

**DAIRY SERVICES DELIVERY IN *DEBREZEIT* MILKSHED OF
ADA'A DISTRICT, CENTRAL ETHIOPIA: ANALYZING OPTIONS
TO DEVELOP PLURALISTIC SERVICE DELIVERY IN THE DAIRY
SECTOR**

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**In Partial Fulfillment of the Requirement for the Degree of
MASTER OF SCIENCE IN RURAL DEVELOPMENT AND
AGRICULTURAL EXTENSION (RURAL DEVELOPEMNT)**

By

ANTENEH GIRMA HAILE

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HARAMAYA UNIVERSITY

**SCHOOL OF GRADUATE STUDIES
HARAMAYA UNIVERSITY**

As *Thesis* research advisor, I hereby certify that I have read and evaluated this thesis prepared, under my guidance, by Anteneh Girma Haile entitled: **Dairy Services Delivery in Debrezeit Milkshed of Ada'a District, Central Ethiopia: Analyzing Options to Develop Pluralistic Service Delivery in the Dairy Sector.** I recommend that it be submitted as fulfilling the *Thesis* requirement.

Tesfaye Lemma (PhD)

Major Advisor

Signature

Date

Ranjitha Puskur(PhD)

Co-Advisor

Signature

Date

As member of the Boards of Examiners of the MSc Thesis Open Defense Examination, we certify that we have read, evaluated the Thesis prepared by **Anteneh Girma Haile** and examined the candidate. We recommended that the Thesis be accepted as fulfilling the Thesis requirement for the Degree of Master of Science in Rural Development and Agricultural Extension (Rural Development).

Hussen Hamda (PhD)

Chair person

Signature

Date

Prof. Ranjan S. Karippai

Internal Examiner

Signature

Date

Dawit Alemu (PhD)

External Examiner

Signature

Date

DEDICATION

To Ethiopian smallholder farmer: Huge amount of money is spent on your name including expense for this thesis research

STATEMENT OF THE AUTHOR

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Name: ANTENEH GIRMA HAILE

Place: Haramaya University, Haramaya

Date of Submission: April 30, 2008

Signature: _____

ABBREVIATIONS

ACDI/VOCA	Agricultural Cooperative Development International/Volunteers in Overseas Cooperative Assistance
ADC	<i>Ada'a</i> Dairy Cooperative
ADLI	Agriculture Development Led Industrialization
AESE	Agricultural Economics Society of Ethiopia
AI	Artificial Insemination
ARF	Agricultural Research Fund
ASDF	Advisory Service Development Fund
ATVET	Agricultural Technical and Vocational Education and Training
BoFED	Bureau of Finance and Economic Development
CBO	Community Based Organization
CSO	Civil Society Organization
CVM	Contingent Valuation Method
DA	Development Agent
DESPA	Decentralized, Strategic and Participatory Extension Approach
DSD	Dairy Service Delivery
DZ	<i>Debrezeit</i>
DzARC	<i>Debrezeit</i> Agricultural Research Center
EEA/EPRI	Ethiopia Economists Association/Ethiopia Policy Research Institute
ESAP	Ethiopia Society of Animal Production
EVA	Ethiopia Veterinarians Association
FAO	Food and Agricultural Organization
FASF	Farmers' Advisory Service Fund
FTC	Farmer Training Center
FVM	Faculty of Veterinary Medicine of Addis Ababa University
GO	Government Organization
GOE	Government of Ethiopia
IFAD	International Fund for Agricultural Development
IPMS	Improving Productivity and Market Success of Ethiopia farmers' project
KA	Kebele Administration
MFI	Micro Financial Institutes

ABBREVIATIONS (continued)

MoARD	Ministry of Agriculture and Rural Development
MODD	Market Oriented Dairy Development
MSED	Micro and Small Enterprise Development
NAIC	National Artificial Insemination Center
NGO	Non Governmental Organization
PASEDP	Program Accelerated and Sustained Development to End Poverty
RARI	Regional Agricultural Research Institute
RDPS	Rural Development Policies and Strategies
REAC	Research Extension Advisory Council
RPO	Rural Producer Organization
SDDP	Small Holder Dairy Development
SMS	Subject Matter Specialists
SSA	Sub Sahara Africa
WB-RCBP	World Bank-Rural Capacity Building Project
WOARD	Woreda (District) Office of Agriculture and Rural Development
WTP	Willingness to Pay

BIBLIOGRAPHY STRETCH

Anteneh Girma Haile was born in *Wonji*, living-quarter of *Wonji/Shoa* Sugar Factory on June 26, 1977. He completed primary and secondary school at *Wonji kutir hulet* and *Wonji* comprehensive secondary school, respectively. He completed his secondary school education in July 1994.

He joined the then *Alemaya* University of Agriculture in September 1994 and completed his Bachelor of Science Degree studies in Agricultural Economics in July 1998. Following that, the author has worked for government and non government organizations in *Amhara* and SNNP regions under different capabilities in agricultural research and development and rural development. During his engagement as socioeconomics junior researcher, the author has won two competitive research grants from World Bank (ARFCG-2002) and USAID (Small grant and Mentorship Program from USAID and Collaborative Research Support Program (CRSP) Universities of the USA). He has authored/co-authored more than five articles in journal and proceedings.

In October 2006, he joined *Haramaya* University through **self sponsor** to pursue his post graduate studies in Rural Development Stream in the Department of Rural Development and Agricultural Extension, which this volume is the partial fulfillment.

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**DAIRY SERVICES DELIVERY IN DEBREZEIT MILKSHED OF ADA'A
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ABSTRACT

Ethiopia's rural development policy and strategies place in centre stage the transformation of smallholder subsistence agriculture to market-orientation to promote commercialization of the sector. Smallholder dairy production contributes 50 % of the livestock output and about 30 % of employment, with still a large untapped potential. Despite a plethora of projects and expressed policy intent, the dairy sector did never really take off. One of major bottlenecks as revealed by many studies is problems related to coverage, responsiveness and efficiency of supportive service delivery. Multiple service providers -public, private and third sector- are increasingly emerging in the dairy sub-sector, which calls for effective and efficient coordination mechanisms and enabling policy environment. The pluralistic service delivery framework was used to analyze the functioning of pluralistic service delivery system in Debrezeit milkshed, which has relatively developed and market-oriented dairy systems. In the milkshed, dairy sector is currently in a transition towards market-orientation, with private sector investment and multiple actor involvement in the service delivery. This district also houses the most advanced and largest dairy co-operative in the country. Primary data was collected from 150 randomly selected smallholder dairy producing households located in urban, peri-urban and rural areas; and also from various service providers. The data generated by Rapid Appraisal of Dairy Innovation Systems by IPMS project in Ada'a and review of government policy and strategy documents supplemented information generated by household survey. The results reveal that while the dairy service provision is mainly dominated by the public sector, the roles of private sector in providing animal feed, product marketing and processing, micro finance, veterinary services are increasing. . However, there is no mechanism to coordinate multiple service providers for them to effectively function as a system. Forage seed/cutting material supplier and vet clinical service providers in the peri-urban and rural sub systems whereas dairy advisory service providers are among the missing actors in the milkshed. In addition, the public sector lack competence to facilitate financial and market links and regulate services and accredit the private service providers in the milkshed. The policy and institutional analysis revealed that existing government policies and strategies are important steps forwards for the commercialization of the sector with out any restriction on non public service providers to participate in the market. Nevertheless, success in pluralistic dairy service delivery, among others, is constrained by inadequacy of the existing policies and strategies (lack and/or delay in the livestock policy and no division of public and private role in animal health service), still more enabling environment and institutional arrangements setback. Policies are required to reconfigure roles of the public sector to take up the missing role or encourage non public actors to play it and avail clear policies that as to what type services to be provided by the public and non public sector. In addition, the required favorable conditions for the promotion of non public actors needs to became visible. This study analyzed cost sharing as an option for developing sustainable and responsive service delivery, by assessing producers' willingness to pay for advisory service using Contingent Valuation Method (CVM) method. Results show that 71.3 % of the producers described themselves as willing to pay for dairy advisory service if their income from dairy would increase. While exploring options for development of a functional and effective pluralistic service delivery system to support the commercialization of smallholder dairy production, this study comes up with options for providing and financing dairy related services that involves the public, private, and third sectors.

1. INTRODUCTION

1.1. Background of the Study

Agriculture dominates the Ethiopian economy, accounting for 80 percent of national employment, 41 percent of gross domestic product (GDP) and 33 percent of total exports or 70 percent of merchandise exports. More than 80 percent of the agricultural output and value-added (amounting to more than a quarter and a third of national output and value-added, respectively) is generated by subsistence farming (Diao, *et al.*, 2007).

Livestock production contributes an estimated 16 percent to the total GDP and over 40 percent to the agricultural GDP (Diao, *et al.*, 2007), 15% of export earnings and 30% of agricultural employment (Staal *et al.*, 2008). Livestock contribute to the livelihoods of 60-70% of the population (Michael H., 2004). The dairy sector in Ethiopia holds large potential to contribute to the commercialization of the agriculture sector due to the country's large livestock population, the favorable climate for improved, high-yielding animal breeds, and the relatively disease-free environment with potential for animal feeding (Ahmed *et al.*, 2004). The sector contributes to half of the livestock output and about 30 % of employment where 50% of households in the highland own cattle of which 56% are dairy cattle (Tsfaye *et al.*, 2008).

Despite the potential for market oriented livestock development, smallholder dairy development performance and its contribution to poverty reduction and economic development has remained very low. Constraints to the development of livestock sector in general and dairy in particular includes shortage and fluctuation in quality and quantity of feed, poor and eroding genetic resource base, poor management practices, diseases, poor market infrastructure, poor service delivery and policy and institutional arrangements. To ameliorate the constraints and realize the potential of the sector, decades of efforts have been made to improve provision of input and support services such as animal health, credit, research and extension services, processing and marketing of milk and milk products. Most of the inputs and service provision activities have been mainly carried out by the public sector through development projects (Azage *et al.*, 2006). The involvement of NGOs and the private sector has been limited.

While the past and the existing dairy services system has made significant progress in expanding its geographical coverage, it remains almost exclusively within the public domain, which is supply driven and based on limited technology packages that provides the rural and peri urban dairy with limited and often inappropriate choices (World Bank, 2006). It also excludes the urban dairy producer with high potential for market oriented dairy development in the country (Stall, 1996 and Azage and Alemu, 1998). Moreover, the extension service is cereal crop-biased with insufficient attention given to high value crops production and commercialization of the livestock sector (EEA/EPRI, 2006). Publicly provided services are less market oriented, for instance it considers marketing services out of its mandates (Berhanu *et al.*, 2006a). The extension system has no capacity to facilitate the terribly required commercialization process, since it is biased in favor of its technology transfer at the expense of organizational development, capacity building at the grass roots level and human resource development (Tsfaye, 2007).

Moreover, there is extensive on-going debate globally about the role of the public sector in the provision (delivery and funding) of agricultural services (Umali and Schwartz, 1994; Rivera *et al.*, 2001; Rivera and Qamar, 2003). A range of pressures, both internal (poor performance of past investments in service delivery) and external (change in environment of today's agriculture, globalization and reduced intervention in the economy) are forcing a re-examination of public agricultural services. Hence, the world is experiencing a situation where many countries are finding it necessary to implement and experiment with different reforms in the provision of agricultural services (Kidd *et al.*, 1998; Rivera and Wamar, 2003, Rivera and Alex, 2005 and Anderson, 2007).

Despite the debates with regard to alternative institutional arrangements for service delivery, in Ethiopia, the agricultural service delivery system revealed a weak demand side where farmers and communities are not well organized to be able to analyze their real needs and demands and validate it in view of their own resources. Nor are communities organized to experiment on their own and find their own solutions to problems. On the service provision side, the challenges have shown that the public is the major actor with weak pluralism aspect and the emerging non public service providers are not working together for their mutual effectiveness. They are also not coming under a plat form to learn and share responsibilities among each other thereby providing the space for communities to respond to their own demand. Service providers do not have the capacity to interpret the

demand and to identify the type of services, which is appropriate to support the different clients. On the policy side, it was analyzed that policies are not converging towards a common and shared agenda for a coherent agricultural/rural development services, nor are policy development processes linked to the different levels of service delivery. Different policies and legislation regulating service provision modes and arrangements as well as performance management aspects, continuous adaptations in the organisational structure, culture, systems and processes, which make the support to the response of the demand effective and efficient are lacking. Therefore, there is an urgent need to strengthen the agricultural services system through technology development and extension, markets and the demand side development, institutional competence and performance and, integrated and co-ordinated service delivery to transform subsistence oriented agriculture to market orientation (Puskur and Hagmann, 2006).

Hence, this study was undertaken to investigate the performance of existing dairy service delivery system in *Debrezeit* milkshed where multiple service providers are emerging following the market orientation of the sector. The study analyzes ways of developing responsive service delivery in the sector to support the transformation process by analyzing the capacity of the services providers including the public, government policy intervention, the production system and willingness of producers to pay for dairy services there by contributing for the basis for pluralistic service delivery debate in the sector.

1.2. Statement of the Problem

Ethiopia has set forth a comprehensive set of development objectives that target economic growth and reduction of poverty through strategies designed to promote a market-led transformation of the rural economy. PASDEP places a great emphasis on commercialization of agriculture, diversification of production and exports, and private sector investment in order to move farmers beyond subsistence farming to small-scale market-oriented agriculture (FDRE, 2006). Nevertheless, the agricultural service delivery system in general and livestock service in particular which were implemented in the past did not lead to the envisaged commercialization of smallholder agriculture. Hence, with the process of commercialization of the country's subsistence-oriented production systems to more productive and market-oriented production systems, the agricultural support service has to be transformed and should become responsive and innovative

(Tesfaye , 2007) and integrated and coordinated service delivery system (Puskur and Hagmann, 2006).

Different strategies (market and non-market) from revitalization within the existing public service to decentralization, contracting, privatization, cost recovery, and the involvement of NGOs and farmer-based organizations have been implemented for public agricultural service reform (Rivera and Alex, 2005 and Anderson, 2007). The implementation of these reforms revealed that, given its shortcomings with regard to effectiveness, efficiency and accountability, in some cases coverage as well, a public sector monopoly in provision of agricultural services is no more justifiable. Moreover, there is no point in replacing government monopoly with a private monopoly (Carney, 1998). As a result, many governments are taking various measures to improve effectiveness and efficiency of national service delivery systems through the involvement of many actors. This has created a growing trend for a state to move from being a simple provider of agricultural services to a regulator, and to scale-up the participation level of private sectors and farmers and their organization so that they would gradually change from beneficiary to clients and partners in service delivery which naturally leads to institutional pluralism in agricultural services delivery (ibid).

In view of this, the need for involving private sector, farmers' organizations and NGOs/CSO in sharing, augmenting and supplementing public sector service delivery is being increasingly recommended in Ethiopia to create a pluralistic service delivery (Omamo *et al.*, 2002; Belay Simane., 2004; Mathewos and Chandargi, 2004; Berhanu *et al.*, 2006a; Habemariam K., 2005; Puskar and Hagmann, 2006; World Bank, 2006 and Byerlee *et al.*, 2007)

In Ethiopia, following the market orientation of the dairy sector in urban and peri-urban center, the involvement of private service center (Kidd *et al.*, 1998) and dairy cooperatives (Azage T., 2004, Habtemariam A., 2004 and Berhanu *et al.*, 2006b) to provide services such as veterinary services, AI and feed supply is found in *Debrezeit* milkshed. Moreover, in Alaba district, nursery and forage seed production and marketing is being taken up by the private sector. Production of day old chicks and pullets for distribution to smallholder framers is also being outsourced to private companies such as ELFORA and Genesis Farms (Azage *et al.*, 2006).

In addition, efforts are being made to improve the agricultural service towards demand driven and responsive through the adoption of participatory methods such as Participatory Demonstration and Training Extension System (PADETS) and Farmer Research Group (FRG) in the public extension and research services, respectively. Moreover, the public research and extension systems has been developing partnership with regional administrations, cooperatives, cooperative unions, and private industrial concerns to promote market oriented production in high-value commodities such as pulses, legumes, oilseeds, bread wheat, and potatoes (Tsedeke Abate, 2006). Otherwise, past public effort to encourage pluralistic service providers were limited, instead, donor supported public projects were responsible in substituting services where supply was missing. Currently, limited attempt is being tried to promote CBOs and private sectors in service delivery by NGOs (SNV, ACDI/VOCA and Land O' lakes) and projects (IPMS and RCBP of the World Bank).

The emerging role of non public service providers are not geared to create a integrated and coordinated service delivery system where the multiple actors along the milk value chain are not linked to form a platforms of pluralistic service delivery system thereby the different roles and mandates of service providers are clarified and learn to play the roles and work together in synergistic way towards making the service delivery effective. Moreover, organisational and institutional arrangement to support the response of the demands by non public actors is weak where its lacks the implementation policies and legislation regulating service provision modes and arrangements as well as policies and political environment required enabling for service providers to perform.

However, the world in general and SSA in particular have experiencing different reform in service delivery which depart from the traditional public modes entailing innovation and reforms, often pluralistic , through a wide of governance structure taking into account the public, private and third sector. The Uganda's reform is a pioneering approach of service delivery reform in Africa, where National Agricultural Advisory Services (NAADS) system is implemented in a combination of decentralization with the involvement of farmers' organizations and a strong market orientation (Anderson, 2007)

In Ethiopia, however, information is lacking as to how the service delivery system is functioning in the emerging non public service providers context. Much of the earlier

studies on service delivery focuses on separate performance analysis of the services, in most cases the national agricultural extension service. Hence, this research was undertaken to generate information on the existing service delivery system and analyze options for pluralistic service delivery system in the case of the dairy sector which is currently in a transition towards market-orientation, with liberalized markets and private sector investment. This is the one sector that is witnessing multiple actor involvement in the service delivery. *Debrezeit* milkshed is one of the areas that exhibit the market oriented dairy production with multiple actors' involvement in the service delivery in the country. The area of *Debrezeit* is certainly the most developed milkshed of the country, providing most of the dairy products available in the market of Addis Ababa, the largest and most diversified market of Ethiopia. The *Debrezeit* milkshed is found in *Ada'a* district, 45km of Addis Ababa. Milkshed is an extensive collection zone for milk produced by smallholder dairy producers and dairy farms. This area accounts for two dairy processing plants as well as the biggest dairy cooperative in Ethiopia (the *Ada'a* dairy cooperative), both in terms of number of members and volume of production and with its own milk processing and feed processing plants.

Therefore, this study was undertaken in *Debrezeit* milkshed to generate information on the role and performance of the different service providers, policy and institutional arrangement for pluralistic service delivery in the dairy sector and producers' willingness to pay for dairy advisory service thereby explore options for institutional innovation leading to pluralistic service delivery system in the dairy sector. The scope of the services covered by this research includes production services (dairy advisory, cross breeding, financial and research), health service and market services.

1.3. Research Questions

The study addressed the following research questions:

1. Who are the actors and their extent of diversity in dairy related service delivery?
2. What are the levels of performance of the dairy service providers in the milkshed?
3. Is there enabling policy and institutional environment for pluralistic service delivery in the dairy sector?
4. Are producers willing and capable of paying for the dairy advisory service?
5. How to institutionalize pluralistic service delivery in the dairy sector?

1.4. Objective of the Study

The main objective of this study is to investigate the performance and characteristics of dairy services delivery system and provide institutional and policy options for designing pluralistic service delivery systems in the dairy sector.

The study was undertaken with the following four specific objectives:

1. Identify the actors and their roles in dairy related service delivery in the milkshed
2. Analyze the performance of the major dairy service providers in the milkshed
3. Explore opportunities and constraints in the policy and institutional environment for pluralistic service delivery in the dairy sectors
4. Assess the ability and willingness to pay of producers' for dairy advisory service

1.5. Scope and Limitation of the Study

The study is limited in terms of coverage and depth owing to time and financial resource availability. Hence, it is limited to addressing the aforementioned objectives of this proposal. The study is limited to one market oriented dairy production milkshed located in *Ada'a* district of Oromia Region, central highlands of Ethiopia.

1.6. Significance of the Study

In Ethiopia, currently pluralistic service delivery is being broadly recommended by many professionals and organizations including international donors. However, before implementing such service delivery system a thorough analysis of the capacity of the services providers including the public, government policy intervention, the production system and willingness of producers to pay for dairy advisory service. Currently, little information is available. This study is intended to fill this gap in the dairy sector and its findings are expected to provide the basis for such a debate.

The findings of this study would benefit policy makers in general, in terms of improving the knowledge in determining the appropriate mix of service providers for pluralistic dairy service delivery in market oriented dairy production in the country. The study will also give insightful learning for services providers. The study is significant in that it can provide insights for researchers and students interested in similar research theme for further investigation in other sectors and contribute to revitalizing and reforming the agricultural service system in the county.

1.7. Organization of the Thesis

This thesis consists of five chapters. Chapter one deals with the background, problem statement, objectives and significance of the study. Chapter two reviews related literature with the research topic. Methodological issues including the study area description is presented in chapter three. The fourth chapter puts the results of the study and their interpretation. The final chapter summarizes the thesis and concludes and puts policy implication and recommendations.

2. LITERATURE REVIEW

2.1 Concepts

Agricultural services and service systems

Services for the agricultural sector:

Services to the agricultural sector are extraordinarily heterogeneous, ranging from agricultural extension to legal counseling on land tenure issues. According to Helmut (2000), typical services to the agricultural sector include: agricultural research; agricultural extension and information services; education and training; rural financing (e.g. saving, credit) and insurance; marketing of agricultural products and market promotion; input delivery services for plant production (e.g. seed, fertilizer, pesticides, irrigation water, machines/tools) and animal production (e.g. genetic material, forage, veterinary products, drinking water, machines/tools); regulatory services often provided by governments (e.g. certification of seeds and bio-products, quality control of agricultural products, regulation of water rights, etc.) and technical support services, i.e. all activities related to the provision of the technical and social infrastructure for agriculture (e.g. transport, supply of fuel and spare parts, planning of resettlement schemes, etc.).

Service systems in the agricultural sector:

A system which can be defined as a simplified reproduction of a part of reality is composed of elements with attributes, i.e. their perceived characteristics, and describes the specific relationships between them and their boundaries. What is regarded as a system (i.e., which elements and relationships are selected to form a system) depends on the perspective and the specific objectives (e.g. small-scale farmer obtaining access to agricultural inputs, private research institutions advising commercial farmers, government institutions privatizing extension services, development organization designed to improve the agricultural services in a specific region). The systems, or holistic, approach is useful when seeking to analyze and understand better the complexity of service systems (Checkland 1999).

Livestock services

The livestock sector plays a crucial role in the economies of many developing countries as an important source of protein-rich products. It is a vital generator of employment. However, Umali *et al.* (1992) pointed that the ability of the sector to attain its full productive potential is influenced by the availability and quality of livestock support services. According to Umali *et al.* (1992), livestock services can be grouped into two major functional categories: health and production services. Health services consist of curative and preventive services and the provision of veterinary pharmaceuticals; while production services include research and extension services relating to improved livestock husbandry and the provision of input supplies such as seeds, feeds, and artificial insemination. Production services try to improve livestock productivity by such means as genetic upgrading of livestock through artificial insemination, the improved formulation of feeds, the use of improved forages and changes in management practices. In addition, Ahuja and Redmond (2004) included a third service as marketing service including marketing information and output marketing.

Therefore, based on this background, dairy services considered in this study include production services (dairy advisory, cross breeding, financial and research), health service (curative, preventive and provision of veterinary drugs) and market services (milk collection and linking to markets).

Pluralistic dairy service delivery

The term “pluralistic” services refer to the coexistence of a variety of institutional options that exist for financing and providing agricultural services. Pluralistic services can help to overcome constraints such as funding and personnel shortages, and provide a strategy for tailoring services to the needs of specific sub-sectors or regions. Pluralistic services are also seen as a way of ensuring greater stakeholder involvement. One of the aspects of pluralistic systems is the use of partnerships and other types of collaboration between players, with the recognition that different players may have comparative advantages for different functions. In pluralistic services, the state can take on the role of facilitator for the many other actors involved in providing services-such as non-governmental organizations, farmers’ groups and private service providers (Van den Ban, 2000).

To analyze pluralistic dairy services, it is useful to distinguish three sectors that may be involved in financing and providing dairy related services: (1) the public sector (public administration, state agencies), (2) the private sector (farm households, agribusiness enterprises, other profit-oriented firms), and (3) the third sector (non-governmental and non-profit organizations, farmers' organizations, civil society organizations) (Birner *et al.*, 2006).

Pluralistic dairy service delivery therefore, refers to the existence of multiple actors in the financing and provision of the dairy related services through coordinated and systematic processes intervention and change management.

2.2 Theoretical Background of Pluralistic Agricultural Services

Fundamental political, economic and social changes are under way in many countries as a result of liberalization, privatization, structural adjustment programs and the transition from centrally planned to market economies. Increasingly, service provision by state bureaucracies and centralized administrations, in particular agricultural research and extension, is being restructured, either to allow for service provision by the private sector and non-profit agencies, or to improve the performance of public service organizations. This trend increasingly leaves service provision to free market forces, risking/leaving marginal clients and areas as well as societal issues unattended. Today, the public sector is confronted with new challenges in the transformation of its roles, functions and organization, as well as its relationship with civil society and market actors. Often, the quantitatively and qualitatively appropriate provision of what previously were publicly supplied services in the agricultural sector is further declining, especially in rural regions of developing countries and countries in transition (Helmut, 2000). This has given the room for engagement of different actors in agricultural service delivery there by evolving the concept of pluralistic service delivery. Accordingly, this part discusses the theoretical background in the development of pluralistic service delivery in the agricultural research, extension, and livestock services.

2.2.1 Agricultural research service

Agricultural research financing and delivery historically has been and is under the domain of public sector. According to Beynon and Duncan (1996), empirical evidence on broad expenditure patterns on research suggest that basic research is primarily undertaken by public institutions (though with exceptions especially in developed countries), while a greater participation by the private sector in applied research was evident. However, private sector shares of total research spending in developing countries are generally very small. Three main reasons are commonly cited to explain why private investment in research is sub-optimal: public good characteristics of some research; the inherent riskiness of research; and indivisibilities and increasing returns (and hence monopoly tendencies) in applied research. But, there is a low growth rate in the financing of agricultural research even in SSA. Although the deterioration in public funding for research systems may not have been as severe or as universal as widely perceived, many are facing acute financial constraints which need to be overcome (ibid).

There are broadly two groups of options for financing and delivering research services that may alleviate financial constraints. The first covers those which reduce the scope of state financing in areas where the private sector may be willing to participate, or beneficiaries to pay. These include the complete state withdrawal from the financing of some services, the commercialization of others (eg. through levies and user charges), and other revenue generating activities. The second group covers those which improve the cost-effectiveness of services that remain in the public sector, and includes more rigorous priority setting techniques to give a more efficient allocation of resources between research programmes, making research more user-oriented and responsive to demand and hence more relevant and less wasteful, and improving both the management of existing resources and the efficiency of service delivery (ibid).

As it is the case in many developing countries, provision of research outputs in Ethiopia has been by the public sector, despite the budgetary constraints. Although there are some limited research is undertaken by the private sector like Synegnta and Pioneer Hybrid in maize research (MOARD, 2006) and NGOs (Azage *et al.*, 2006) in Ethiopia, the core scientific activity has remained in the public sector. In countries like Ethiopia, the private

sector will not invest in agricultural research due to the uncertainty associated with outputs and returns to investment, the fact that it requires expensive scientific equipment and the need for having multidisciplinary teams and the difficulty of appropriating the benefits. Therefore, public investment in agricultural research in developing countries should be considered as a springboard to economic development (Azage *et al.*, 2006).

2.2.2 Agricultural extension service

In view of valuable contributions that the agricultural extension sector can make to agricultural development, governments have traditionally taken the dominant role in its provision. Hence, the service has referred to the work of a professional body of agricultural experts, often government employees, teaching improved methods of farming, demonstrating innovations, and helping farmers to organize and solve their problems (Umali and Schwartz, 1994).

However, public sector extension was severely attacked in the 1980s for not being relevant, for insufficient impact, for not being adequately effective, for not being efficient and, sometimes, for not pursuing programmes that foster equity (Rivera, 1991). The evolution of public agricultural extension arrived at a worldwide turning point in the 1980s; it was, so to speak, the end of the beginning as Rivera *et al.* (2001) defines it.

Rivera (1991) notes, "Public sector extension [in the 1980s] was criticized for not doing enough, not doing it well, and for not being relevant." Such "government failures" were attributed to bureaucratic inefficiencies and poor formulation and/or implementation of extension programs, with the result that public agricultural extension programs frequently performed poorly, were inadequately funded, and/or lacked a coherent linkage with its clients (farmers) and with its "information suppliers" (the research sector).

In order to bring these institutional reform in the agricultural extension services, various approach/strategies to extension that have appeared in the last three decades as an attempt to overcome some of the weakness inherent in the public extension systems of recent decades. Anderson and Feder (2003) prefer to focus on specific formats or approaches such as Training and Visit (T&V), decentralization, privatized extension and Farmer Field

Schools (FFS). In contrast, Rivera *et al.* (2001) distinguishes between a variety of public sector reform strategies supporting the new paradigm market-driven income-generation. According to this distinction, market reforms encompass four major reform strategies. These include revision of public sector systems, pluralism, cost recovery and total privatization. The non-market reforms comprise two main reform strategies: decentralization and subsidiarity. Decentralization is focused on transferring central government authority to lower tiers of government and subsidiarity is the transferring or delegation of responsibility to the lowest level of society.

However, though the public sector can accept the responsibility for extension functions, this does not mean that it needs to provide extension through a public service. There exist many possibilities for integrating the public, private (for-profit and not-for-profit), and the third sector of farmers groups and associations (including paraprofessionals and community-appointed grassroots agents). Governments can take on a key role in developing strategies for the evolution of extension systems which take into account subsidiarity and complementarity among the sectors. It can then concentrate on policy formulation and analysis, on quality control and regulatory functions, and on targeting assistance and establishing mechanisms that develop institutional pluralism to benefit farmers and the agricultural sector as a whole. It can then focus more of its attention on resource-poorer farmers and the development of emerging sectors (Kidd *et al.*, 1998). Still, aside from the need to partner with the private sector and to enter where markets fail, public sector services are necessary to protect the environment, ensure public health, prevent inequity regarding access to public information, and provide for emergencies. Also, a professional public extension serves to validate information from commercial sources, transfer practices (not just technology), conduct and report accomplishments and promote organizational action (Rivera, 2003).

The extension institutional reforms again call new initiatives following the change in the new agriculture (growth of the private sector and civil society, and globalization, more competitive, market-oriented climate of today's agriculture). Rivera *et al.* (2001), identify new extension institutional reform initiatives involving both market and non-market reforms, as well as initiatives for non-farm rural development, with an emphasis at all times on stakeholder, and especially end-user, participation in the approaches employed in these reforms. The reform initiatives call for:

1. Pluralism of extension providers, involving coordinated partnerships with non-profit non-governmental organizations,
2. Partnerships involving farmers and farmers' organizations, and other private sector extension-providers,
3. Cost recovery options, including those negotiated directly between farmers and extension technicians (which requires human resource development coupled with technical assistance),
4. Decentralization to lower tiers of government ,
5. Subsidiarity at the grassroots level.

An additional initiative for non-farm rural development is also included, emphasizing micro-enterprise development.

Moreover, the ongoing extension institution reform identifies new roles for government in public commitment in agricultural extension to adopt a diversified and pluralistic national strategy to promote agricultural extension and communication for rural development. In order to institutionalize this diversified and pluralistic service, the public is also expected to build a platform for dialogue and collaboration with the relevant institutions that comprise the diversity of multi-sectoral agricultural extension service providers that exist in most countries (Rivera and Qamar, 2003).

This will lead to discuss towards pluralistic institutional base for extension. Pluralistic extension system is extension system where there are many other actors in the system beyond the traditional public extension agencies. These other actors operate as private for-profit firms or private non-profit agencies. The latter may be further classified into member-based organizations, such as Rural Producer Organization (RPO) and community organizations, and non- governmental organizations (NGOs) that are not member-based (although both often have the same legal status)(World Bank, 2002).

Anderson, J.R (2007) in his background paper for *World Development Report 2008* discussed the various reform efforts in the public sector, which included decentralization, cost-recovery and outsourcing, and an increasing involvement of the private sector and the third sector (non-governmental organizations, farmers' organizations) that led to the emergence of pluralistic forms of agricultural services. Table 1 illustrates the diverse options that exist for financing and providing agricultural advisory services. Since all

options have advantages and disadvantages, it is an important task for the development of extension policies to identify the mix of options that is best suited to support a country's agricultural development strategy in a cost-effective way, taking the country-specific conditions into account.

Table 1. Options for providing and financing pluralistic agricultural advisory service

Provider of the service	Source of Finance for the Service					
	Public sector	Private sector: Farmers	Private sector: Companies	Private sector: Companies	Third sector: NGOs	Third sector: FBOs
Public sector:	(1) Public sector advisory services, no fees different degrees of decentralization	(5) Fee-based public sector advisory services	(9) Private companies contract staff from public sector advisory services	(12) Private contract staff from public sector advisory services	(16) NGOs contract staff from public sector advisory services	(17) FBOs contract staff from public sector advisory services
Private sector: Companies	(2) Publicly funded contracts to private service providers	(6) Private sector companies providing fee-based advisory services	(10) Embedded services: Companies provide information with input sale or marketing of products	(13) Private contract staff to provide advisory services	(14) NGOs hire own advisory staff and provide services free of charge	(18) FBOs hire own advisory staff and provide services free to members
Third sector: Non-governmental organizations (NGOs)	(3) Publicly funded contracts to NGO providers	(7) Advisory services agents hired by NGO, farmers pay fees	(11) Private contract NGO staff to provide advisory services	(15) Private contract staff to provide advisory services	(19) NGOs fund advisory service staff who are employed by FBOs	(20) FBOs hire own advisory staff and provide services free to members
Third sector: Farmer-based organizations (FBOs)	(4) Publicly funded contracts to FBO providers	(8) Advisory service staff hired by FBO, farmers pay fees				

Source: Birner *et al.* (2006), adapted from Rivera (1996) and Anderson and Feder (2004).

In addition, the World Bank (2002) put the argument for pluralism in extension systems on the basis of the premise that the private sector (whether private companies, NGOs, RPOs, or specialized consulting firms) can provide extension services more efficiently and effectively than public sector agencies, and that these advantages increase the likelihood of long-term and sustainable services.

The document identified three niche and comparative advantages for each type of private provider:

- Private for-profit providers are motivated by profit and market forces that should provide more efficient and effective services where markets are competitive and function well. Private extension is becoming increasingly important because the public sector is withdrawing from some service provision and states are privatizing areas deemed to be private goods.
- NGOs are often quite flexible, committed to working with the poor and disadvantaged, able to provide intensive and integrated assistance to target grass-roots community organizations, and adapt approaches to local situations. They often have skills in building local organizations and linking them to markets.
- Producer organizations empower farmers to express demands, contract service providers who meet their needs, and enhance accountability. It makes sense for an RPO to engage in extension delivery if the RPO strategy is to improve the agricultural productivity of its members, if services have a clear commodity focus, if farming is viewed as a business, and the RPO has the human and financial resources to do so.

2.2.3 Livestock services

The provision of livestock services has often been in the domain of the public sector. Over time, a growing diversity has developed in the manner in which livestock services are delivered in individual countries. In most developing nations, livestock services still remain a government responsibility, while in the more developed countries, some support service functions of the government are being performed in partnership with, or have been transferred to, the private sector (Umali *et al.*, 1992). Meanwhile, the authors expressed that private entrepreneurs are playing an increasingly important role in the livestock services sector of most countries; the range of services they offer cover the spectrum of curative, preventive and productive services. They also engage in the production and distribution of livestock supplies such as veterinary medicine, vaccines, seeds, and fertilizer as well as conduct extension programs. The responsibility for a service provision depends on the nature of that task. Economic and policy (equity) justification are given to sort a given service to be public and private.

Ahuja and Redmond (2004) used economic framework for livestock service delivery and raises issues for efficient delivery of these services to users. Farmers make economic decisions. The first principles of economics must therefore be the point of departure in thinking about the most efficient way of organizing livestock service delivery. The first fundamental theorem of welfare economics states that ‘if (i) there are no externalities, (ii) both buyers and sellers have symmetric information, (iii) there are no increasing returns to production, (iv) all buyers and sellers take prices as given (that is, no one has any market power), and (v) there are no transaction costs, then the competitive equilibrium is pareto-efficient.

This result significantly influenced early thinking on the delivery of livestock services (Umali *et al*, 1992; FAO, 1997) which, in turn, drove the policy for delivery of livestock services in many countries around the world in the eighties and the nineties. The first fundamental theorem is a useful starting point when thinking about the framework. However, if any of its conditions are violated, ‘market failure’ occurs resulting in efficiency loss. In that case a set of mechanisms is needed to correct the market failure or to find alternative models for organizing the activity. The literature on livestock health services has recognized the sources of market failure – especially public goods and externalities, and moral hazard. Umali *et al*. (1994), for example, categorically stated that, “In determining the appropriate channel for delivery of services, it is necessary to classify each service on the basis of its public and private good character, while taking into account any externalities, moral hazard problems, or free rider problems that may accompany the production or consumption of the service”. Based on these characteristics, they suggested the classification and sectoral delivery of livestock health and production services as given in Table 2. In principle, the services, which are essentially private goods because the individual users capture all the benefits, should be supplied by the private sector. Key private goods involved in livestock service delivery include clinical veterinary services, most vaccinations, the sale of pharmaceuticals, artificial insemination and other breeding services, feed and fodder inputs and most financial services. For services that benefit an entire community, such as vaccinations against the most contagious diseases, sanitation and quality control, the public sector should intervene. Advisory services and training are in principle private good services but with less immediate benefit for the users, the public sector therefore needs to intervene to facilitate the development (*ibid*)

Table 2. Nature of livestock services and appropriate sectoral delivery mechanism

	Type of economic good		Sectoral delivery	
	Public	Private	Public	Private
Health services				
Clinical intervention				
Diagnosis		X*		YY
Treatment		X**		YY
Preventive				
Vaccination		X*	Y	
Vaccine production		X*		YY
Vector control				YY
Tick control		X*	Y	YY
Tsetse fly control	X		Y	YY
Veterinary surveillance	X		YY	
Diagnosis support		X*	Y	YY
Quarantine			YY	
Drug quality control			YY	
Food/hygiene inspection			YY	YY
Veterinary research	X	X	YY	YY
Veterinary extension	X	X	YY	YY
Provision of vet supplies				
Production		X		YY
Distribution		X		YY
Production services				
AI-semen production		X		YY
AI-insemination		X		YY
Research	X	X	YY	Y
Extension	X	X	YY	Y

Note: *, private good with consumption externalities; **, private good with consumption externalities only for infectious diseases; X, good classified as public or private; YY, economically justified; Y, economically justified under special circumstances.

Source: Umali *et al.*, 1994

Using the same principles, FAO (Smith, 2001) suggested the following responsibility of public and private sector for delivery of livestock services

Public sector: ensuring the health of the national herd including disease surveillance, compliance monitoring, quarantine, quality control of remedies and vaccines, planning for emergencies and reporting to international bodies and neighboring countries; oversight of food safety, import and export inspection and certification according to international standards; regulation, monitoring and support of other partners in the animal health care system; accreditation of personnel; creation of an enabling environment for the private sector; and general formulation of livestock development policy.

Private sector: clinical diagnosis and treatment; production and distribution of remedies and vaccines; artificial insemination; management of herd health and production programmes; marketing livestock and products.

Shared responsibility: disease diagnosis and reporting; compulsory testing; accreditation; tick and tsetse fly control; food hygiene and inspection; continuing education and training; diagnostic support; animal welfare; notifiable disease control; disease emergency response; zoonosis control; research; and advice and extension.

Ahuja and Redmond (2004) further used the equity dimension to discuss the service provision. The first fundamental theorem of welfare economics is a pure efficiency result. It completely side-steps the notions of fairness, distribution and equity, and is obviously silent about the welfare of those who are excluded from the market. Due to the importance of livestock in supporting the livelihoods of poor farmers throughout the developing world, and the assumption that the market will exclude poor livestock keepers due to poor paying capacity, the governments in a large number of countries chose to build and heavily subsidize large systems and networks for delivering even those services that could be most efficiently provided through the market. A large number of African and Asian countries opted for that route. While the deterioration in the fiscal condition of many African states, as well as deterioration in efficiency due to resource misallocation, forced many African states to shift the delivery of curative and clinical veterinary services to the private sector, a number of countries in South Asia continue with the model of state provision of these services.

Animal health service

The provision of animal health services has historically been in the domain of the public sector, but that has changed in individual countries over time. In most developing nations, animal health services still remain a government responsibility. In the more developed countries, some service functions are being performed in partnership with, or have been transferred to, the private sector. In some developing countries (the Central African Republic, India, and Morocco), donor agencies have facilitated the transfer of responsibilities from the public to the private sector (Umali *et al.*, 1994).

Animal health services may be private or public goods, depending on the medium used and the ease with which information flows to other farmers. Umali *et al.*, 1994 classifies clinical diagnosis and treatment, production and distribution of vaccines and other veterinary supplies as pure private goods which do not involve any externalities or moral hazard problems. These can, therefore, most efficiently be supplied by the private sector.

Services such as veterinary surveillance, research and extension, on the other hand, have a significant public good component and should remain the responsibility of public sector.

Public sector responsibility does not necessarily mean public sector implementation. However, the public sector may take the responsibility for supporting the development of private service systems in areas where these may not be immediately profitable, for example, in market development. The public sector might also take a proactive role in areas where social concerns make public intervention necessary for the establishment of equitable access to services. Taking responsibility in this sense means providing the enabling environment and sometimes supplying funding through private organizations (IFAD, 2004).

In Ethiopia, according to Azage *et al.*, 2006, the government is the major animal health service provider. There is also limited involvement of the private sector and NGOs in the provision of drugs and animal health services. A few years back, there have been attempts to promote privatized veterinary services, but has not effectively materialized. Due to the nature and variability of livestock production system in Ethiopia, some animal health services have public good characteristics. The widespread nature of killer diseases, limitations in accessibility, cross-border animal movement and drug supplies, lack of adequate infrastructure and the presence of incomplete markets contribute to market failure in the provision of animal health services. This situation is not different from many African countries (Umali *et al.*, 1994).

Based on a research on the animal health service Mussa and Gavian (1994) raised several policy issues regarding animal health services in Ethiopia. The paper argued that vaccination against contagious diseases and vector control are public goods since the benefits extend to the whole economy, while curative services (diagnosis and treatment) of non-transmittable diseases are primarily private goods. Preventive services work better when managed by the state while fee for service could be encouraged for curative services.

Livestock marketing service

As the other agriculture services, livestock marketing services have been the responsibility of the public sector. Through the transformation of the livestock sector to market orientation, different actors are evolving to provide marketing services. Dairy cooperatives

are among the many that give marketing services to their members through collection and marketing of milk. Along with marketing services, these organizations often provide other services. For example, many dairy cooperatives in Kenya and India not only collect and market milk, but provide technical services and distribute inputs (IFAD, 2004). Livestock marketing services include provision of market information, quality control and grading of meat or milk, operation of auction markets, facilitation of marketing systems themselves, provision of marketing and processing facilities, and transport of livestock or of raw milk. Marketing systems have been generally administered by organizations such as marketing boards, co-operatives or a combination of both.

In Ethiopia, the government is the major provider of livestock marketing services. The government arrangements in livestock marketing activities have taken various organizational forms. The Livestock and Meat Board was the first one established in 1964 to develop livestock marketing infrastructure in the country. A number of other development projects also dealt with livestock marketing issues over the years. The most recent one was the Livestock Marketing Authority (LMA) which took national responsibility for the promotion of livestock marketing until it was dissolved in 2004. Currently, livestock marketing is organized under the Agricultural Marketing and Inputs Sector of the MoARD (Azage *et al.*, 2006).

In recent years, by the promotional effort on dairy marketing to establish marketing cooperatives and entry of private firms in the formal milk market, the government role in milk marketing and processing services is being supplemented in urban and peri-urban areas. On the same way, the dairy marketing cooperative are playing a significant role in providing the marketing service by buying milk from members and non members, process it and sell products to traders and local consumers.

2.4 Policy and Institutional Arrangement for Pluralistic Service Delivery

From a policy and institutional perspective, it is important to distinguish between the variables that policymakers and services managers can influence directly (choice variables), and those variables that they can influence only indirectly or that are beyond their influence (frame conditions) to design pluralistic service delivery. The characteristics of agricultural services – their governance structures, capacity, organization and

management and methods of service delivery - are choice variables. The frame conditions, which have to be taken into account when making choices on the design of services delivery includes policy environment, capacity of potential service providers and partners , farming systems and market access , and community aspects (Birner *et al.*, 2006).

The policy environment for dairy service delivery is an important condition for pluralistic dairy service delivery. The political commitment of the government to the dairy sector and the overall agricultural development strategy (ADLI and PASDAP) has far reaching implications for designing different models of providing dairy services. Likewise, the relative priority placed by governments or other providers on different goals, including economic growth, social inclusion and environmental sustainability, will influence the type of advisory services that are most appropriate. When analyzing the objectives of advisory services, one has to keep in mind that governments may pursue other objectives than the officially stated ones. For example, creating a channel to exercise political influence in rural areas may be an underlying motivation for governments to invest in advisory services (*ibid*).

More specifically, public sector commitment and clarity are required to the development of demand driven services which in turn requires policies to create an enabling environment for pluralistic development of service supply, and that the public sector is committed to making clear the different roles of the public and the private sectors in delivery of services. The public sector must stop the free supply of services that can be delivered through the private sector, and instead strengthen its efforts in taking care of public interests and long-term interventions, which are unlikely to attract private sector investment. Moreover, pluralistic service delivery requires the availability of service providers. A choice of advisers must be available who are able to offer quality services at an appropriate price. This in turn requires that the services are financially viable as a business for the providers. It also requires that farmers are well informed about the different services and service providers. Long-term sustainability of pluralistic service delivery requires continuous capacity building of farmers, their organizations and their service providers. Institutions are required which can offer training to farmers and service providers. Professional backstopping is also needed in the form of information, testing,

tools for analyses and organizations that can transform research results into practical recommendations for farm management (Chipeta, 2006).

Provisions in the policy and legal framework for pluralistic service delivery in Ethiopia

Agricultural service in Ethiopia has been influenced by the different political systems and prevailing government policies and strategies. In the imperial era, agricultural extension and other support services were targeted for larger commercial farmers while marginalizing the smallholder farmers, and therefore limited coverage. During the Derg regime, the system has a relatively wider coverage and attention, but the focus was on cooperative/collective farmers and large-scale commercial state farms, still at the expense of smallholder farmers. After 1991, ADLI provided policy guide to focus on increasing productivity of the smallholder agriculture in general and dairy in particular and the agricultural services has been tailored to it and its coverage has been expanded (Ahmed *et al.*, 2004 and Habtemariam, 2005).

Currently, the agricultural policy that better discuss the country's agricultural service delivery is the Rural Development Policies and Strategies (RDPS) backed by different strategies and programs (PASDEP, capacity building) and legal framework (proclamations and regulations). Other wise, the country do not have agricultural extension policy and/or livestock or dairy specific policy.

Rural Development Policies and Strategies (RDPS)

RDPS is the only proxy policy to service delivery. RDPS guided by ADLI puts the need to institutionalize structural changes with major capacity development in human resource , input supply , technology adoption and provision of infrastructure are pointed (FDRE, 2002). For the structural change, the policy demands responsive research and extension services. It acknowledges the transfer of improved agricultural technologies and inputs through responsive advisory and extension service backed by short term trainings. This service are ready available at each kebele through three diploma holder DA for crop, livestock and natural resources fields. RDPS undoubtedly put public research and extension for its sole responsibility in technology generation, verification and popularization giving a room for private company and selected farmers in technology

multiplication with strong supervision of the public sector. At the same time, the policy emphasizes the need for identification and registration of private technology multipliers as part of the system so as to give the necessary support to build their capacity and enable them to duplicate technologies at required quality at a comprehensive system of quality control. The continuous improvement of this system is pointed as the government key agricultural development task.. The policy also gives much emphasis on the role of primary cooperatives and unions to participate in input and output marketing. In the meantime, RDPS stress the importance of improving the finance system in the rural areas through establishing rural banks/Microfinance and use of cooperatives to link producers with banks.

Moreover, the policy puts the non-substitutable role of private sector in strengthening the agricultural marketing and animal feed supply through establishing agro-processing and feed processing firms, respectively. It also discussed to tune the agricultural professional training to serve the private sectors and producing profession that create job opportunity for their own and others by inculcating entrepreneurship training in the formal curriculum. To support this, micro and small enterprise development is given due emphasis.

Program for Accelerated and Sustainable Development to End Poverty (PASDEP)

PASDEP (FDRE, 2006) continues to emphasize rural development led by agricultural growth, improved governance and decentralization of delivery of services, and the reduction of vulnerability. Relative to the previous poverty reduction strategy, PASDEP places much greater emphasis on commercialization of agriculture, diversification of production and exports, and private sector investment in order to help farmers to move beyond subsistence farming to small-scale market oriented agriculture. Under PASDEP, these objectives would be pursued through a range of policies and instruments including: (i) modernization of the research and extension systems and making them more demand-driven while providing complementary training through the Technical and Vocational Education and Training (TVET) program to build capacity in the delivery of agriculture extension services to farmers (ii) enhancing competition and increasing efficiency in agricultural input and output markets; (iii)strengthening the rural credit system; and (vi) creating a conducive investment climate for commercial agriculture.

PASDEP recognizes the contribution of the private sector to the overall economic growth and poverty reduction and service delivery in particular. At the same time, pointed strengthening the institutional framework to enable private initiative through continued simplification of business processes and licensing requirements; strengthening of the regulatory framework and establishment of a level playing field with regard to property ownership; financial sector reform, increase the availability of capital and working finance; and progressive withdrawal of state entities from areas that can be efficiently provided by the private sector, through the continued privatization program and increased competition. In addition, recognizing that the private sector is still in its formative stage in the country, government will serve as a facilitator and gap filler to overcome initial barriers (ibid).

Implementation Capacity Building Strategies and Programs (CBSP)

CBSP has three components that involve the development of manpower as well as improving operational and organizational systems. Implementation capacity is the combination of manpower development, enhanced organizational set up and improved operational systems. CBSP gives due emphasis in building implementation capacity for RDPS actors: producers, public, private and cooperatives. At the same time, civil service reform is one of the programs for building implementation capacity of civil servants where agricultural extension service as one of the public services in the country and is covered under the program. As part of the civil service reform, service provision reform sub-program is designed to layout procedures and organizational structures that facilitate the provision of services to the public on the basis of the principles of accountability, transparency and working efficiency. In this regard, policies and directives have been laid out for setting out the principles by which services are rendered indicating the service sources for the beneficiaries as well as the conditions by which beneficiaries may appeal whenever they are denied services (FDRE, 2002)

Legal Framework (Proclamations, and investment and business licensing)

Most of the legal frameworks for dairy service delivery in the country are limited to animal disease, new organ establishment and the investment and business licensing proclamation.

One of the old aged proclamations related to service delivery is the animal disease proclamation that dates back to 1940's. Between 1994 and 1971, there are at least four proclamations and amendments issued for the control of animal disease. In this regard, the recent is the Animal Diseases Prevention and Control Proclamation No. 267/2002 part four that puts registration of animal health professionals and delivery of services.

The cooperative society proclamation (147/1998) allows the establishment of cooperatives societies to actively participate in the free market economic systems is the other. This proclamation allows cooperatives to acquire land, and receive government assistance through training and other means (capacity building, auditing), notwithstanding the incentives permitted by the investment code. Licensing and supervision of Micro-Finance Institutions (40/1996) and the directive issued by the NBE (MFI/05/96) are policies governing the formulation and cooperation of MFI.

Proclamation to No 102/1996 to establish Quality and Standard Authority of Ethiopia (QSAE) can be cited as legal provision to control the quality of the service in a pluralistic service delivery framework. A proclamation to provide drug administration and control (Proclamation no. 176/1999) is prepared realizing the significant role of health in securing proper life and productivity of the people and recognizing that drug shares a vital role in the health service, as well as in animal fertility and productivity and economic development of the country. Hence, this proclamation is developed to establish an effective system of drug administration and control where vet drugs fall in this system.

The investment proclamation No 280/2002 and 373/2003 and investment regulation (84/2003) gives a room for investment climate and stipulates incentive for private sector development and are relevant for dairy service delivery. Commercial registration and business proclamation (67/1997) prohibit engaging in any commercial activity unless registered in a commercial registry and requires to present certification of professional qualification and statement related to the commercial activities. In this regard, list of commercial code were prepared for registration where dairy related services such as dairy farm, milk and dairy processing, animal feed, forage, veterinary service and AI services (both semen importation and field level services) in retail, whole sell, industry and import and export trades and consultancy service are clearly outlined.

2.5 Theoretical Framework for Assessing an Organization's Performance

Performance is the ability of an organization to meet its goals and achieve its overall mission. An organization's performance is influenced by its capacity, by its internal environment, and by the external environment in which it operates. It can be expressed in terms of four key indicators: effectiveness, efficiency, relevance, and financial sustainability (See Box 1).

In assessing the performance of advisory services, Birner *et al.* (2006) provided approach to measure and explain the performance and quality of agricultural advisory services. Accordingly, research on performance can be based on monitoring and evaluation systems that are used by advisory services, even though independent data collection is also important to overcome the potential bias. Most public sector advisory services have some type of monitoring and evaluation in place. Activity monitoring is in fact a standard instrument in the public administrations. For advisory services, activity monitoring usually refers to number of clients visited, number of demonstration plots established, etc. Donor-funded projects involve monitoring and evaluation systems that are often carried out in addition to reporting systems of the public administration. NGOs can also play an important role in measuring and publicizing the performance of public services. Data on performance collected by researchers, NGOs or the service providers themselves are relevant for supporting learning processes within an organization. This insight has led to the development of process monitoring approaches, in addition to conventional progress monitoring. Research on performance systems for advisory services should contain elements of both progress and process monitoring, and of evaluation. Action research that involves clients and stakeholders in defining the performance criteria to be monitored and evaluated can be an important research strategy in this context. Likewise, methods of impact chain analysis or outcome mapping is also useful in this context. Research on the performance of advisory services can make important contributions to the quality management of services delivered by different service providers and to the management of contracts with service providers. Hence, measuring to which extent an advisory services system is demand-driven requires measuring how well this organization and aggregation process works.

Elements of the organizational assessment framework

Organizational performance refers to the ability of an organization to meet its goals and achieve its mission. Performance can be gauged in terms of four key indicators:

- Effectiveness: the degree to which the organization achieves its objectives;
- Efficiency: the degree to which it generates its products using a minimum of inputs;
- Relevance: the degree to which the organization's objectives and activities reflect the necessities and priorities of key stakeholders;
- Financial sustainability: the conditions to make an organization financially viable.

Organizational capacity refers to the resources, knowledge, and processes employed by the organization. Includes:

- Staffing;
- Infrastructure, technology, and financial resources;
- Strategic leadership;
- Program and process management;
- Networks and linkages with other organizations and groups.

External operating environment refers to the external environment in which the organization carries out its activities. Includes:

- The administrative and legal systems in which the organization operates;
- The policies and political environment that influences the organization;
- The social and cultural milieu;
- The technology available;
- Economic trends.

Internal environment refers to internal factors that influence the direction of the organization and the energy displayed in its activities. Includes:

- Incentive and rewards systems;
- The organizational 'climate' or 'culture';
- The history and traditions of the organization;
- Leadership and management style;
- Clarity and acceptance of the organization's mission;
- Extent of shared norms and values promoting teamwork and pursuit of organizational goals;
- Organizational structure.

Box 1. Elements of the organizational assessment framework

Source: Horton *et al.*, 2003

In addition, Blum (2008) gave list of indicators for assessing the status of extension systems and the quality of services in nine major topics. The indicators entail extension system actors and characteristics of the system, coordination of advisory services, linkages and partnerships, governance structure and client involvement, human resource capacities, extension service, funding and financial expenditures, support systems and demand side of service.

2.6 Empirical Studies

A number of empirical studies have been conducted by different people and institutions on agricultural service worldwide. The studies are mainly concentrated on describing the operation and effectiveness of the current government dominated extension system, experience of transforming the public extension services, demand for private extension service, pluralistic extension service and farmers' willingness to pay for extension service. But studies conducted on pluralistic agricultural service delivery are minimal. Accordingly, review of the empirical studies deal in this study focuses on evaluation extension service reform on governance structure, evaluation of other agricultural services and farmers' willingness to pay for agricultural service.

Evaluation of extension services

In Zimbabwe, the status of the local extension system was evaluated using the rapid appraisal of agricultural knowledge system (RAAKS) methodology complemented by qualitative research techniques. More over the study utilized SWOT analysis within both organizations and the agricultural extension system as a whole. The study identified the various actors in the agricultural extension service delivery, strengthen, weakens and opportunities of each actors. One of the study major findings was that formal linkages among agricultural extension service providers are weak because they tend to be more personalized than institutionalized (Hayani-Mlambo, 2002).

Anderson (2007) analysis picked Ghana as a typical of many of the recent reforms that decentralized public extension service of the Ministry of Food and Agriculture (MOFA). According to Asuming-Brempong *et al* (2006), program review based on interviews with 59 stakeholders, decentralization has not happened as planned; with much control still coming from central units. Moreover, Rivera and Alex, (2005-Vol I) categorize this reform as incomplete decentralization.

An internal and external evaluation on the Kenya National Extension and Livestock Agriculture Programme (NALEP) review carried out in 2006 based on subjectively judged relevance, sustainability, efficiency, and risk perceptions revealed demand driven extension service has emerged also reaching the poorer segments of the rural communities, such as landless, HIV/AIDS widows. The internal assessment also showed increased

business orientation where 55% of common interest groups visited were actively involved in marketing of members produce.

Impacts of extension services in Rural Mozambique (Gemo *et al.*, 2005) showed a positive effect recorded for knowledge increase and livelihood improvement of farmers concluding that a gradualist approach to outsourcing initiatives is the wisest policy, especially pending careful evaluative processes. Anderson (2007) call these reforms ‘Decentralization with mainly public service delivery’ and evaluate their challenges and achievements as unsatisfactory as it resulted more of the difficulties of implementation than the benefits of so doing.

The Uganda’s reform is a pioneering approach of extension reform in Africa where National Agricultural Advisory Services (NAADS) system is implemented in a combination of decentralization with the involvement of farmers’ organizations and a strong market orientation (Anderson, 2007). Anderson (2007) presented three NAADS evaluation results based on evaluation made by three different approach/methods. The first is qualitative evaluations of NAADS members and non members came with group members were better off (well-being) and empowerment , establishment of sub-county farmer fora, and emergence of private service provider, has been successful in reducing rural poverty. The second evaluation used propensity score matching of participants vs. others revealed that NAADS has significantly improved farmers' (self-rated) access to information - by about 30% and increased objective knowledge and there is no significant difference between participants and non participants in overall profits from agricultural production, per capita consumption expenditures, or yields for the crops included in the survey. Thirdly, the impact of NAADS was evaluated with the objective of quantifying the initial impacts through quantitative methods mostly descriptive statistics. The resulted showed positive impacts on availability and quality of advisory services to farmers thereby adoption of new crop and livestock enterprises and use of modern production technologies and practices. However, no significant differences in yield growth between NAADS and non-NAADS districts for most crops, reflecting the still low levels of adoption of these technologies

Evaluation of other agricultural services

Kaberia (2002) evaluated decentralized animal health delivery project in Mero district, Kenya based on its effectiveness, efficiency and financial viability. The effectiveness of the service was seen based on the degree to which it achieves its goal/purposes. Efficiency and financial viability of the service was evaluated based on the degree to which the practitioners manage to minimize the cost of service delivery: the service affordability by farmers, income of the practitioners and drug shops, overall cost benefits and sensitivity analysis. The evaluation indicated that the farmers are prepared to pay for animal health service as lessons.

In India, Sulaiman and Sadamate (2000) used expenditure intensity, contact intensity and technical manpower ratios of various organizations involved in service provision to assess their performance. Based on the performance analysis, the study identified the organization size, capacity in operation and technical skill and source of finance as important indicators.

Morton and Miheso (2000) examine the perception of smallholder dairy producers on the various livestock service and their organizations. The study used qualitative interview especially listing the advantage and disadvantage of each organization for each livestock service.

Willingness To Pay (WTP) for agricultural service

WTP for agricultural services can be directly or indirectly determined. Holloway and Ehui (2001) and Horna *et al.* (2005) provide indirect way to estimate WTP for extension services. These methodologies are appropriate for cases in which farmers are not familiar with fees for extension services. Holloway and Ehui (2001) estimated WTP of dairy producers for individual extension services visits in Ethiopia. These authors used a traditional consumer model and focused on the cash income constraint to derive the amount of income that the household is willing to forgo in order to have one more additional unit of service rendered. Horna *et al.* (2005) examined farmers' preferences for seed of new rice varieties and their willingness to pay for information, as an indicator of willingness to pay for extension services in rice production in Nigeria and Benin. Farmers' preferences were modeled as a function of the utility obtained from rice seed attributes,

social and economic characteristics of the farmer, and level of information about the variety.

Gautam (2000) in Kenya and Sulaiman and Sadamate (2000) in India provide examples of direct WTP for extension services estimation. In both works, WTP for extension services was elicited through contingent valuation methods, which are survey based economic techniques for the valuation of non-market resources, typically environmental areas. In addition, Sulaiman and Sadamate (2000) used a linear discriminant function to predict farmers' behavior and evaluate the determinants of their willingness or unwillingness to pay. The methodology is appropriate when farmers are familiar with fee based extension services and can give a plausible value. While in India it was already a practice in place to charge fees for livestock services, in Kenya it was seen for veterinary services.

In Nigeria, a study undertaken to assess farmers' willingness to pay (WTP) for extension services. The Contingent Valuation Method (CVM) was used to assess the amount which farmers are willing to pay. Results of the analysis showed that the majority of farmers described them as having the ability to pay for services and are willing to pay if their income from farming would increase and the programmes are made relevant to them. They also want to pay through cooperative societies. The study concluded that there is a challenge to extension specialists to make programmes participatory and farmers relevant if farmers are to be charged with the responsibility of participating in financing agricultural extension services (Ajayi, 2006).

2.6 Conceptual Framework

Hagmann *et al.* (2002) service delivery framework is adopted as the conceptual framework to analyze the pluralistic dairy service delivery system. The framework put service provision to comprise three levels of intervention, those that should not be addressed individually and in isolation but rather be regarded as a system and seen as interdependent. (See figure 1). The three levels are:

1. The local level of where people live, the realities they find themselves in, and the needs which they perceive in order to improve their livelihoods referred as ***'Organizing the demand'***

2. The service providing organizations and their responsiveness to assist and support people in their identified needs and referred as *'Responding to the demand'*
3. The wider support mechanisms at political and organizational levels, which allow for the above to happen and the level is called *'Supporting the Response'*

In such a framework, the simple but fundamental fact applies that service provision responds to demand. Thus, the first and second levels must be addressed simultaneously for the planning of interventions for improvement and change of the system. The policy level not only sets the rules and defines mandates but creates an enabling environment which allows the system to function and – it is hoped – that development will happen.

Hagmann (2007) further put the need for the framework to follow systemic approach centers on political and economic framework conditions, competence and coordination of service providers and organization and articulation of the demand.

In addition, framework for analyzing pluralistic agricultural advisory service of Birner *et al.* (2006) was adopted to analyze selected three sets of conditions that need to be considered when analyzing on pluralistic service delivery: the policy environment; the capacity of potential service providers; and the type of production systems and the market access of dairy producers. The policy environment refers to the political priorities of a country and its agricultural development strategy for providing and financing agricultural services, the proportion of the budget that a government is able and willing to spend on the agricultural sector and the relative priority placed by governments on different goals, including economic growth, social inclusion and environmental sustainability. The capacity, management and organization refer to the capacity for the provision of dairy services, and in which the services are managed with in the respective governance structures. The ability of the dairy producers to exercise voice and formulate demand is an important aspect of the dairy service delivery. This ability is influenced both by the characteristics of the dairy producers and by the characteristics of the dairy service delivery.



Adapted from: Hagmann, Connolly, Ficarelli, and Ramaru, 2002. The Service Delivery Framework

Figure 1. Conceptual framework to analyze dairy service delivery system

3. METHODOLOGY

3.1 Description of the Study Area

Milkshed is dairy producing areas that supply a city with milk. By this definition, *Debrezeit* milkshed covered *Ada'a* district and *Debrezeit* town. *Ada'a* district is one of the 12 districts in East Shoa Zone, Oromiya Regional State, located about 45 kms south-east of the capital, Addis Ababa and is very close to the other major urban centers like Adama and Modjo. The district covers an area of 1750 km², stretching east of the Bole International Air Port to the North West of the Koka dam. The population in Addis Ababa, Adama, Mojo and *Debrezeit* create a large market for most agricultural commodities. There are 27 kebele administrations in *Ada'a* district in addition to 9 urban kebeles in *Debrezeit* municipality with total household size 20,362 in *Ada'a* and 17,490 in *Debrezeit* town.

Agriculture is the main stay of the people in the *Ada'a* District. Households in *Debrezeit* town and its environs are employees and/or pensioned staff in the different organizations in the town and near by towns. Moreover, there are traders, firms owners and dairy farmers in the town. The agro-ecology in the district is best suited for diverse agricultural production. Crop and livestock production are the major source of income and livelihood for the peoples in the district. The district is nationally known for its best quality tef production, which dominates the agricultural production system, followed by wheat and pulses, especially chickpea. Selected wheat producers are linked to Kaliti food complex to supply durum wheat with predetermined quality and premium price. Chickpea is also entering in to market oriented production where producers are supplying Kabuli type for export and food processing company through the Yerer cooperative Union.

Livestock production is an integral part of the production system. Production of cattle, sheep, goat and poultry is a very common practice and there is an existing market-oriented production system. There is long practice of fattening old oxen as a seasonal business – during holiday seasons when the farmers know that they will have ready market. There is also a fast growing smallholder dairy production system with a strong milk marketing cooperatives which involves over 850 smallholder dairy farmers. The area of *Debrezeit* is certainly the most developed milkshed of the country, providing most of the dairy

products available in the market of Addis Ababa, the largest and most diversified market of Ethiopia.

There are a number of farmers' service cooperatives in the district and unions with the surrounding districts. There are 90 farmers' association which were organized in three unions (multipurpose, Saving and credit , and mining) and six types of cooperatives where there are 21 multipurpose cooperative with 21,351 members (14.52 % females), 34 S & C cooperatives with 3,503 members (39.88 % females) (WOCP, 2008 personal contact). One of them is *Ada'a Dairy Cooperative*, which is the biggest and advanced dairy cooperative in Ethiopia, both in terms of number of members and volume of production with its own feed and milk processing plants. One of the unions (*Yerer lume farmer cooperative*) has started to import and distribute fertilizer, and purchase of improved seeds (wheat, chickpeas) from farmers (Berhanu *et al*, 2006b) and grain marketing for local and export market.

Infrastructure like telecommunication, electric power, elementary and high schools, National Veterinary Research Institute, Faculty of Veterinary Medicine, the *Debre Zeit Agricultural Research Center* etc. contribute to the development of the rural poor, particularly for *Debre Zeit* farmers and the country in general. Rural roads that branch to different kebeles and villages have greatly helped in the supply of inputs and outputs of agricultural products. The Addis Ababa–Djibouti railway line runs for about 28 kms with in the milkshed. Moreover, the area is known for its large scale commercial broiler and egg production has taken place in or near *Debre Zeit* town.

The district has the potential for both crop and livestock production, which is mainly undertaken by smallholder farmers. There are also a relatively growing number of commercial farms and agro-processing industries operating in the area. The district agricultural potential and the infrastructure and institutional arrangements has made the emergence of private service providers such as animal feed factory, private animal health institutions, agro processors and private livestock farms. *Debre Zeit* milkshed is thus a demonstration site that shows the direction to other national dairy producing areas for the commercialization of the sector.

3.2 Sampling Procedure

Two- stage sampling procedure was used to select sample kebele Administrations (KAs) and respondents. Firstly, the milkshed was stratified into three groups, namely, urban, peri-urban and rural based on their proximity to *Debrezeit*. A list of rural and peri-urban KA in the milkshed was obtained from the district agricultural and rural development office. *Debrezeit* City Administration Trade and Industry Office provided a list of the urban kebles. Then, one KA from each stratum was selected randomly since the stratum is supposed to be homogenous. Secondly, list of all dairy producers were prepared by enumerators. Sample size was determined based on the researcher time and resource availability and accordingly the total sample size for this study was 150 dairy producer households. Then, dairy producers were randomly selected based on probability proportional to size (PPS) of dairy producers household population in the KAs (Table 3).

Table 3. Number of dairy producers and sample size

Dairy Subsystems	Total No of KAs	Selected Kebele	Total No of dairy producers	Sampled respondents
Urban	9	Kebele 02	158	70
Peri urban	13	Ude	108	48
Rural	14	Hidi	72	32
Total			338	150

Source: Survey Result (2007)

3.3 Method of Data Collection

The study required both primary and secondary data. Pertinent secondary data was obtained from various sources including *Ada'a* dairy cooperative, *Ada'a* district offices of the agriculture and rural development, Federal Ministry of Agriculture and Rural Development (MoARD) on government policies and strategies, ILRI/IPMS *Ada'a* Pilot Learning Site, and private sector, community based organizations (cooperatives/associations) and NGOs involved in dairy service in the milkshed.

The required primary data has been gathered from the sampled dairy producing households, public and private service providers, dairy development projects and relevant non government organizations. Pre-tested interview schedule and checklists were

employed as survey instruments. In addition, data generated by Rapid Appraisal of Dairy Innovation Systems by IPMS project in Ada'a and review of government policy and strategy documents supplemented information generated by household survey. Summary of the major source for primary data is presented in Table 4.

Table 4. Summary of the major sources for primary data

Sets of data	Source	Sampling method	Data collection method
Dairy producers socioeconomic characteristics, dairy production system and market access, demand for dairy related services, and perception on the quality of dairy service delivered by different providers	150 sample dairy producing household heads (HHH)	Simple random sampling after two stage sampling	HH survey using semi structured interview
Willingness to pay for the dairy advisory service	>>	>>	The contingent valuation survey
Evolution of dairy service delivery, performance and characteristics of the dairy services delivery system,	Selected representative dairy producing HHH	Convenience Sampling	Focus group discussion using a checklist
Types and coverage of service, Linkage with other actors , capacity and management of the organization, opportunity and constraints in the business	Private feed suppliers	Convenience Sampling	Interview using a checklist
	Vet drug retailers	Census	Interview using a checklist
	Ada'a Dairy Cooperative WOARD	Case Study	Interview using a checklist
	NGOs	Case Study	Interview using a checklist
		Convenience Sampling	Interview using a checklist
Government policy environment and future plan	MoARD	-	Interview using a checklist

3.4 Method of Data Analysis

The data generated are quantitative and qualitative in nature. Therefore, qualitative assessment was employed for data collected through focused group discussion, dairy service providers' survey and government policy document narrative analysis. The role of the service providers was seen based the configuration of various actors involved, their interactions, mechanisms for linkages, and knowledge flows using Innovation System Framework (Hall *et al*, 2007). The actors' performance in the dairy service delivery was evaluated based on its effectiveness, efficiency, relevance and prospects of financial sustainability. Effectiveness, relevance, efficiency and prospect for financial sustainability are the four dimensions of organizational performance (Horton *et al.*, 2003).

Quantitative data collected from the producers' survey was analyzed using descriptive statistic. Based on producers' survey data, socio economic characteristics of dairy producers, the perception on quality of the various dairy related services and their willingness to pay for dairy advisory was assessed. Moreover, Contingent Valuation Method (CVM) was used to measure the willingness to pay for dairy advisory service.

3.5 The Contingent Valuation Method

Estimating Willingness to Pay (WTP) for dairy service

There are two approaches to assessing willingness to pay (Ahuja and McConnel, 2000). One is to exploit observation on prices and quantities currently consumed to estimate demand curves, and infer willingness to pay from there. The second approach is contingent valuation method (CVM), a more direct assessment of preference. This approach uses responses to hypothetical questions to infer preference and willingness to pay. For the purpose of estimating willingness to pay for dairy service, a household survey and a contingent valuation survey was implemented.

There are different approaches of valuation techniques to eliciting information about the respondent's WTP. In early application of the CVM, respondents were often asked open-ended questions about their WTP. An open-ended question might be worded as follows: "What is the most you would be willing to pay for...?" and is intended to elicit a point estimate of the respondent's WTP. It is nowadays less and less frequently used due to

obvious respondent difficulty in answering the payment question, which results in many missing values for WTP. The iterative bidding approach starts by querying individuals at some initial dollar value and keeps raising (or lowering) the value until the respondent declines (accepts) to pay. This final dollar amount is interpreted as the respondent's WTP. However, this approach has been virtually abandoned because it tends to result in starting point bias; an effect such that the final WTP amount at the end of the bidding game is systematically related to the initial bid value. Another disadvantage is that repeated questioning may annoy or tire respondents, causing them to say "yes" or "no" to a stated amount in hopes of terminating the interview (Albertini and Cooper, 2000).

The most widely used approach to eliciting information about the respondent's WTP is the so-called dichotomous choice format. The dichotomous choice payment question asks the respondent if he would pay X to obtain the service. There are only two possible responses to a dichotomous choice payment question: "yes" and "no". The dichotomous choice approach mimics a behavior in regular market where people usually purchase or decline to purchase a good/service at a stated price. To improve the precision of the WTP estimates, in recent years researchers have introduced follow up questions to the dichotomous choice payment question (Hanemann and Kanninen , 1998). The payment offered in the follow up question will be greater than that offered in the initial payment if the answer to the initial payment question is "yes" and vice versa. Finally, the dichotomous choice follow-up question is followed by an open-ended follow-up question ("What is the maximum you would pay for...?" (Albertini and Cooper, 2000).

In this study, Contingent Valuation Method (CVM) was applied to elicit the willingness to pay (WTP) for dairy advisory service. The questionnaire contains questions on the amount of money farmers were willing to pay per visit. Dichotomous choice format questions, with one additional dichotomous choice and with an open ended follow up questions, were used to elicit the WTP. Rather than asking directly the respondents' WTP, in the dichotomous choice format, a respondent was asked about his WTP a pre-specified amount for the service in question. It is argued that this choice is easier for respondents to make than the conventional CVM willingness to pay decisions, where respondents are asked open-ended questions (Bennett and Carter, 1993). A pre-test was done on 10 selected respondents in the peri urban kebele to find starting points for eliciting WTP in the main survey. Open-ended questions were used in the pre-test. The starting point

identified for WTP is birr 10.00 per visit taking the currently price paid for other dairy related services (eg. Birr 20 is charged per AI and bull service). A visit as a reference period is believed to be a good length of time for producers especially in terms of evaluating the advisory service.

CVM application: problems and ways of attempting it

Problems of CVM include lack of information about the true WTP, strategic behavior in response and hypothetical nature of the survey. Lack of information about the true WTP is a problem in relation to controlling the reliability of the obtained CVM values. Indications about reliability can be obtained through undertaking a given CVM study at different points in time, the so-called test-retest situation. This can provide information about the extent to which similar CVM values are obtained given no change in other conditions (Holvad, 1999).

The structure of CVM surveys can lead to strategic behavior among the respondents. For example, if the respondents perceive that the good/service as likely to be provided irrespective of the stated preferences then there could be incentives to free-riding implying lower WTP's. On the other hand if respondents perceive that the provision of the good/service is contingent on the stated preferences combined with the impression that eventual payment is a fixed amount then that could lead to overstating the true preferences. The hypothetical character of CVM could lead to problems if the respondents have difficulties in coping with such a survey. It could lead to irresponsible behavior giving too high or too low values because of uncertainty concerning the good in question and because the hypothetical character could be perceived as implying that responses given have no consequences. To a large extent this problem can be limited through appropriate survey design and using CVM in relation to situations/ experiences which are familiar and well-perceived (Holvad,1999). One way of attempting to disguise the strategic bias incentive is the use of dichotomous choice version of the CVM. In dichotomous choice format, respondents are asked if they are willing to pay a pre-specified amount for the service in question. This disguises the incentive for strategic behavior (Bennett and Carter, 1993). In this study, the questionnaire was designed in such a way that strategic biases were avoided. In order to help in avoiding strategic bias two different opening statements were prepared. One was intended to capture any strategic

behavior and the second one was especially designed to discourage respondents from incorporating any strategic element (See Appendix 8).

As explained by Hanley *et al.* (1997), the following steps were adopted to exercise the CVM. The first step set up a hypothetical market to dairy advisory service in question. This sets up a reason for payment for services where direct payment is currently not exacted. How funds raised also need to be described, that is, the payment vehicle must be decided upon. Accordingly, per visit payment vehicle was selected. The question were pre-tested before the main survey occur using a small number of respondents.

The second stage is obtaining bid value. A closed-ended with double bounded referendum model was presented to those respondents who say no to the first amount with a lower amount and those who say yes to the first amount with a higher amount.

Stage three deals with obtaining the mean WTP. Following Hanemann and Kanninen (1998), double bound non parametric test were adopted to measure the mean willingness to pay.

Non Parametric Estimation of the willingness to pay from dichotomous CV responses

It was assumed that the dairy producers knew the inherent value of the advisory service. The decision making process of potential producers' willing to pay was expressed as:

$$WTP_i = L_i = \alpha + \beta_i X_i + \varepsilon_i ; \text{ If } \beta_i X_i + \varepsilon_i > 0 \text{ ----- (1)}$$

Where:

L_i , denoted an unobservable index variable

$$WTP_i = 0 \quad \text{If } \beta_i X_i + \varepsilon_i \leq 0$$

$$\varepsilon_i \approx N(0; \delta) \quad I= 1 \dots n$$

WTP_i was the observed response of the i^{th} dairy producer. L_i is continuous for the producers willing to pay for advisory service, and $WTP_i = 0$ for the producers who are not willing to pay. A dichotomous choice (simple referendum) survey design was used to select the willingness to pay. Following Gorham (1998), various levels of payment that

respondents were willing to pay for advisory service per visit were estimated. The estimated amounts were used to calculate a lower bound mean (LBM) of household WTP_i for advisory service as per Kristrom's non-parametric method. Kristrom's (1990) non-parametric method consists of grouping the frequency of the "yes" response to the bid range in a monotonically decreasing order with increasing bid ranges and connecting the points by linear interpolation. To obtain the mean of WTP_i, the integral below the cumulative density function is approximated as shown in the following equation:

$$E(x) \text{ in the interval } x_1 - x_2 \quad \int_{x_1}^{x_2} xf(x)dx = x[F(x_2) - F(x_1)] \text{ for } x_1 \leq x \leq x_2 \dots\dots\dots (2)$$

Where x_1 and x_2 are the lower and upper limits of bid x , respectively, and $f(x)$ and $F(x)$ are the probability density function and cumulative distribution function, respectively. The mean willingness to pay is the sum of all the sub-means. Using the lower limit of each interval for every bid x_i and applying equation (2) for each interval, the mean willingness to pay is estimated as:

$$LBM = \pi_0 (P_0) + \sum_{i=1}^k \pi_i (P_i - P_{i-1}) \dots\dots\dots (3)$$

Where π_0 is the cumulative percentage of respondents willing to pay the initial or smallest finite amount offered (P_0), and k is the number of subsequent amounts offered.

4. RESULTS AND DISCUSSION

This part of the thesis presents the major findings of the study under five sub sections. The first subsection presents the dairy producers' and the dairy production system characteristics in the milkshed. The second describes the actors involved in dairy service delivery (DSD) highlighting their roles, interactions and coordination and identify role gap. The performance of the major actors in DSD is analyzed in third subsection. The implications of current service delivery system to develop pluralistic service delivery is analyzed from the perspective of government polices and institutional arrangements in the forth subsection. Finally, the fifth subsection discusses the options for developing a service delivery system, which is accountable and responsive to the customer by analyzing producer's willingness and ability to pay for dairy advisory services.

4.1 Description of the Dairy Systems and Sample Household Characteristics in *Debrezeit* Milkshed

According to Birner *et al* (2006), characteristics of producers and the production system play an important role in facilitating design of agricultural service delivery. Heterogeneity in terms of land holdings and source of livelihood, sex, education and other demographic factors influence the capacity of dairy producers to demand and pay for services. Moreover, the dairy system also influences the opportunities and needs for dairy service delivery since type, intensity and diversity of the dairy produce and producers' access to input and output markets and other services differ across sub systems.

ILRI research methodology for characterizing dairy production systems has been used to characterize the dairy system in the milkshed (Agyemang *et al.*, 1990). Accordingly, dairy system was characterized in terms of urban, peri-urban and rural locations in the milkshed, details of which are presented in section 4.1.1 and 4.1.2.

Respondents in this study consisted of household heads or responsible person and/or owner of the dairy enterprise in the family; which tuned out to be the wife of the household heads in the most cases. The analysis of this study was based on this consideration. Tables 5-8 indicate characteristics of the respondents related to dairy

development and the dairy system in the milkshed. In addition, the status of the entire sample and the three dairy subsystems (urban, peri-urban and rural) with respect to selected variables has been indicated. Test of difference among the three dairy sub systems have employed chi-square, t-test or F-ratio, as appropriate. T-test was used when only two sub systems are compared.

4.1.1 Dairy production system characteristics

Dairy production and management systems

Table 5 shows selected variables that are used to characterize the dairy system in the milkshed. Almost 50 % of the dairy cows were crossbred cows of local with Holstein-Friesian. The distribution of crossbred cows was highly skewed with 91.4 % found in urban subsystem and none in the rural subsystem. Variation in crossbred cow ownership across the subsystems was statistically significant at 5 %. The initial source of the crossbred cows or heifer for the existing herd were WOARD, ILRI-DZ, purchased from dairy farmer/farm, breeding from neighbor, breeding from AI and gift from relatives. The difference in the source was statistically significant at 1 % across the subsystems where 85.9 % and 50.0 % of the producers with crossbred cows acquired the starter heifer/cow by purchasing from dairy farms in the urban and in the peri urban subsystem, respectively whereas 33.3 % of the peri urban producers acquired from WOARD.

The herd composition recorded from the study showed the presence of local and crossbred cows, heifer, calf and bull in the herd with average total herd size of 3.9, 5.31 and 5.34 in the urban, peri urban and rural sub systems, respectively. The average number of local cows per household in the milkshed is 1.13 with highly statistically significant difference across the subsystems where only 6 respondents in the urban subsystem with a range of 1-3 local cows per household. On the other hand, the peri-urban and the rural dairy producers kept 1.94 and 1.87 local cows on an average, respectively. With regard to crossbred cow ownership, the opposite was found to be true. The average number of crossbred cows per household in the milkshed was 1.06 with highly significant difference between the urban and the peri urban subsystems. The highest ownership was observed in the urban subsystem with an average holding of 2.03 whereas the peri urban average holding was 0.37 and zero in the rural subsystem (Table 5).

There was a high statistical difference in both the local and crossbred milk yield in lt/day (Table 5). The average milk yield from a local cow is 2.10 lt/day in the milkshed, with a highest of 3.74 lt/day in the urban and the lowest of 1.86 lt/day in the peri urban subsystems. Similarly, crossbred cow productivity varies across the urban and peri urban sub systems with an average milk yield of 9.63 lt/day in the milkshed, 10.73 lt/day in the urban and 4.71 lt/day in the peri-urban subsystems. This variation in the average milk yield (lt/day) across the subsystems is attributed to the difference in management and feeding system, which will be discussed in the next paragraph.

The three dairy subsystems in the milkshed showed highly significant difference with their dairy cow management. In the milkshed, 92.3% of the crossbred cows were under stall feeding system while 100 % of the crossbred cows were stall fed in the urban subsystem. In contrast, the local cows were left in the field for open grazing in the rural (100 %) and peri urban (97.8%) systems. In the urban system, even for the local cows stall feeding (54.5 %) and tethering (27.3 %) were practiced. The stall fed cows in the urban subsystem were provided different feed, where the proportion of respondents who provides the different feed were found to be 50 % hay, 65.7 % processed feed, 90 % nough cake, 95.7 % wheat bran, 100 % purchased crop residue, 50% factory by-products, 82.9 % green grass and 5.7 % improved forage. The rural and peri urban subsystems provided dairy cows with crop residues, green grass and concentrates such as nough cake and wheat bran for milking cows though they purchase the concentrates mostly for fattening oxen. In addition, the peri-urban producers (39.6 %) supplement their dairy cows with improved forage, mostly oat /vetch mixture where as small proportion of the urban producers (5.7 %) supplement elephant grass grown at home garden.

The type of barn the dairy cows are housed has showed highly significant difference across the sub systems where 86.6 % and 40.0 % of the urban and per- urban dairy cows, respectively were kept in a barn with iron sheet roof or grass roof whereas 96.9 % and 33.3 % in the rural and peri urban systems respectively were housed in fenced barn.

The breeding system adopted by the dairy producers showed a highly significant difference across the subsystems. As indicated in Table 5, 100 % of the rural dairy farmers and most in peri urban system (83.3 %) used local bulls for natural mating whereas the urban dairy producers used AI and improved bull (93.8 %).

Table 5. Dairy system characteristics

Variables	Total sample	Sub system			Test value (χ^2 /F/t)	Sig.
		Urban	Peri-urban	Rural		
Crossbred ownership					92.077	**
Yes (%)	49.30	91.40	25.00	0.00		
No (%)	50.70	8.60	75.00	100.00		
Source of the first crossbred cows (%)					18.601	***
WoARD	11.80	7.80	33.30			
ILRI-DZ	1.30	1.60	0.00			
Purchased from dairy farmer/farm	80.30	85.90	50.00			
Breeding from neighbor	2.60	3.10	0.00			
Breeding from AI	1.30	0.00	16.70			
Gift from relative	1.30	1.60	0.00			
Dairy cows ownership size (mean)						
Total dairy herd	4.66	3.90	5.31	5.34	6.393	***
Local cow	1.13	0.24	1.94	1.87	117.437	***
Local heifer	0.44	0.08	0.58	1.00	21.033	***
Crossbred cow	1.06	2.02	0.37	-	7.611	***
Cross heifer	0.36	0.67	0.15	-	3.644	***
Dairy cow productivity						
Local cow (lt/day)	2.10	3.74	1.86	1.91	24.586	***
Crossbred cow (lt/day)	9.77	10.77	4.71	-	4.508	***
Local cow lactation length (months)	8.36	7.32	8.53	8.47	1.267	NS
Cross cow lactation length (months)	9.88	10.01	9.25	-	1.149	NS
Crossbred cow management (%)					10.620	***
Grazing	2.70	0.00	16.70	-		
Stall feeding	92.30	100.00	83.30	-		
Local cow management (%)					62.473	***
Grazing	88.60	18.20	97.80	100.00		
Tethering	3.40	27.30	0.00	0.00		
Stall feeding	8.00	54.50	2.20	0.00		
Barn type (%)					126.466	***
No Barn	3.30	5.70	2.10	0.00		
Fenced Barn	31.30	0.00	33.30	96.90		
Barn without roof	8.70	7.10	16.70	0.00		
Barn with grass roof	6.70	1.40	18.80	0.00		
Barn with iron sheet roof	50.00	85.20	29.20	3.10		
Feeding type/system (%)						
Hay	33.33	50.00	12.50	28.10		
Processed feed	34.00	65.70	8.30	3.10		
Nough cake	80.67	90.00	62.50	87.50		
Wheat bran	79.33	95.70	62.50	68.80		
Improved forage	16.00	5.70	39.60	3.10		
Green grass	84.00	82.90	93.80	71.90		
Crop residue	97.33	100.00	97.90	100.00		
Factory by-product (molasses and urea)	27.33	50.00	10.40	3.10		
Breeding system (%)					112.504	***
Local Bull	52.40	6.20	83.30	100.00		
Improved Bull	6.90	7.70	10.40	0.00		
AI	24.10	52.30	2.10	0.00		
AI and improved Bull	16.60	33.80	4.20	0.00		
Total (N)	150	70	48	32		

Remark: When only two sub systems are compared (cross bred owners), t –test was used
 ***, **, and * statistically significant at 1 %, 5 %, and 10 % probability level, respectively

NS- statistically not significance

Source: Survey Result (2007)

The study revealed that the difference in the dairy production systems has implication in the type of dairy service that a dairy producer demands. The urban sub system with higher number of crossbred cows demand AI service, home based veterinary services, advisory service on improved dairying. More specifically, the urban sub systems demand a different advisory service for its concentrates based feeding systems following its zero grazing and space constrained systems (waste management). On the other hand, the peri urban and rural sub systems demand for dairy services that concentrate on cross breeding, feed and improved dairy management

Experience in milk and milk product marketing

The dairy producers in the milkshed had started supplying milk to the market 25 years ago with an average of 3.89 years. Statistically, there was a highly significant difference in the average number of years producers had supplied milk to market. The urban, peri-urban and rural subsystems started supplying milk since 7.82, 3.49 and 0.71 years, respectively. The earliest markets for the milk were neighbors and cafés through contract arrangement. Now days there are two other major milk market outlets in the milkshed (Ada milk cooperative and private milk processors that are operating in the area like Sebeta agro industry, Lema Milk, and Genesis Farms) (Table 6). The three subsystem also shows a highly significance difference on milk market link where 100 % of the urban producers are linked though 79.2 and 90.6 % of the peri-urban and rural producers, respectively are not linked to milk market.

Access to the three markets (informal milk market, Ada cooperative and private processors) also varied across the subsystems and it was highly significant at 1 % for the informal milk market and *Ada'a* milk cooperative. The average number of years since producers started accessing the Ada milk cooperative was 1.73 while the maximum was 8 years. The peri urban producers started accessing this market four years ago whereas the rural producers have not yet been linked to this market. The third market outlet operational in the milkshed is the private milk processors, where the average number of years is 0.17 for the milkshed with a maximum of 4.5 years when Lema milk started to collect milk from the peri-urban producers (Table 6).

In addition to market link, percentage of milk marketed and processed was analyzed to characterize the dairy system with respect to its market orientation. Percentage of milk

marketed from the local and crossbred cows has shown a statistically significant difference at 1 % and 10 %, respectively where the urban and peri urban producers marketed 81.13 % and 72.50 % of the milk from crossbred, respectively. On the other hand, the percentage of milk marketed from the local cows was 52.45 % in the urban, 2.63 % in the peri urban and 5.73 % in the rural subsystems.

Table 6. Experience in milk and milk product marketing

Variables	Total sample	Sub system			Test value (χ^2 /F/t)	Sig.
		Urban	Peri-urban	Rural		
Market Link					110.197	***
<i>Ada'a</i> milk cooperative	33.33	61.43	14.58	0.00		
Contract (neighbor/Café)	23.33	41.43	6.25	9.38		
Private milk processors (Mama and Lema)	8.00	17.14	0.00	0.00		
No link	44.67	0.00	79.17	90.63		
No of years supplying milk to contract(neighbor/café)						
Mean	3.89	7.82	3.49	0.71	39.985	***
Maximum (years)	25.00	25.00	24.00	3.00		
No of years supplying milk to <i>Ada</i> milk cooperative						
Mean	1.73	3.51	0.31	-	8.123	***
Maximum (years)	8.00	8.00	4.00	-		
No of years supplying milk to milk processors (Mama and /or Lema)						
Mean	0.17	0.31	0.09	-	1.654	NS
Maximum (years)	4.50	4.00	4.50	-		
% of milk marketed from local cows (mean)	7.87	52.45	2.63	5.73	21.628	***
% of milk marketed from cross cows (mean)	79.97	80.82	72.50	-	1.936	NS
% of milk processed from local cows (mean)	70.72	29.65	78.88	67.47	6.251	***
% of milk processed from cross cows (mean)	1.64	0.00	11.36	-	3.125	***
% of local cow milk products marketed (mean)	20.87	90.62	13.17	19.32	13.605	***
Total (N)	150	70	48	32		

Remark: When only two sub systems are compared (cross bred owners), t –test was used ***, **, and * statistically significant at 1 %, 5 %, and 10 % probability level, respectively NS- statistically not significance

Source: Survey Result (2007)

The market orientation of the urban dairy producers can also be gauged from the percentage of milk utilized for processing and the difference across the subsystems is highly significant. The peri-urban and rural producers have only marketed 13.17 % and 19.32 % of their products, respectively though they processed 78.88 % and 67.47 % of the

milk from the local cow, respectively (Table 6). More importantly, 11.36 % of milk from cross breeds is processed in the peri-urban subsystem where as practice of processing milk from crossbred is not practiced in the urban sub systems. This practice is attributed to the better access to milk market and market oriented production objective in the urban sub system. The study identified the demand for milk market service in the rural and peri-urban sub systems. However, the study recommends further study to delineate specific areas in the rural and the peri-urban sub systems that would be an entry point for market orientated dairy development since dairy is enormously related to accessibility thereby quality and time of inputs and output delivery.

Source of livelihood and income of dairy producers

The major source of livelihood in the rural and peri-urban dairy producers in is mixed crop livestock production with other minor sources such as small trading, daily labor and remittance. On the other hand, the major source of livelihood for the urban dairy producers is monthly salary (42.9%), pension (25.7 %) and small trading (10.0 %). Dairy farming is one of the livelihood sources in the urban subsystem but not necessarily the major source. The urban dairy subsystem is operational in *Debrezeit* town, with no access to arable and grazing land, where as the peri- urban and rural producers have an average of 1.97 ha arable and 0.20 ha grazing land (Table 7).

Table 7. Source of livelihood and income of dairy producers

Variables	Total sample	Urban	Sub system Peri- urban	Rural	t- value	Sig.
Source of livelihood (%)						
Dairy farming	46.70	100.00	0.00	0.00		
Mixed crop livestock farming	53.30	0.00	100.00	100.00		
Pension	12.00	25.70	0.00	0.00		
Monthly Salary	20.00	42.90	0.00	0.00		
Small trading	7.30	10.00	4.20	6.30		
Daily labor	4.00	5.70	2.10	3.10		
Remittance	4.70	7.10	2.10	3.10		
Land Ownership (ha)						
Arable land	Mean	1.97*	-	1.95	2.00	0.218 NS
	SD	1.17*		0.79	1.01	
Grazing land	Mean)	0.20	-	0.18	0.23	1.085 NS
	SD	0.18		0.17	0.19	
Total (N)	150	70	48	32		

* - Mean and SD calculated for the peri urban and rural only

NS- statistically not significance

SD- Standard Deviation

Source: Survey Result (2007)

Income source of the dairy producers is indicated in Figure 2. Source of income also varied following the livelihood source. The average per household total income in the milkshed is Birr 18,093.57 per year where income from milk, crop and livestock production and monthly salary take the major share. The highest income from milk and milk products and monthly salary was observed in the urban sub system, whereas income from sale crop and livestock was the major in the rural and peri urban sub systems. Income from crop and livestock production also showed statistically difference at 10 % between the rural and peri-urban subsystems as the peri urban producers are engaged in market oriented cattle fattening activities. Average income from milk was the highest in the urban subsystem where a maximum of 57, 000.00 Birr/year/household with an average of 14,773.51 Birr /year was observed. In the peri urban subsystem, an average of 1,164.00 Birr/year with a maximum of 11,880.00 Birr/year was earned. On the other hand, the highest average income observed from milk products in the rural subsystem was 297.96 Birr/year/household followed by the peri-urban subsystem with an average of Birr 79.17 Birr/year/household ,which implies these sub system are constrained to access milk market that concentrated in the urban system. Income from milk and milk products is highest in urban center though the average total herd size is the smallest in sub system revealing that crossbred cows are the major contributor for income from milk and milk products as the highest crossbred ownership was seen in the urban sub system. The higher and diversified income source in the urban sub system gives a clue to participate producers in financing of dairy advisory service.

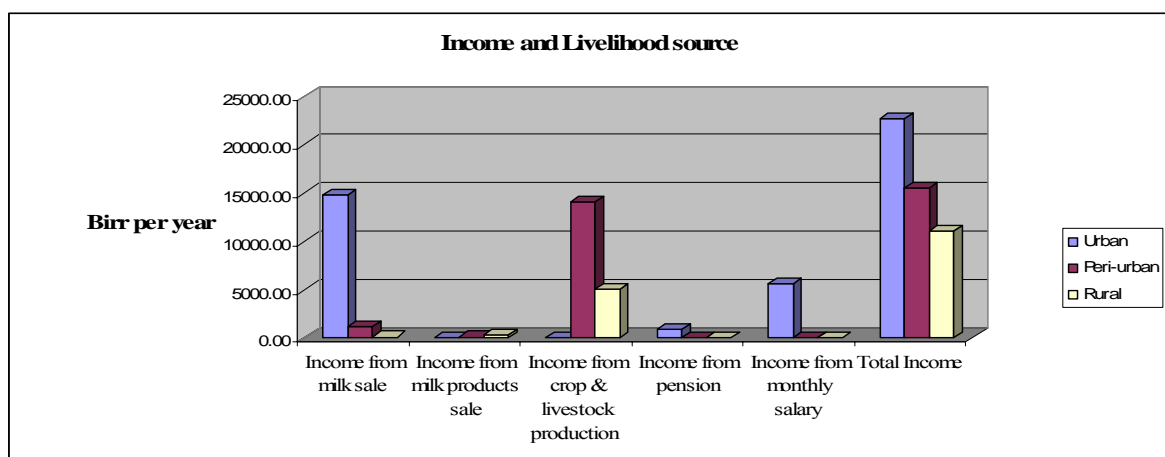


Figure 2. Income and livelihood source of dairy producer
Source: Survey Result (2007)

4.1.2 Demographic characteristics of dairy producers

As the respondents were selected based on their involvement and/or ownership of the dairy enterprise, there were 30.7 % female respondents, much higher than many studies would have. The number of female respondents, who are either household heads or owners of the dairy enterprise, is more in urban subsystem where they comprised 40 % of respondents than the peri-urban and rural subsystem where females comprised 20 to 25 % of the respondents. Sex difference among respondents across different dairy sub-systems is statistically significant at 10 %. Most (38 %) of the respondents were literate who attended grades 1 to 8, followed by 16.7 % who attended grades 9 to 12 and 8.6 % joined higher learning institutes including air force diploma program. Level of education was statistically significance at 1 % across subsystems. The involvement of the retired staff of National Air force at *Debrezeit* in dairy sector was the major driving force for the involvement of literates in the urban dairy subsystem during the 1991 government change in the country. Subsequently, respondents with BSc and MD degree were involved in the sector (Table 8). The urban system with more literate and better educated dairy producers have implication in the design of dairy advisory delivery method, which gives a room to select printed media and manual for promotion of market oriented dairy development.

Table 8. Respondent characteristics

Variables	Total sample	Sub system			Test (χ^2 /F)	Sig.
		Urban	Peri-urban	Rural		
Age	50.23	50.61	52.62	45.81	4.043	**
Education level (%)					42.20	***
Illiterate	24.00	25.70	20.80	25.00		
Read and write	12.70	0.00	27.10	18.80		
Grade 1-8	38.00	30.00	43.80	46.90		
Grade 9-12	16.70	19.00	6.30	9.40		
Grade > 12	8.60	17.10	2.10	0.00		
Sex (%)					5.534	*
Female	30.70	40.00	20.80	25.00		
Male	69.30	60.00	79.20	75.00		
Marital Status (%)					2.154	NS
Married	82.60	81.40	85.10	81.30		
Divorced	4.70	2.90	6.40	6.30		
Widowed	12.80	15.70	8.50	12.50		
Total (N)	150	70	48	32		

***, **, and * statistically significant at 1 %, 5 %, and 10 % probability level, respectively

NS- statistically not significance

Source: Survey Result (2007)

4.2 Actors Mapping in Dairy Service Delivery (DSD)

According to Hagmann *et al* (2002), in pluralistic service delivery environment where there are multiple service providers, clarifying the different roles and mandates of service providers and the type of linkages between service providers are critical to ‘make the service delivery system work as a system’. The purpose of this subsection is to provide information on how the multiple dairy related service providers (actors) are functioning in the *Debrezeit* milkshed: main actors and organizations in the sector with the specific roles they play; extent of linkage between actors and organizations and the nature of these linkages for supporting interaction; level of coordination, and identification of any missing actor or role in the service delivery system. The detailed analysis is presented in four subsections. Section 4.2.1 deals with the different actors from public, private and NGO/CSO and their roles. Section 4.2.2 maps their pattern of interaction. Section 4.2.3 the current level and potential actor for the coordination of dairy service delivery system. Section 4.2.4 presents missing actors and role in DSD.

4.2.1 Actors and their roles in dairy service delivery

Following Birner *et al.* (2006), actors in DSD of *Debrezeit* milkshed were classified and analyzed using the three sector mode (public, private and third sector). The actors’ identification result highlights the diversity of actors involved in DSD. In the milkshed, there are multiple actors involved in dairy service delivery (DSD) from the public, private and third sectors, with the significance of actors and their roles changing over time (Box 2). For the details on the role of these sectors in DSD, see Appendix 1.

4.2.1.1 Public sector role

About 28 years ago, the public sector was the lone service delivery agent engaged in supply of crossbred heifers and related support services (Appendix 3). Currently, the public sector especially WOARD plays a central role in DSD and includes dairy advisory and training, AI, animal health and veterinary and dairy input (crossbred heifer, forage seeds and cutting) distribution services. Other public actors are also involved in DSD. For the details on the role of the public sector in DSD, see Appendix 1.

Box 2. Evolution of dairy service delivery in the milkshed

Emergence of dairy related services in the milkshed traces back to the 1970's to the Minimum package project (Mpp) of MOA which is now taken up by WOARD. Mpp introduced cross/exotic dairy breeds in the milkshed. Since then up to the downfall of the Derge regime in 1991, there were three dairy related services providers namely *Ada'a* Office of Agriculture (now WOARD), FVM and *Ada'a* flour factory. Agriculture office was the major source for advisory, AI and cross breed supply services. DVM was the major source for veterinary service. Producers remember this time as "good time for veterinary services" where a group of professionals (instructor with their students) came to farm households in a 25 seat vehicle to attend to sick animals. They stayed long hours and used this opportunity to learn in-depth about the case, whenever a case was reported to the faculty. The treatment was free. The animal feed supply service, restricted to wheat bran, was supplied by the state owned *Ada'a* flour factory at a subsidized price to encourage concentrate feeding in the area. The government change in 1991 provided a turning point for dairy production and thereby service delivery in the milkshed. Most staffs of the National Air force based in Debrezeit were made redundant with and without pension at this time. This sudden staff displacement forced the air force veterans to look for other income sources besides government pension and dairy was selected by some of the veterans. This enhanced the number of dairy producers and thereby the amount of milk production. Feed shortage and milk market problem evolved as a challenge to the dairy development which resulted in the establishment of *Ada'a* dairy cooperative in 1996 to solve the problem collectively and for reducing dependence on government or private sector for services and inputs, checking exploitation by service providers and assured market outlet and fair price for milk to members. Subsequently, other private service providers have grown. The involvement of *Ada'a* cooperative in milk collection in 2000 could be taken as a milestone in the evolution of the dairy service delivery that encouraged many dairy producers in the urban and peri-urban subsystem to engage in market oriented dairy development leading to the booming of private dairy related service providers.

Source: Focus Group Discussion Result

Dairy advisory and training activity

The dairy advisory and training is currently being provided by 20 Development Agents (DAs) who graduated from ATVET specializing in animal sciences, serving 27 kebeles in the district based in Farmer Training Centers (FTCs). Even though, the FTCs' in the district are not yet fully equipped and geared to perform their envisaged functions, the FTCs in the two kebeles in which this study was carried out, have organized dairy trainings (Table 9). 100 % and 25 % of the trainings in the rural and the peri urban subsystems, respectively were provided by the FTCs. On the other hand, research centers, WOARD and NGO were the different actors providing trainings to the urban subsystem.

Table 9. Dairy training service by organization in the last three years

	Sub System						Total Sample	
	Urban		Peri-urban		Rural		N	%
	N	%	N	%	N	%		
No of training participants	17	24.3	11	22.9	3	9.4	31	20.67
Training Organization								
Research center (D/Zeit & Holeta)	3	17.65	8	75.00	0	0.00	11	35.48
WoARD	3	17.65	0	0.00	0	0.00	3	9.68
FTCs	0	0.00	4	25.00	3	100.00	7	22.58
ILRI DZ & VOCA	8	47.06	0	0.00	0	0.00	8	25.81
NGO (JECCDO)	2	11.76	0	0.00	0	0.00	2	6.45
Genesis Farm	1	5.88	0	0.00	0	0.00	1	3.23

Source: Survey Result (2007)

WOARD through its DA backed by the district subject matter specialist is the major actor who provides information and advisory service on MODD. Table 10 presents the percentage of producers' getting technical information and advice by service provider. The data revealed that currently the urban producers are not getting technical advice from WOARD while covering the major share of the milk market in the milkshed.

Table 10. Source of technical information and advice on MODD

Source by organization	Sub System						Total Sample	
	Urban		Peri-urban		Rural		N	%
	N	%	N	%	N	%		
DA	0	0.00	23	47.90	24	75.00	47	31.33
Ada cooperative	5	7.10	0	0.00	0	0.00	5	3.33
Total (N)	5		23		24		52	

Source: Survey Result (2007)

The development agents provide advice mainly through information dissemination during meetings organized in the kebele (84.6 %) and individual farm visits (25.00 %) (Table 11). The visits are generally undertaken once a month. The advice and information delivered by DAs includes aspects of feeding, management, AI use, health, and improved breed in that order whereas advice and information on milk quality was chiefly provided by *Ada'a* milk cooperative advisory service in the urban subsystem.

Table 11. Advisory and technical information dissemination method

Means /Mechanism	Sub Systems						Total	
	Urban		Peri-urban		Rural		N	%
	N	%	N	%	N	%		
Farm to farm visit by DA	0	0.00	11	47.8	2	8.30	13	25.00
Going to the service provider (milk supply)	4	80.00	0	0.00	0	0.00	4	7.70
Going to DA office (FTC)	0	0.00	0	0.00	2	8.40	2	3.80
Called by the service provider for meeting	2	40.00	19	82.60	23	95.80	44	84.60
Total (N)	5		23		24		52	

Source: Survey Result (2007)

Animal health and veterinary service

The WOARD animal health team is mandated to provide service such as disease prevention and control (clinical service); disease surveillance and information; quarantine and inspection; control of illegal vet drug trade; supervise the operation of private service providers in the sector; and evaluate the standard, professional competence and project proposal of new entrants in the sector. Provision of veterinary service is the major and the day to day activity and encompasses basic animal health education; treatment and vaccination; laboratory diagnosis and sample collection for regional laboratory. In addition to clinical based service, technicians involve in mobile clinical service on call basis and vaccination campaigns.

The producers' survey revealed that the WOARD vet clinic involvement in clinical treatment was only 3.3 %, vaccination (67.57 %), drug sales (10.00 %) and delivery services (14.29 %). The *Debrezeit* FVM is another public veterinary service provider in the milkshed through the "Open-air clinic" (Getachew, 2004), accounting for the provision of 7.69 % of the clinical service and 9.29 % of the drugs. The faculty is also another source of part-time animal health professionals that serve the dairy producers and accounts for 18 % of clinical service and 4.67 % of drug provision during treatment (Table 12).

Table 12. Types and sources of veterinary service in *Debrezeit* milkshed

Type and source	Sub System						Total	
	Urban		Peri-urban		Rural		N	%
	N	%	N	%	N	%		
Clinical service	70	100.00	21	43.80	0	0.00	91	60.67
WOARD vet clinic	1	1.40	2	4.20	0	0.00	3	3.30
<i>Debrezeit</i> FVM	4	5.70	3	6.30	0	0.00	7	7.69
WOARD vet personnel on call basis	13	18.60	15	31.33	0	0.00	28	30.77
Private vet clinic	1	1.40	0	0.00	0	0.00	1	1.10
Private veterinarians on call basis	38	54.33	7	14.60	0	0.00	45	49.45
Part time vet personnel on call basis	30	42.90	2	4.20	0	0.00	32	35.16
Ada cooperative veterinarian	16	22.90	0	0.00	0	0.00	16	17.58
No service	0	0.00	27	56.30	32	100.00	59	39.33
Vaccination service	68	97.10	47	97.90	32	100.00	148	98.67
WOARD vet personnel on call basis	21	30.00	47	97.90	32	100.00	100	67.57
Ada Dairy Cooperative	46	65.70	0	0.00	0	0.00	46	31.08
Private veterinarians	7	10.00	0	0.00	0	0.00	7	4.73
No source	1	1.40	1	2.10	0	0.00	2	1.35
Drug sale	67	95.70	41	85.40	32	100.00	140	93.33
WOARD vet clinic	4	5.70	2	4.20	8	25.00	14	10.00
<i>Debrezeit</i> FVM	7	10.00	6	12.50	0	0.00	13	9.29
Private vet clinic	26	37.20	30	62.50	32	100.00	88	62.86
WOARD vet personnel	5	7.10	0	0.00	0	0.00	5	3.57
Private veterinarians	11	15.70	3	6.30	0	0.00	14	10.00
Part time vet personnel	7	10.00	0	0.00	0	0.00	7	5.00
Ada cooperative veterinarian	21	30.00	1	2.10	0	0.00	22	15.71
No source	0	0.00	8	16.70	0	0.00	8	5.71
Delivery service	26	37.10	2	4.20	0	0.00	28	18.67
Public health personnel	2	7.70	2	100.00	0	0.00	4	14.29
Private veterinarian	16	61.50	1	50.00	0	0.00	17	60.71
Part time vet personnel	16	61.50	0	0.00	0	0.00	16	57.14
Ada Dairy cooperative	3	11.50	0	0.00	0	0.00	3	10.71
Total (N)	70		48		32		150	

Source: Survey Result (2007)

4.2.1.2 Private sector

Private organizations, institutions and individuals providing dairy related services in the milkshed include feed suppliers, veterinary drugs shops, full time and part time veterinarians and assistant veterinarians, private milk collectors, transporters and processors, financial institutions and private dairy farms. These private service providers operate more intensively in *Debrezeit* town with few feed retailers in the peri urban and rural areas. Private organizations play a vital role in the dairy service delivery and can be disaggregated into six types.

A. Private animal feed suppliers

Private animal feed suppliers are the major source of dairy feed in the milk shed (Table 13). There are five types of animal feed suppliers in addition to the *Ada'a* dairy cooperative. Table 14 presents the details of different types of feed suppliers.

Table 13. Source of dairy feed in the milkshed

Feeding type/source	Sub System						Total sample	
	Urban		Peri-urban		Rural		N	%
	N	%	N	%	N	%		
Hay	34	48.57	6	12.50	9	28.13	47	31.33
<i>Ada'a</i> milk cooperative	18	52.90	0	0.00	0	0.00	18	38.30
Own farm	0	0.00	6	100.00	9	100.00	15	31.91
Others' farm	2	5.90	1	16.70	0	0.00	3	6.38
Hay Suppliers	16	47.10	0	0.00	0	0.00	16	34.04
Processed feed	47	67.14	4	8.33	1	3.13	52	34.67
<i>Ada'a</i> milk cooperative	15	31.90	0	0.00	0	0.00	15	28.85
Feed processing	39	83.00	0	0.00	0	0.00	39	75.00
Feed retailers	0	0.00	4	100.00	1	100.00	5	9.62
Processing at home	1	2.10	0	0.00	0	0.00	1	1.92
Nough cake	63	90.00	30	62.50	27	84.38	120	80.00
Feed retailer	61	96.90	30	100.00	27	100.00	118	98.33
Oil processing firm	2	3.20	0	0.00	0	0.00	2	1.67
Wheat bran	68	97.14	30	62.50	23	71.88	121	68.00
Feed Retailers	49	72.1	30	100.00	23	100.00	102	84.30
Flour factories	37	54.4	2	6.70	0	0.00	41	33.88
Green grass	56	80.00	45	93.75	24	75.00	125	83.33
Own farm	0	0.00	45	100.00	24	100.00	69	55.20
Others' farm	56	100.00	6	13.33	1	4.20	63	50.40
Crop residue	69	98.57	47	97.92	32	100.00	148	98.67
Own farm	0	0.00	47	100.00	32	100.00	79	53.38
Others' farm	69	100.00	14	29.80	0	0.00	83	56.08
Factor by product (molasses and Urea)	35	50.00	5	10.42	1	3.13	41	0.00
<i>Ada'a</i> cooperative	34	97.10	0	0.00	0	0.00	34	82.93
Feed retailers	3	8.60	0	0.00	0	0.00	3	7.32
Feed processing (ALEMA)	0	0.00	5	100.00	1	100.00	6	14.63

Source: Survey Result (2007)

Table 14. Details of private feed suppliers in the milkshed

Type	Number and/or name of the firm	Specific feed supplied	% producers' serviced in the milkshed	Service area dimension
Floor and Biscuit /macaroni factories	<i>Ada'a</i> floor and pasta factory in DZ East Africa Floor Factory in DZ Awash floor and biscuit factory in DZ	Two grade of wheat bran	33.88 %	Within and outside Milkshed including export
Animal feed processors	Bora animal feed in DZ Alema animal feed in DZ	Concentrate feed (poultry & dairy)	75.00 %	Within and outside Milkshed
Private dairy farm	Genesis farm in DZ Almaz Farm in DZ	Concentrate feed (poultry & dairy)	0	Within and outside Milkshed
Animal feed retailers	About 15 retail shops in <i>Debrezeit</i> Retail shops in <i>Ada'a</i> district out of <i>Debrezeit</i> town (number not known) Micro and small enterprises (eg. Ude kebele)	Wheat bran Nough cake Processed feed products (Molasses and Urea)	84.3 % 98.33 % 9.62 % 7.32 %	Milkshed
Hay supplier	Hay transporters and retailers in DZ (Number not known) One large scale and export oriented feed supplier in DZ	Hay	34.04 %	Within and outside Milkshed including export

Source: Survey Result (2007)

B. Private Animal Health Service Providers

In the milkshed there are three licensed veterinary drug shops in *Debrezeit* (TDA, Kumeshi and Ziqula) and about 4 part-time animal health professionals from DVM, NVI and DzARC currently involved in animal health service delivery for a fee. TDA and Kumeshi drug shops are run by a veterinarian and Ziqula by an assistant veterinarian studying DVM. One of the full time private veterinarians (TDA) is the major animal health service provider in the milkshed with more customers in the urban and peri urban systems. The producers' survey showed that 49.45 % of the clinical services, 4.73 % of the vaccination service, 72.86 % of drug sales and 60.71 % of the delivery services are provided by the private veterinarian on call basis and/or in the drug shop. Likewise,

35.16 % of the clinical service, 5% of drug sales and 57.14 % of the delivery services are provided by the part time veterinary professionals and para professionals (Table 12).

C. Private milk processing firms

Currently, there are three private milk collectors and processors (Sebeta agro industry, Lema milk and Genesis farm) in addition to *Ada'a* milk cooperative. There is high competition among these actors and the price of milk is determined by the market. Out of the 62 market links of producers recorded in the milkshed, 80.65 %, 17.74 and 1.61 % is with *Ada'a* milk cooperative, Sebeta agro industry and Lema milk, respectively. One reason for the cooperative domination is the fact that the urban study area was far from lema milk and genesis farm locations, dominated by *Ada'a* milk cooperative members.

Sebeta Agro Industry is a modern dairy plant established in April 1998 and has a processing plant and dairy farm located 40 km West of Addis Ababa and 70 km from *Debrezeit* in Sebeta town of Oromia state. *Debrezeit* milk collection site is one of raw milk sources with 315 customers through 6 collection centers since 2004. *Ada'a* milk cooperative used to supply milk to this organization between 2000 and 2003. Sebeta has started to collect milk in *Debrezeit* in 2004 after *Ada'a* milk cooperative terminated the agreement. Currently, an average of 3,000 lt of milk is collected per day from *Debrezeit* with a range of 2,500 to 3,700 lt/day.

Lema milk established a milk processing plant in *Debrezeit* in 2003 and collects milk through 6 collection points in *Debrezeit* and the main center with 25 customers' representative collect an average of 1,700 lt/day with a range of 1,500 to 3,000. The customer representatives have 2-3 milk suppliers. Dukem and Akaki milk cooperatives located 10 and 25 km from DZ respectively are also suppliers of milk to Lema. This was the first processor to collect milk from the peri urban producers 4.5 years ago.

Genesis farm is a private limited company located in *Debrezeit* town and the milk processing unit has been using milk from its own dairy farm (40 %) and urban and peri urban dairy raw milk suppliers (60 %) in the milkshed since 2002. Unlike others, the farm collects milk only at the processing site from 60 customers paying highest price. The farm offers training on milk hygiene and provides feed on credit to its customers.

D. Private improved bull service provider

In the milkshed improved bull is one method for cross breeding. Currently, there are four private improved bull owners in the urban and one in the peri urban subsystems charging 20.00 Br per service. Very recently, IPMS in collaboration with public sector has introduced two bull stations in the peri urban subsystem for efficient cross breeding and to promote private service provider participation in service delivery.

E. Financial institutions

In the milkshed, four financial institutions have been identified as a potential source for dairy credit: Cooperative Bank of Oromiya (CBO), Oromiya Credit and Saving Share Company (OCSSC), Gasha Microfinance Share Company (GMSC) and Bussa Gonofa Microfinance Share Company (BGMSC). Though there are other commercial banks such as Commercial Bank of Ethiopia, Awash Bank and Abyssinia Banks in *Debrezeit* town their involvement in dairy sector is insignificant. The producers' survey showed that none of the producers took credit for dairy development from these financial institutions. For the details on the role of the financial sector in DSD, see Appendix 1.

4.2.1.3 Third sector (NGOs/CSOs, international organizations and external assistance)

Third sector encompasses producers association and international actors and NGO/CSO.

Producers Associations

The only producers association in the milkshed is *Ada'a* dairy cooperative. *Ada'a* dairy cooperative in *Debrezeit* is one of the strongest co-operatives in the country with its own feed and milk processing plant. It is a formal cooperative which was established in September 1996 with a capital of 3,400.00 ETB raised through shares to its 34 members with the major objective of supplying feed to its members at a reasonable price. Now, the membership reached 852 (450 male, 400 female and 2 organizations).

Service provided to members by the cooperative

Currently, *Ada'a* milk cooperative is becoming a prime mover in DSD especially in the urban and peri urban subsystems through its major services to members, which include

feed supply, AI, veterinary services, milk marketing (collection and processing) and advisory services.

Feed supply

The cooperative is providing a stable supply of balanced concentrate feed processed from noug cake, corn (maize), straw, bole (salty soil), calcium (Gypsum) and, wheat bran, at a reasonable price since 2006 by establishing a new feed processing plant. The cooperative is the major supplier of hay, processed feed and factory by-product (molasses) for 38.3 %, 28.85 % and 82.93 % of its members, respectively (Table 13).

Animal health care service

The cooperative has been providing animal health service to its members through its full time veterinarian for routine and emergency services. The household survey revealed that 22.9 % and 11.5 % of the urban dairy producers were served by the cooperative veterinarian for clinical and delivery services, respectively. Moreover, the cooperative has a contractual arrangement with one animal health professional from private dairy farm for preventive vaccination of dairy animals, with vaccines procured from the National Veterinary Institute in *Debrezeit*. The cooperative is the major source of vaccination service to members and non members covering 31.08 % of the dairy producers in the milkshed and 65.7 % of the urban producers (Table 12).

Milk Market related service

Facilitating linkages with milk market is the third major service delivered to members. The marketing service started in 2000, four years after the cooperative establishment. Under the marketing service, the cooperative undertakes three major activities: milk collection, processing and marketing. Milk is collected twice a day, in the morning and evening. There are 14 milk collection centers where members travel 0.2 to 1 km to supply milk on foot.

The cooperative processes milk whenever there is excess milk, mostly during fasting seasons and/or when the milk is returned from its major customer in Addis Ababa, when not able to meet quality standards. Very recently, the cooperative has established a milk processing plant to increase the marketing service efficiency and thereby benefit the cooperative members by increasing profit margin and milk price. The machine is installed

and to started production with a daily milk collection capacity of 15,000 liters. It also intends to diversify the milk products (for example, milk with different fat levels) to satisfy consumer demands. The brand for the product is labeled “Ada’a Milk”. The cooperative sells raw milk, yoghurt, cheese and butter for members and non members in addition to supplying raw milk to Shola*. Members have the advantage of being able to buy the milk products (butter) on credit, which can be deducted from the fortnightly payment due to them.

Information and advisory services

The cooperative has been providing continuous training on improved dairy husbandry (milk processing, hygiene, handling and quality in milk processing, feeding and feed formulation, on farm forage, crop residue management, small scale silage making, breed improvement and animal health care) in collaboration with ILRI-DZ, EIAR-DZ, SNV and IPMS. Training has also been organized in collaboration with VOCA-Ethiopia on cooperative management and record keeping.

International actors and NGO/CSOs

These organization fulfilled four functions in the milkshed: Supporting technology development (ILRI-DZ); technology transfer (IPMS, HUNDEE, Land O’lakes); improving marketing (IPMS, Land O’ lakes, SNV, ILRI); and enhancing the development of non public service providers in the dairy sector (SNV, Land O’lakes and IPMS). For the details on the role of the third sector in DSD, see Appendix 1.

4.2.2 Patterns of interaction

According to Hagmann *et al.* (2002), linkages between service providers in the service delivery system are critical to ‘make the system work as a system’. The different roles and mandates of service providers need to be clarified and even more important; they need to ‘learn to play the roles’ and work together in synergistic way towards making a difference. Hence, to map the interactions thereby learning among the actors in the service delivery

* SHOLA is the milk bran for the government owned dairy development enterprise (DDE), currently privatized

system, Hall *et al* (2007) tools for diagnosis and institutional change in Agricultural Innovation Systems is adopted.

Accordingly, actor interaction is mapped using a matrix where major actors in DSD are listed on both the first row and first column of the matrix (Table 15). Each box in the matrix then represents the linkage between the two actors and represents the type of linkage. Bold box shows strong linkage. Strong linkages were observed between dairy producers and organization involved in the supply of inputs (AI, vet and feed) and milk processors. This pragmatic strong linkage is occurring in the urban sub system and also expanding to the peri urban setting. Where as the others are links that an organization have for the purposes of accessing a technology and knowledge or collaborating on a joint activity, though not strong in this case, but would be more important for supporting continuous improvement of service delivery to take place. The weak interaction among actors radiate from the actors' habit and practice of poor knowledge and information sharing and missing actor/role that are critical for coordinating the service delivery system. These weak interactions call for strong efforts to strengthen the capacities of relevant actors for interacting and learning.

Table 15. Actor linkage matrix in the milkshed

	Ada Dairy Co-op	Dairy Producers (Ada'a Cooperative members)	Peri urban & rural dairy producers (Non cooperative members)	WoARD (Livestock Dep't)	WoARD (Cooperative promotion)	ILRI-DZ (past actor)	EIAR-DZ	DVM	NVI	Sebeta agro industry	Genesis farm	CBO (coop. Bank of Oromiya)	Micro-finance	Private Bull station	IPMS	Land O'lakes	Private vet service	Feed suppliers
Ada Dairy Co-op		Service (market, AI, feed, vet & training)	Market link	Nil	Capacity building, Technical and admin support	Technical support, Capacity building	Technical support	Nil	Vaccine source	Nil	Finance link, Maintenance & technical support	Share holder Bank service	Nil	Nil	Technical support, Capacity building	Technical support, Capacity building	Nil	Source of wheat bran, rough cake, hay
Dairy Producers (Ada'a Cooperative members)		Information exchange, Cross breed source	Cross breed source	AI & vet service	Training Facilitation of organization	Training, Source of crossbred cows	Training, Source of crossbred cows	Vet service	Vaccine source	Market link	Training, Market link	Nil	Source of finance	Bull service	Facilitation of technical support and market link,	Training	Vet service	Feed source
Peri urban & rural dairy producers (Non cooperative members)		Cross breed source	Information exchange, Cross breed source	Service (advisory and training, AI, Vet)	Facilitation Market linkage, Facilitation of organization	Training, Source of crossbred cows	Training, Source of crossbred cows	Vet service	Nil	Nil	Market link	Nil	Source of finance	Bull service	Facilitation of technical support and market link	Technology transfer, Market link	Vet service	Feed source
WoARD (Livestock Dep't)					Joint activity	Joint activity Capacity building and forage seed source	Joint activity Technical support	Nil	Vaccine source (new linkage)	Nil	Nil	Nil	Nil	Nil	Capacity building Joint Activity	Joint Activity	Regulatory and legal service	Nil
WoARD (Cooperative promotion)						Nil	Nil	Nil	Nil	Nil	Nil	Facilitation of linkage between the cooperatives and bank	Nil	Nil	Facilitation of market linkage, Joint activity, Capacity building	Nil	Nil	Nil
ILRI-DZ							Resource sharing	Resource sharing, Student externship	Resource Sharing	Nil	Nil	Nil	Nil	Nil	????	Nil	Nil	Nil

Table 15 continued

	Ada Dairy Co-op	Dairy Producers (Ada'a Cooperative members)	Peri urban & rural dairy producers (Non cooperative members)	WoARD (Livestock Dep't)	WoARD (Cooperative promotion)	ILRI-DZ (past actor)	EIAR-DZ	DVM	NVI	Sebeta agro industry	Genesis farm	CBO (Coop. Bank of Oromiya)	Micro-finance	Private Bull station	IPMS	Land O'lakes	Private vet service	Feed suppliers
EIAR-DZ								Resource sharing, Student externships, joint activity	Resource Sharing	Nil	Nil	Nil	Nil	Nil	Joint Activity	Nil	Nil	Nil
DVM									Resource Sharing	Nil	Vet service, Exposure visit for students	Nil	Nil	Nil	Nil	Nil	Source of knowledge	Nil
NVI										Nil	Vaccine source	Nil	Nil	Nil	Nil	Office	Nil	Nil
Sebeta agro industry											Nil	Nil	Nil	Nil	Nil	Nil	Capacity building	Capacity building
Genesis farm												Nil	Nil	Nil	WALC member	Nil	Nil	Hay wheat and bran source
CBO													Share holder	Nil	WALC member	Nil	Nil	Nil
Micro-finance														Nil	WALC member	Nil	Nil	Source of finance
Private Bull station															Capacity building	Nil	Nil	Nil
IPMS																WALC member	Nil	Nil
Land O'lakes																	Capacity building	Capacity building
Private vet service																		Nil
Feed suppliers																		

Source: Survey Result (2007)

4.2.2.1 Knowledge and information sharing

In a pluralistic service delivery system where there are a multitude of actors are supposed to work together and complementing each other requires facilitative interventions towards change. The change has to follow learning process intervention that gives a room for continual improvement through action and reflection processes based on a good framework for learning and knowledge management within and across service delivery system (Hagmann *et al.*, 2002). Hence, major actors' perception on the current level of knowledge and information sharing along factors that govern the current level was collected and presented in Table 16.

Table 16. Major actors' perception on the current level of knowledge and information sharing

Actor	Public sector rating		Actors	NGO sector rating	
	WOARD	DzARC		Land O'Lakes	HUNDEE
Go- NGO	2	3	NGO- GO	3	3
Go-Private	1	3	NGO- private	3	3
GO-GO	2	2	NGO- NGO	2	4

Remark: 1-Very Poor, 2-Poor, 3-Good, 4-Very Good and 5-Excellent

Source: Survey Result (2007)

The actors put their own reason for the current level of knowledge and information sharing. Accordingly, WOARD put no culture and experience of information sharing both by staff and the organization for the poor and very poor level. DzARC acknowledge the zonal level research extension advisory council (REAC) that created a room to bring together actors twice a year for the good information flow that occurs with the GO and private sector. While the poor knowledge and information sharing with the NGO was attributed for the involvement of NGOs in REAC meeting once in every two years. NGOs rate good information and knowledge sharing with GO mainly because they undertaken joint activities. However, with in the NGO sector itself, the habit and practice govern the level of information sharing where HUNDEE has network with other NGOs for knowledge and information sharing while Land O' Lakes do not.

4.2.3 Pluralistic dairy service delivery system coordination

According to Hagmann (2007), following the entrance of new actors from the private and the third in the service delivery side by side with the old (monopoly) state providers or are replacing them and find their niches, the old state monopolies are challenged by pluralism in their old mandate and self understanding. Hence, this process needs to be coordinated and managed in a systematic and learning process intervention and change management (Hagmann et al, 2002). Each actor or subsystem in the dairy service delivery systems has its own contribution to the common endeavor. The contribution can be knowledge, resource, social or political capital. Also, each actor in the systems has its own expectation regarding how tasks have to be defined and coordinated.

According to Hagmann *et al* (2002) one of the central question for rural service delivery system is “Who is and should orchestrate the actors and the actions at the different levels”. Since this study focuses milkshed (district level), milkshed main actors’ perception on the current level of dairy service delivery system coordination along factors that govern the current level were collected. In addition, potential actors for the coordination of the system along their relative strengthen were collected from the main actors.

The main actors (WOARD, DzARC and HUNDEE) rated the current level of coordination as poor. DzARC and HUNDEE (local NGO) identified absence of coordinating body as the structural causes for the poor coordination while WOARD identified itself as the current coordinator of the dairy service system. Table 17 presents main actors recommendation for actors who has the potential for coordinating dairy service delivery system in the milkshed with their relative strengthen and relative importance rate.

In addition to the main actors perception, capacity analysis undertaken in the WOARD revealed that, currently, the WOARD does not have the required technical and financial resource to coordinate the actors and there by the service delivery. Hence, actors in DSD are not currently coordinated. Effort has been made by IPMS to coordinate the actors through initiating and coordinating dairy platform, where WOARD is expected to lead the coordination role. But due to many problems the coordination role by WOARD couldn’t come into reality. Very recently, the new business process reengineering carried out in the

MoARD has structured one team to coordinate the activities of research, extension, farmer and private sector. The performance of this new team will have paramount importance to coordinate actors in the pluralistic service delivery system there by improve the service delivery. However, this new team needs to adopt continuous organizational learning to be successful coordinating body by including stakeholders from all sectors. Other wise, this missing role require the creation of new autonomous body (like dairy board/associations such as the Kenya dairy board) at all level with the mandate to coordinate the actors' thereby strategic issues in the sector including the policy making processes.

Table 17. Main actors' recommendation for coordinating dairy service delivery system in the milkshed

Key actors	Relative strengthen	Relative importance rate
WOARD perception		
WOARD: Livestock Department	Mandate, presence of technical experts (multidisciplinary) and field level staff and Political power	1
DzARC	Control of the technology	2
Land O' lakes	Financial capacity	3
DzARC perception		
DZ ARC	Experience of coordinating wheat coordination group , better financial and logistics capacity and presence of technical capacity	1
WoARD	Political power and presence of field level staff	2
Yerer Union	More closer to dairy producers Finance control especially for input credit	3
HUNDEE perception		
WOARD	Staff up to field level, mandate, political capital	1
Dairy cooperative	Cooperative member mobilizing capacity	2
Hunde/ local NGO/	Financial capacity	3

Source: Survey Result (2007)

4.2.4 Missing actors and/or role in DSD

As discussed in section 4.2.1 and summarized in Appendix 1, there is diversity of actors from the public, private and third sectors involved in DSD following the market orientation of the dairy sector. Even though diversified actors are emerging, it is important

to get some understanding of any missing actor, competencies, links and roles that exist within these organizations (Hall *et al*, 2007).

Accordingly, forage seed/cutting material suppliers, clinical veterinary service providers in the peri urban and rural systems, dairy advisory service providers in the urban sub system are identified as missing actors in the milkshed revealing that the range of actors are not appropriate to the nature of the dairy sector. Linkages between dairy producers and financial institutions are missing across the milkshed where 52.90, 72.90 and 71.90 % of the producers in the urban, peri-urban and rural settings, do not know the presence of financial institutions for dairy credit (Appendix 8). In the meantime, 30.4 % of the producers do not own cross breed cows due initial capital limitation. Besides, 20.7 % and 7.0 % of the respondents in the rural and peri urban raised absence of market linking body as the reason for non membership in *Ada'a* dairy cooperative and non market link, respectively. More importantly, interaction has been missing between major actors (producers and the public agencies; public and private sectors, private and private, public and public) because of lack of coordinating body. Role that is critical for coordinating pluralistic dairy service delivery systems at the district level is overlooked since WOARD is mandated to coordinate the service delivery system. This barrier has prevented the integration of different types of information (technical, market intelligence, socioeconomic information) needed to improve the quality of service through learning process intervention. Moreover, quality assurance role is also ignored where the private sector services are not monitored and/or regulated for their quality. For example, WOARD is responsible to monitor and regulate the performance of private veterinary institutions and bull stations. Some quality standards such as animal feed and milk and milk products standards are developed by the Ethiopia Quality and Standard Authority, but not implemented due to lack of responsible actors in the service delivery. Stakeholder bodies such as dairy association are missed at all level though they would have scope in filling the gap of coordinating actors and/or platforms, policy advocacy works and service delivery (input and output market, training and technology acquisition). Currently, *Ada'a* dairy cooperative is providing service with little scope (not involved in knowledge based activities) and coverage (members only).

The missing actor/role analysis revealed that policies are required to change the role of the public sector or to encourage others to play the missing role. For example, private sector

actors and other actors outside government are becoming important players, and public sector must reconfigure their roles and relationships in light of these developments. Missing competencies analysis is undertaken in section 4.3 together with performance assessment of the actors.

4.3 Performance of Actors Involved in DSD

In a pluralistic environment where there are multiple service providers, it is important to assess the performance of the different possible providers and the quality of their services in order to identify who is good at what and the opportunity for learning and complementarily. According to Hagmann *et al* (2002) service delivery framework, analysing the performance of the different actors is carried out in the “Responding to the demand “level of the service providers where the delivery of services needs to be managed and organised so that it responds adequately to the articulated service demand.

Performance of an organization is the overall ability to meet its goals and achieve its overall mission and influenced by its capacity, internal and the external environment in which it operates (Horton *et al.*, 2003). The rest of this section discusses the capacity and the internal environment that influence the performance of the major service providers in the milkshed through four subsections. The external environment focusing on the institutional and policy environments will be discussed in section 4.4.

4.3.1 Performance of public dairy service

Currently, dairy related service is being delivered through regular program by the WOARD livestock development department that extends up to FTCs. The dairy extension and regular program comprises improved dairy husbandry trainings, input (heifers and forage), and promotion of milk groups and linking to market, AI and animal health services. Here, performance analyses focus on dairy advisory service for separate discussion of AI and animal health service through comparative analysis with other service providers in section 4.3.3

Effectiveness of public dairy service in terms of achieving the objectives

In terms of improving the productivity and income of dairy producers, the public dairy related service can be said effective since there are definitely recorded positive impacts on cross breed dairy owners. The producers' survey revealed that a single produce managed to generate 57,960.00 birr/year from milk sale. But, the service is not effective in achieving its objective in terms of covering the mandate areas since it was only restricted to urban and peri urban subsystems. The major reason was inadequate supply of cross breed heifers that are expected from the regional cattle breeding ranches. These ranches are reported for their poor performance by different authors (Ababu *et al* 2006; Workineh and Ababu, 2006; Azage *et al*, 2006; Kefena 2006). More importantly, the organization's objectives are not effective in addressing the major of the subsistence poor farmers since the cross breed heifer is not accessible by the poor farmers because of its capital intensiveness and the organization poor capacity (no culture) to create the required link with financial institutions though there are four financial institutions in the milkshed.

Efficiency and prospect for financial sustainability

Though efficiency and financial sustainability analysis demand unit cost and total budget of delivering service and such data are difficult to come, only their prospects is discussed here. The current dairy development program is almost exclusively funded by the regional government unlike the past donor supported programs. Full budget allocations by the public make it difficult the service to sustain itself with reduced public financing unless measures to institutionalize cost sharing arrangement are designed. The detailed analysis on fee for responsive and accountable dairy advisory service delivery will be presented in section 4.5.

Quality of the service: in terms of timeliness, targeting and feed back

Following its top down, supply driven and non-participatory nature of the extension service, the service is not on time as the DAs as well SMS are responsive to the supply from the regional level both for training and technological inputs. Accordingly, training and advisory services are planned by the service provider with out taking the client time and needs into consideration. The producers' survey showed that only 25 % of the respondent have got farm to farm visit by DAs where as the majority (84.6 %) are getting the service through general meeting to the extent that farmers do not know the agenda for the meeting. These type of meetings are chaired by one of three DA or supervisors

irrespective of his/her discipline. Here, the extension workers reflect their attitude towards farmers that of teachers with the mandate to give knowledge to farmers; extension workers tended to treat farmers as learners who could only benefit and improve their farming through adoption of modern knowledge and technologies (Belay and Degnet, 2004). Subsequently, the content of the advisory service is developed based of the supply of menu driven packages thrown from top that provides the farmer with limited and often inappropriate choices. Targeting is the quality parameter that contributed for the poor performance of the service where the focus of the extension service was most of the time well to do farmers with cross bred cows. Training, technology introduction and advisory service is pro-better off living aside the majority with local cows. The quality of the partnerships established and the feed-back effects created is far from satisfactory. Due to the poor monitoring and evaluation system in the service delivery, feed back for introduced technologies are not collected and forwarded to the technology supplier (research sector). It can also fire back to the poor linkage developed between research and extension. The ineffectiveness of the extension system in delivery quality service, among other, radiate because of it remains almost exclusively within the public domain which restricted farmers select a variety of service providers to choose from.

Relevance of the public dairy service to market oriented dairy development

For the envisaged transformation of the subsistence agriculture to market oriented, the public extension service has been given paramount importance in the PASDEP. With the development of production for the market oriented commodities, the need for institutional support services such as relevant information and knowledge, credit, input supply and marketing services increases significantly. Historically the extension service in Ethiopia has been focused on improving productivity and production in line with the focus of government agricultural development programs on improving food security. Currently, though cereal biased, there is some progress towards market oriented agricultural development through developing agricultural marketing strategies that give due emphasis in organizing agricultural cooperatives and unions (MoARD, 2005).

The transformation process needs the extension service to change from input supplier to knowledge broker (Berhanu *et al.*, 2006a). This in turn calls for the extension service to focus on advisory service so as to realize the envisioned transformation. Advisory services assume a much more holistic and facilitatory role, and the field staff of an advisory service

is not just a conduit of information, but an advisor, facilitator, and knowledge broker (Alex *et al.*, 2002) and the purpose of advisory services need to go beyond merely providing technical solutions to look more broadly at the institutional environment in which technologies are developed and disseminated (Birner *et al.*, 2006).

As dairy is input intensive and market susceptible, an important aspect of market oriented dairy advisory service is the role it plays in facilitating linkages between producers and market agents, financial institutions, input suppliers and other support services. In the milkshed, though it is at infant stage (below satisfactory), effort is being extended to link dairy producers in the peri urban system to *Ada'a* dairy cooperative. Otherwise, considerable amount of time of district experts and DAs is devoted to directly involving in input supply and other activities apart from advisory service. The extension system is not in a position to create a network and linkage with other organization especially with research and financial institutions. The survey result revealed that none of the producers did take dairy credit from the MFI operating in the milkshed whereas 30.4 % of the producers do not own cross breed cows due initial capital limitation. Besides, 20.7 % and 7.0 % of the respondents raised absence of market linking organ as the reason for non membership in *Ada'a* dairy cooperative and non market link, respectively.

Above and beyond, different authors put their concern on the relevance of the current extension for the envisaged transformation processes in question. For example; Tesfaye (2007) noted for lack of clear vision and organizational capacity for the effective facilitation for the needed transformation and poor record of forging effective functional linkage with the research system; EEA/EPRI (2006) for the cereal biased with insufficient attention given to high value crops and commercialization of the livestock sector and Berhanu *et al.* (2006a) pointed on the consideration of marketing service not as part of mandates of extension and technology transfer bias at the expense of organizational development, capacity building at grass root level and human resource development of the current extension system.

Capacity and management for dairy advisory service

Capacity in terms of staff numbers and staff qualification is a major characteristic of an advisory service that affects the organization performance. As indicated above, the service is publicly funded; this capacity is determined by the fiscal possibilities and the political

commitment of policy-makers and donors to invest in agricultural advisory services. Currently, government is investing large amount of money in training high and medium level agricultural advisory service agents with a plan to train 55 thousands DAs in 2008 (Berhanu *et al*, 2006a). Accordingly, the district has got 20 livestock development agents.

In addition to staff numbers, the qualification and motivation of the advisory service staff is an important dimension of capacity. The changing role of agricultural advisory services and the move from transfer of technology to advisory methods require new skills, which go beyond the technical subject-matter qualification, in which the staff of advisory services is typically trained. Likewise, the shift towards pluralistic services requires new skills, which allow field and administrative staff to manage complex relations among a wide set of partners (Birner *et al*, 2006). In this regard, the country discipline based training program both for SMS and DA suffers with lack of appropriate course content to this newly required skills for facilitation, negotiation and network and platform building though they are given one compulsory agricultural extension course. It is reflected in the DA self assessment undertaken to evaluate the skills and knowledge required to respond to stakeholders needs where they strongly agree that they do have the all the skills and knowledge (Appendix 2) revealing that they are still concerned on technology transfer. Farmers are also satisfied with the DA knowledge and skills to respond to their need (Table 18). On the contrary, district livestock team disagree on the statement that all staff members have the required skills and knowledge to respond to stakeholders need (Appendix 2). Hence, both pre-service and in-service training level of the SMSs and DAs needs a revision to respond to the emerging role that the staffs are expected to play in the field. Habemariam (2005) and Berhnau *et al* (2006a) also recommended the same so as to equip ATVETs graduate with required knowledge and skills to help farmers develop their entrepreneurship skills. Davis *et al*. (2007) pointed the need to strengthen the agricultural education and training system in the country from an innovation systems perspective since the envisioned agricultural transformation demand new capabilities demanding new educational approaches

Staff morale and attitude is the other important staff capacity dimension. The current extension services have good numbers of specialized staff but constrained by low staff morale. Possibly due to the poor incentive structure and hardship in the profession, several DAs and SMS are attending distance education in other discipline and are preparing

themselves to leave the extension service after they have gained experience in the field. This will have negative implication to the envisaged commercialization of the sector since the effectiveness of agricultural extension work highly depends on the quality and numbers of extension professionals who are qualified, motivated, committed and responsive to farmer demands (Belay and Degnet, 2004). Table 18 and Appendix 2, respectively put farmers satisfaction and DAs self evaluation on the attitude to satisfy stakeholder needs where farmer are satisfied and DAs are strongly agree on their good attitude. However, the district livestock team self evaluation disagree on the statement that explains all staff members have adequate motivation and good attitude to respond to all stakeholder (Appendix 2).

Table 18. Assessment of satisfaction level of producers with the existing WOARD advisory service

Statement	Rate (%)				
	Strongly agree	Agree	Indifferent	Disagree	Strongly disagree
WOARD Livestock DAs have the knowledge and skills to satisfy our needs	36.20	53.20	0.00	6.40	4.30
WOARD Livestock DAs have the attitude to satisfy our needs	63.80	34.00	0.00	2.10	0.00
WOARD Livestock development staff is flexible enough to address our concerns	6.40	42.60	0.00	25.50	25.50

Source: Survey Result (2007)

Capacity in terms infrastructure, technology, and financial resources is the other dimension of organization capacity that influence its performance. In this regard, the district extension service is challenged by serious shortage of operational budget, transportation facilities and improved technology for distribution and demonstration. This in turn contributed on the poor motivation of staff. Appendix 2 clearly shows district livestock team and DA strongly disagree on all the facilities and financial resources related statement revealing that shortage of finance and facilities are the major challenge to effectively achieve their duties. Unless appropriate measures are timely taken, with poor pay to the staff, in adequate logistics and operational budget, and low motivation to serve farmers, there is a danger that the public extension system will have impact on the transformation of the subsistence agriculture

Organization internal factors that influence the direction of the organization and the energy displayed in its activities can be incentive and rewards systems and the organizational leadership and management style (Horton *et al.*, 2003). Accordingly, the poor incentive and reward system operational in the current extension system is negatively affecting the organization performance. Though there is a recent institutionalization of incentive and reward system in the extension service, the district livestock team and DAs have strongly disagreed on organization's incentive and reward system (Appendix 2). Moreover, the extension personnel are accountable to the district department heads. The effectiveness of their activities cannot be easily established, their performance is measured in terms of input indicators that are easy to provide and confirm. The field staffs are thus practically not accountable for the quality of their extension work, and often even the quantity can be compromised with impurity. The district department heads are accountable for extension performance to the political (district cabinet) level. On top of this, both the district livestock team and DAs put their dissatisfaction by the administrative leadership that they are accountable in Appendix 2.

A variety of management tools (Birner *et al.*, 2006) and extension reform approaches (Anderson, 2007) were recommended and being reformed worldwide to improve the performance of public extension service. More specifically, Silim Nahdy (2004) recommended institutional innovation in agricultural advisory service delivery for SSA, that tend to include farmer empowerment; cost sharing for sustainability, separation of funding from advisory service, reorientation of farmers to market, decentralization, and knowledge intensive service delivery. Options to develop responsive advisory service in the dairy sector will be discussed in section 4.4 and 4.5.

4.3.2 Performance of *Ada'a* dairy cooperative

Performance of *Ada'a* dairy cooperative is evaluated by its effectiveness in achieving the stated objectives, efficiency for cost effectiveness in service delivery and relevance for market oriented dairy development. In additional, overall organization growth is assessed to appraise the performance.

Effectiveness: in achieving the stated objectives

The cooperative is effective in achieving the initial objective of providing feed and milk marketing services through minimizing the high transaction cost for the sale of milk and reduce seasonal price fluctuations; increase production and productivity of dairy farms and improve the overall incomes of member farmers; supply inputs such as feed, health services to member farmers at reasonable price; and provide training in dairy cattle management, milk hygiene and handling and milk processing to member. Group discussion with the cooperative members made to evaluate the performance of the cooperative revealed that they strongly agree on the statements for better access to inputs at reason price, milk market, knowledge and skills on improved dairy management, acquired business skills and more income since joining the cooperative. Another study in the milkshed also revealed the same where cooperative membership have contributed for better market access and larger herds characterized by higher productivity (Francisco and Ruben, 2007). These finding support previous literature on Ethiopia dairy cooperative (Nicholson, 1997; Holloway *et al.*, 2000 Ahmed *et al.*, 2003 and D’Haese *et al.*, 2005). However, members complain on the timeliness and effectiveness of the services stating that ‘we would have been better serviced if we had got better management body’. More specifically, they were raising the mismanagement in the cooperative leadership including abuses by employees by under measuring, adulteration and stealing during milk collection and transportation to Addis Ababa. The poor governance in the cooperative leadership is aggravated by lack of members’ participation in the cooperative decision making process. Similarly, Francisco and Ruben (2007) cited the internal corruption as an important deterring factor in the cooperative expansion.

Efficiency: cost effectiveness/unit cost of service delivery

With regard to cost effectiveness in service delivery, the cooperative is charging 10 % of the total milk supplied to cover operating expenses. But, this 10 % operating cost is not reduced with increased number of milk suppliers, amount of milk and numbers of transport vehicles after 10 years when the cooperative started with 34 members, 24, 000.00 lt/month and rented car. During the group discussion, members were resentfully raising this unit cost of providing the marketing service.

Relevance- Market Oriented Dairy Development (MODD)

The cooperative performing good in promoting market oriented dairy development in the milkshed through creating market link between the urban and peri urban sub systems, collaborating with other dairy associations, public organization, NGOs, projects and donors affiliated on MODD (nationally, regionally and internationally) to enhance dairy development. With this regard, the cooperative have had strong linkage with researchers from ILRI-DZ station, who have been advising the cooperative since its starts and giving various capacity building supports. Moreover, the cooperative is member of the national and East and South Africa dairy associations. The cooperative have strong linkages with EIAR-DzARC, IPMS, VOCA, SNV and Genesis Farm, all envisaged MODD through partnership building strategy. Currently, the cooperative is leading most partnership initiated to promote MODD in the milkshed. These linkages are sustaining the cooperative effort to promote MODD through financial and capacity building supports. The establishment of a dairy training center by the cooperative is also an activity towards MODD. However, members complain on lack of advisory service to promote their dairy productivity from the fact that currently they are not getting any dairy advisory service which the cooperative can at least contract it from DVM staff or deploy an advisory agent(s).

Overall organizational growth

The cooperative that was established with 34 members with capital of Birr 3,400.00 and monthly milk collection capacity of 24, 00.00 from six collection centers has now reached 852 members with milk collection capacity of 212,911.00 lt/month from 14 collection centers. The capital of the cooperative has increased including the establishment of a feed processing and milk processing plants with a capacity collecting 15,000 liter of milk per day and project gross benefit of 450,000.00 birr per month that also increases the type of service delivery to members and non members. Following the organizational growth, the cooperatives is also expanding its objectives to include environmental protection concerns through better management of animals, products and waste; employment generation opportunities and assist participation of subsistence rural dairy farmers in agriculture lead industrialization process through establishing urban-rural link.

4.3.4 Comparative analysis of dairy related services of different service providers

In a pluralistic environment where there are multiple service providers, it is important to assess the performance of the different possible providers and the quality of their services in order to identify who can best do the job. Accordingly, services delivered by more than one provider are evaluated by the producers for quality service and presented in four sub section for veterinary, feed, AI and milk marketing services.

4.3.4.1 Veterinary service

As indicated in section 4.2, currently there are five major vet service providers in the milkshed. Table 19 present the result of producers' evaluation for the service. Accordingly, producers ranked the private vet service first for their timeliness followed by the *Ada'a* cooperative vet service. For effectiveness of the veterinary service, producers selected public (DVM) clinic as the best. The group discussion carried out to evaluate the overall assessment vet service providers, producers selected the private vet service providers if and when their service is monitored by the public vet service. Producers selected private service providers for their timeliness and availability for home services. In the meantime, producers complain on the effectiveness of the private vet personnel's for use of expired drugs. Cooperative members still prefer the cooperative vet service if it can improve the quality and timeliness of service.

Table 19. Producers' evaluation on veterinary services

Service providers/ evaluation criteria	Location	Excellent (%)	Very good (%)	Good (%)	Poor (%)	Very Poor (%)	Score	Rank
Timeliness								
Public (DVM)	Urban (n=22)	0.00	31.80	50.00	18.20	0.00	313.60	
Vet Clinic (n=24)	Peri urban (n=2)	0.00	0.00	100.00	0.00	0.00	300.00	
	Total (n=24)	0.00	29.20	54.20	16.70	0.00	312.80	4
Public	Urban (n=40)	0.00	32.50	42.50	20.00	50.00	347.50	
(WOARD) Vet	Peri urban (n=27)	7.40	25.90	37.00	29.60	0.00	310.80	
personnel (n=99)	Rural (n=32)	0.00	6.30	28.10	59.40	6.30	234.60	
	Total (n=99)	2.00	22.20	36.40	35.40	4.00	282.80	5
Private Vet	Urban (n=56)	39.30	46.40	12.50	1.80	0.00	423.20	
Clinic (n=101)	Peri urban (n=13)	61.50	23.10	0.00	15.40	0.00	430.70	
	Rural (n=32)	28.10	37.50	31.30	3.10	0.00	390.60	
	Total (n=101)	38.60	40.60	16.80	4.00	0.00	413.80	2
Private Vet	Urban (n=56)	41.40	44.60	12.50	1.80	0.00	426.50	
personnel (N=59)	Peri urban (n=5)	80.00	20.00	0.00	0.00	0.00	480.00	
	Total (n=61)	44.30	42.60	11.50	1.60	0.00	429.60	1
Ada'a Coop. Vet	Urban (n=39)	17.90	69.20	10.30	2.60	0.00	402.40	
personnel (N=40)	Peri urban (n=1)	100.00	0.00	0.00	0.00	0.00	500.00	
	Total (n=40)	20.00	67.50	10.00	2.50	0.00	405.00	3
Effectiveness								
Public (DVM)	Urban (n=22)	77.30	22.70	0.00	0.00	0.00	477.30	
Vet Clinic (n=24)	Peri urban (n=2)	50.00	50.00	0.00	0.00	0.00	450.00	
	Total (n=24)	75.00	25.00	0.00	0.00	0.00	475.00	1
Public	Urban (n=40)	20.00	72.50	7.50	0.00	0.00	412.50	
(WOARD) Vet	Peri urban (n=27)	28.00	60.00	12.00	0.00	0.00	416.00	
personnel (n=99)	Rural (n=32)	25.00	40.60	34.40	0.00	0.00	390.60	
	Total (n=99)	23.70	58.80	17.50	0.00	0.00	406.20	4
Private Vet	Urban (n=56)	28.60	62.50	7.10	1.80	0.00	417.90	
Clinic (n=101)	Peri urban (n=13)	36.40	63.00	0.00	0.00	0.00	434.00	
	Rural (n=32)	0.00	12.50	50.00	34.40	3.10	271.90	
	Total (n=101)	20.20	46.50	20.20	12.10	1.00	372.80	5
Private Vet	Urban (n=56)	30.40	62.50	5.40	1.80	0.00	421.80	
personnel (N=59)	Peri urban (n=5)	60.00	20.00	20.00	0.00	0.00	440.00	
	Total (n=61)	32.80	59.00	6.60	1.60	0.00	423.00	2
Ada'a Coop. Vet	Urban (n=39)	23.10	74.40	2.60	0.00	0.00	420.90	
personnel (N=40)	Peri urban (n=1)	100.00	0.00	0.00	0.00	0.00	500.00	
	Total (n=40)	22.50	67.50	10.00	2.50	0.00	417.50	3

Table 19 continued.....

Service providers/ evaluation criteria	Location						Score	Rank
		Excellent (%)	Very good (%)	Good (%)	Poor (%)	Very Poor (%)		
Costliness								
Public (DVM) Vet Clinic (n=24)	Urban (n=22)	77.30	18.20	4.50	0.00	0.00	472.80	
	Peri urban (n=2)	100.00	0.00	0.00	0.00	0.00	500.00	
	Total (n=24)	79.20	16.70	4.20	0.00	0.00	475.40	1
Public (WOARD) Vet personnel (n=99)	Urban (n=40)	2.50	67.50	30.00	0.00	0.00	372.50	
	Peri urban (n=27)	85.20	11.10	3.70	0.00	0.00	481.50	
	Rural (n=32)	56.30	40.60	3.10	0.00	0.00	453.20	
	Total (n=99)	42.40	43.40	14.10	0.00	0.00	427.90	2
Private Vet Clinic (n=101)	Urban (n=56)	0.00	17.90	50.30	26.80	5.40	281.50	
	Peri urban (n=13)	8.30	16.70	58.30	8.30	8.30	308.10	
	Rural (n=32)	0.00	0.00	0.00	37.50	62.50	137.50	
	Total (n=101)	1.00	12.00	35.00	28.00	24.00	238.00	5
Private Vet personnel (N=59)	Urban (n=56)	0.00	17.90	50.00	26.80	5.40	280.60	
	Peri urban (n=5)	20.00	20.00	20.00	40.00	0.00	320.00	
	Total (n=61)	1.60	18.00	47.50	27.90	4.90	283.20	4
Ada'a Coop. Vet personnel (N=40)	Urban (n=39)	15.40	48.70	33.30	2.60	0.00	376.90	
	Peri urban (n=1)	0.00	0.00	100.00	0.00	0.00	300.00	
	Total (n=40)	15.00	47.50	35.00	2.50	0.00	375.00	3

Remark: Score is calculated by assigning 5 for excellent, 4 for very good, 3 for good, 2 for poor and 1 for very poor. Then multiply % of observation by the score and finally adding the total observation

Source: Own computation from the survey (2007)

4.3.4.2 Feed supply service

As indicated in section 4.2.2, currently there are six animal feed suppliers type in the milkshed. However, comparison was made among in the five major ones. Table 20 present the result of producers' evaluation for the service. Accordingly, producers ranked the feed retailers first for their timeliness followed by the feed processors and flour factory. With regard to variety of feed supply and costliness of the service, producers selected *Ada'a* cooperative followed by feed processors for the variety and flour factories for costliness. Feed retailers with major market share are again ranked first for their nearness since they are located near to the producers even to rural villages but their quality of feed is ranked last that calls to institutionalize quality and standard in the feed market. Flour factories are selected first for their best quality feed supply (wheat bran).

Table 20. Producers' evaluation on feed suppliers

Service providers/ evaluation criteria	Location	Excellent (%)	Very good (%)	Good (%)	Poor (%)	Very Poor (%)	Score	Rank
Timeliness								
Ada'a	Urban (n=42)	2.40	52.40	42.90	0.00	2.40	352.70	
Cooperative (n=44)	Peri urban (n=2) Total (n=44)	50.00 4.50	0.00 50.00	50.00 43.20	0.00 0.00	0.00 2.30	400.00 354.40	4
Feed Processors	Urban (n=52)	34.60	40.40	25.00	0.00	0.00	409.60	2
Feed Retailers (n=104)	Urban (n=43) Peri urban (n=30) Rural (n=31) Total (n=104)	64.10 40.00 9.70 40.00	17.90 46.70 51.60 37.00	17.90 13.30 32.30 21.00	0.00 0.00 0.00 2.00	0.00 0.00 0.00 0.00	445.80 426.70 351.80 415.00	1
Flour Factor (n=42)	Urban (n=40) Peri urban (n=2) Total (n=42)	25.00 50.00 26.20	45.00 0.00 42.90	22.50 50.00 23.80	7.50 0.00 0.00	0.00 0.00 0.00	387.50 400.00 374.00	3
Hay Suppliers (n=24)	Urban (n=22) Rural (n=2) Total (n=24)	4.50 0.00 4.20	22.70 100.00 29.20	54.50 0.00 50.00	18.20 0.00 16.70	0.00 0.00 0.00	313.20 400.00 321.20	5
Variety of feed supply								
Ada'a	Urban (n=42)	11.90	50.00	31.00	7.20	0.00	366.90	
Cooperative (n=44)	Peri urban (n=2) Total (n=44)	0.00 11.40	100.00 52.30	0.00 29.50	0.00 6.80	0.00 0.00	400.00 368.30	1
Feed Processors	Urban (n=52)	9.60	44.20	40.40	5.80	0.00	357.60	2
Feed Retailers (n=104)	Urban (n=43) Peri urban (n=30) Rural (n=31) Total (n=104)	19.00 33.30 0.00 17.50	52.40 50.00 0.00 35.90	19.00 13.30 22.60 18.40	9.50 3.30 77.40 28.20	0.00 0.00 0.00 0.00	380.60 413.00 222.60 342.70	3
Flour Factor (n=42)	Urban (n=40) Peri urban (n=2) Total (n=42)	0.00 50.00 2.50	39.50 0.00 30.00	55.30 50.00 55.00	5.30 0.00 5.00	0.00 0.00 0.00	334.50 400.00 307.50	4
Hay Suppliers (n=24)	Urban (n=22) Rural (n=2) Total (n=24)	0.00 0.00 0.00	9.1 0 8.3	72.7 50 70.8	18.2 0 16.7	0 50 4.2	290.9 200 283.2	5

Remark: Score is calculated by assigning 5 for excellent, 4 for very good, 3 for good, 2 for poor and 1 for very poor. Then multiply % of observation by the score and finally adding the total observation

Source: Own computation from the survey (2007)

Table 20. Continued.....

Service providers/ evaluation criteria	Location	Excellent (%)	Very good (%)	Good (%)	Poor (%)	Very Poor (%)	Score	Rank
Costliness								
Ada'a Cooperative (n=44)	Urban (n=42)	4.80	69.00	23.80	2.40	0.00	376.20	
	Peri urban (n=2)	100.00	0.00	0.00	0.00	0.00	500.00	
	Total (n=44)	9.10	65.90	22.70	2.30	0.00	381.80	2
Feed Processors	Urban (n=52)	19.20	63.50	17.30	0.00	0.00	401.90	1
Feed Retailers (n=104)	Urban (n=43)	0.00	9.50	57.10	33.30	0.00	275.90	
	Peri urban (n=30)	13.30	50.00	16.70	16.70	3.30	353.30	
	Rural (n=31)	0.00	0.00	3.20	35.50	61.30	141.90	
	Total (n=104)	3.90	18.40	29.10	29.10	19.40	258.00	5
Flour Factor (n=42)	Urban (n=40)	15.80	31.60	44.70	7.90	0.00	355.30	
	Peri urban (n=2)	50.00	50.00	0.00	0.00	0.00	450.00	
	Total (n=42)	17.50	32.50	42.50	7.50	0.00	360.00	3
Hay Suppliers (n=24)	Urban (n=22)	4.50	27.30	45.50	22.70	0.00	313.60	
	Rural (n=2)	0.00	0.00	100.00	0.00	0.00	300.00	
	Total (n=24)	4.20	25.00	50.00	20.80	0.00	312.60	4
Nearness								
Ada'a Cooperative (n=44)	Urban (n=42)	16.70	26.20	52.40	4.80	0.00	355.10	
	Peri urban (n=2)	50.00	50.00	0.00	0.00	0.00	450.00	
	Total (n=44)	18.20	27.30	50.00	4.50	0.00	359.20	2
Feed Processors	Urban (n=52)	7.70	42.30	40.40	7.70	1.90	346.20	3
Feed Retailers (n=104)	Urban (n=43)	37.20	34.90	20.90	4.70	2.30	400.00	
	Peri urban (n=30)	33.30	50.00	13.30	3.30	0.00	413.00	
	Rural (n=31)	6.50	45.20	32.30	12.90	3.20	339.20	
	Total (n=104)	26.90	42.30	22.10	6.70	1.90	385.30	1
Flour Factor (n=42)	Urban (n=40)	2.60	26.30	50.00	21.10	0.00	310.40	
	Peri urban (n=2)	0.00	100.00	0.00	0.00	0.00	400.00	
	Total (n=42)	2.50	30.00	47.50	20.00	0.00	315.00	4
Hay Suppliers (n=24)	Urban (n=22)	9.10	13.60	50.00	22.70	4.50	299.80	
	Rural (n=2)	0.00	100.00	0.00	0.00	0.00	400.00	
	Total (n=24)	8.30	20.80	45.80	20.80	4.20	307.90	5
Quality feed supply								
Ada'a Cooperative (n=44)	Urban (n=42)	4.90	87.80	7.30	0.00	0.00	397.60	
	Peri urban (n=2)	100.00	0.00	0.00	0.00	0.00	500.00	
	Total (n=44)	9.30	83.70	7.00	0.00	0.00	402.30	3
Feed Processors	Urban (n=52)	42.30	26.90	26.90	3.80	0.00	407.40	2
Feed Retailers (n=104)	Urban (n=43)	0.00	21.40	66.70	11.90	0.00	309.50	
	Peri urban (n=30)	20.00	33.30	36.70	10.00	0.00	363.30	
	Rural (n=31)	0.00	0.00	6.50	38.70	54.80	151.70	
	Total (n=104)	5.80	18.40	39.80	19.40	16.50	277.30	5
Flour Factor (n=42)	Urban (n=40)	50.00	23.70	26.30	7.50	0.00	438.70	
	Peri urban (n=2)	100.00	0.00	0.00	0.00	0.00	500.00	
	Total (n=42)	52.50	22.50	25.00	0.00	0.00	427.50	1
Hay Suppliers (n=24)	Urban (n=22)	0.00	27.30	40.90	31.80	0.00	295.50	
	Rural (n=2)	0.00	0.00	50.00	50.00	0.00	250.00	
	Total (n=24)	0.00	25.00	41.70	33.30	0.00	291.70	4

For remark and source refer the same table

4.3.4.3 Artificial Insemination (AI)

As discussed in section 4.2, suppliers of AI for smallholders comprise *Ada'a* cooperatives and government AI technicians, and in rare cases part time AI technicians from private dairy farms. A substantial proportion of farmers are still using natural service because of the ineffective AI service in the milkshed. In terms of the quality of service, cooperatives AI technician scored very low due to its low success rates, and offering no variety of semen. One advantage of cooperatives over government inseminator is its timeliness for calls in inseminating. The government AI technician is the most preferred for its better success rates, and offering a variety of semen though it scored less for its timeliness (Table 21). Both inseminators are complained for their payment as they charging more than the official rate. For example, the government rate is 2.00 Birr and cooperative is 8.00 birr per insemination but the inseminators are charging producers 20.00 birr per insemination.

4.3.4.4 Milk collection service

As discussed in 4.1 and 4.2, smallholders in the milkshed are able to market their milk to *Ada'a* cooperative, informal milk markets (neighbors and café), and private milk processors (Mama, Lema and Genesis Farm). Appendix 7 captured results for the three groups. The advantages of cooperatives that consistently emerged are that there is no limit to amount of milk to supply; supply other services (AI, feed, Vet); timely payment; Nearby milk collection center; Pay in 15 days lump sum; Producers also cited their sense of ownership in the cooperative and its assets, and the fact it generated bonus/dividend payment as an advantages. What would appear at first sight to be their most significant disadvantages are their low prices, between 20 to 30 cents/lit less than that offered by private milk processors. Moreover, producers raise the intensive quality control over milk and the subsequent milk returning as the other disadvantage of supplying milk to the cooperative. Non members raise membership difficult due to high registration fee and share as the other disadvantage of cooperative milk link. Informal milk market (neighbors and café) have a clear advantage for their milk collection from farms; better prices; prepayment for milk supply, timely payment and not exerting milk quality control. Their disadvantage is delay in milk collection time; unreliability (irregular demand); delay in payment for the milk supplied; complain on the milk quality with out testing and absence of lump-sum payment.

Table 21. Producers' evaluation on AI service

Service providers/ evaluation criteria	Location	Excellent (%)	Very good (%)	Good (%)	Poor (%)	Very Poor (%)	Score	Rank
Ada'a Cooperative AI Technician (n=44)								
Timeliness	Urban (n=55)	37.0	44.4	13.0	3.7	1.9	410.9	2nd
	Peri urban (n=4)	25.0	50.0	25.0	0.0	0.0	400.0	
	Total (n=59)	36.2	44.8	13.8	3.4	1.7	410.1	
Success rate	Urban (n=55)	5.6	61.1	29.6	0.0	3.7	364.9	
	Peri urban (n=4)	25.0	25.0	50.0	0.0	0.0	375.0	
	Total (n=59)	6.9	58.6	31.0	0.0	0.0	361.9	
Costliness	Urban (n=55)	16.7	48.1	33.3	1.9	0.0	379.6	
	Peri urban (n=4)	0.0	25.0	75.0	0.0	0.0	325.0	
	Total (n=59)	15.5	46.6	36.2	1.7	0.0	375.9	
Variety of semen supply	Urban (n=55)	7.4	40.7	51.9	0.0	0.0	355.5	
	Peri urban (n=4)	0.0	50.0	50.0	0.0	0.0	350.0	
	Total (n=59)	6.9	41.4	51.7	0.0	2.3	357.5	
WOARD AI Technician (n=59)								
Timeliness	Urban (n=55)	12.7	65.5	20.0	1.8	0.0	389.1	1st
	Peri urban (n=4)	50.0	25.0	25.0	0.0	0.0	425.0	
	Total (n=59)	15.3	62.7	20.3	1.7	0.0	391.6	
Success rate	Urban (n=55)	21.8	45.5	29.1	0.0	3.6	381.9	
	Peri urban (n=4)	50.0	50.0	0.0	0.0	0.0	450.0	
	Total (n=59)	23.7	45.8	27.1	0.0	0.0	383.0	
Costliness	Urban (n=55)	27.3	56.4	16.4	0.0	0.0	411.3	
	Peri urban (n=4)	100.0	0.0	0.0	0.0	0.0	500.0	
	Total (n=59)	32.2	52.5	15.3	0.0	0.0	416.9	
Variety of semen supply	Urban (n=55)	18.2	29.1	52.7	0.0	0.0	365.5	
	Peri urban (n=4)	100.0	0.0	0.0	0.0	0.0	500.0	
	Total (n=59)	23.7	27.1	49.2	0.0	0.0	374.5	

Remark: Score is calculated by assigning 5 for excellent, 4 for very good, 3 for good, 2 for poor and 1 for very poor. Then multiply % of observation by the score and finally adding the total observation

Source: Own computation from the survey (2007)

Private milk processors are competing *Ada'a* cooperative and gives better price. Producers take this as the first advantage of supplying to private milk processors followed by their flexible milk quality control and at the same time collecting all the milk without limit. Their disadvantage is delay in payments; absence of regular milk collection center and delays in milk collection time. Moreover, absence of other service such as AI, vet and feed is raised as disadvantage of private milk processors.

4.4 Policy and Institutional Environment for Pluralistic Service Delivery

In analyzing agricultural services for institutional pluralism, policy and institutional environment for services is an important condition. In particular, the political commitment and priorities of a country and its agricultural development policy and strategy have far-reaching implications for the appropriateness of different models of providing and financing agricultural services (Birner *et al.*, 2006). According to Hagmann *et al.* (2002) service delivery framework this level is called '**Supporting the Response**'. At this level, analysis on the policies and legislation for the institutional arrangements of service provision, monitoring and evaluation and quality assurance of the service for regulating service provision modes and arrangements was undertaken. The analysis was made based on narrative analysis of government policy and strategy documents. This was backed by information collection from government representative (eg MoARD) on future plan and organizations that are currently promoting pluralistic service delivery in the agricultural in general and dairy in particular (Land O'Lakes, SNV and World Bank supported Rural Capacity Building Program in MOARD). Moreover, discussion with professional association such as ESAP and EVA was also held to know their role and strategies, if any on pluralistic service delivery.

As discussed in the literature review on the policy provision for pluralistic service delivery, the policies and strategies are important steps forwards for the commercialization of the sector with out any restriction on non public service providers to participate in the market. More specifically, government built appropriate infrastructure (roads, electricity, telecommunication, and water supply facilities), facilitate the organization of farmers cooperatives and their interaction with private sector and brought in a consortium of financial institutions to satisfy financing requirement. Nevertheless, success in pluralistic service delivery, among others, requires enabling environment. In this regard, the rest of this part discusses the major constraints in the policy and institutional arrangement for pluralistic service delivery in the dairy sector.

Gap in the existing policies and strategies and policy making process

A set of existing policies and strategies in the country could only service as an overall guidance to agricultural development, but inadequate to address the specific need of service delivery. There is lack of clear policies that as to what type services to be provided

by the public and non public sector, and the required favorable conditions for the promotion of the same. For example, Animal Diseases Prevention and Control Proclamation No. 267/2002 Article 17:4 clearly put the need to define the role and responsibilities of the public and the private sector in the delivery of animal health services. But nothing comes out to date. Lack and/or delay in the livestock policy can also be cited here as it is expected to lead at least the cross breeding service in the country. Professional and producers association could advocate getting the right policy support through their involvement in the policy making process thereby increase the competitiveness of the sector.

Still more enabling environment

Development of responsive services requires that policies create an enabling environment for pluralistic development of service supply, and that the public sector is committed to making clear the different roles of the public and the private sectors in delivery of services. In this regard, enabling environment for development of private sector in service delivery is almost lacking and far limited to dairy market and animal feed services. The other lacked enabling environment is lack of equal play field in the market and lack of incentive and backstopping institutions in the private sector development. The public sector is expected to strengthen its efforts in developing capacity of producers in formulating the demand for services, developing favorable conditions for the private service providers (capacity building, incentives), coordinating the various service providers by creating platforms, monitoring and evaluation and quality assurance and taking care of public interests and long-term interventions (infrastructure), which are unlikely to attract private sector investment instead of participating in the free supply of inefficient and ineffective services that can be delivered through well functioning private sector.

Currently, these favorable environments are lacking to occur. The incentive to private sector development is far from expectation. Spielman *et al.* (2006) pointed that despite the growth of private sector in service delivery, some of the key market, organizational, and policy incentives have yet to fall into place in Ethiopia to stimulate private investment in agricultural service delivery. Further more, the recent World Bank measures of ease of doing and starting business in Ethiopia place the country at 102 and 106 out of 178 countries in 2008, respectively and a rank of 58 in dealing with license. The difficulties in

starting a business and enforcing contracts in Ethiopia are well documented, and reflect many cumbersome procedures, strict regulations, barriers to accessing credit, and minimum capital requirements (World Bank, 2007b).

The political will which is highly demanded for pluralistic service delivery to occur is one of the lacked enabling environments. Un-acknowledging the role of NGOs in the RDSP and PASDEP and experts at all levels is an indication for lack of political commitment for diversifying the types of service providers in technology/input supply and advisory services. This is being seen in the WB funded RCBP that is forced to delay the Advisory Service Development Fund (ASDF) component by the concerned government officials. The success of IPMS and Land O' Lakes interventions to promote private services providers will be seen in the near future. In order to get the supportive enabling environment, private service providers could advocate through their associations (trade and/or producers).

Institutional arrangements setback

There exists a multiple actors in the service delivery and regulatory institutions in the public, private, farmer based organization, civil society and NGOs with verified responsibility, and yet complimentary. Currently, the Agricultural Marketing and Input Sector in the MoARD with its decentralized structure has developed implementation strategy to coordinate and support in capacity building for the production, supply, distribution and marketing of agricultural inputs system in the country, though fertilizer and improved seeds biased (MoARD, 2005). However, the public system is not functioning in an efficient or coordinated manner for the financing and delivering services thereby support responsive service delivery system due to less recognition for pluralistic service delivery system by the public and poor institutional linkage between different public organizations at different levels, and between public organizations and other players in the system (i.e., private, cooperative/unions, NGOs and civil society organizations). These weak linkages are exacerbated by the public sector's persistent emphasis on yields and technologies rather than a more comprehensive focus on improving the service delivery (Spielman *et al.*, 2006). Moreover, lack of responsible organ to coordinates pluralistic service delivery in the sector at all level revealing gap in institutional arrangement for pluralistic service delivery. The institutional instability due to

frequent restructuring of organizational structure and ineffective institutional linkage with in the public sector aggravated the gap in institutional arrangement.

More specifically, the poor functional linkage between cattle breeding ranches, NAIC, Ethiopia Standard and Quality Authority (ESQA) with research and/or extension; and between research and extension, loose relation between federal and regional research institutions are mentioned with in the public. Nevertheless, pluralistic service delivery system demands strong coordination and collective learning among the multiple actors in the system.

The loose working relations among public sectors and between public and non public actors demand innovative functional linkage mechanisms. Functional linkage can occur through creating networks, partnership and alliance and /or plat forms where all actors in the service delivery would be coordinated to create pluralistic service delivery system. Producers association like dairy association at their respective level can be responsible to orchestrate all the actors and facilitate the plat forms by either generating or searching for fund.

4.4.1 Analyzing options for the policy and institutional arrangements in dairy related services

In order to determine appropriate governance structure with in the pluralistic dairy service delivery system, the policy and institutional arrangement for each service is also an important condition for designing pluralism. Accordingly, advisory, veterinary, feed, cross breeding, financial, market and research services for dairy sector are analyzed separately in the rest of this section.

4.4.4.1 Advisory service

In the country, much is said and written (RDPS and PASDEP) for the need to make agricultural research and extension service market oriented so as to support the envisioned transformation of smallholder producers. In this regard, the role is pronounced to be

mainly a public responsibility. However, market oriented agricultural extension services demand transformation of traditional role of agricultural extension to market oriented advisory service and at the same time making the service demand driven (Chipeta, 2006). Chipeta (2006) further put the main principles for demand driven service delivery systems to encompass: services shall be driven by user demand; service providers shall be accountable to the users and users shall have a free choice of service providers. As discussed in section 4.3 in detail, the country extension system is almost exclusively within the public domain resulting for its top down and supply driven nature and the system accountability to upwards (officials). Hence, the current extension service, which is also being under restructuring, needs to transform itself to support the transformation process through reform in organizational and institutional arrangements. More effective organisations are needed to supply services e.g. advisory services, to demand services e.g. producer associations, and to train and facilitate the work of both e.g. backup services. These areas of organisational development need to be anchored in institutional structures which promote and regulate the interactions among actors in pluralistic service delivery system (ibid).

To analyze option for market oriented public advisory service, the different extension reforms experienced worldwide were referred. According to Andreson (2007) in his background paper for the world development report 2008 analyzed the impact of different extension governance structure reform and come out, decentralization with in the public as one of the major reform in developing countries, tells more of the difficulties of implementation than the benefits of so doing. Hence, this study suggests cost sharing arrangement so as to give solutions to the mainly raised problems of the current dairy advisory service which are discussed in 4.3.1: system accountability, supply driven nature, poor incentive systems, shortage of operational costs and working facilities and not covering the urban dairy sub systems. Experience shows that services which are fully or partly paid for by the users are more likely to be driven by demand than services provided free of charge. First of all, user payment guarantees that the demand is genuine and that the users are committed to receiving the advisory service. Moreover, user payment for services is a powerful tool to increase the accountability and incentives for the service providers towards the users (Neuchâtel Group, 2006). Similarly, Gautam (2000) discussed the advantage of cost recovery as it provides appropriate incentives, and hence accountability and client responsiveness; it brings budgetary respite; and it promotes

pluralism by allowing alternative providers, particularly private suppliers, to enter the market.

Nevertheless, cost recovery advisory service is not without practical problem as it excludes less commercial farmers (i.e., poorer farmers and those farming smaller and less favored areas) for whom the value of information is lower and may purchase fewer advisory services. This may entail not only social considerations, but may be an inefficient outcome if the poor have a lesser ability to prejudge the value of information and tend to undervalue it (Anderson, 2007). The resolution of this concern (e.g., Sulaiman and Sadamate 2000) is the stratification of advisory systems by types of clients within the country. That is, smaller-scale and poorer farmers may be served by public advisory or by formats of contract advisory receiving larger shares of public funding (e.g., an association of smaller farmers receives a larger matching allocation to hire advisory staff) (Anderson, 2007).

Gautam (2000) further discussed the relationship between cost sharing arrangement for advisory service and poor farmers, by identifying some pertinent issues such as producer demand for advice, their willingness to pay for it, and their ability to afford the payments. One method of assessing producers' ability and willingness to pay for the service, Contingent Valuation Method (CVM) was used and will be discussed in 4.5. Subsequently, the different intervention options for the financing and delivery of advisory service is analyzed for the milkshed

4.4.4.2 Animal health service

In the country livestock producers depend mainly on public animal health service for free and/or cost recovery arrangements. Moreover, as discussed on 4.2, non public veterinary service providers are emerging following market oriented dairy production in the urban and peri urban settings.

The government enabling environment for development of private sector in agricultural service delivery has undergone one step in animal health and veterinary service through Proclamation No. 267/2002 Article 16 (registration) and 17 (service delivery). The animal

health services delivery gives a room for any person to establish animal health station, center or institution upon the fulfillment of the necessary requirements and requires in advance produce a certificate of competence from the ministry or concerned region in order to obtain a business license of animal health station, center or institution. The ministry shall create favorable conditions for the promotion of private animal health services delivery and based upon the nature of the services, define the role and responsibilities of the public and the private sector in the delivery of animal health services. But, this is not yet to come which is pointed as one of the major constraint for the private sector development in the service delivery. Where as, on the basis of its public and private good character, while taking into account any externalities, moral hazard problems, or free rider problems that may accompany the production or consumption of the service, different authors have classified each services and determined the appropriate channel for delivery of services (see, Umali *et al*, 1992; Umali *et al.*, 1994; FAO, 1998 and Ahuja and Redmond, 2004).

Apart from gap in institutionalizing rules and regulation, private veterinary services providers are involved fully in the import, wholesaling and retailing of vet drugs and equipments estimated to be over 627 in the country. In 2007, there are 28 firms involved in drug importation, 548 in vet drug retail, 51 in veterinary clinic (including drug dispensation) (Personal Communication-MoARD, 2008). However, the playing field revealed that private animal health service providers are seriously constrained by illegal/unlicensed dug vendors that are charge reduced price where as the public has a role in ruling out the illegal actors. Moreover, these actors are constrained by the bureaucratic registration process to get a license from MoARD and/or its decentralized structures, lack the necessary favorable conditions to get land, incentives and capacity building supports such as leave of absence and incentive for voluntary redundancies of public animal health personnel, subsidized credit and subsidized motorcycle for interested animal health professionals, which are implemented and successful in other countries (Veen and Haan, 1995 and Leonard *et al.*, 2000). Service providers involved in the retail and veterinary service still compliance on the veterinary drug supply arguing that the importers do not have responsible staff for drug selection and their current status of shifting to other business like medical equipments importation.

In the country, the first organized effort by the government to privatize the delivery of animal health service was made through the Pan Africa Rinderpest Campaign –Phase I (PARC-II) in 1994. A total of Birr 8.4 million revolving credit funds were allocated and the veterinary privatization promotion office was established. The Development Bank of Ethiopia has been the financial intermediary. In response, only 12 animal health professional have got the fund that puts the financial performance only to 11 % of the approved budget. The Ethiopia Veterinarians Associations has requested for the coordination of the fund to promote private sector but the role couldn't get ahead of being a committee members. The progress of the project on privatization was disappointing (Personal Communication, EVA and Project Focal Person, 2008). Factor contributing to this progress include: unclear areas of veterinary intervention by the public and private, lack of clear procedure guidelines on establishment of private veterinary practices; lack of real commitment by government to privatize veterinary clinical and other services; underdeveloped rural roads and fragmented market for private sector participation; absence of enabling environment including appropriate legislation and regulation; and market distortion by the subsidized public and free NGO veterinary services. Whereas the same project in Kenya has boosted the number of formally registered private service providers in the sector (Omore *et al.*, 1999). This study recommends further study to analyze the perception of public veterinarians and fresh graduate on privatization of veterinary service in Ethiopia since this veterinary privatization scheme had not initiated new entrance in the sector.

In the milkshed, especially in the urban and accessible peri urban sub systems, there is a relatively higher incidence of crossbred cows and a good access to veterinary service market and hence there appear to profitably support the private veterinary sector and the government should create the required conditions, including level playing field to enable the development of the private sector. This will necessitate measures such as full cost recovery, withdrawal of the government from this potential area, the development of a regulatory framework for private veterinary practice and targeted subsidies for those who can genuinely not afford to pay. Reducing the government presence for clinical service delivery in potential areas (urban and peri urban) would release significant resources for focusing on rural areas with poor market access, low level of dairy intensification and low income from dairying.

Base on the experience of other countries attempting to reform veterinary services supported by the framework of FAO (FAO, 1997 and Smith, 2001) and World Bank (Umali *et al.*, 1994), the following pointed need due attention to improve the veterinary service in the country. Experience has indicated that preventive services work better when managed by the state while privatization could be encouraged for curative services. Accordingly, division of responsibilities between the public and the private sector (including third sector and para vet professionals) are suggested in Appendix 4. Special program should be developed to provide services in low-potential and marginal areas through para vet professionals. Government should institutionalize cost recovery concept of "user-paid" fees for specific services that are acquired from the public veterinary services so as to make the playing field leveled. Moreover, the role of veterinarians' associations in promoting private service providers has paramount importance. Their role is appreciated in advocating for the right enabling environment and legislation update, participate in formulation of national animal health policies, and design ways to help private veterinarians to establish their practice, without suffocating a healthy competition from less qualified professionals, provided these act within the limits of their competence.

4.4.4.3 Feed supply services

Feed, both inadequate supply and quality, is one of the major factors limiting dairy productivity in the country. Hence, factories and institutions that produce animal feed and forage play paramount important with respect to solving this problem. Rural Development Policies and Strategies (RDPS) emphasized the role that private sector can contribute in solving the problem. It further points the need to establish those factories and institutions by the government, when there is no alternative due to lack of participation of private investors. Accordingly, it is one sector that responded to liberalization policy flourishing private factories and firms in the production of concentrate feed. Niger seed cake and wheat bran market also follows the same trend following private sector investment in oil and flour and biscuit factories, respectively. Subsequently, feed retail market flourished up to rural kebeles. The problem with this service is assuring quality which demands urgent need to institutionalize standard and quality system for the major feed types.

However, the forage and hay markets follows different trend. By its nature and due to small to nil grazing farm size, the amount required by smallholder from the market is small, which would not encouraged the involvement of private sector. Moreover, the adoption of the available technological options is limited. Hence, the forage development needs innovative research and service delivery for successful supply and/or introduction into the existing farming systems. The hay and /or crop residue market are constrained by supply problem due to the competition of hay and crop residue for export market.

4.4.4.4 Cross breeding service

In Ethiopia, crossbreeding service is provided through two major means: Artificial Insemination (AI) and distribution of improved breeds from cattle improvement and multiplication center. It is a service monopolized by the public sector and both means are known for their inefficiency and ineffectiveness in the country (Ababu *et al.*, 2004; Azage *et al.*, 2006; Ababu *et al.*, 2006; Workineh and Ababu, 2006 and Kefena Effa, 2006). In addition, private dairy farms/farmers (see Table 5) and crossbreeding using improved bull are also major source of crossbred cows in the urban and peri urban areas. Currently, some progress is made to start *in vitro* production of crossbred embryo at EIAR-Holleta biotechnology laboratory and training of staff was underway by expatriate staff from Cuba (Personal Communication-DZARC, 2007). According to Workineh and Ababu (2006), it is an area for the public sector to support and promote, leaving the more routine management of crossbreeding ranches for the private sector. Based on this background information, the following institutional arrangements are suggested to improve dairy cross breeding service in the country.

AI Service

According to Azage *et al.* (2006), problem with efficiency and effectiveness of AI technician and monopolized public delivery of the service are some of the major problems in the country AI system. On top of this, the field AI system loosely linked with the National AI center responsible to produce semen nationally where AI technicians are not getting the required refreshment training, poor monitoring and evaluation and recording system to the point difficult to trace the success rate, lack of transport and operational cost for the field service and AI technicians involvement in corruption and unethical service

delivery are all irritating the inefficient and ineffective field AI service. In addition, absence of mechanism of using the revenue accrued from the cost recovery to expand the service is also a problem. Hence, this study based on the current performance of the public AI service and its pure private good nature of the service suggests private AI service delivery in urban and accessible peri urban settings where there is effective demand and government to focus on areas where the involvement of private providers are not involved and institutionalize appropriate enabling environment. Workineh and Ababu (2006) recommended the public sector support in import and testing of improver genotypes, supply of liquid nitrogen, quality assurance and regulatory services for promoting private AI service delivery.

Improved Bull Service

Improved bull service is one means of getting dairy crosses through private service providers. It is the service that currently gives relief to AI problems, though it is also constrained by different problems such as lack of information on the genotype of the bull, shortage and non-replacement of exotic bulls and disease transmission. Similarly, like other private services, bull service is also not monitored and evaluated for its performance by concerned body though the performances of the bull (disease, pedigree and physical appearance) have paramount influence on the crossbreeding service. Hence, this study strongly suggests the institutionalizing monitoring and evaluation, quality assurance and support system to the private bull service delivery based on its importance in the breeding service especially to rural areas.

Supply of crossbred cows from dairy farms/farmers

This option of accessing crossbreds is the major one in *Debrezeit* milkshed where 80.3 % of the respondents have got their initial/starter crossbred cow from private dairy farms/farmer. However, it is known for the supply of unknown pedigree, without history records, undesirable traits and expensive price of the cows. Hence, this option can be strengthened to improve the service through careful identification of the dairy farms and institutionalize contract arrangements for crossbred production with predefined quality and quantity. The contracted farms need to get appropriate enabling environment to facilitate the service.

Supply of crossbred cows from ranches

The supply of F1 heifers in the country is organized mainly from the four government owned and operated cattle breeding and multiplication ranches with extension and/or research mandates at Gobe, Abernossa , Metekel and Andanssa (Azage *et al.*, 2006 and Workineh and Ababu , 2006). The performance of these ranches to supply F1 heifers is far from smallholder demand due to lack of long term breeding programs and low overall performance to meet their annual average output targets, for example the effective heifer distribution efficiency is only 14.6% at Abernossa ranch between 1994 and 2000 (Ababu *et al.*, 2006 and Azage *et al.*, 2006). Experience in other countries shows that private ranches have advantage to take on a long term development path based on current and future markets and hence have a better chance of success (Workineh and Ababu, 2006).

Hence, this study suggests complete privatization and/or public private partnership to improve the old aged and poorly performing government owned ranches so as to make a more rational use of public resources at the disposal of these ranches and improve the breeding service for the supply F1 heifer to the small holder dairy producers. Although not the concern of this thesis, Workineh and Ababu (2006) recommended the same to encourage long term planning of genetic improvement in the ranches. Public private partnership based privatization, as being seen in other public enterprises like Addis Tyre Share Company can be applicable to the public cattle breeding and multiplication ranches. The essence of this partnership is to put a public say in the ranches where the ranches have local breed conservation and improvement objective which may not be attractive by private sector due to its long gestation period. Moreover, the experience of privatizing the dairy farms and /or ranches showed that private investors are not entering to the operation once the firms are transferred and may not operate at the farm full capacity (fore example, Abernossa ranch; the then sheno research center for sheep production, *Debrezeit* dairy farm). Workineh A. (2007) has also recommended establishment of new private ranches in marginal and low fertile areas of the country through reviving and putting into to more productive use of the marginal areas through adaptive and efficient large scale livestock production. Both, the privatization and new private ranches promotion need enabling environment from the government in terms of getting land, credit and support system.

4.4.4.5 Credit service

Though the credit market is responsive for the liberalized economy in the country, it is not serving the dairy sector due to reason discussed below. Good number of new private commercial banks and one cooperative bank were established, their involvement in dairy sector credit is limited to large investors which are not interested to invest in dairy sector because of long reproduction cycles of the species resulting long gestation period of the investment. These commercial banks have involved in credit service through government incentives for special programs and NGOs support. Effort is being made by Land O'Lakes to collaborate with three private commercial banks (Bank of Abyssinia, Awash International, and Dashen) that are Development Credit Authority (DCA) partners with USAID. Land O' Lakes provided training to the banks' lending officers to improve their understanding of the dairy sector, particularly dairy processing; its investment requirements, cash flow expectations, and potential returns on investment and cover 50 % collateral for those interested borrowers and constrained by lack of collateral. But, these banks are constrained by shortage of capital and loan able fund (Personal Communication –Land O' Lakes, 2008).

The other major source of dairy credit service is from Micro Finances Institutions (MFI) flourished after the issuance of Proclamation 40/1996, which provides the establishment, licensing and supervision of microfinance institutions. Since then to 2005, there are 23 licensed MFIs reaching about 905,000 credit clients and some saving clients in the country (Getahun G., 2005). Though most of the MFI are addressing the dairy sector, it is constrained by unfavorable loan size and period for sector, far to rural dairy producers and long loan procedure for smallholder dairy producer. According to the recent MFI, the maximum loan size is Birr 5,000.00 which is not enough to start a single dairy cow farm with 3 years loan that is not feasible for dairy. The interest rate is high (up to 20.00%) when compared to the bank interest rate (7.5 %) and the ceiling interest rate is still open to be decided by the board of directors, according to the new Directive No MFI/13/2002 (Ibid). On top of this, the MFI are loosely linked to other actors in the service delivery system including government actors. This is because MFI are working independently once they got certificate from National Bank and Wolday A. (2002) pointed National Bank of

Ethiopia have limited capacity to supervise MFIs and absence of a government department or other institutions to supervise and support this FMI.

These MFI such as OSCSC and ACSI have insurance service associated with death of borrower. This service can developed to incorporate livestock insurance service as Azage *et al.* (2006) indicated the importance of livestock insurance system in Ethiopia based on the risk associated with the sector. Dairy associations at all level should advocate for responsive credit system for the sector.

4.4.4.6 Milk marketing and processing service

Milk marketing system is one of the services responsive to the liberalization policy implemented in 1991 in the country. Until 1991, the formal market of cold chain, pasteurized milk was exclusively dominated by the Dairy Development Enterprise (DDE) which supplied 12 percent of the total fresh milk in the Addis Ababa area (Holloway *et al.* 2000). Recently, however, dairy cooperatives and private businesses have begun collecting, processing, packing and distributing milk and other dairy products leaving the milk market competitive. Still, the proportion of total production being marketed through the formal markets remains small (Staal *et al.*, 2008). Until recently, DDE (Shola Milk) remains the only government enterprise involved in processing and marketing dairy products. Currently, DDE is also privatized as of September 2007 to ELFORA, a member of MIDRCO Company for new brand “LAME”. Moreover, dairy cooperative like *Ada’a* Dairy Cooperative are starting to process milk. However, the progress seen in expansion of milk marketing by cooperatives and private sectors is limited to urban and peri-urban areas of small holder dairy producers. Hence, improving local marketing service has paramount importance to make local producers more market oriented and competitive in the market and the following specific strategies are recommended to improve the milk market service.

Forming of milk marketing groups: In the rural dairy sub system, lack of milk market is among the major bottlenecks for not adopting improved dairy cows thereby not benefiting from the potential. Hence, organizing marketing group in accessible rural areas could

create milk market by linking producers with big dairy cooperative and private milk processors which are concentrated in the urban and peri-urban cities of the country.

Stimulating consumption of milk and milk products in the country: Milk consumption per capita in the country is low due to consumer preferences and low income. Looking at the historical data and considering the key role that domestic demand had played in the development of the dairy sector in other poor countries, Staal *et al* (2008) concluded that demand played an important role constraining growth of the dairy sector in Ethiopia. Hence, aggressive promotion effort to stimulate consumption of milk is needed for the sector development. This strategy can be promoted through generic promotion by the government and brand promotion by the dairy processors all level in collaboration with other actors. Events such as school milk day for local milks can be an entry point for promotion.

Institutionalizing milk quality and standards in the market: When products from several producers are sold under the same label a consistent level of quality is necessary. The Ethiopia quality and standard authority have developed milk and milk product standards, but not yet institutionalized. This call policies and/or institutional arrangement to change the role of the public sector or to encourage others to play the roles.

Recapturing local markets: Recapturing local markets for imported products (powered milk) is an important strategy for the development of the sector since powered milk are gaining a strong foothold in the market. In addition, the market opportunity created by COMESA will have a negative effect to our producers with the current low level of competitiveness as compared to our neighboring countries. Kenyan small-scale farmers are poised to become major players in the market for milk, according to researchers at the International Livestock Research Institute (ILRI) in Nairobi (Press Release on 8 NOVEMBER 2007 available at www.smallholderdairy.org). Hence, dairy association at national level should work on projecting the milk and milk products supply and demand so as to influence the amount of imports. Moreover, these associations should advocate for the right policy and institutional support to enhance the competitiveness of the local dairy producers to compete in the market.

4.4.4.7 Agricultural research

In Ethiopia, agricultural research is one of the major public budget holders experiencing growth in funding following the attention given to transform the subsistence agriculture to market oriented though the expenditure as a percentage of agricultural GDP remains among the lowest in SSA (Pardey and Beintema, 2001; Beintema and Solomon, 2003; ASTI, 2004). Public sector research is a cornerstone of Ethiopia's agricultural innovation system (Speilman *et al.*, 2006). There is a National Agricultural Research System (NARS) and Regional Agricultural Research Institutes (RARIs) system.

Dairy research constitutes 8 sub-programs, namely: breeding and genetics, husbandry and management, feed resources management, animal nutrition and physiology, animal health, dairy processing technology, socio-economics, and technology transfer (Alemu *et al.*, 2001). However, it is being argued that past research efforts and development work could not bring substantial impact in the betterment of dairy production at national level due to low uptake of the developed technologies and knowledge by smallholder dairy producers. Though, the reasons for the poor adoption of dairy technologies and knowledge requires further study, the reasons fall in two major categories internal and external inefficiency and ineffective of the research system. This part is only interested on the research system and suggests the following reasons: the research idea were initiated on the interest of the researchers, researches were undertaken on station with little or with out involvement of the end users, poor linkage between research, extension and farmers, and shortage of research funds as dairy research is capital intensive.

These problems and the government demand for research impact, has triggered the research system to change towards on farm and client oriented researches (Berhanu *et al.*, 2006, Spielman *et al.*, 2006). National, regional and research center based Research Extension Advisory Council (REAC) and institutionalizing Farmer Research Group and Farmer Extension Group are currently being used to facilitate the participation of stakeholder in the research process. However, there is still drawbacks in institutionalize functional linkage between research, extension, end users (both small holders and private), private service provider and market actors. Moreover, unclear division of responsibility

and loose structural linkage between NARS and RARIs is becoming a setback for the coordinated research system in the country.

With regard to financing and delivery of the research system, agricultural research is also the services that demonstrate existence of multiple actors in the financing and provision of the research services especially for maize and participatory research in the country. The limited research undertaken by the private sector like Syngenta and Pioneer Hybrid in maize research (MoARD, 2006) can be referred. Different NGOs such as Farm Africa, JICA- FRG project, USAID-AMAREW project, CIDA-SWHISA project, Agri Service Ethiopia- PROLINNOVA project, IRISH AID and SOS-Sahel can be cited for the involvement in financing participatory research in partnership with research center and /or WOARD. The national agricultural research system as well as the regional agricultural research institutes is well organized to accommodate this opportunity though the loose relation between federal and regional research institutions drag it. The impact of these pluralistic arrangements needs further study to see their impact and further replication to advisory service.

Moreover, the World Bank funded Agricultural Research and Training Project (ARTP) which designed to support pluralism in the continuum of technology identification, development, dissemination and funding through competitive Agricultural Research Fund (ARF) can be mentioned. ARF was operational through enhancing participation of the entire range of concerned and capable stakeholders in both the implementation and funding of research and technology dissemination. The currently operational WB project (RCBP) is interested on the ARF experience and allocated US\$ 3.3 million for expanded and transparent National Agricultural Research Fund (NARF) for agricultural research with strong envision that NARF would make it possible for a wide variety of institutions with research capabilities to compete for public support and better serve farmers and other clients, and to mobilize incremental financial or “in-kind” resources (World Bank, 2006). The role ARF to increase the participation of private sector in the agricultural research could be enhanced through inviting competent private sector rather than confiding the opportunity to public sector again. This will gives opportunity to create public private partnership in the dairy research service.

Hence, this study suggests the research system to adopt innovation system perspective that gives a room to create network and partnership (public-private) among actors in the service delivery system and making the research system more user-oriented and responsive to demand and hence more relevant and less wasteful, and improving both the management of existing resources and the efficiency of service delivery.

4.5 Willingness and Ability of Dairy Producers to Pay for Dairy Advisory Service

As discussed in 4.2 and 4.3, the government is demonstrating its commitments in supporting public agricultural extension services to promote market oriented agricultural development of small holder farmers. However, the public extension service needs transformation so as to support the envisaged transformation process. Major points identified by this and previous studies (Habtemariam K., 2005; Berhanu *et al.*, 2006a; and Byerlee *et al.*, 2007) and World Bank (2006) project appraisal document on the current extension system is the top down and supply driven nature originated from its public monopoly that resulted in extension personnel accountability to upwards, poor incentive system as well as lack of operational costs and basic facilities. On top of this, the service is provided free of charge as a social service, which makes government bear the total cost of providing the service.

However, many dairy related services in the milkshed are already paid for by the users except for advisory service. Payment is started with services that bring an immediate benefit to the users, such as input supply, artificial insemination, veterinary services, financial services (through interest rate) and marketing service (indirectly from milk supplied). Whereas, advisory services are normally services, which have longer-term benefits and experience shows that it is sometimes necessary to supply public funding to supplement the users' own contribution through cost recovery arrangement, for a period until farmers have themselves determined that the benefits of the advisory services outweigh the costs involved.

The rationale of cost-recovery is two-fold. On the one hand, cost recovery aims at addressing the fiscal sustainability problems inherent in publicly funded extension. On the other hand, cost recovery is expected to make advisory service more demand-driven, as clients are expected to exercise voice if they pay for the services (e.g., Gautam 2000,

Holloway and Ehui 2001). However, cost recovery may further exclude poor farmers and marginalized groups (e.g., Heemskerk and Wennink 2005) and need institutional arrangement for pro poor services especially in food insecure areas where farmers can't manage to pay for services. In the meantime, fee for services in cost recovery arrangement where the service has been previously provided free of charge, can only be possible if farmers are willing to pay for the services. Hence, the rest of this part discusses producers' ability and willingness to pay for dairy advisory service.

4.5.1 Descriptive results

Data presented in Table 5-8 showed the result of selected demographic and socioeconomic characteristics of the respondents. In addition Table 22 presents descriptive results related to willingness to pay survey. The CV survey revealed that 107 out of 150 respondents, ie, 71.3 % were willing to pay for dairy advisory service, whereas the remaining 47 respondent that represent 28.7 % reported that they are not willing to pay without statistical significance difference across the sub systems. The reason pointed out by the non willing respondents were they couldn't afford (55.8%), it is the responsibility of the government to provide such services (30.2 %) and 14.6 % do not trust in improving the service through payment. The CV survey came out with the maximum willingness to pay per visit and the reason for that. The major reasons collected were respondents can't afford more than the stated value (39.8 %), think that the service worth that amount (44.7 %) and 15.5 % pointed the government should fill the gap for the true value of the service (Table 22).

The respondent's assessment of their ability to pay show that 65.4 % and 12.1 % of willing respondents rated themselves as able to pay and well able, respectively, while 22.4 % rated themselves as not able to pay. Respondents also indicated their preferred modes of payment in response to a question on how they would be willing to pay if fees were to be introduced. About 80.6 % would like to pay for advisory services in cooperative and 1.9 % in-group with other producer. Those willing to pay personally to the service provider constitute 17.5 % of the respondents (Table 22).

Table 22. Distribution on variables relating to willingness to pay for dairy advisory service

Variables	Total sample	Sub system		
		Urban	Peri-urban	Rural
Willing to pay (%) *	71.3	71.4	72.9	68.8
Reason for not willing to pay				
I do not trust in improving the service through payment	14.6	0.0	30.8	20.02
I could not afford	55.8	65.0	53.8	40.0
It is the responsibility of government to provide the service	30.2	35.0	15.4	40.0
Maximum willingness to pay Birr/Visit				
5 Birr	12.1	14.0	5.7	18.2
10 Birr	34.6	24.1	37.1	54.5
10-20 Birr	32.7	44.0	28.6	13.6
> 20 Birr	20.6	18.0	28.57	13.6
Reasons for the maximum willingness to pay				
I couldn't afford more than this	39.8	52.0	32.3	22.7
I think it worth this amount	44.7	44.0	51.6	36.4
Government should cover the rest	15.5	4.6	16.1	40.9
Self evaluation on the willingness to pay				
Not able	22.4	32.0	14.3	13.6
Able	65.4	62.0	60.0	81.8
Well able	12.1	6.0	25.7	4.5
Preferred mode of payment				
Individually/personally	17.5	18.4	25.0	4.5
With other producers	1.9	4.1	0.00	0.00
In cooperative	80.6	77.6	75.0	95.5
Conditions that will enhance payment				
Relevance of the advisory service	15.9	6.0	28.6	18.2
Effectiveness and efficiency of the development agent	9.3	12.0	5.7	9.1
Improvement in production output and market	36.4	52.0	28.6	13.6
Improved income from dairy	38.3	30.0	37.1	59.1
Willing to pay (N)	107	50	35	22
Total (N)	150	70	48	32

*- There is no statistical significance across the sub system ($\chi^2 = 0.003$)

Source: Own Survey (2007)

The cooperative dominated preferred mode of payment is an indication that majority of the respondents have realized the benefit of being organized in cooperative since the 62.9 % of the urban producers are members of the *Ada'a* dairy cooperative and others are also confident on the performance of the cooperative to facilitate such service delivery. Table 22 presents the conditions, which could enhance dairy producers pay without complaint. Accordingly, they pointed improved income from dairy (38.3 %), improvement in production output and market (36.4 %), relevance of the advisory service (15.9 %) and effectiveness and efficiency of the development agent (9.3 %).

Evidence from the above analysis revealed that dairy producers have boldly indicated their willingness to pay for advisory service as far as it is useful and important to improve the dairy sector. These findings suggest that cost recovery mechanism might be able to enhance the funding of service delivery system and, therefore, be a viable option, which may be explored in the provision of effective, efficient and sustainable dairy services to producers.

Based on the ability and willingness to pay result, the dairy production and the policy and institutional arrangements, different intervention options for the financing and delivery of advisory service is analyzed for the milkshed. The willingness and ability to pay gives a room to opt cost sharing across the sub systems owing to the non significance difference across the sub system. But, the diversity of the dairy production systems and the policy and institutional arrangement across the sub systems dictate to select different options for the peri-urban and rural on one side and the urban setting on the other side.

The policy and the institutional options in the urban, and peri-urban and rural sub systems are different. There is a political decision on public advisory service provision for the rural and peri urban settings by the WOARD that can be understood from the huge public investment in deploying 55,000 DAs at 18,000 FTCs in the country. Moreover, the non-existence of private and weak engagement of NGOs in advisory service and the absence of monitoring and evaluation system in the public service limits other realistic options, for example, contracting for the two sub systems. Hence, this study suggests for transformation of the traditional role of extension to market oriented public advisory service through participating dairy producers for the financing of the service. In contrast, the urban dairy sub system is neither covered nor designed to access advisory service by the public sector. Rather, discouraged to continue dairy production at individual level. However, the urban sub system is covering the majority of the milk market in the milkshed with large number of crossbred cows which demand better management practices and thereby advisory service. In the meantime, the dairy producers are organized in Ada'a dairy cooperatives. Hence, the cooperative can at least contract advisory service (from competent service provider, for example, *Debrezeit* faculty DVM staff) or recruit its own advisory staff where dairy producers participate in co-financing the advisory service.

This does not mean, however, to remain the primary responsibility of the public sector to deliver advisory service in the peri urban and rural settings for the future, but with the perspective to facilitate the development of alternative non public sector structures through supporting capacity and withdrawing as the non public service market starts functioning.

4.5.2 The Contingent Valuation Method result

4.5.2.1 Testing the Contingent Valuation Method

A common concern of researchers, who use the contingent valuation method as well as those who are end-users of the results of the method, is the validity of the research outcome. This issue of validity refers to the degree to which valuation outcomes from the CVM indicate the true value of the asset being investigated. In this regard, the literature identifies few categories of methodological issues, which could in fact reduce the validity of CVM results. One of these is the loss of validity arising from biased results generated by the CVM. The major potential sources of bias is the consideration whether WTP responses derived from a contingent valuation study could somehow be influenced by respondents' strategic behavior. To avoid this threats test for the existence of strategic behaviors is conducted.

Test for Strategic Bias

To assess for the possible existence of strategic biases in the WTP responses, the hypothetical market scenario used during the study was presented in two formats. The basic difference between the two is that the first was intended to capture any strategic behavior. The second one, on the other hand, includes a statement, which was specifically designed to discourage respondents from incorporating any strategic element in their valuation of the service. The latter explicitly states that, respondents' answers to the WTP question cannot change the plan that the government has to delivery advisory service in the future (See Appendix 9). These two scenarios were distributed randomly among the questionnaires and hence 78 questionnaires carried the scenario, which was designed to capture strategic behavior and 72 questionnaires carried a scenario, which was designed to discourage strategic behavior. Then after, the proportion of yes and no responses in the

two groups were calculated and the chi square value was checked to identify if there is significance difference. The result is presented in Table 23 and the chi square value found to be 0.727, which is not statistically significant even at 10 percent probability level that gives a room to conclude that the respondents are not acting strategically.

Table 23. Proportion of ‘yes’ and ‘no’ responses for the two scenarios

	Scenario 1	Scenario 2	χ^2 Value	Significance
Proportion in each group	78	72		
Yes response	74.4	68.8	0.727	Not Significant
No responses	25.6	31.9		

Source: Own Survey (2007)

4.5.2.2 Estimation of the value

As discussed in the methodology part, the amount of money that dairy producers are willing to pay for advisory service is calculated using the Lower Bound Mean (LBM) estimate. The double bound question indicated the amount dairy producers are willing to pay. The amount were analyzed and presented in Table 24. In this method, three levels of payments ranging from 5 to 20 Birr per visit were used in the calculation. The mean willingness to pay is estimated using LBM equation (3).

Table 24. Willingness to pay for dairy advisory service using CVM

Amount willing to pay (Birr/visit)	Frequency	Percentage	Cumulative percentage
20	54	36.00	36.00
10	40	26.67	62.67
5	13	8.67	71.33
Number of Respondents	107		

$$\text{LBM} = 0.7133 * 5 + .6267(10-5) + .36(20-10) = \text{Birr } 10.30 \text{ per visit}$$

Source: Equation (3) result

Accordingly, the mean willingness to pay for advisory service in the milkshed is estimated at Birr 10.30 per visit. If this is multiplied by the number of livestock producers, the amount which would accrue to the advisory service provider would be substantial and reduce the governments’ incurred expenses on advisory services, thereby resulting only in a need to provide subsidy and not to bear the total cost of providing the services. In

addition, private advisory service providers could begin to operate among the dairy producers. However, this would be possible only if the conditions mentioned by producers that enhance their willingness to pay for the services were met. This could also be done without necessarily embarking on total 'privatization of agricultural advisory service, a phrase which according to Rivera and Cary (1997) is misleading and might be rejected by producers.

5. SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Summary and Conclusion

This study was undertaken to explore the performance of existing dairy service delivery system in *Debrezeit* milkshed and thereby analyzing ways of developing responsive service delivery in the sector to support the transformation. It entails the specific objectives of investigating the role of the different actors and analyzing the performance of the dairy service delivery system in the milkshed; exploring opportunities and constraints in the policy and institutional environment for pluralistic service delivery in the dairy sector; and assessing producers' ability and willingness to pay for dairy advisory service. Primary data was collected from 150 smallholder dairy producer households randomly selected by a multistage sampling with probability proportional to size (PPS) sampling design from three kebeles representing the urban, peri-urban and rural sub systems and various service providers. This was supplemented by information from participatory rapid appraisal and review of government policies and strategies. Qualitative and quantitative methods were deployed to analyze the collected data. Contingent Valuation Method (CVM) was used to measure the willingness to pay for dairy advisory service.

The study result showed that dairy system in the woreda can be mapped into three subsystems: urban, peri-urban and rural; the urban sub system being significantly different from the others. It is a sub system with large number of cross bred dairy cows which are better yielding, higher volume of milk produced and marketed. The dairy producers have better income from dairying and have other diversified source of livelihood, more educated and members of the Ada'a dairy cooperatives. The peri urban and rural sub systems are similar in most respects, but the number of crossbred cows and access to milk market is slightly better in the peri-urban setting. Constraints for market oriented dairy development are also different across the subsystems and require sub-system specific technical, policy and institutional innovations to improve the service delivery to promote market oriented dairy development in the milkshed.

In the milkshed, there are multiple actors involved in dairy service delivery (DSD) from the public, private and third sectors, with the significance of actors and their roles

changing over time. About 28 years ago, the public sector was the lone service delivery agent engaged in supply of crossbred heifers and related support services. Public sector especially WOARD plays a central role in DSD and includes dairy advisory and training, AI, animal health and veterinary and dairy input (crossbred heifer, forage seeds and cutting) distribution services. Private organizations, institutions and individuals in which *Debrezeit* town are also entering into provision of dairy related services such as feed supply, veterinary drugs and service, milk collection and processing and, financial services. Ada'a milk cooperative is becoming a prime mover in DSD especially in the urban and peri urban subsystems through its services to members, which include feed supply, AI, veterinary services, milk marketing (collection and processing) and advisory services. The international actors and NGOs in the milkshed involved in supporting technology development; technology transfer; improving marketing; and enhancing the innovative service delivery in the dairy sector.

These actors interact in the service delivery. Strong linkages were observed between dairy producers and organization involved in the supply of inputs & milk processors. Whereas, the others are links those that an organization has for the purposes of accessing a technology and knowledge or collaborating on a joint activity. These linkages are weak but would be more important for supporting continuous improvement of service delivery to take place. The weak interaction among actors emanates from the actors' habits and practices and missing coordination function. More importantly, actors that are critical for coordinating pluralistic service delivery system are missed or overlooked role by the existing actor (WOARD) in the milkshed. These observed habits and practices that hinder actors' collaboration demand organizational innovation to reframe habits and practices for collaboration based on learning and trust. Moreover, the missing role/actors demand institutional innovation to change the role of the public sector or to encourage others to play different roles or play existing roles more effectively.

Performances of the various actors involved in DSD were evaluated based on their effectiveness, relevance, efficiency and prospects of financial sustainability. Accordingly, the public dairy service delivery was found to be effective in terms of improving the productivity and income of dairy producers with a recorded positive impact on cross breed dairy owners. However, it is not effective in addressing the major of the subsistence poor farmers. The content of the advisory service is developed based on the supply of menu

driven packages decided at the national/regional level that provides the farmer with limited and often inappropriate choices. The relevance of the public dairy service to market oriented dairy development is challenging due to its ineffective role it plays in facilitating linkages between producers and market agents, financial institutions, input suppliers and other support services. The current extension services have good numbers of staff but constrained by shortage of skills for facilitation, negotiation and network and platform building, system accountability, supply driven nature, poor incentive systems, shortage of operational costs and working facilities. These competencies and /or role gap require the public dairy service to adopt organizational innovation to transform itself to market oriented public dairy advisory service provider that tend to include accountability, farmer empowerment , cost sharing for sustainability, reorientation to market and knowledge management.

Ada'a dairy cooperative is effective in achieving the initial objective of providing feed and milk marketing services. Cooperative members confirmed that they have got better access to inputs at reason price, milk market, knowledge and skills on improved dairy management, acquired business skills and more income since joining the cooperative. However, members complain on the timeliness and effectiveness of the services. More specifically, they were raising the mismanagement in the cooperative leadership including abuses by employees by under measuring, adulteration and stealing during milk collection and transportation to Addis Ababa. The cooperative working good in promoting market oriented dairy development in the milkshed through creating market link between the urban and peri urban sub systems, collaborating with other dairy associations, public organization, NGOs, projects and donors affiliated on MODD. Hence, to expand proven initiatives, strengthen good practice and addressing the weakness, the cooperative could adopt organization innovation such as participatory decision making, knowledge management activities, policy advocacy works and responsive and cost effective service delivery.

In addition, the performance of the different possible providers and the quality of their services was evaluated by dairy producers in order to identify who is good at what and the opportunity for learning and complementarily. Accordingly, veterinary, feed supply, AI and milk marketing service were evaluated. The result revealed that private service providers are good in their timeliness than the public and cooperative sector in the

veterinary, AI and feed supply services. Where as the private sector are evaluated for their poor quality service in the veterinary, AI and feed supply. The quality problem is aggravated because there is no quality assurance and qualification of service providers by the public and hence calls for new institutional arrangement to change the role of the public sector or to encourage others (such as dairy association) to play the roles.

The policy and institutional environment for dairy service delivery is an important condition for pluralistic dairy service delivery. In this regard, the country Rural Development Policies and Strategies (RDPS) backed by different strategies and programs (PASDEP, capacity building) and legal framework (proclamations and regulations) are important steps forwards for the commercialization of the sector with out any restriction on non public service providers to participate in the market. Nevertheless, success in pluralistic service delivery, among others, is constrained by inadequacy of the existing policies and strategies, still more enabling environment and institutional arrangements setback (poor linkage and coordination of actors in the public, private and third sector).

Similarly, options for veterinary service entails policy for appropriate division of responsibilities between the public, private and third sector, institutionalizing cost recovery concept of "user-paid" fees for specific services that are acquired from the public veterinary services so as to make the playing field leveled. Here, the role of veterinarians' associations in promoting pluralism in service providers has paramount importance. Their role is appreciated in advocating for the right enabling environment and legislation update, participate in formulation of national animal health policies, and design ways to help private veterinarians to establish their practice,

With regard to cross breeding service, four options are discussion: AI, improved bull service, supply of crossbred cows from dairy farms/farmers and supply of crossbred cows from ranches. Based on the current performance of the public AI service and its pure private good nature of the service, this study suggests private AI service delivery in urban and peri urban areas where there is effective demand and government to focus on areas where the involvement of private providers are not involved and institutionalize appropriate enabling environment. As to improved bull service, institutional innovation options with regard to monitoring and evaluation, quality assurance and support system to the private bull service delivery could be seen to improve the breeding service especially

to rural areas. Options to improve supply of crossbred cows from dairy farms/farmers includes careful identification of the dairy farms and institutionalize contract arrangements for crossbred production with predefined quality and quantity and the contracted farms need to get appropriate enabling environment to facilitate the service. Finally, this study suggests complete privatization and/or public private partnership to improve the old aged and poorly performing government owned ranches.

The quality problem (mixing unwanted ingredients) in the feed supply service stipulates institutional innovation to change the role of the public sector or to encourage others to play the role of regulatory (standard and quality systems) and qualification of feed suppliers. The forage development needs innovative research and service delivery for successful supply and/or introduction into the existing farming systems.

Organizational innovation is required by the financial institutions to serve the dairy producers in terms of loan size and period and include additional services like livestock insurance as one options to improve the finance service. In addition, institutional innovation is required to forge network among the finance sector and create a link with other stakeholder in the milk value chain. With this regard, the role of dairy association at all level has paramount importance to advocate for responsive credit system for the sector.

In order to improve the local marketing service thereby making local producers more market oriented and competitive in the market and the following are identified as innovation needs in the sector: organizational innovation to organize milk marketing group in accessible rural and peri urban area to link to milk collectors and processors, institutional and policy changes to stimulate consumption of milk and milk products in the country through generic promotion by the government and brand promotion by the dairy processors. Change in policy making process is also required to participate dairy organizations in dairy related policy making process for example in the process of projecting the amount of milk and milk products demand and supply thereby decision on the import of dairy and dairy products imports.

Option for the research system concentrates on the institutionalization of agricultural innovation system perspective that gives a room to create network and partnership (eg. public-private) among actors in the service delivery system and making the research

system more user-oriented and responsive to demand and hence more relevant and less wasteful, and improving both the management of existing resources and the efficiency of service delivery.

This study analyzed cost sharing as an option for developing sustainable and responsive dairy advisory service delivery, by assessing producers' willingness to pay using Contingent Valuation Method (CVM) method. Results show that 71.3 % of the producers described themselves as willing to pay for dairy advisory service if their income from dairy would increase. They also want to pay through cooperative societies. The CVM result showed that the Lower Bound Mean (LBM) of amount which farmers are willing to pay for dairy advisory service Birr 10.36 per visit. The study concluded that there is a challenge to advisory specialists to make the service producers relevant if producers are to be charged with the responsibility of participating in financing dairy advisory service. In addition, it gives an opportunity for the operation of private advisory service providers among the dairy producers.

The policy and the institutional arrangement in the urban, and peri-urban and rural sub systems are different. There is a political decision on public advisory service provision for the rural and peri urban settings by the WOARD. Hence, this study suggests for transformation of the traditional role of extension to market oriented public advisory service through participating dairy producers for the financing of the service in the rural and peri urban areas. In contrast, the urban dairy sub system can adopt different approach by capacitating the Ada'a cooperative to contract advisory service from competent service provider, for example, *Debrezeit* faculty DVM staff or recruit its own advisory staff where dairy producers participate in co-financing the advisory service.

5.2 Recommendation

1. In an efficient service delivery system, producers must be considered and treated as clients. Clients' demands must be the starting point of service delivery. Hence, the public and/or third sector has to encourage dairy producers to organize them in groups (or dairy cooperatives) so that they can articulate, organize the delivery and share the costs of the services. Subsequently, producer groups (cooperatives) should be

empowered for formulating and demanding quality services through strengthening their voice and negotiating power to influence service providers and to claim accountability of providers to the clients. Hence, development of demand side of service delivery is the major component for effective pluralistic service delivery system to happen.

2. Following the emergence of multiple service providers in the dairy related services, the central task is to have efficient pluralistic, decentralized service management and service delivery. Sustainability of efficient pluralistic service requires the availability of competent service providers that respond to diverse demands by dairy producers. This has to be backed up by the development of competent service providers through platforming and collaboration for learning and interaction thereby improving the relevance and quality of service, reframe actors' habits and practice for collaboration based on learning and trust, developing quality and standards for the services. This has to be followed by systems qualification of service providers, identify and strategizing for missing competence and role within the pluralistic service system. WOAD should undergo organizational reform or new actor (dairy platform/system coordinating body) should be created to coordinate dairy platforms thereby the development of efficient service providers.
3. Policies are required to change the role of the public sector or to encourage others to play different roles or play existing roles more effectively within pluralistic service delivery systems. Private sector actors and other actors outside government are becoming important players in the dairy service delivery, and public sector must reconfigure their roles and relationships in light of these developments. For example, there are lacks of clear policies that as to what type services to be provided by the public and non public sector and the required favorable conditions for the promotion of the same (for example in animal health services), missing roles (such as regulatory role in animal feed, milk and milk products, cross breeding services quality and standards and coordination of the multiple actors and service delivery system). Hence, producers association (like dairy association, dairy cooperatives, trade unions) and professional association like ESAP, EVA and AESE should participate in policy analysis and advocating for the right enabling policies and legislation update and participate in formulation of the national policies related to the sector.

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7. APPENDICES

Appendix 1. Actors and their roles in DSD in the milkshed

Sector type	Name of the actor	Service provided/ role facilitated by the actor	Mandate area				Remark
			Ada'a District	U	PU	R	
Public	Ada'a WOARD-Livestock Dep't	Animal health and veterinary , AI , Dairy advisory and training and Dairy input supply services	X		X	X	The urban system has access to the AI and vet services
	Ada'a WOARD – Office of Cooperative Promotion	Facilitation and organization of dairy cooperatives, Capacity building supports (back up services) such as market linking, training and auditing	X	X	X	X	
	<i>Debrezeit</i> Municipality – Office of Trade and Industry (Urban Agriculture Unit)	Facilitate technical and administrative support for urban dairy producers		X			
	<i>Debrezeit</i> Municipality- Office of Micro and Small Enterprise Development	Facilitate and promote the organization of micro and small enterprise (dairy and service providers)		X			
	<i>Debrezeit</i> Agricultural Research Institute (EIAR-DzARC)	Research, training and source of cross bred cows, forage seed and cutting materials		X	X		National Mandate
	National Veterinary Institute (NVI)	Supply of vaccine and source of part-time veterinary personnel		X			National Mandate Source of part-time vet personnel for the Urban
	<i>Debrezeit</i> Faculty of Veterinary Medicine (FVM- AAU)	Veterinary service and source of part-time veterinary personnel	X	X	X	X	Limited to vet drug sales service
Private	Ada'a Dairy Cooperative	Supply inputs such as milk marketing, feed, AI, health services to member farmers at reasonable price; and provide training in dairy cattle management, milk hygiene and handling and milk processing there by minimize the high transaction cost for the sale of milk and reduce seasonal price fluctuations		X	X		The services are limited to urban setting
	Private Animal Feed Suppliers	Supply a variety of feed		X	X	X	Concentrated in urban
	Private Veterinary Service Providers	Provide veterinary services including home service		X	X	X	The rural have access to drug sale
	Private Milk Processing Firms	Collect , process and market milk and milk products		X			
	Private Bull Service Station	Provide cross breeding service		X	X		

NB: U, PU and R represents the Urban, Peri-urban and rural dairy production systems

Appendix 1. Continued.....

Sector type	Name of the actor	Service provided/ role facilitated by the actor	Mandate area				Remark
			Ada'a District	U	PU	R	
Financial Institutions	Cooperative Bank of Oromiya	Provides short term (one year), medium (two years) and long term (three to five years) loan with an interest rate of 8.5 %, 10 % and 11 %, respectively	X				Have 35 branches in (Addis Ababa and Oromiya)
	Oromiya Credit and Saving Share Company	Provides both short-term loan (two years) and long term loans at an interest rate of 15.0 % for both types of credit	X				
	Gasha Microfinance Share Company	Provides credit, saving, micro insurance and advisory and follow up services with an interest rate of 10 % and 11.5 % in urban and rural areas, respectively.	X				Have four satellite cites at four kebeles in the district
	Bussa Gonofa Microfinance Share Company	Provides financial services	X				
Third sector (NGOs/CSOs, international organizations and External Assistance)	ILRI <i>Debrezeit</i> Station	Has been engaged in dairy research and development activities Source of crossbred heifers and improved forage seeds and cutting materials and capacity building supports		X	X		Past Actor with international mandate
	Jerusalem Children Centered Development Organization	Provide credit and training for poor women to engage in dairy enterprise		X			Local NGO focusing on urban agriculture
	Land O'lakes	Facilitate market linkages among stakeholders, stimulate business development , introduction of forage technology, promotion of private sector in service delivery (AI and Vet) and advance industry organization in the dairy sector , provide training on dairy cattle management, improve milk hygiene, encourage clean milk production, increase operational efficiency of private farms	X	X	X		Implementing Ethiopian Dairy Development Project
	SNV	Promote value chain development combined with business development services concept where milk and milk product value chain is functional in Ada'a Promote private and CBO service providers where Ada'a milk cooperative is supported to strengthen its milk collection centers, training of cooperative committee and members on leadership and improved dairy husbandry, respectively.	X	X			Implementing Business Organizations and their Access to Markets'' (BO&AM) in Ethiopia
	HUNDEE	Training on improved dairy husbandry, on farm forage production and distribution of local cows for women groups			X		Not based in Ada'a
	Improving Productivity and Market Success (IPMS)' project for Ethiopian farmers implemented by ILRI on behalf of the MoARD	Facilitate market link among stakeholders, promotion of improved dairy production , marketing and processing , promotion of improved feeding systems , promote private services providers (AI and bull stations), capacity building, and facilitate the establishment of woreda advisory and learning committees (WALC) and dairy platform	X	X	X	X	Implemented in ten Pilot Learning Woredas (PLWs) in four regions

NB: U, PU and R represents the Urban, Peri-urban and rural dairy production systems

Appendix 2. Self assessment by the WOARD livestock team and DA

Statement	WOARD Livestock team					DA						
	Score*											
	0	1	2	3	4	5	0	1	2	3	4	5
Our staff members have adequate knowledge and skills to respond to all stakeholder needs			X									X
Our staff members have adequate motivation and good attitude to respond to all stakeholder needs			X									X
Training is planned according to stakeholder needs					X							X
Our staff members work sufficiently in interdisciplinary teams			X								X	
All staff members regularly receive incentives for performance or output		X					X					
There is a well-defined strategy paper for the thematic or geographic mandate area			X								X	
There is good/ effective administrative leadership			X								X	
There is good/ effective technical leadership					X		X					
Our organization actively tries to generate sufficient revenue/funds to maintain its facilities		X					X					
Our organization has sufficient funds to cover costs for overheads , perdiem		X					X					
Our organization knows its stakeholders			X									X
The stakeholders know the organization and the services it can provide					X					X		
The stakeholders are satisfied with the services that our organization provides					X						X	
Our organization responds adequately to stakeholder requests for services					X							X
Our organization has an updated detailed stakeholder inventory/ directory					X						X	
Our organization has interaction and linkage with other dairy service providers in the area			X					X				
Our staff frequently participate in local dairy platforms			X				X					
Stakeholders are partners in the identification of service needs			X				X					
Our organization has the required facilities to provide efficient service	X						X					
Our organization has the required facilities to provide efficient service		X					X					

*1 meaning you strongly disagrees and 5 meaning you strongly agree, 0 is not known (not in a position to score).

Appendix 3. Crossbred cow acquisition period in GC

Period	Sub system						Total Sample	
	Urban		Peri-urban		Rural		N	%
	N	%	N	%	N	%		
1979-1980	1	1.56	0	0.00	0	0.00	1	1.32
1981-1991	17	26.56	1	8.33	0	0.00	18	23.68
1992-1999	19	29.69	2	16.67	0	0.00	21	27.63
2000 to date	27	42.19	9	75.00	0	0.00	36	47.37
Total	64		12		0		76	

Source: Survey Result (2007)

Appendix 4. Suggested animal health and veterinary service division of responsibilities between the public and the private sector

<p>Services under public sector responsibility</p> <ul style="list-style-type: none"> • Formulation of national animal health policies (creation of an enabling environment for private sector activities) • Elaboration of regulations governing animal production, processing and marketing activities and the activities of the private veterinary and para-veterinary professions • Ensuring the health of the national herds (surveillance, compliance monitoring, quarantine, quality control of drugs and vaccines, emergency planning, reporting to international agencies and neighboring countries) • Inspection and control of livestock products for food safety purposes • Import and export certification • Food hygiene and inspection • Animal health research • Accreditation and monitoring of private suppliers of services animal health services
<p>Services under shared public and private responsibility (through contracting)</p> <ul style="list-style-type: none"> • Disease diagnosis and reporting • Tsetse control in collaboration with community based organizations and NGOs • Education and training • Disease control • Disease emergency response • Animal health management advice and extension
<p>Services under the responsibility of the private sector</p> <ul style="list-style-type: none"> • Clinical diagnosis and treatment • Importation, production , distribution and retail of vet drugs , vaccines, chemicals, biologicals and animal health equipment • Artificial insemination • Animal health consultancy • Management of herd health and production programmes

Appendix 5. Producers perceived problem on dairy feed service delivery in the milkshed

Perceived Problem (%)	Total sample	Sub system		
		Urban	Peri-urban	Rural
Hay				
Shortage of production	53.33	0.00	100.00	100.00
Shortage of supply	38.67	82.90	0.00	0.00
High cost	23.33	45.70	6.30	0.00
Quality problem	0.67	1.40	0.00	0.00
Crop residue				
Shortage of production	18.67	0.00	18.60	59.40
Shortage of supply	24.00	53.70	0.00	0.00
High cost	26.00	55.20	2.10	3.10
No problem	34.00	0.00	81.30	37.50
Wheat Bran				
Shortage of supply	2.00	1.40	4.20	0.00
High cost	98.00	98.60	97.90	100.00
Nough cake				
Shortage of supply	2.00	4.30	0.00	0.00
High cost	96.00	94.30	97.90	100.00
Quality problem	3.33	1.40	8.50	0.00
Processed Feed				
Shortage of supply	20.00	27.10	20.80	3.10
High cost	76.00	74.30	70.80	87.50
Unawareness	7.33	0.00	16.70	9.40
Quality problem	1.33	1.40	2.10	0.00
Grazing				
Overstocking	6.00	0.00	18.90	0.00
Absence/shortage of grazing land	100.00	100.00	95.80	100.00
Utilization by other livestock species	8.00	0.00	16.70	12.5
Improved Forage				
Unawareness	11.33	10.10	68.80	3.10
Lack of seed/cutting material	19.33	42.00	0.00	0.00
Lack of growing land	74.00	53.60	89.60	96.9
Lack of adaptable variety	2.67	5.80	0.00	0.00

Source: Survey Data (2007)

Appendix 6. Producers perceived problem on veterinary service delivery in the milkshed

Perceived Problem (%)	Total sample	Sub system		
		Urban	Peri-urban	Rural
Lack of vet institution in the kebele	32.00	0.00	100.00	0.00
Far to reach the animal to the near by vet institute	33.00	73.10	0.00	0.00
Absence of vet personnel in the kebele vet clinic	21.00	0.00	0.00	100.00
In effective service delivery	12.00	16.40	6.30	12.50
High cost of the service	13.00	19.40	14.60	0.00

Source: Survey Data (2007)

Appendix 7. Producers' perception on strengthen and weakness of milk-marketing links in the milkshed

	Urban	Peri Urban	Rural	Total		Urban	Peri Urban	Rural	Total
Advantages of Ada'a Dairy Cooperative					Disadvantages of Ada'a Dairy Cooperative				
• No limit to amount of milk to supply	81.1	2.7	-	83.8	• Lower price of milk	29.0	10.1	-	39.1
• Supply other services (AI, feed, Vet)	64.9	1.4	-	66.3	• Under measuring, adulteration and stealing by workers	33.3	5.8	-	39.1
• Timely payment	28.4	-	-	28.4	• Exert quality control over milk and return milk	26.1	-	-	26.1
• Nearby milk collection center	4.1	8.1	-	12.2	• Membership is difficult due to high registration fee & share	14.5	-	-	14.5
• Pay in 15 days lump sum	9.5	-	-	9.5	• Do not allow their members to sell to others	4.3	-	-	4.3
• Strengthening the cooperative (sense of ownership)	5.4	-	-	5.4	• Lower price and demand during fasting season	4.3	-	-	4.3
• Bonus/divided payment	4.1	-	-	4.1	• Delays in milk collection time	0.0	1.5	-	1.5
Advantages of Informal Milk Market (Neighbors and Café)					Disadvantages of Informal Milk Market				
• Collect milk from farms	85.0	3.3	5.0	93.3	• Delay in milk collection time	55.0	-	-	55.0
• Better prices	56.7	-	-	56.7	• Delay in payment for the milk supplied	36.7	-	1.7	38.4
• Prepayment for milk supply	21.7	-	-	21.7	• Not a reliable market (Irregular demand)	26.7	-	-	26.7
• Timely payment for milk supply	10.0	-	-	10.0	• Complain on the milk quality with out testing	16.7	-	-	16.7
• Do not exert milk quality control	6.7	-	-	6.7	• No lump-sum payment	15.0	-	0	15.0
Advantages of Private Milk Market (Mama, Lema & Genesis)					Disadvantages of Private Milk Market				
• Higher prices than ADC	90.2	-	-	90.2	• Delay in payments	25.9	-	-	25.9
• No hard milk quality control	24.4	-	-	24.4	• Absence of regular milk collection center	25.9	-	-	25.9
• No limit for the amount of milk to supply	12.2	-	-	12.2	• Delays in milk collection time	18.5	-	-	18.5
• Collect milk from farm (Lema)	9.8	-	-	9.8	• Exert quality control over milk and return milk	14.8	-	-	14.8
• Timely payment for the milk supplied	7.3	-	-	7.3	• No other services (AI, Vet and feed supply)	14.8	-	-	14.8
• On time collection of milk	7.3	-	-	7.3	• Cannot take all the milk	7.4	-	-	7.4

Source: Survey Result (2007)

Appendix 8. Producers reason for not using dairy credit from financial institution

Perceived Reason (%)	Total sample	Sub system		
		Urban	Peri-urban	Rural
Unwariness on their existence in the milkshed	63.50	52.90	72.90	71.90
No need for the service	31.10	36.80	27.10	25.00
Long procedure to use the service	2.00	4.40	0.00	0.00
Fear of indebtedness	3.40	5.90	0.00	3.10

Source: Survey Data (2007)

Appendix 9. Description of Scenarios 1 and 2 for the Contingent valuation survey

Scenario 1: This is specifically designed to discourse strategic behavior

As you know in your area the cost of providing dairy advisory service to the farmers has mostly been financed by the government and provided free of charge. The lack of funds, cost ineffectiveness and lack of impact is now becoming a major obstacle in providing advisory services. In view of this, there is a need to initiate thinking towards cost recovery in service delivery to ensure financial sustainability of service delivery and to build genuine quality control mechanism. This will lead to a new scheme to provide dairy advisory services to the farmers through some user charges. We want to know the amount of money you are willing to pay for dairy advisory service per advisory visit if high quality advisory services can be provided. Your answer cannot change the plan that the government has to delivery advisory service in the future. We would now like you to answer the following questions on the amount of money you are willing to pay to make this plan.

Scenario 2: This is designed to capture any strategic behavior by the respondent in answering willingness to pay questions.

As you know in your area the cost of providing dairy advisory service to the farmers has mostly been financed by the government and provided free of charge. The lack of funds, cost ineffectiveness and lack of impact is now becoming a major obstacle in providing advisory services. In view of this, there is a need to initiate thinking towards cost recovery in service delivery to ensure financial sustainability of service delivery and to build genuine quality control mechanism. This will lead to a new scheme to provide dairy advisory services to the farmers through some user charges. We want to know the amount of money you are willing to pay for dairy advisory service per advisory visit if high quality advisory services can be provided.

Appendix 10. Producers Survey Interview Schedule

General Information:

Identification Number (code) _____
Date of interview _____
Name of kebele _____
Name of the village/ketena _____
Name of enumerator _____
Signature _____

Household head Name _____

1) HOUSEHOLD CHARACTERISTICS

1.1 HH head characteristics

1.1.1 Sex 1. Male 2. Female

1.1.2 Age _____

1.1.3 Marital status

1. Married

3. Divorced

2. Single

4. Widowed

1.1.4 Education level

1. Illiterate

2. Read and write (religion based)

3. Primary education =2, Number of years _____

4. Secondary education =3 Number of years _____

5. Higher education=4 _____

1.2 Source of livelihood of the household?

1. Dairy farmer

5. Wage employed

2. Farmer

6. Monthly salary

3. Handicraft

7. Other (specify)

4. Retirement fund

1.3 Family composition:

Family size: Male _____ Female _____

Number of adults (15-60 years of age): Male _____ Female _____

Number of children (10-14 years): Male _____ Female _____

Number of old persons (above 60 years) Male _____ Female _____

Number of children below 10 years of age _____

Number of adult family members working full time on dairy _____

Number of adult family members working part time on dairy _____

Number of children (11-14 years) working full time on dairy _____

Number of children (11-14 years) working part time on dairy _____

2) FARM CHARACTERISTICS and DAIRY PRODUCTION

2.1. Farm size (in timad) and tenure

Allocated arable land size _____ Allocated grazing land size _____

Rented in (Cash/Share) arable land _____ Rented out arable land _____

Rented in grazing land _____ Rented out grazing land _____

2.2. Livestock ownership

Species	No	Dairy breeds	No.	Dairy breeds*	No
Oxen		Local cows		Crossed cows	
Sheep		Local bull		Improved bull	
Goat		Local heifer		Crossed heifer	
Equines		Local calf		Crossed calf	

* Please specify the blood level and type _____

2.3. When did you first acquire exotic pure or cross bred cows? Year _____

2.4. How did you acquire the exotic pure or cross bred cows?

1. Purchased on reduced price from (Agriculture, NGO _____, ranch _____, ILRI);
 2. Purchased from a dairy farm/farmer;
 3. Breeding from a neighboring farmer
 4. Breeding from a relative or family
 5. Purchased from local market
 6. Other means (Specify) _____
- 2.5. If the respondent is/did not acquired exotic pure/cross bred cow, what is the reason?
1. Lack of cross bred cows in the area (if only the producer had tried to phase so far)
 2. Fear of management problem (health, feed...)
 3. Fear of market link
 4. Unawareness on the benefit of crossbreds
 5. Lack of money for purchasing
 6. Other (specify) _____

2.6. Productivity the breeding cows

No	Breeding cows	Breed type	Blood level (if Possible)	Lactation Length	Average Milk yield/day		
					Beginning	Middle	Final
1	Cow1						
2	Cow2						
3	Cow3						
4	Cow4						
5	Cow5						

2.7. Dairy husbandry

2.7.1. Type of management

Management type	Season							
	Local				Crossbreds			
	Kiremt	Bega	Tibi	Belg	Kiremt	Bega	Tibi	Belg
grazing								
tethering								
Stall/in door/ feeding								

2.7.2. Housing type

1. No housing
2. Fenced
3. House with out roof
4. House with grass roof
5. House with iron roof
6. Specify if any _____

3) SOURCE OF DAIRY SERVICE

3.1 INPUT AND MATERIAL

3.1.1 Feed

3.1.1.1. What are the types and source of feed?

No	Feed Type	Source
1	Hay	1. Purchased from Ada milk Coop. 2. Purchased from private feed supplier (Specify); 3. Own farm; 4. purchased from other farm; 5. Specify if any,
2	Processed feed	
3	Nough Cake	
4	Furishka	
5	Improved forage	
6	Grazing	
7	Crop residue	
8	Factory products (urea, molasses)	

3.1.1.2. Please mention the main feed resource problem in your area?

No	Feed Type	Problem
1	Hay	1. Shortage of production 2. Shortage of supply 3. Costly 4. Other(specify)
2	Processed feed	1. Unavailability 2. Costly 3. Unawareness 4. Other(specify)
3	Nough Cake	1. Unavailability 2. Costly 3. Unawareness 4. Other(specify)
4	Furishka	1. Unavailability 2. Costly 3. Unawareness 4. Other(specify)
5	Improved forage	1. Unawareness, 2. Lack of seed/planting material, 3. Lack of growing land 4. Lack of adaptable type 5. Other (specify)
6	Grazing/Pasture	1. Overstocking 2. Low productivity of pasture land 3. Shortage of land 4. Utilization by other livestock type 5. Other(specify)
7	Crop residue	1. Shortage of supply, 2. Shortage of production, 3. Costly, 4. Other (Specify)
8	Factory products (urea, molasses)	1. Shortage of supply, 2. Shortage of production, 3. Costly, 4. Other (Specify)

3.1.1.3. If there are more than one feed suppliers, how do you evaluate them?

Service provider	Evaluation*			
	Timeliness	Variety of feed	Costliness	Quality
Ada milk cooperative				

* 1. Excellent 2. Very good 3. Good 4. Poor 5. Very poor

3.1.2 Artificial Insemination/Bull service

3.1.2.1. What method do you use for breeding?

1. Natural (bull service) 3. Both
2. Artificial insemination (Source _____)

3.1.2.2. Which method do you prefer/use and why?

A. If you prefer Natural (bull service), what are the reasons

1. Higher conception rate 2. AI service is not available at a convenient distance
3. Other (specify) _____

B. If you prefer Artificial insemination, what are the reasons?

1. Avoidance of disease 2. Choice of breeds 3. Rapid calf growth
4. Other (specify) _____

3.3.1.1. What are the major problems in accessing dairy veterinary service in this area?

1. Lack of service giving organization
2. Lack of veterinary technician
3. lack of medicine or drugs
4. High cost
5. Far to take the animals

3.2 MARKET LINK AND MARKET INFORMATION

3.2.1 Milk product obtained, consumed, sold and milk quality

Type of dairy cow	no of animals	milk yield/day	home consumption	Calf feeding	utilized for other purpose	milk sold
local						
cross						
exotic						

3.2.2 Products processed from milk

Type cow	produced			home consumed			Sold		
	butter in kg	cheese	Yogurt	butter in kg	cheese	Yogurt	butter in kg	cheese	Yogurt
local									
cross									
exotic									

3.2.3 Who are the preferred consumers/markets in this area?

Milk/milk product	Market source: 1. Ada coop; 2. Genesis farm, 3. Lema milk 4. Neighbor , 5. Local Market(specify)
Milk	Rank 1 st _____, 2 nd _____, 3 rd _____, 4 th _____
Butter	Rank 1 st _____, 2 nd _____, 3 rd _____, 4 th _____
Cheese	Rank 1 st _____, 2 nd _____, 3 rd _____, 4 th _____
Other(specify)	Rank 1 st _____, 2 nd _____, 3 rd _____, 4 th _____

Remark: The ranking should be done by discussing the advantage and disadvantage of each channel

3.2.4 Distance of the farm from the nearest milk collection center in minutes _____, Km _____

3.2.5 Distance of the farm from Debrezeit in minutes _____, in Km _____

3.2.6 Number of years since you have started to supply milk to market

Local Market _____ yrs

Dairy Cooperative _____

Processing Firm (Mama, Lema) _____

Private Farm (Genesis) _____

3.2.7 Advantages and Disadvantages of each Milk-Marketing Channel/point

Market channel	Advantage *	Disadvantage*
Ada milk cooperative		
Genesis Farm		
Relative/neighbor		
Lema Milk		
Local Market		

3.2.8 Do you have a milk market link? 1. Yes 2. No

3.2.9 If the answer for Question 3.2.8 is Yes, with whom is the link?

1. Ada milk coop. 2. Lema 3. Genesis 4. Other (specify) ___

3.2.10 If the answer for Question 3.2.9 is No, what is the reason?

1. Unable to produce more for the market
2. Unavailability of market linking body
3. The marketing agents are not reliable
4. Other (specify) _____

3.2.11 Are you a member of milk marketing cooperative? 1. Yes 2.No

3.2.12 If the answer for Question 3.2.11 is No, what is the reason?

3.2.13 Source of information on input and output market

A. Source of Input(feed , medicine...) market information

B. Source of milk market price information

3.2.14 Marketing problems

3.3 KNOWLEDGE AND INFORMATION

3.3.1 Training

3.3.1.1. Have you ever participated on dairy production training for the past three years?

1) No 2) Yes

3.3.1.2. If the answer for Q. 3.3.1.1 is no, what is the reasons? _____

3.3.1.3. If yes, specify the training type and the organization organized the training.

Training Type	No of days	Year	Organization	Training evaluation*

* Do you think that the training was helpful to gain knowledge and skill to solve your practical problems? 1) No 2) Yes. If no, why? _____

3.3.2 Advise

3.3.2.1. Do you get dairy advisory service on dairy production? 1. No 2. Yes

3.3.2.2. If the answer for Q 3.3.2.1 is no, why?

- 1. No service provider nearby
- 2. Possessed the required information
- 3. Availability of contact farmers in the area
- 4. No need for service
- 5. Others (specify) _____

3.3.2.3. If the answer for Q 3.3.2.1 is yes, for how long do you get the service? __ Years

3.3.2.4. Who provides the advisory service?

- 1. Development agents
- 2. NGOs (specify) _____
- 3. Private dairy farms (specify) _____
- 4. Others (specify) _____

3.3.2.5. How do you get the advisory service?

- 1. Farm to farm visit by the development agent
- 2. Going to the service providers (eg. When supplying milk)
- 3. Others (specify) _____

3.3.2.6. If the answer for 3.3.2.5 is choice no 1, how frequent were you visited by development agents last year? _____

- 1. Once per month
- 2. Twice per month
- 3. Three times per month
- 4. Four times per month
- 5. Others, specify _____

3.3.2.7. If the answer for 3.3.2.5 is choice no 2, specify the arrangement to get the service for each service provider.

3.3.2.8. What are the major dairy information and knowledge that you have been delivered by the advisory service? Please describe for each service provider.

3.3.2.9. Assessment of satisfaction by the existing WOARD advisory service

Statement	Rate				
	Strongly agree	Agree	Indifferent	Disagree	Strongly disagree
WOARD Livestock DAs have the knowledge and skills to satisfy our needs					
WOARD Livestock DAs have the attitude to satisfy our needs					
WOARD Livestock development staff is flexible enough to address our concerns					

3.3.2.10. If the advisory service provision is not as per your information and knowledge need, could you please mention relevant information and knowledge that you need to enhance market oriented dairy production.

1. _____
2. _____
3. _____
4. _____

3.3.3 Research

3.3.3.1. Source of dairy research/innovation in your area?

1. D/Z ARC 2. D/Z ILRI 3. WOARD 4. Other (specify) _____

3.3.3.2. Have you ever participated in problem identification and/or research-planning?

1. Yes 2. No

3.3.3.3. If yes, specify the organization and year _____ Number of times _____

3.3.3.4. What are the dairy technology type/ services you get from ARC?

1. Feed 2. Husbandry 3. Health 4. Dairy marketing processing

3.4 Finance and Credit

3.4.1 Have utilized any credit service that support dairy development in this area?

1. Yes 2. No

3.4.2 If yes, type of credit, source and its performance?

Credit type	Source*	Evaluation **					
		Timeliness	Interest charge	Collateral	Bureaucratic procedure	Access	Tiedness

* 1. Cooperative bank of oromiya 2. NGO (specify) _____ 3. Friends/relatives
4. Ada milk coop. 5. Gasha microfinance 6. Oromiya microfinance

** 1. Excellent 2. Very good 3. Good 4. Poor 5. Very poor

3.4.3 If the answer for 3.4.1 is no, what is the reason?

1. No service provider nearby 2. No need for service
3. Availability of informal money leaders in the area
4. Others (specify) _____

4) Income from dairying and Other Source

4.1. Referring to the question 1.5 page 1, income from each source of livelihood income per year in Birr.

Dairy: Milk _____, milk product _____, live animals _____
Crop and livestock other than dairy _____, Pension pay _____,
Monthly salary _____, Remittance _____;
Others (specify them) _____

5) Willingness to pay for dairy advisory services

Description: Scenario 1 or 2 (which was randomly distributed to 150 HH), See appendix 8 for the detail.

- 5.1. Would you be willing to pay fee for high quality dairy advisory service and enhance market oriented dairy production? 1. Yes 2. No
- 5.2. If the answer for Q 6.1 is no, why?
1. I do not trust in improving the service delivery through paying
 2. I could not afford
 3. It is the responsibility of the government to provide such services and it is unfair that the government should charge for this
 4. I do not see the problem itself (Inefficient service delivery)
 5. Other (specify) _____
- 5.3. If yes to Q. 6.1, would you be willing to pay X birr per visit?
Yes=1 if yes go to (6.4) No=2 if no go to (6.5)
- 5.4. Would you be willing to pay BX birr per visit? Where $BX > X$.
Yes=1 if yes go to (6.6) No=2 if no go to (6.6)
- 5.5. Would you be willing to CX birr per week? Where $CX < X$.
Yes=1 if yes go to (6.6) No=2 if no go to (6.6)
- 5.6. What is the maximum you are willing to pay per visit? -----
- 5.7. What is the main reason for your maximum willingness to pay fee stated in number 5.6 above?
1. I could not afford more
 2. I think it worth that amount
 3. Other reason (specify) -----
- 5.8. How do you evaluate your ability to pay for dairy service?
1. Not able
 2. Able
 3. Well able
- 5.9. Preferred mode of payment?
1. Personally
 2. With other farmers
 3. In cooperative
- 5.10. Preferred payment vehicle (how the WTP amount would be paid)?
1. Per visit
 2. Per month
 3. Per bi-annual
 4. Per annum
- 5.11. If the answer for question 6.10 is per visit, how frequently you demand the visit?
- 5.12. _____
Conditions that will enhance payment?
1. Relevance of the advisory service
 2. Effectiveness and efficiency of the development agent
 3. Improvement in production output and market
 4. Improved income from dairy

Appendix 11. Dairy related service providers interview checklist

A. Organizational Profile

1. Title of Service Provider
2. Contact details of the organization
3. Date of Establishment
4. Location Offices, if any, and where they are working, e.g. which kebele and which communes/villages etc.
5. Organization type : Public/CBO/Private/NGO
6. Strategy & structure the organization: vision, mission and objectives (if developed); basic Organizational structure and management, e.g. if there is a Board of Trustees; lines of responsibility and reporting.
7. Human resources: Number of full/part time paid staff; full/part time volunteers.
8. Financial resources approximate annual income/turnover; major donors.
9. Target group of the organization
10. Service delivery dimension : services carried out and details
11. Main challenges: What has the organization found difficult? What are some of the main problems and issues that it faces?
12. Lessons learned: What would the organization do differently or the same, based on their experiences?
13. Future plans: What are the future directions of the organization? e.g. plans to scale up activities by expanding coverage or reaching new groups? Plan to institutionalize and/or strengthen linkage among stakeholders?
14. Evolution of the service delivery in the milkshed : Trend, Motivation and challenges

B. Service providers' organizational dimension: Configuration

1. Interactions, linkage and Partnership/coordination
2. Existing formal interaction/knowledge and network flow/, linkage and partnerships / coordination among the dairy service providers.
 - Actors involved – collaborating partners.
 - Types and forms of partnerships:
 - Why and how the various partnerships were initiated.
 - Where applicable, funding and level of funding for partnerships.
 - Potential partners – actors that can be involved in specific partnerships.
 - Why identified potential partners are not yet partners.

C. Mechanism of linkage

- Strength of linkage with other agents for each actor in dairy service delivery in the milkshed : S= Strong; M= Medium; W=Weak; N=None,
- Where linkages are strong and medium, identify the important linkage mechanisms used?
- Where linkages are poor, identify the most important reason?
- Source of knowledge and information about dairy?

D. Opportunities and constraints in the policy and institutional environment for pluralistic service delivery in the dairy sectors

1. Descriptive account of historical changes in market oriented dairy policy , livestock development master plan , ADLI for transforming subsistence agriculture to market oriented agricultural development
2. Does policy give a coherent and comprehensive framework to orient the actions of different actors and agencies?
 - Are the actions of agencies which finance or deliver extension, including donors, consistent with the agricultural policy framework?
 - To what extent does policy realistically envisage and promote joint actions among agencies (public, private, producer organizations) that build on their different roles and strengths?
3. Current and planned changes to institutional structure for the delivery of AI, clinical health, dairy advisory service , dairy marketing and processing and inputs such as feed and credit by multiple actors
 - New actors involved
 - New/changing roles (old actors playing new roles, new actors taking over old roles, new actors taking up new roles etc...)
 - Changes in infrastructure to support dairy activity – roads, markets, processing, storage etc
 - Regulation/ laws regarding land tenure/transactions/access for private service providers, land use policy, grazing policy
4. Current and planned policy regarding provisions of inputs and services , output marketing and processing, role of private sector vs co-operatives