste, nutrition and safety to support the regional economy, to support local businesses and to maintain a direct connection with the source of the food.

Finally results from the research indicated the existence of niche market potential for Ohio Berry products and the consumers were willing to pay more for locally produced foods. The research also indicated that labeling local will enable producers to capture significant market share and firm profit and consumers realize higher utility if these products are availed at reasonable price in the market. Moreover, socioeconomic factors were found to be good determinants of the magnitudes of premiums and will help to strategically determine the target for pricing or promotion strategy. In addition, the research found out the relative effectiveness of cues as a major factor for success of marketing and that communicating a local region- of- origin or small scale production method as an important marketing strategy.

Monjardino D.and Raquel M., (2001) conducted a research on preferences for traditional cheese in Lisben. The objective of the study was to understand how consumers value, in terms of preferences for different attributes of cheese. The attributes selected for the study were price per kilo, cheese texture, unit of sale size and recognition as protected designation of origin (PDO).They used conjoint analysis to estimate utilities for those attributes and to determine the existence of consumer groups with similar preference profiles. The researchers used a random stratified sample size of 269 with age and municipality of residence as stratification criteria. The respondents selected had knowledge of PDO and had bought PDO cheese. For conducting the conjoint experiment, the attributes were divided, in to two or three levels. Each product concept was therefore defined according to the levels of attributes already defined. The analysis ultimately indicated that recognition as PDO as the most important attribute for the choice of traditional cheeses, followed by price, texture and unit of sale.

Tano et al., (1998) had used conjoint analysis to estimate farmers' preferences for cattle traits in southern Burkina Faso. The technique used was in the context of West African country where literacy is low, where cattle perform multiple functions, where low-input management is the norm, and where cattle are exposed to a number of tropical diseases and other environmental stresses. The research was motivated by the desire to provide a better understanding of farmers' preferences for cattle so that specific programme to encourage and use of trypanotolerant cattle could be assessed. The selected study sites have high potential for expansion of agricultural production, but now support relatively low populations of people and livestock. Tick-borne diseases and trypanosomiyasis, transmitted by the tsetse fly, are severe constraints on animal health and productivity. Thus, the study's particular attention was on farmers' preferences for disease resistance, relative to other important traits, which could be introduced through breeding programmes that utilize indigenous genotypes. Stratified random sample sizes of 299 cattle-owning households were included in the study.

The strata used were subsistence livestock farmers (20%), mixed crop-livestock producers (58%) and, beef and milk livestock farmers (22%).Respondents were given eight profiles for each cows and bulls. After considering all eight profiles, cattle owners evaluated each profile by selecting his/her preference. Ratings of profiles were recorded using pre-prepared questionnaire. The

researchers had used the proposition of Sy et al.,(1997) which states that the utility an individual will derive from choosing a given cattle breed is a function of the characteristics of the breed, the individual's socioeconomic background, the interaction between the individual's background and the characteristics of the breed. Since utility is not directly observable, the researchers in their empirical work in place of utility used a choice variable representing ratings of animals. Respondents were provided cards with pictorial representations of the differences in the levels of the traits to demonstrate each cattle profile.

The statistical ratings eventually indicated that the four highest ranked traits of bulls were fitness to traction, weight gain, disease resistance and feeding ease. Similarly, reproductive performance, milk yield, weight gain and disease resistance were the major traits for cows. Finally, analysis using the maximum likelihood procedure for ordered Probit model indicated that disease resistance, fitness for traction and reproductive performance are significant suggesting that breed improvement programmes should include these traits. The study also showed the potential usefulness of conjoint analysis for quantifying preferences in less developed countries for livestock and for the wide variety of other multiple attribute goods.

Hamath et al., (1993), evaluated the preferences of cattle producers in Manitoba,Canada for different cattle characteristics using the conjoint analysis methodology. The researchers estimated preferences for three different segments of the cattle production system: purebred, breeders, commercial cow-calf producers, and cattle feeders. Data were collected via mail survey on 109 households. The finding of the research indicated that different segments of the cattle sector do not value characteristics the same and that it is difficult to design some breed improvement program to be broadly acceptable.

Murphy et al., (2000) conducted a conjoint experiment on Irish Consumer Preferences for honey. Least squares regression was used to estimate part worths for the conjoint analysis using the scale attribute as a basis for segmentation three distinct segments were identified. Market simulation experiments simulated market shares for 11 products; the ideal products for each segment (three in total), two existing mass-produced honeys, four from small-scale local farm producers and one from a farm producer produced on a larger scale. The first cluster was the

least price sensitive, with the most important attribute being small-scale Producer source. Mass-produced honeys had a very small market share in this segment. The second cluster was distinguished by deriving a high utility from a light-colored honey. Again Mass-produced honeys had the smallest market share. In the first two clusters, in addition to some of the ideal products, honey/s from small-scale producers had high market shares. The third cluster was the most price sensitive and the mass-produced honeys commanded their largest market share in this segment. This segment also derived the highest utility of all segments from a honey produced on a mass scale. The results show that adjusting pricing and promotional approaches could increase market share for honey producers.

Girma G., (2006) conducted a research on Valuing the Benefits of Improved Lake Quality taking the case of Lake Awasa,Ethiopia.He used Choice Experiment among fishermen of Awassa Lake to estimate the value of improvement of the lake quality in general in terms of attributes selected. The attributes selected were Tilapia fish stock improvement and Forest cover. He analyzed the data using Multinomial Logit Model and derived important issues regarding the preferences of fishermen of Lake Awassa.Results indicated that fishermen of Lake Awassa had high levels of environmental concern and are willing to pay for the improvement of the lake environment in terms of the attributes selected in the choice experiment.

According to the result the most preferred attribute is Tilapia stock. The mean willingness to pay for Tilapia fish stock improvement was estimated to be Birr 8.83/Month while that of vegetation cover was insignificant. The researcher had also estimated compensating surplus which reflect overall willingness to pay for a change from the status quo(current situation) to alternative improvement scenarios.Accordingly,he estimated the high impact scenario to be Birr 31.42/month, medium impact scenario Birr 28.62/month and the low impact scenario to be Birr 18.62/month. The overall conclusion drawn from the study was that the fishermen were willing to support the environmental improvement if fishing is permitted.

Other researchers have also made researches on quality and safety of food products. Table 3.1 below summarizes some of the researches undertaken by researchers.

Table 3.1: Summary of Papers on Empirical Literatures

Author/Year	Title	Data collection method and sample size	Method and model	Major Findings
Baidu-Forson,F.waliyar and B.R.Ntare(1996)	Farmers Preferences for socioeconomic and technical interventions in ground nut production system in Niger: Conjoint and ordered probit analysis	Purposive sample size of 101	Ordered Probit and Ranked attributes	The alleviation of market and credit constraints provides greater utilities to farmers than the availability of more productive groundnut varieties.
Hamath et al.,(1993)	Estimating the values of Cattle Characteristics Using an Ordered Probit Model in Canada	Mail Survey on 109 HHS	Conjoint Analysis method ,Ordered Probit Model and Rated attributes	Differences across the regions for preferred attributes express the high degree of physical, social, and economic heterogeneity among the sites.
M.Murphy,C.Cowan and M.Henchion(2000)	Irish Consumer Preferences for honey: a conjoint approach	153 HHS	Least Square on Rated attributes	Adjusting pricing and promotional approaches could increase market share for honey producers.
Mitchell R.Ness and Hubert Gerhardy(1995)	Consumer Preferences for quality and freshness attributes of eggs in England	160 HHS	Conjoint Method and preference ratings	Despite the general trend of increased consciousness of health, dietary and environmental issues, there are still groups of consumers.
Carson et al.,	Are Agricultural Extension Packages What Ethiopian Farmers want?	1520 HHS from East Gojam and South Wollo,Ethiopia	Choice Experiment /Stated Preference	Risk aversion reduces the adoption rate of modern inputs in Ethiopian agriculture.

In the reviewed papers it can be seen that conjoint analysis has been used in agricultural products widely. The review indicates that conjoint analysis could be appropriate for public goods having multi-iattributes. We can also learn that socioeconomic determinants can be analyzed using models like ordered probit, least square or using choice experiments. The review also shows that respondents can express their preference for the attribute combinations (Profiles) using rates or ranks.

4. MODEL SPECIFICATION AND ESTIMATION

4.1 Theoretical Model Specification

The conceptual foundation of conjoint analysis arises from the consumer theory developed by Lancaster (1966, 1991) which assumes that utility is derived from the properties or characteristics of goods (Ratchford, 1975). A major implication is that the overall utility for a good can be decomposed into separate utilities for its constituent characteristics or benefits (Louviere, 1994). In terms of the utility function, this translates into using the characteristics of goods as the arguments of the function. Conjoint analysis and hedonic price analysis are alternative empirical applications to the Lancaster consumer theory (Withheld, 1998; Rosen, 1974; Griliches, 1971).

The hedonic price technique has been widely used to estimate marginal values for characteristics of goods (Faminow and Gum, 1986; Lambert et al., 1989; Schroeder et al., 1988).However, using hedonic price analysis to estimate milk and butter quality and safety preferences in Ethiopia can be very difficult. Most transactions do not take place in formal markets where transactions are transparent and easily recorded. Rather, transactions usually take the form of private agreements between buyers and sellers using cash, barter or exchange.

In conjoint analysis data are generated through a survey in which respondents are asked to rate products with alternative levels of important characteristics. Tradeoffs between characteristics can be studied, including wider variation in relevant variables than might be observed in actual field data. Thus, researchers can guide new quality and safety improvement programs by presenting characteristics of hypothetical product. Those data can provide information about the marginal values of the specified levels of attributes. The marginal values can be used to generate preferences of producers of existing or hypothetical products that are described in terms of the levels of attributes. The overall preference of a specific profile is obtained by adding up the estimated coefficients of the levels of attributes that make up the profiles. This is particularly relevant for assessing the potential and overall utility of quality and safety improvement.

Let U represent utility for an individual. This utility is hypothesized to be a function of various factors including the characteristics of the product, q, the individual's socioeconomic backgrounds, c, and an interaction term between the individuals' backgrounds and the product characteristics, μ. Since respondent obtains some relative happiness from each product chosen, Train (1986) argues that the respondent would choose the product which provides the greatest utility. That is, the respondent will choose product j over j+1 only if $U_j > U_{j+1}$.

The respondent's theoretical utility model can be formally written as:

$$U_j = f(Q_{1j}, Q_{2j}, \ldots\ldots, Q_{gj}; C_1, C_2, \ldots\ldots, C_j; \mu_1, \mu_2, \ldots\ldots, \mu_g / \Theta_g) \quad \ldots\ldots(1)$$

Where,

$J=1,2\ldots\ldots m;\ g=1,2,\ldots\ldots n;\ i=1,2,\ldots\ldots,n$

The variables Q & C are main effect variables representing product attributes and individuals' profiles, respectively. The term $\mu_g = Q_{gi}.C_i$ is the interaction variable between individuals' profiles and product characteristics. The parameter estimates are represented by the vector Θ_g.

The partial derivative of the consumer's utility of the jth product with respect to the product characteristic $\partial U(Q^*)_j / \partial Q_{gj}$, gives the value or the part worth that the consumer assigns to the gth characteristic level of the jth product(Louviere,1990).Since the utility of a product to an individual is a function of both product characteristics and an individual's profiles, the part worth is a joint effect of the two variables(Moore,1980).More formally,

$$\partial U(Q^*)_j / \partial Q_g = \partial f(.)/\partial Q_g + \partial f(.)/\partial \mu_g * \partial \mu_g / \partial Q_g \quad \ldots\ldots (2)$$

Where,

$\partial U(Q^*)_j / \partial Q_g$ =The part worth of the gth level of characteristic of a product to a given individual .It is composed of two parts. The first, $\partial f(.)/\partial Q_g$, or the marginal value of the gth product attribute level, measures the changes in utility when only product attribute levels are allowed to vary. For convenience, this partial derivative hereafter will be referred to as V_g. The

second part of the equation (2) is a product of two partials. The first term, $\partial f(.)/\partial \mu_g$, or b_g, measures the variations in the utility associated with the changes of the interaction term. It is also referred to as a weight factor. The second term of combination, $\partial \mu_g / \partial Q_g$, or Z_i, represents an individual's socioeconomic background. In general, the partworths of a product attribute to an individual can be represented easily by:

$$\partial U(Q^*)/\partial Q_g = V_g + Z_{ibg} \quad \ldots\ldots (3)$$

The weight factor, b, is hypothesized to take any value from negative infinity and captures the variability in preferences for a product due to the interaction between a person's background and product attributes .This is a direct measure of segmentability of the market. People with the same b coefficient have similar preference, and hence can be grouped into one segment. Partially differentiating equation (1) with respect to individuals' profiles $\partial U(Q^*)/\partial Z_i$, gives variations of the utility which are accounted for by changes in the individual's socioeconomic variables. The relative importance of products for respondents can be computed by using estimates from equation (1).The relative importance is:

$$\psi a = \frac{[\max(v^*_{ga}) - \min(v^*_{ga})]}{\sum \omega_a} \quad \ldots\ldots (4)$$

Where,

v^*_{ga} is the marginal value of the gth level of the ath attribute; ψ_a represents the relative importance for the ath attribute ; $\sum \omega_a$ is the sum of the ranges, $[\max(v^*_{ga}) - \min(v^*_{ga})]$, across all attributes(Train,1986).

4.2 Empirical Model Estimation

The conceptual basis for the model used in this paper is Lancaster's theory of consumer demand. Lancaster argued that consumers value products because of the characteristics they possess. Ladd and Zober (1982) extended this model by distinguishing between a product's characteristics and

the consumption services provided by a product. They argued that consumers' utility depends on the consumption services, which are, in turn, dependent on the characteristics of the product.

As data on the dependent variable in this study is measured as ratings, conjoint model is used to estimate part-worths with the following specification for milk:

$$Y_{in} = \beta 0 + \beta 1\ X_{1in} + \beta 2\ X_{2in} + \beta 3\ X_{3in} + \beta 4\ X_{4in} + \beta 5\ X_{5in} + \beta 6\ X_{6in} + \beta 7\ X_{7in} + \beta 8\ X_{8in} + \beta 9 X_{9in} + \beta 10 X_{10in} + \beta 11\ X_{11in} + E_{in}$$

Where,

i = 1, 2, . .12 represent profiles, n = 1, … N are survey respondents,

Y_{in}=Rate assigned by the nth respondent to the *i*th profile in the orthogonal array

E_{in}=the error term

X_{1in}, and X_{2in}= level of the attribute Fat content of the *i*th combination;

X_{3in} and X_{4in}=level of the attribute Adulteration.

X_{5in} and X_{6in}=level of the attribute Hygiene;

X_{7in} and X_{8in}= level of the attribute Smell

X_{9in}, X_{10in} and X_{11in}= level of the attribute Price

Similar method was used for butter. Accordingly, the following conjoint model was specified:

$$Y_{in} = \beta 0 + \beta 1\ X_{1in} + \beta 2\ X_{2in} + \beta 3\ X_{3in} + \beta 4\ X_{4in} + \beta 5\ X_{5in} + \beta 6\ X_{6in} + \beta 7\ X_{7in} + \beta 8\ X_{8in} + \beta 9 X_{9in} + \beta 10 X_{10in} + \beta 11\ X_{11in} + E_{in}$$

Where,

i = 1, 2, .12 represent profiles, n = 1 … N are survey respondents,

Yin=Rate assigned by the nth respondent to the *i*th profile in the orthogonal array

E_{in}=the error term

X_{1in}, and X_{2in}=Freshness level of the attribute

X_{3in} and X_{4in}=level of the attribute for Hygiene.

X_{5in} and X_{6in}=level of the attribute Purity

X_{7in} and X_{8in}= level of the attribute for Origin

X_{9in}, X_{10in} and X_{11in}= level of the attribute Price

βs are parameters to be estimated. For estimation purposes, effects coding approach (Hardy 1993) is used to appropriately model all the Xs (see Table 5a, and 5b in the Appendix for milk and butter orthogonal profiles respectively).

In order to generate data on the various milk and butter attributes and associated levels of interest, a survey was conducted in Addis Ababa. A pre-tested survey was conducted and respondents were asked to rate the set of 12 profiles on a scale of 1 to 10 with 1 as the least preferred alternative and 10 as the most preferred. As each respondent was asked to rate 12 hypothetical scenarios, this resulted in 3600 rating observations. The data consist of responses from 300 subjects, each identified by a unique value of the variable *ID*. Subjects were asked to rate the 12 product profiles from the most to the least preferred. The variables *PREF1* through *PREF12* contain the IDs of the associated product profiles.

Analysis of the data is a task that requires the use of command syntax—specifically the CONJOINT command (See Appendix E).Using the syntax, the conjoint part-worth (relative importance) of milk and butter attributes were estimated using SPSS14.

Estimation of categorical dependent variable using OLS will not be efficient because the error terms of the OLS estimates have the potential for heteroschedasticity (Johnston, 1984).In such situations an ordered probit model would be appropriate. Probit model's advantage over OLS is twofold. The first advantage is that it provides a solution to the heteroschedasticity problem which occurs when regression is used to analyze discrete dependent variable (Aldrich and Nelson, 1984).Secondly, maximum likelihood estimates are, under general conditions, consistent, asymptotically efficient, and asymptotically normal (Judge et al. 1988).Hence, hypothesis testing can be performed even if the distribution of the estimates is not known for small sample case.

In Probit estimation method two assumptions are considered. These assumptions are:

Assumption 1: The model distinguishes between a dependent variable of theoretical importance which is not observed (i.e., U) and the observed dependent variable (i.e., R, or the preference ratings).

Assumption 2: The model assumes that the independent variables are linearly related to the unobserved dependent variable, which in turn is related to the observed dependent variable via cut-off or threshold variables(Maddala,1983).In other words, a change in milk/Butter attributes affects respondents' utility function first, and then their preference ratings through the threshold variable.

4.3 Definition of Main Attributes and Socioeconomic Variables

a. Definition of Main Attributes and Levels

The attributes and levels used for the experiment are selected from RMA survey conducted. In the RMA survey Consumers were asked to identify the major attributes and levels that they consider in the purchase of milk and milk products. But since the main focus of this study is perceptions of consumers on raw milk and butter, effort is made to categorize the results of the survey on milk and butter in to standardized form. Accordingly, it is summarized in Table 4.1 below.

Table 4.1: Attributes and Levels of Milk used in the conjoint experiment

Attributes	Levels	Description
Fat Content	1.Skimmed	The presence of milky taste,
	2. Whole	the feeling that milk contains all the ingredients.
Hygiene	1.Unclean	Neatness of containers, Neatness of Persons
	2. Clean	and safetness of the place/store/Premise for the milk

Smell	1.Smelly 2. Not Smelly	Presence of smell other than the natural smell of
Adulteration	1.Water Added 2. Water not added	The feeling that the water content in the milk is high as per the perception of the consumer
Price	1. Three Birr/Litre	The lowest selling price per Litre of Raw Milk at the time of survey
	2. Four Birr/Litre	The average selling price per Litre of Raw Milk at the time of survey
	3. Five Birr/Litre	The highest selling price per Litre of Raw Milk at the time of survey at the time of survey

Table 4.2: Attributes and Levels of Butter used in the conjoint experiment

Attributes	Levels	Description
Smell	1.Smelly 2. Not Smelly	Presence of smell other than the natural smell of Butter
Freshness	1.Not Fresh 2. Fresh	Presence of the right color of Butter and not stayed for long time as per the perception of consumers
Purity	1.Not Pure 2. Pure	The presence/absence of foreign matter in Butter
Origin	1.Non Sheno 2. Sheno	The place/Source of the Butter is from Sheno or others such as Gojam, Wellega, Welita etc.

Price	1. Thirty Five Birr/Kg	The lowest selling price per Kg of Butter at the time of survey
	2. Fourty Five Birr/Kg	The Average selling price per Kg of Butter at the time of survey
	3. Sixty Birr/Kg	The highest selling price per Kg of Butter at the time of survey

b. Definition of Socioeconomic Variables

In all the reviewed papers it was indicated that concern for a particular product quality and safety improvement is affected by socio economic and demographic variables.The RMA results also confirm these facts. For this paper, the major socio economic and demographic determinants identified are:

- **Age of Respondent(AGE)**

Since older people are expected to be less concerned about safety and quality and hence are expected to rate less.Age of respondentess is included in the model in 3 categories : 1 representing respondents whose age is less than 30years,2 representing those respondents whose age is 30-50 years while 3 represents respondents with ages more than 50 years.

- **Sex of Respondent(SEX)**

Due to their role in meal planning in Ethiopian culture,female are expected to rate more for improved quality and safety of milk and butter attributes.Sex is included in the model as a dummy variable taking a value 1if the respondent is female;0otherwise.

- **Education Level of Respondent(EDUCL)**

It is generally believed that years of schooling increases awareness of people because a person with higher education level will have a better knowledge of language,listening different mass

medias and above all reading different quality and safety literatures than those having less education level.Hence,education level is expected to have a positive relation with rating of quality and safety.It is included in the model in category 0 representing the illiterate,1 representing those respondents whose education level is primary(1-6grades),2 representing respondents with secondary education level(7-12 grades) ,3 representing tertially education level(>12 grades).

- **Total Family Size(FAMSIZE)**

If the household members are more ,the consumption of milk and butter will also be more,as a result,consumers will have high expenditure which will reduce their concern for quality and safety than those having less family size due to budget constraint.Therefore,family size included in the model as catagorical variable with 1 representing respondents with 1-5 family size,2 representing 6-10 family size and 3 representing respondents with more than 10 family size.

- **Income of the household (INCOME)**

As the income of the household(including income of the household head and all the members from different sources) increases the rate on quality and safety also incrases.There is a generally accepted thory that income and willingness to pay are positively related. More willingness to pay for quality and safety improvement implies higher rating for quality and safety improvement.Income is included in the model in seven categories as follows:

1=Less than 500Birr/Month 2=501-1000Birr 3=1001-2000Birr

4=2001-3000Birr 5=3001-5000Birr 6=5001-10000Birr

7=Greater than 10000Birr

- **Duration of Stay in Addis Ababa(Dstay)**

It is believed that year of stay in urban areas such as Addis Ababa increases awareness about quality and safety of Milk and Butter.It is ,therefore,included in the model as categorical variable taking values 1 if the respondent stayed in Addis Ababa for less than or equal to 10 years,2 otherwise.

5. SURVEY METHODOLOGY

5.1. Types of Data and Source

In the study both primary and secondary data have been utilized. The primary data include: individual household characteristics (such as age, education, professional status, income, family size and soon), purchase and consumption/expenditure status of households, market outlets for the households, perception and willingness to pay of households for quality and safety improvement and ratings of different quality and safety attribute combinations. For the study a stratified random sample size of 300 households were used. The selection of the households was done in three stages. The first stage was stratifying the city of Addis Ababa by 10 Sub-Cities. In the second stage, each Sub-City was stratified by income category of kebeles as per the classification of Central Statistical Authority of Ethiopia (CSA). Finally, in the third stage, a random sample of households from each kebele within the sub city and income category was selected.

5.2. Method of Data Collection

5.2.1. Rapid Market Assessment

Attributes and their levels, socioeconomic variables included in the model are selected based on results of Rapid Market Assessment (RMA).RMA is an easy and effective means of gathering relevant information on market situation. It helps in identifying factors that motivate consumers to shop in a certain market. Besides, it enables to know how much they spend and how much they are willing to spend for the product in question. With RMA, we can have a reasonable knowledge on volume of consumer traffic and perceptions, and enable to solicit additional information relevant in constructing questionnaires.

The techniques used include, consumer survey and Key informant survey

5.2.2 Consumer Survey

In order to classify the population according to settlement ,data were gathered from Central Statistical Authority(CSA).The data indicated that Sub-Cities of Bole, Yeka and Kirkos have the highest number of households with high, medium and low classes respectively. The class level was determined by CSA based on the availability of infrastructure, size of residence, quality of residence, and some other personal observations. And then, one kebele was chosen at random from each Sub-City. Keble 03 was chosen from Bole, Keble 014 from Yeka and Kebele 04 from Kirkos. Finally, a total of 60 households with 20 households from each Sub-City/kebele were selected and interviewed. (See Appendix D1 for the questions raised to each consumers).

5.2.3 Surveying Key Informants

Key informants who are believed to give important information related to the assessment were selected from cafeterias, offices and owners of butter shop. The key informants for the RMA survey include: Café head supervisors, owners of butter shop, department head of methodology in CSA, research department head of Addis Ababa Trade and Industry and Addis Ababa Urban Agriculture Bureau (See Appendix D2 for the questions raised to key informants).

5.3. Sample Size and Sampling Technique

In order to adequately represent the population of Addis Ababa, the researcher took samples from enumeration areas that have been categorized by class by Central Statistical Authority (CSA). For its own purpose CSA has classified the residents of Addis Ababa by enumeration area and then the residents living within one enumeration area are categorized as High, Medium and Low class based on the quality of their houses, the quality of roads and overall living condition (based on observation of overall personal property) of the people. Accordingly, each kebele within each enumeration area is classified as follows:

High Class: under this category the majority of the residents have their own villa, the roads are asphalted and the living standard of the majority of the people is good.

Medium Class: under this category the majority of the people have living standard between High Class and Low Class.

Low Class: Under this category the majority of the residents within a given enumeration areas don't have their own houses, the roads are not asphalted, the area is shanty and generally the living condition of the majority of the people is low.

A total of 300 households from 13 kebeles were randomly selected in such a way that 3 kebeles are from high class, 4 kebeles from medium class and 6 kebeles from the low class. The selection was done proportional to the size of population in each class. Accordingly, 170 (57%), 80 (27%) and 50 (16%) of households were taken from low class, medium class and high class respectively. Table 6.1 below summarizes sample kebeles and the sample size in each class.

Table5.1: Sample size of households by income category

S/n	Sub city (k/ketema)	Kebele	Sample Size of HHs by income category			
			High(H)	Medium(M)	Low(L)	Total
1	Addis Ketema	04		20		20
2	Akaki/Kaliti	08			25	25
3	Arada	03			30	30
4	Bole	07(H),08(M),019(L)	10	20	30	60
5	Gulelle	01	15			15
6	Kirkos	012			30	30
7	Kolfe Keraniyo	06	25			25
8	Lafto(Nefas silk)	012		20		20
9	Lideta	010(L),016(M)		20	30	50
10	Yeka	021			25	25
Total			50	80	170	300

Remark: The kebeles are based on the former category

5.4. Development of Conjoint Experiment

The conjoint analysis method uses a set of experimental product concepts as an input. Hypothetical product concepts are presented as the descriptions of the products in the form of a bundle of particular product attributes. Concepts are shown on "concept cards". Based on data gathered with conjoint analysis it is possible to find the utility of the examined product attributes to a particular customer and thereby calculate the relative importance of different product attributes (Green, Krieger, 1991).Because of the complexity of the conjoint method there are various approaches to data gathering as well as to data analysis available to a researcher. In order to construct the appropriate framework and substantiate the chosen approach for investigating Milk and butter's customers' needs the different conjoint techniques and steps are followed. According to Green and Srinivasan (1978; 1990) the following steps are followed in conjoint analysis.

Step1. Choosing the product attributes to be investigated

Step2. Choosing the data gathering method

Step3. Composing the concept cards all possible combinations or certain choice amongst them

Step4. Choosing the presentation format of product attribute (profiles) using graphical and verbal

Step5. Assigning a measurement scale using rating scale

Step6. Data gathering mainly interviewing personally

Step7. Modeling the preferences using part-worth model.

In data gathering phase, each household is asked to rate a set of concept cards (profiles) based on purchasing preference. Every card describes an existing or hypothetical product in terms of a bundle of product attributes. Regression is used to analyze the data to determine the part-worth utilities for different product attributes (more precisely, to certain attribute levels). Part-worth utilities are used to determine the relative importance of different product attributes to the customer (Green, Krieger, 1991). As customers' needs and preferences usually vary to a large extent conjoint analysis is applied at an individual level. Every subject's needs are modeled by an individual utility function — the functional form of the model is the same for all subjects, but the parameters of the function (betas) will differ.

a. Choosing the product attributes to be investigated

To create concept cards it is necessary at first to choose the most relevant product attributes, preferably corresponding to the customer's most important needs. The number of product attributes examined is limited in conjoint method. Greater numbers of product attributes necessitates a greater number of concept cards (in order to get reliable estimates of utility function parameters). At the same time the number of concept cards that a respondent can effectively rate is quite small. In different studies it is found that the tolerance level of a respondent is between 12–30 concept cards and 6–8 product attributes, depending on the motivation and product awareness of the respondent (Oppewal, Vriens, 2000). That is why the correct choice of product attributes is often considered the most demanding phase of conjoint analysis (Walley *et al.*, 1999).For initial identification of customer wishes different techniques are used. The easiest perhaps is to use information gained from past customer interactions. To this end, Rapid Market Assessment (RMA) survey was conducted by the researcher and accordingly four major product attributes and their corresponding levels were identified for each milk and butter.

b. Choosing the data gathering method

Data required for conjoint analysis can also be gathered using paired comparison. In paired comparison a customer is asked to choose between two attributes which are presented with specific attribute levels (Green, Srinivasan, 1978). However, this method has several limitations. The first limitation is the higher divergence of the research situation from real life decision making — consumers are not in real life comparing only two product attributes, but entire products (the whole bundle of product attributes).The second limitation is the large number of questions (paired comparisons) that are needed for analysis. Therefore paired comparison approach is justified mostly when the number of product attributes is large and it is not possible to apply the full concept method.

c. Composing the concept cards

Given that three attributes have two levels and one attribute has three levels, there are 2*2*2*3 = 24 possible product profiles for each experimental design in a full factorial design, which will make data collection quite impractical. The number of profiles was 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. The use of a fractional factorial design resulted in a randomized selection of twelve profiles in each individual questionnaire.

d. Choosing the presentation format of product attributes

In conjoint studies, stimuli can be presented to respondents in one of the following three ways: verbal descriptions, paragraph descriptions, and pictorial representations (Weiner, 1993; Cattin and Wittink, 1982). Verbal descriptions use cards in which each level of attributes is described in a brief line item fashion, while paragraph descriptions give a more detailed description of each level (Weiner, 1993). Pictorial representations use some graphical images to present the levels of attributes. Verbal and paragraph descriptions are convenient, straightforward and inexpensive. However, Visual materials help respondents to process the information, thereby facilitating the interpretation and rating of the concept cards (Holbrook and Moore, 1981). The main disadvantage comes from the additional time that is necessary to conduct field interviews in order to ensure that respondents are interpreting the pictures in a similar manner. Therefore; we have used both images as well as verbal description in this paper.

e. Data gathering

The procedure of sorting concept cards is usually perceived by respondents as complicated and tedious. Consequently data are best gathered through personal interviews. In the interview each respondent is asked to look through all the concept cards as possible products on sale and rate them according to their personal purchasing preferences. Interview helps to avoid distrust, give guidelines, control the rating process and eventually get better data. The advantage of conjoint analysis compared to usual interviews is that it does not ask the respondent directly "what is the importance of different product attributes for you." Rather the importance is based on sequential choices made in rating of the cards. This method can therefore minimize response error.

f. Modeling the preferences

Consumers' needs and preferences are usually modeled by using one of the following three utility function forms: vector model, ideal-point model or part-worth model. The part-worth model is most flexible and vector model is most rigid in terms of the shape of the preference function. But, at the same time, the number of parameters to be estimated increases in the opposite direction (Green, Srinivasan, 1978). It is common to estimate the preference functions in conjoint analysis by ordinary least squares regression (Smith, 2005). Research has shown that the efficiency (predictive power) of this technique is often quite similar to more complex techniques like Logit, Monanova, Linmap etc., but the results are easier to interpret (Oppewal. Vriens, 2000).

5.5 Field Procedure

Before making the actual interview, Rapid Market Assessment (RMA) survey was conducted in order to get important information required for the development of the questionnaire. A draft questionnaire was then prepared based on the information obtained from the RMA survey. The questionnaire consisted of seven parts. The first part was about general information regarding the households which includes socio-economic and demographic characteristics of the households (such as age, sex, education level, marital status etc). The second part was about consumption of dairy products at home which includes the point of purchase, consumption situation from home production, and consumption comparison by month and over ten years.

In the third part, it was tried to gather information on consumption/expenditure of dairy products away from home. The fourth part was regarding consumption/expenditure on other food items consumed at home. Part five tried to gather information on general market outlets including frequency of visit to a market outlet, reasons for choosing the outlet and soon. Perception and willingness to pay for quality and safety attributes was included in part six. Finally, part seven included scenarios of different milk and butter options with bundles of quality and safety attributes.

The survey was administered using face to face (in-person) interview by the researcher himself. The researcher had explained the whole scenario, the attributes and their levels using pictures.

Finally, the field procedure consisting of pretesting the questionnaire, sampling, administering and implementing of the actual survey in the selected kebeles was followed. This was done in order to make some possible modification in the design of the questionnaire based on the responses of the pretesting so as to make it understandable both for respondents and to enable the researcher to meet the objectives of the survey.

5.6 Description of the Study Area (Addis Ababa)

Addis Ababa is the Federal capital of Ethiopia and a Chartered City; having three layers of Government: City Government at the top, 10 Sub City Administrations in the Middle, and 99 Kebele Administrations in the bottom (Addis Ababa City Administration, 2008). Addis Ababa is located in the heart of the country surrounded by Oromia regional state. The city is the diplomatic capital of Africa. More than 92 embassies and consular representatives cluster in the city where the Organization of African Union and the United Nations Economic Commission for Africa have their headquarters.

Based on figures from the Central Statistical Agency of Ethiopia (CSA) published in 2005, Addis Ababa had an estimated total population of 2,973,004, consisting of 1,428,001 men and 1,545,003 women. The CSA estimated that presently there are no rural parts to the city, so 100% of the inhabitants are considered urban dwellers; Addis Ababa contains 24% of all urban

milk products are raw fresh milk, packed pasteurized milk and butter with percentage share of 51.1%, 32.3% and 4% respectively. With regard to market outlet the major outlets are home delivery, producer gate and corner shop with percentage share of 34.1%, 31.8% and 15.7% respectively. The share of supermarkets is also significant with percentage share of 12.1%.From the table we can also see that the major market outlets for the major milk products purchased are corner shop and supermarkets for packed pasteurized milk, home delivery and producer gate for raw fresh milk. The above facts show that the consumers of Addis Ababa frequently consume limited number of milk products and buy them from limited market outlets.

Table 6.2: Frequency of purchase of milk products for home consumption

Product type	Type of Market outlet											
	cafe	Corner shop	Grocery store	Home delivery	market away from Addis	Own production	Producer gate	Special butcher shop	Street vendor	Super market	Grand Total	%Share
Ayib		9	3	8	1		24		3	29	77	1.8
Boiled whole/skim milk										20	20	0.4
Butter	16	62	69		2	1	16	2	3	3	174	4
Cheese										64	64	1.5
Cosmotic Butter	4	44		8		1	8		20	3	88	2
Evaporated condensed milk									1		1	0
Ghee		12								3	15	0.3
Ice cream	5				12					3	20	0.4
Local cheese		17					1		2	13	33	0.8
Local Yougurt	6	3					20			5	34	0.8
Milk Powder		20							1	10	31	0.7
Packed pasturized fresh milk		1094	25	30			36			225	1410	32.3
Packed pasturized low fat milk										12	12	0.3
Raw fresh milk	3	102	3	1442		42	571	49		15	2227	51.1
Skimmed milk		10								64	74	1.7
Tinned condensed milk										1	1	0
UHT milk										4	4	0.1
Yogurt		15					9			53	77	1.8
Grand Total	34	1388	100	1488	15	44	685	51	30	527	4362	100
% Share	**0.8**	**31.8**	**2.3**	**34.1**	**0.3**	**1**	**15.7**	**1.2**	**0.7**	**12.1**	100	

a) Consumption expenditure share of Milk products over major food products consumed in Addis Ababa

With regard to consumption expenditure table 6.3 shows that the major expenditures of households are Cereals (47.1%), Edible oils (12.6%) and beans and other pulses (8.4%). The share of expenditure on milk products is one of the least which is only 2.1%.This shows that the expenditure of majority of the households focuses on food items that are major staple in their day to day life.

Table 6.3: Share of Consumption expenditure of different food products

S/n	Product type	Total Expenditure / Month	Average expenditure Month	%Share
1	Milk Products	4,450.50	14.8	2.1
2	Cereals(teff,maize,wheat flour,bread,millet,sorghum etc)	101,114	337	47.1
3	Other Staples (like inset)	389	1.3	0.2
4	Edible oils, fats	27,109	90.4	12.6
5	Sugar and accessories(tea, coffee, cacao etc)	16,571	55.2	7.7
6	Salt and spices	8,562	28.5	4
7	Beans and other pulses	18,074	60.2	8.4
8	Roots and tubers(sweet potatoes, Irish potatoes etc)	3,276	10.9	1.5
9	Vegetables(cabbages,tomatoes,onions, carrots etc)	15,849	52.8	7.4
10	Fruits(bananas, oranges, apples, pineapples lemons etc)	10,027	33.4	4.7
11	Refreshments(biscuits, snacks, soft drinks)	9,412	31.4	4.3
	Grand Total	214,833.50		100

6.2 Econometric Analysis

6.2.1 Conjoint Analysis Results

Table 6.4 shows the part-worth (utility) scores for each factor. Higher utility values indicate greater preference. Accordingly, hygiene, adulteration, Smell are the three most preferred attributes with utility score of 26.3%, 21.6% and 21.1% respectively. The less preferred attribute is fat content followed by price. This result indicates that the respondents are more concerned on the safety attributes (i.e., Hygiene and smell) and quality attributes (adulteration).

The separate question raised to respondents on their belief on the quality and safety situation of milk has shown that 71% and 70.3% of them don't believe that the raw milk supplied to the market is good in quality and safety respectively. Among the respondents 86% have shown willingness for safety improvement while 14% are not willing to pay for the improvement. Similarly, 85% of the respondents are willing to pay for quality improvement while 15% of them are not willing to pay more. The fact that price has less relative importance score also gives indication of more concern for safety and quality improvement than price.

However, the ranking and the conjoint relative importance score results show variations in rating. Based on attribute ranking, the two most important quality and safety attributes rated by respondents are Adulteration and Hygiene whereas the conjoint result indicated Hygiene and smell as the two most important attributes. (See Table 6.5 for detail).

Table 6.4: Relative importance of the main attribute of Milk and Butter

Attributes	Milk	Attributes	Butter
Fat Content	13.579	Freshness	17.49
Hygiene	26.336	Purity	24.12
Smell	21.136	Hygiene	24.36
Adulteration	21.571	Origin	14.58
Price	17.379	Price	19.45

Table 6.5: Comparison of Conjoint versus relative ranking

Milk			Butter		
Attributes	Conjoint	Rankings	Attributes	Conjoint	Rankings
Fat Content	13.579 (5)	3	Freshness	17.49(4)	4
Hygiene	26.336 (1)	5	Purity	24.12(2)	1
Smell	21.136(3)	2	Hygiene	24.36(1)	2
Adulteration	21.571 (2)	1	Origin	14.58 (5)	5
Price	17.379 (4)	4	Price	19.45(3)	3

Note: *Number in parentheses indicate the rank of the attributes based on the conjoint syntax results*

Source: Out put using syntax and rankings made by respondents

In addition, effort was made to see whether there is correlation between observed and estimated preferences using the Pearson's R and Kendall's Tau parameters. Results indicated the presence of strong correlation with values of R=0.99 and Tau=1.0 for Milk (P<0.001). The Pearson's R and Kendall's Tau results for butter are lower with values 0.826 and 0.786 respectively. But still both are significant (At P-value<0.01).

Similarly, using the syntax for butter, the conjoint part-worth (relative importance) of Butter attributes were estimated and depicted as in Table 6.4 .The table shows the part-worth (utility) scores for each attribute. Accordingly, hygiene, Purity, Price are the three most preferred attributes with utility score of 24.36%, 24.12% and 19.45% respectively. The less preferred attribute is Origin followed by freshness with percentage share of 14.58% and 17.49% respectively. This result also indicates that the respondents are more concerned on the safety attributes (i.e., Hygiene and Purity) and less on quality attributes like origin and freshness. The importance given to price is nearly average.

6.2.2 Ordered Probit Results

In order to identify the socioeconomic determinants of ratings, separate models were estimated for milk and butter using ordered probit model. Results of the ordered probit model are reported in Tables C1and C2 (APPENDIX C).

As can be seen from table C1 (Appendix C) the Threshold Variables[1] and main attributes of milk are all significant (at P<0.01).Among the socio economic variables only Income (at P<0.1) and Age (at P<0.01) are significant. The coefficient of Income is positive and that of age is negative, which are both in agreement with expectations (i.e., as income increases the rating to quality and safety increases but decreases with age).This shows that as income of people increases rate for quality and safety improvement also increases but as age increases the rate decreases.

[1] The threshold variables represent a link between the utility of profiles to the respondents and the numerical ratings given to the profiles(Tano et al.,1998)

With regard to interaction[2] of main attributes and socioeconomic variables the significant variables are the interactions of Hygiene with Income, Smell with Age, Adulteration with Age, Adulteration with Sex, Adulteration with Duration of stay in Addis Ababa .While interactions of Price with Sex and Price with Number of Schooling are significant at $P<0.01$ and $P<0.05$ respectively. However, the coefficients of the interactions of Adulteration with Sex and Duration of stay in Addis Ababa, and the coefficient of the interaction of Price with Number of Schooling are contrary to the expected signs.

Similarly, in TableC2 (Appendix C) we can see that the threshold variables except Rating=4 and all main attributes of Butter are significant (at $P<0.01$).This indicates that the main attributes have significant contribution in explaining the variation in the dependent variable ratings. From socioeconomic variables only Age (at $P<0.05$), Sex (at $P<0.05$), Number of Schooling (at $P<0.1$), Family Size (at $P<0.1$) and Income (at $P<0.1$) are significant. The signs of the coefficients of Number of Schooling and Income are contrary to the expectation.

Among the interactions of main attributes of Butter and Socioeconomic variables the significant variables are: Hygiene with Age, Hygiene with Sex,Origin with Age, Origin with Duration of stay in Addis Ababa, Price with Age, Price with Number of Schooling, Price with Family Size and Price with Duration of Stay in Addis Ababa are all significant (at $P<0.1$) while interaction of Origin with income is significant at $P<0.05$.

However, the coefficients of the interaction variables such as Hygiene with Age, Origin with Age, Origin with Duration of stay in Addis Ababa, Price with Age, Price with Family Size, and Price with Duration of Stay in Addis Ababa have signs contrary to the expectation.

[2] Interactions measure how much changes on one variable affect the effect of another variable. Put another way, they reveal whether or not the effect of variable changes in different contexts (Green, 2000).

7. CONCLUSION AND RECOMMENDATION

7.1 Conclusion

This study measures the perceptions of consumers on quality and safety attributes of milk and butter in urban Ethiopia taking the case of Addis Ababa. The research is initiated based on the observation that, on the one hand, there is a huge livestock resource, rising population size, rising incomes and rising level of urbanization but, on the other hand, the potential of the sector could not be tapped. The main argument of this study is that lack of information by producers on quality and safety perceptions of consumers is the main cause of the problem. It is believed that if the major quality and safety attributes can be identified and the market is served based on the perceived attributes, there is a possibility of using the resource effectively.

The main objective of this study was, therefore, to identify the major attributes of milk and butter as perceived by consumers. The study has also tried to identify the major socioeconomic and demographic determinants of perceptions for quality and safety of milk and butter. To achieve the objective, a stratified sample size of 300 was taken. Finally, the conjoint analysis result indicated that the most preferred attributes of milk were Hygiene, Adulteration and Smell. For butter, Hygiene, Purity and Price were the most preferred attributes. The result shows that consumers were more concerned in non price attributes of milk while they were sensitive to price in addition to the main attributes of butter.

With regard to socioeconomic and demographic determinants of rating, the order probit result indicated that Income and Age were significant with expected sign for milk. This shows that as income increases the rate for quality and safety improvement also increases but decreases as age increases. However, other variables such as sex, number of schooling, family size and duration of stay in Addis Ababa were insignificant indicating that rating is not affected by gender, education level and family size. For butter, Age, Sex, Number of schooling, Family Size and Income were significant but the signs of the coefficients of number of schooling and Income were contrary to the expectation. This result indicates that unlike milk consumers' perception for quality and safety of butter differs across the different socioeconomic and demographic

categories of the consumers. The result shows that the younger generations are more concerned about quality and safety of butter. Similarly, the result indicated that female respondents showed more concern compared to the male respondents. This may be due to the fact that, in Ethiopian culture, most of the time females participate in meal planning as a result they may have understood the consequences of poor quality and safety than the males.

7.2 Recommendation

The population of Addis Ababa is increasing from time to time, level of urbanization of the city is increasing and GDP of Ethiopia is also growing. The implication of this is increased demand for different products, including a better quality and safety milk products. The study has also indicated that consumers are ready to pay more as long as quality and safety of milk and butter are improved. It is, therefore, recommended that producers and regulatory authorities are required to adjust their efforts by considering the preferences of consumers for the different attributes of quality and safety as well as the socioeconomic and demographic characteristics of consumers with such preference. The fact that consumers attach value to quality and safety attributes more than price shows their concern and willingness for quality and safety improvement. Finally, the finding of this research can be validated with more sample size or using different methodologies.

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Zeithamal, V.A., (1998): Consumer perceptions of price, quality, and value: A means-end model and synthesis of evidence. Journal of Marketing.

APPENDIX A: SECONDARY INFORMATION RELATED TO MILK AND BUTTER

Table A1.Cooperatives Engaged in the distribution of Milk products in Ethiopia

Region	Number of primary cooperatives	Members		
		Male	Female	Total
Afar	5	-	147	147
Amhara	45	1007	140	1147
Oromia	36	1728	636	2364
SNNP	11	288	159	447
Gambela	1	12	4	16
Dire Dawa	1	13	1	14
Total	**99**	**3048**	**1087**	**4135**

Source: Federal Cooperative Agency (2006)

Table A2 Number of Major Market actors in Milk and Butter Products in Addis Ababa

Product Type	Market Actors	Category based on Capital in Birr			
Milk		Large (>50,001)	Medium (20,001-50,000)	Small (<20,000)	Total
	Dairy Processors	3			3
	Hotels	44	159	624	827
	Supermarkets	17	214	559	790
	Cooperatives		1	12	13
	Farmers(Dairy Farms)	6	36	147	189
Butter	Dairy Processors	3			3
	Butter Shops		1	214	215
	Cooperatives		1	12	13
	Dairy Farms	6	36	147	189
	Supermarkets	17	214	559	790
	Hotels	44	159	624	827

Source: Addis Ababa Trade and Industry Office

TableA3.Name of company, Year of establishment, Capital, permanent and temporal employees and production capacity

Name of Company	Year of Establishment	Capital in Birr	Employment			Production Capacity (l/year in'000)
			Perm	Temp	Total	
Sebeta Agro Industry Plc	1988E.C	8.82mil	270	100	370	40
Dairy Dev't Enterprise (DDE)	1939E.C (1986E.C)*	28.7mil	333	10	343	9125
Lema Dairy Dev't Plc	2003G.C	2.5mill	41	-	41	120
Total		40.02	644	**110**	754	9285

Source: Addis Ababa Trade and Industry Office

TableA4. Potential Agriculture Land For Cattle Production, Cattle Population, And Milk Production, & Annual Milk Import Growth, For Ethiopia And Selected Neighboring Countries

Country	Cattle Highlands[1] (1000sq km)	popn (000 hd)	Milk prodn (MT)	Milk prodn (Kg/anm)	Annual milk import growth (%)[2]	Per capita Consumption of milk (%)
Ethiopia	415	29500	800	213	23.7	25.6
Uganda	12.8	3905	372	350	8.5	19.7
Kenya	80.2	9500	1001	450	NA	51.3
Sudan	71	22400	1760	499	10.9	133.9

Source: Sendros & Tesfaye, Institute of Agricultural Research, 2003
[1] suitable for Dairy Production
[2] Includes food aid and commercial imports
NA=Not Applicable

Table A5- Milk products imported and exported by Ethiopia during the year 2000-2004.

Year	Import		Export	
	Quantity in kg	Value in birr	Quantity in kg	Value in birr
2000	1,446,996	25,906,508	861	34,837
2001	1,167,143	26,309,859	4,139	92753
2002	1,708,258	22,907,277	5,556	173,225
2003	2,007,664	49,108,256	4,143	242,258
2004	Na	Na	8,356	769,643

Source: Export promotion department of MoTI
Na=Information not available

TableA6: Import of Dairy Product (milk, Whole and Fresh) by neighboring countries

Countries	Quantity (1000 tones)				
	2004	2003	2002	2001	2000
Djibouti	33.33	44.11	51.05	37.23	46.29
Kenya	16.52	4.85	10.07	34.93	15.46
Sudan	89.73	66.55	70.37	56.48	39.52
Yemen	341.80	325.81	241.56	229.15	243.86
UAE	596.06	620.50	783.92	512.90	567.67
Saudi Arabia	1947.16	1627.20	1424.29	1321.20	1362.09
Egypt	503.03	823.48	816.83	805.42	1006.75

Source: www.fao.org

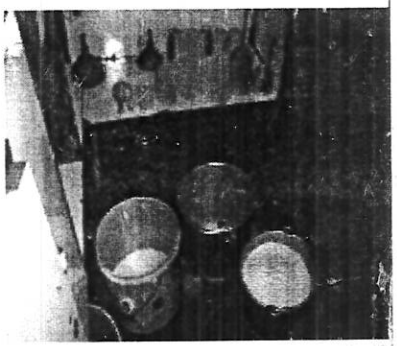
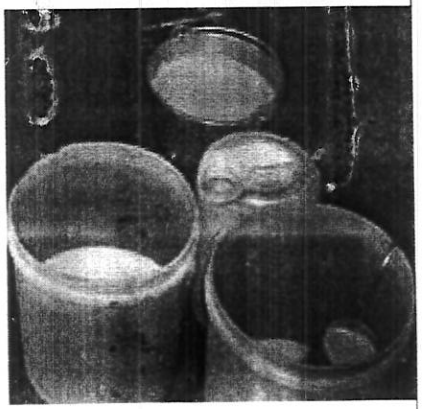
TableA7.Countries that supply dairy products to neighboring countries

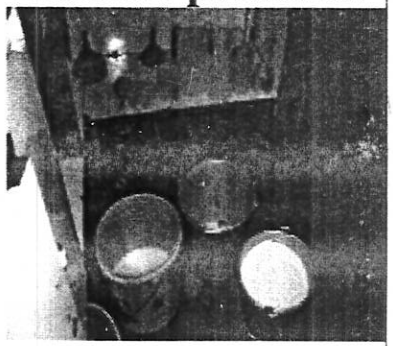
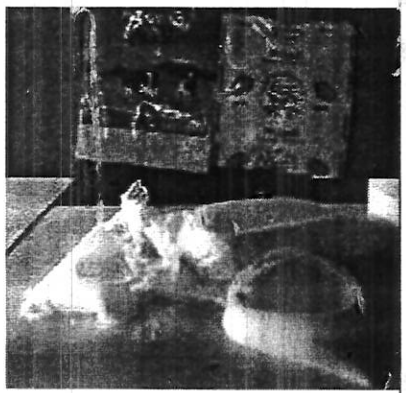
Egypt	Yemen	UAE	Kenya	Djibouti	Sudan	Saudi Arabia
Netherlands	Netherlands	Netherlands	U.K	France	Netherlands	Denmark
New Zealand	France	Australia	Netherlands	Netherlands	France	Germany
Australia	Denmark	New Zealand	New Zealand	Yemen		New Zealand
Denmark	New Zealand	Belgium	France	Spain	Yemen	Australia
France	Australia	France	Egypt	Denmark	South Africa	Spain
Finland	U.K	Brazil	South Africa		U.K	Poland
Ireland	Saudi Arabia	Yemen	Denmark		Belgium	Netherlands
Belgium	Poland	Oman	UAE		Australia	
Spain			Italy		Kenya	
Sweden					Uganda	
UK						
Germany						
Poland						
USA						
Italy						

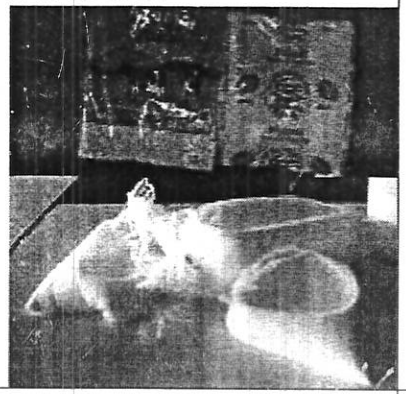
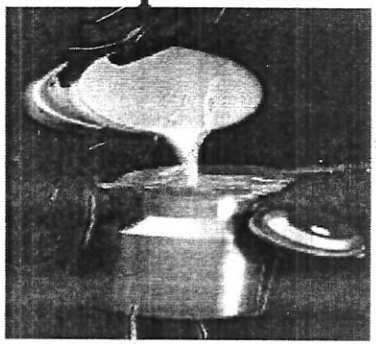
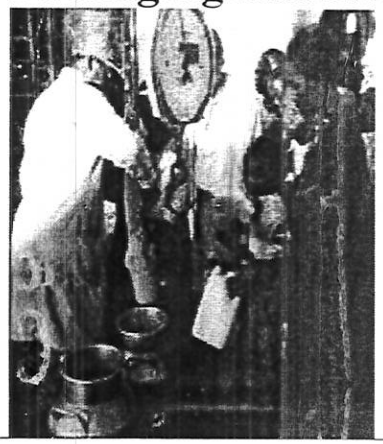
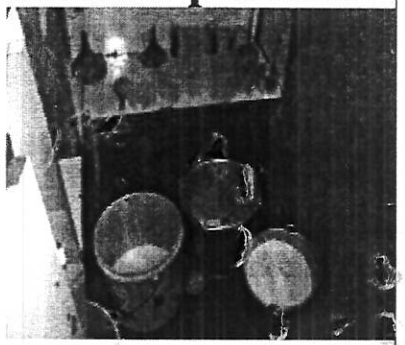
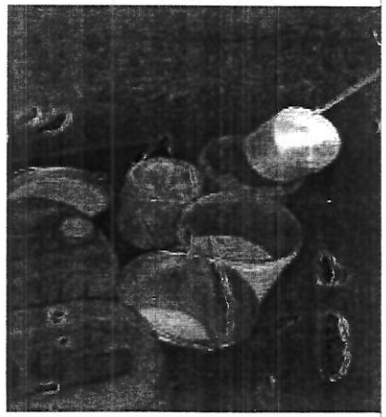
Source: www-p-maps.com

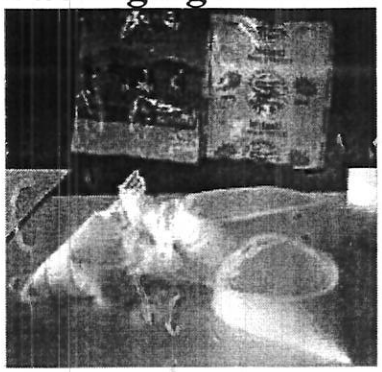
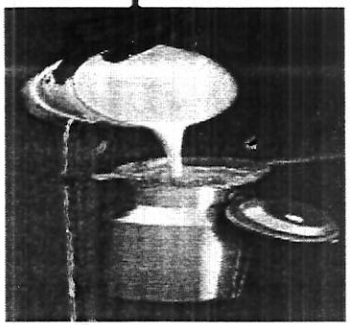
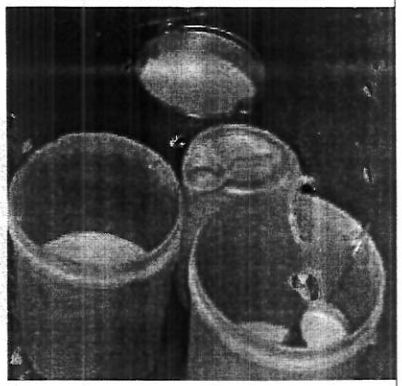
APPENDIX B. PICTURE OF ORTHOGONAL PROFILES RATED BY RESPONDENTS

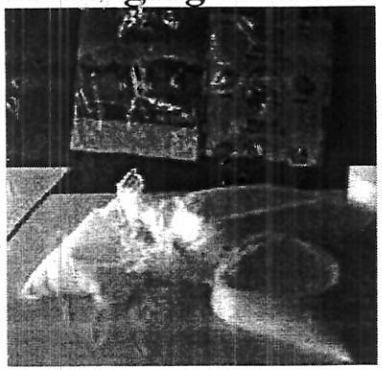
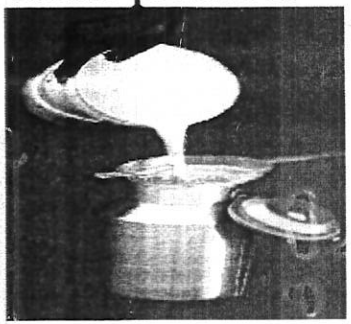
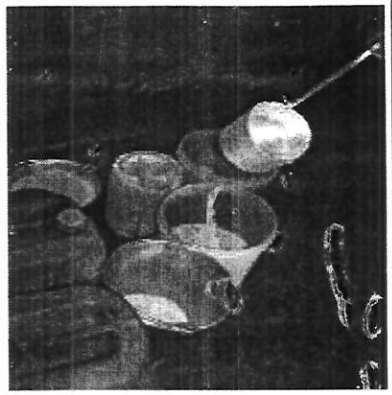
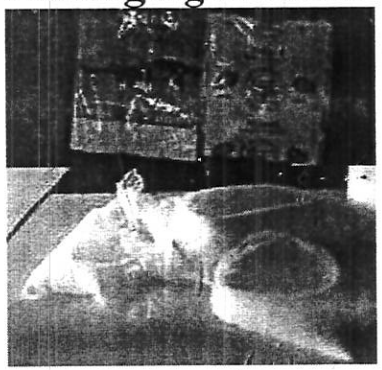
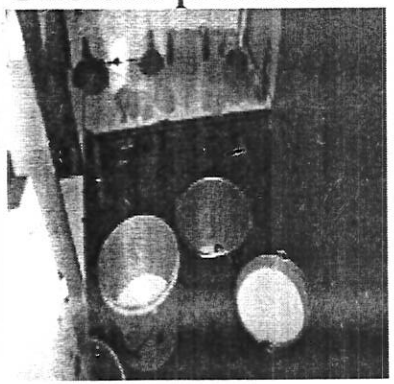
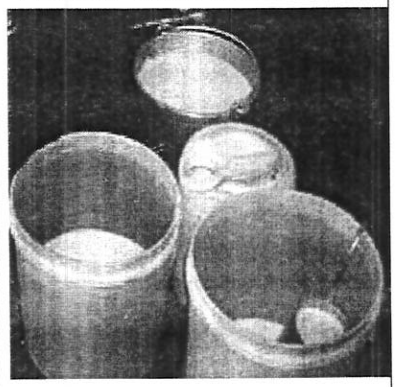
TableB1: Orthogonal Profiles for Milk

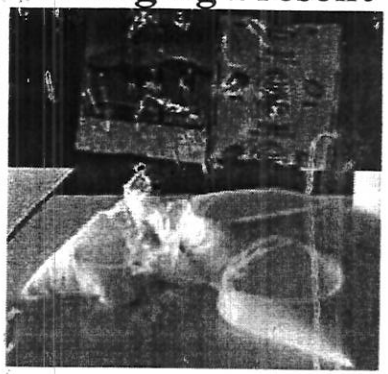
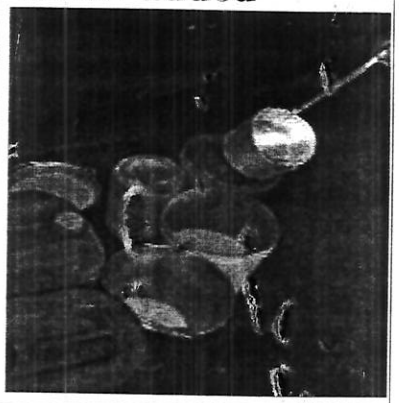
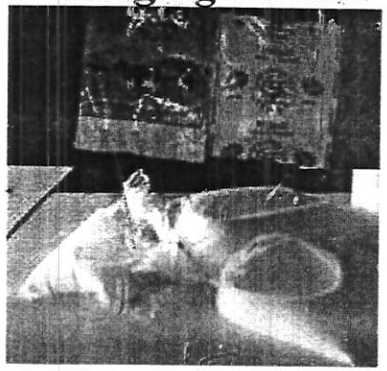
1	Packaging Present 	Unclean premises 	Not smelly 	Water added 	Price (BIRR) 5
2	**Packaging Absent** 	**Clean premises** 	**Smelly** 	**Water not added** 	**Price (BIRR)** 5

3	**Packaging Absent** 	**Unclean premises** 	**Not smelly** 	**Water not added** 	**Price (BIRR)** 3
4	**Packaging Present** 	**Unclean premises** 	**Smelly** 	**Water not added** 	**Price (BIRR)** 4

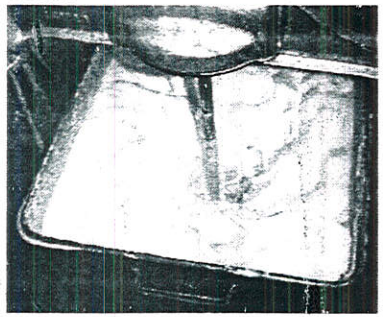
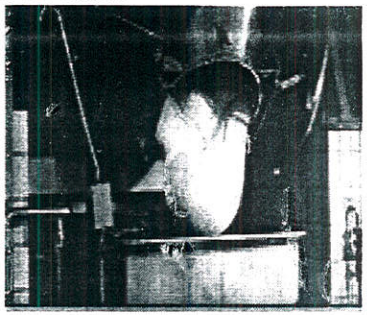
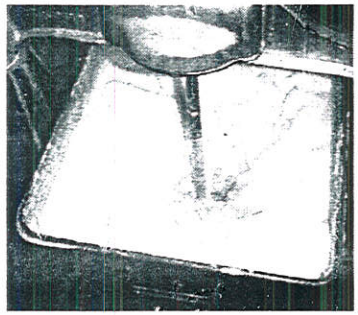
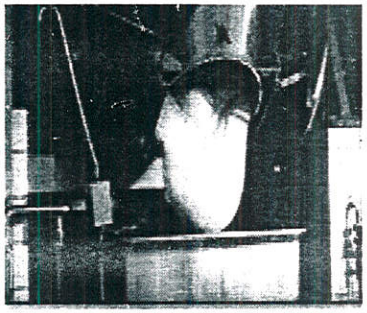
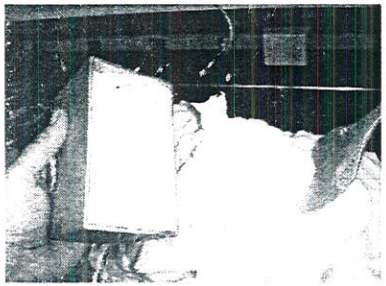
5	Packaging Present 	Clean premises 	Smelly 	Water added 	Price (BIRR) 3
6	Packaging Absent 	Unclean premises 	Smelly 	Water added 	Price (BIRR) 3

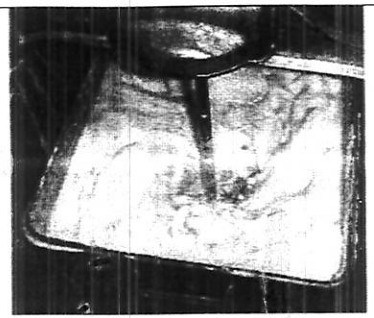
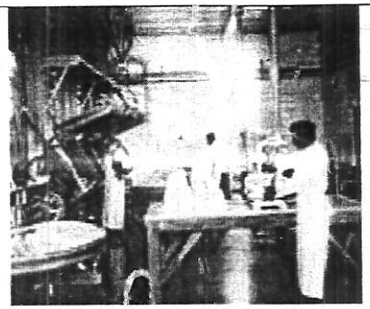
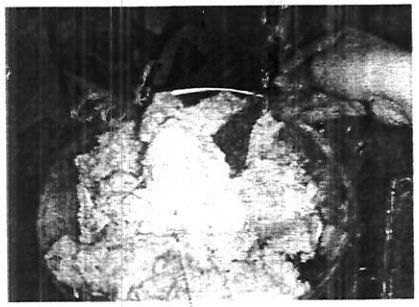
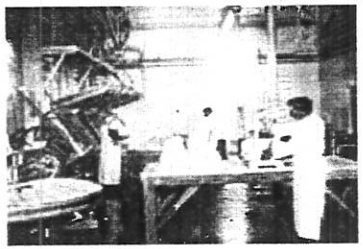
7	**Packaging Present** 	**Clean premises** 	**Not smelly** 	**Water not added** 	**Price** (BIRR) 3
8	**Packaging Absent** 	**Clean premises** 	**Not smelly** 	**Water added** 	**Price** (BIRR) 4

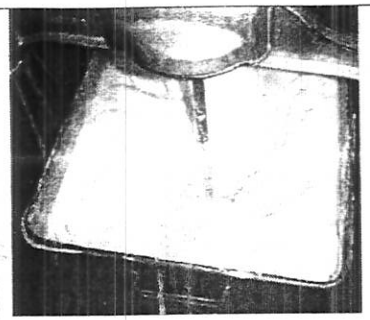
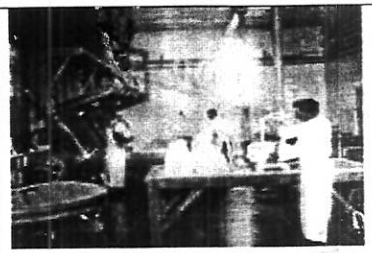
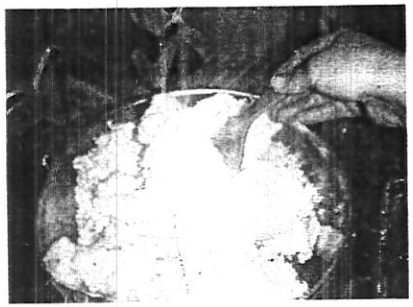
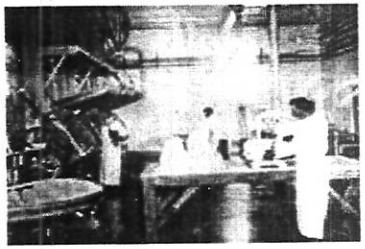
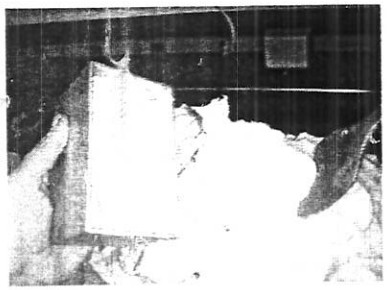
9	Packaging Present 	Clean premises 	Not smelly 	Water added 	Price (BIRR) 5
10	Packaging Present 	Unclean premises 	Not smelly 	Water not added 	Price (BIRR) 3

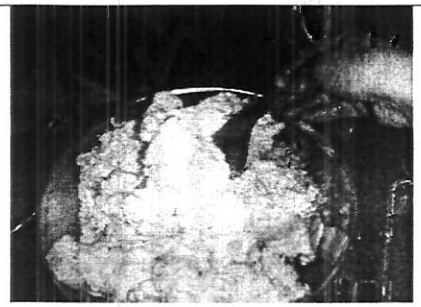
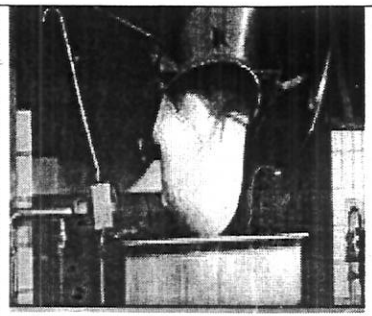
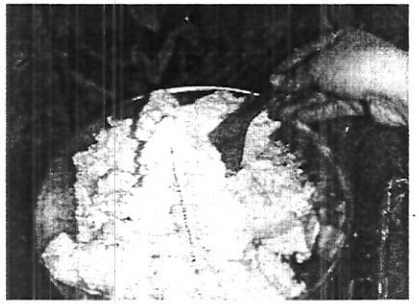
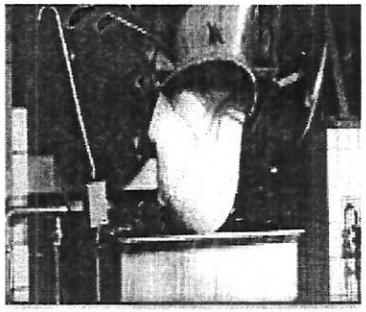
11	**Packaging Present** 	**Unclean premises** 	**Not smelly** 	**Water added** 	**Price** (BIRR) 4
12	**Packaging Present** 	**Clean premises** 	**Not smelly** 	**Water not added** 	**Price** (BIRR) 4

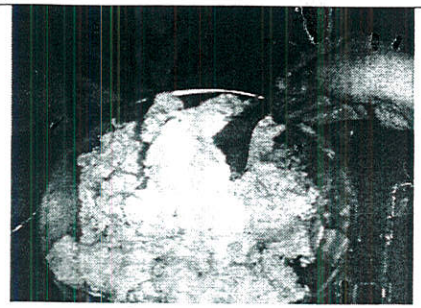
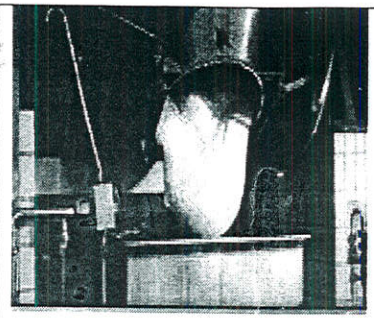
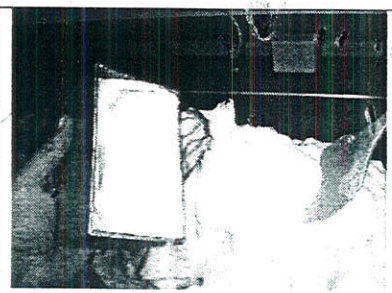
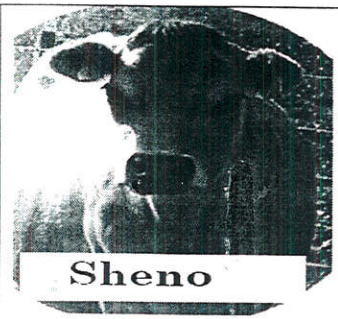
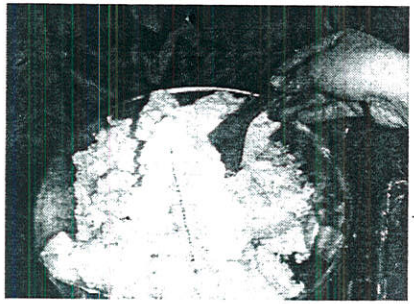
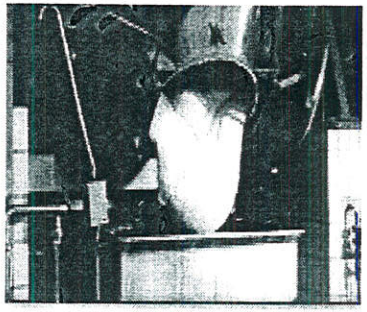
TableB2: **Orthogonal Profiles for Butter**

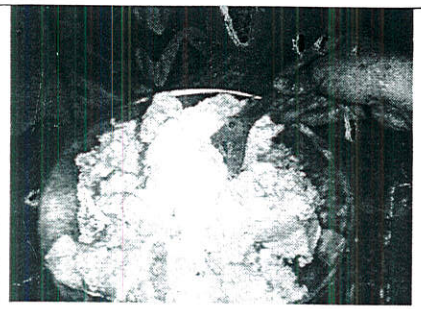
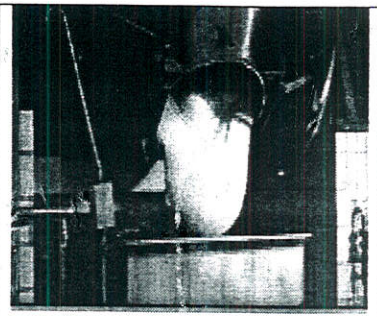
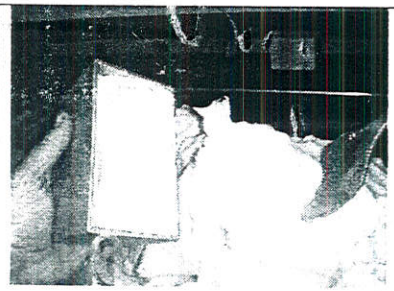
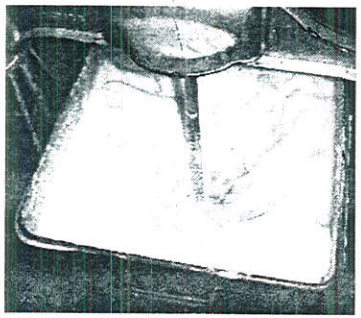
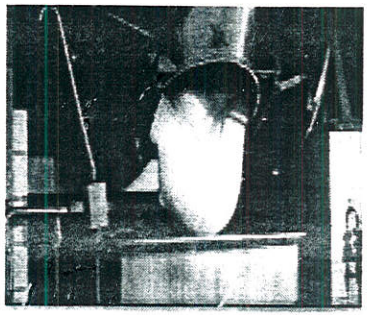
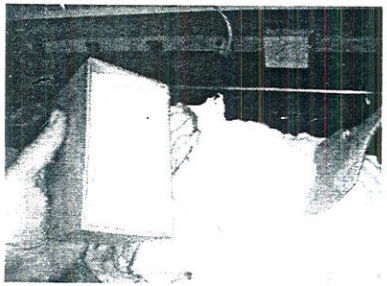
1	Fresh 	**Not clean** 	Not pure 		Price/Kg 60
2	Fresh 	**Not clean** 	Pure 	**Non Sheno**	Price/Kg 45
3	Fresh	**Clean**	**Not pure**	**Non Sheno**	Price/Kg

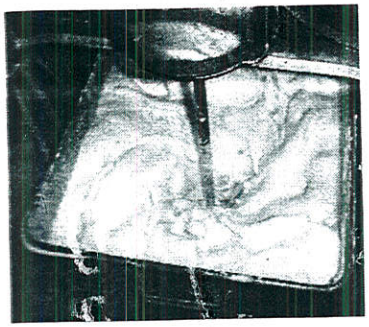
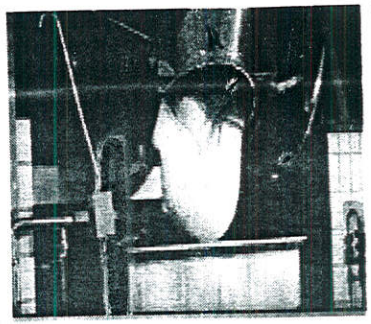
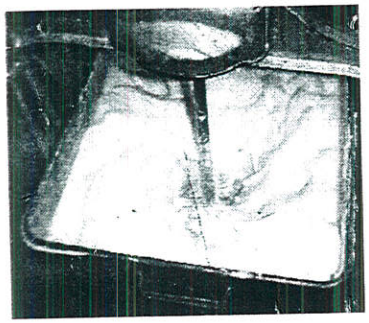
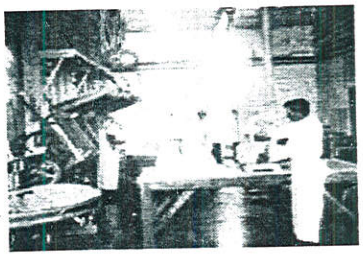
					35
4	**Non fresh** 	Clean 	**Not pure** 		**Price/Kg** **45**
5	**Fresh**	Clean	**Pure**		**Price/Kg** **35**

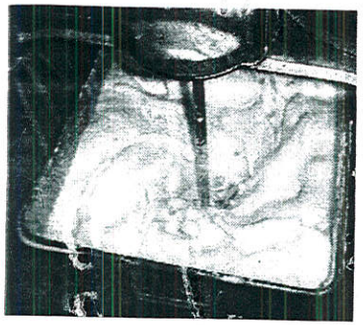
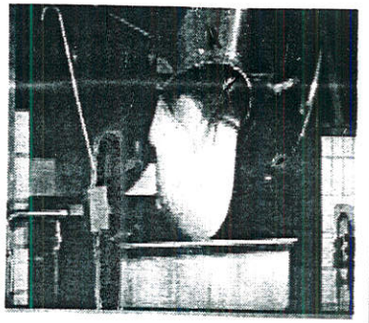
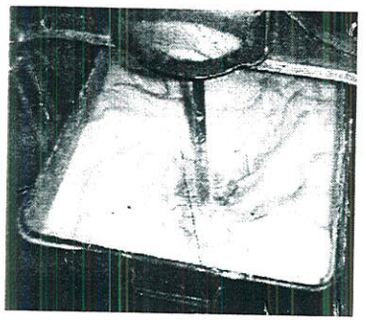
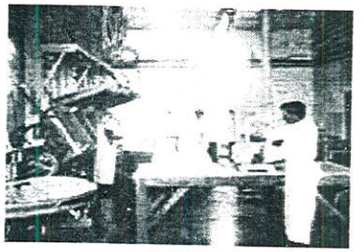
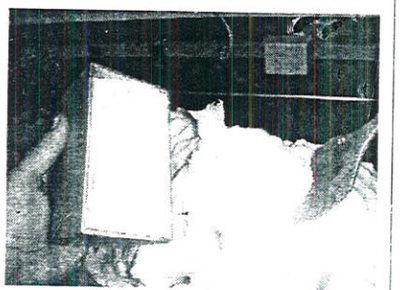
					
6	**Non fresh** 	**Clean** 	**Pure** 	**Non Sheno**	**Price/Kg** 60
7	**Non fresh**	**Not clean**	Pure		

					**Price/Kg** **35**
8	**Non fresh** 	**Not clean** 	**Not pure** 	Non Sheno	**Price/Kg** **35**
9	**Non fresh**	**Not clean**	**Pure**	Non Sheno	**Price/Kg**

					**Price/Kg** **35**
8	**Non fresh** 	**Not clean** 	**Not pure** 	Non Sheno	**Price/Kg** **35**
9	**Non fresh**	**Not clean**	**Pure**	Non Sheno	**Price/Kg**

					35
10	Fresh 	**Not clean** 	**Pure** 	**Non Sheno**	Price/Kg 35

11	**Fresh** 	**Not clean** 	**Not pure** 	Non Sheno	**Price/Kg** **35**
12	**Fresh** 	**Clean** 	**Pure** 	Non Sheno	**Price/Kg** **45**

11	**Fresh** 	**Not clean** 	**Not pure** 	Non Sheno	**Price/Kg** **35**
12	**Fresh** 	**Clean** 	**Pure** 	Non Sheno	**Price/Kg** **45**

TableC3.Simple Correlations in Milk Attributes

	Fat content	Hygiene	Smell	Adulteration	Price
Fat content	1	.029	.029	-.120	.019
Hygiene	.029	1	-.029	.120	-.241
Smell	.029	-.029	1	.120	-.019
Adulteration	-.120	.120	.120	1	-.155
Price	.019	-.241	-.019	-.155	1

TableC4. Simple Correlations in Butter Attributes

Attribute	Freshness	Hygiene	Purity	Origin	Price
Freshness	1	.029	-.029	.120	-.019
Hygiene	.029	1	.029	-.120	.241
Purity	-.029	.029	1	.120	-.019
Origin	.120	-.120	.120	1	-.155
Price	-.019	.241	-.019	-.155	1

Declaration

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

Declared by:

Name: Osman Negus Nuru

Signature: _____

Date: 06/11/2008

Confirmed by Advisor:

Name: Wassie Behanu

Signature: _____

Date: 06/11/08

Place and date of submission: _____