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Review

Challenges of generation and dissemination of improved dairy practices: Evidence of literature from Ethiopia

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Dairying is being practised as an integral part of agricultural activities in Ethiopia since a time of immemorial. Although the inception of dairy research and dissemination of improved dairy practices lasts for more than five decades, the majority of the farmers still continue to adopt traditional dairy practices. This review was made to point out the major challenges that imbedded the improved dairy practices generation and dissemination in Ethiopia. Intensive conceptual and empirical literature reviews based on several studies were done in the area of constraints and challenges; adoption and impact studies of dairy sub sector. The review indicated the central challenges of dairy development that emanated from policy, research, extension, technology, market, infrastructure, actors linkage and farmer problems of which lack of qualified personnel in research and extension organizations, low economic status of the majority of the farmers to afford improved dairy practices, absence of ready market for dairy product, high cost of cross bred and absence of an operational breeding strategy and policy are few to refer to. Though these problems were identified by different scholars at various times, they are not yet resolved and less adoption of improved dairy practices is persistently continuing. The review clearly indicated the need for an urgent revisiting of the current dairy research, extension and actors linkage strategies; capacitating dairy research and extension organization; creating ready market; and promoting farmer-to-farmer extension are some initiatives that are needed for sustainable development of the livestock sector of the country in general, and dairy development in particular.

Keys words: Challenges, dissemination, dairy development, improved dairy practices

INTRODUCTION

Ethiopia is a large country with a total land area of 1,104,300 sq.km and is the most populous Sub-Saharan African country. The total population of the country is 74 Million with annual growth rate of 2.6 per cent (Central Statistics Agency, CSA, 2007) and the current population of the country is estimated to be 89 million. Majority of the population (85 %) is engaged in agricultural source of production (Amdissa, 2006). Agriculture is also the major foreign exchange and constituted 46 per cent of GDP. The main agricultural exports are coffee, hides and skins, pulses, oilseeds, bee wax, tea and floriculture. Domestically, cereal, vegetable, fruit, meat and dairy production play an integral role for subsistence purposes. Agriculture is characterized by low productivity despite

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its high economic importance. Dairy production is indispensable sub sector of agriculture to improve the livelihoods of the community. Though cattle, camel and goats are the major sources of milk and milk products in Ethiopia, cattle produce 83 per cent of the total milk and 97 per cent of cow milk comes from indigenous breeds. In addition, the country is endowed with diverse topographic and climatic conditions favourable for dairy production. These conditions support use of improved, high milk yielding breeds, and offer relatively suitable environment for dairy production. To exploit the dairy sub sector of the country, it needs homemade policy and strategy on dairy technology generation, development and dissemination.

Poverty reduction in Ethiopia is impossible without significant growth in major staples food (Amdissa, 2006). The overriding policy agenda of the Ethiopian government necessitates the need for increasing dairy production and productivity to ensure food security and poverty eradication as investment in agriculture is 2.5 to 3.0 times more effective in increasing the income of the poor than is non agricultural investment (Johannes, 2012). Thus, to attain growth in agriculture, farmers need to get access to improved agricultural technologies and extension services. The Ethiopia government has also made various efforts to maximize the productivity of the sector, of which establishing research organization is one to mention. This review aimed at highlighting the main challenges that hindered the dairy development of the country which in turn assist the policy makers, researchers and practitioners to re-think and formulate a suitable strategy that contributes to the development of dairy sub sector of the country.

Dairy farming in Ethiopia

Ethiopia is home to the largest population of cattle in Africa, with the latest estimate 52,129,017 head of cattle (Central Statistical Agency, CSA, (2011), comprising 45.13 per cent are males and 54.87 per cent females, 99 per cent of them are indigenous low yield breeds and managed by smallholder, commercial and pastoral farmers while the hybrids and pure exotic breeds were represented by 0.72 and 0.09 per cent, respectively (CSA, 2010). The reports of Domestic Animal Genetic Resource Information System (DAGRIS), the Ethiopian Institute of Biodiversity Conservation (EIBC) and Domestic Animal Diversity Information System (DADIS) managed by FAO indicate 32, 27, and 31 numbers of local breed of cows respectively. Though variation exists among the report, on average 30 local breeds of cows are available in the country. High population of cattle, conducive climatic conditions and high urbanization rate are good indicators for the existence of potential in dairy development, though the current performance of the dairy industry in Ethiopia is not promising when compared to dairy development in Eastern African countries as the development efforts so far made have not brought a significant impact on the growth of the sector. According to Yilma *et al*. (2011) during the production year of 2010, the average daily milk production was only 1.69 liters with average lactation length of about 180 days and mean annual milk yield per cow of 305 liters. Similarly in the previous study by Alemu *et al.* (2000) the annual growth rate in cow milk production reported in 1990 in Ethiopia was nearly one per cent as opposed to 6.2 per cent in East Africa and 3.3 per cent in the whole of Africa. The per capita milk consumption in Ethiopia, 18.68 liters is very low as compared to the global average of 100 liters and even far below the average for Africa, 26 liters. FAO Statistical Database also evidently points out that globally, Ethiopia has the lowest average milk productivity (210kg/year/cow) and only it precedes Tanzania (174kg/year/cow).The dependence on import milk and milk products remain increasing, for example, in 2001 import of milk and milk product was about 3.1million USD and increased to about 9 million USD in 2008. However, according to Yilma *et al*. (2011) milk production in the country has generally increased over the last 10 years from about 1.5 billion liters in 2001 to about 2.2 billion liters in 2005 and around 2.9 billion liters in 2010. This increasing trend is mostly associated with an increase in the number of cows. However, the per capita milk consumption has declined from 26 kg per annum in 1980, to 22 kg in 1993, 19 kg in 2000 and 16 kg in 2009. This is likely to be attributed to the mismatch between the growth rate of milk production and human population.

Four major milk production systems are practised in Ethiopia, namely, highland smallholders, Pastoralist, urban and pre-urban and Intensive dairy farming.

The highland smallholder milk production: It is a central part and covers about 40 per cent of the land size of the country. The suitable climate of the area makes it potential for dairy development. The area is characterized by subsistence mixed farming of crop and livestock production system. Livestock feeding mainly depends on grazing and browsing. In the highlands, grazing on communal lands is the common practice. This feeding method is supplemented with natural grass hay, crop residues such as straws and chaffs of cereals and pulps, and agro- industrial by-products mostly from the flour/oil industries and brewery residues. Dairy producers who keep improved dairy cows also cultivate improved forage crops such as elephant grass, oats, vetch and alfalfa to supplement grazing (CSA, 2010).

Pastoralist: It is in the low land area (below 1500 m.a.s.l) of the country covering about 30 per cent of the livestock population and characterized by low milk production due to feed and water problems.

Urban and peri-urban: This milk production system consists small and medium dairy farms in towns and cities including their surroundings. It is mainly produced due to the presence of demand for milk in the area and

produced for earning additional income from the milk sale. Feed sources are oil seed cakes, bran, roughage etc. It is also mainly located in the highlands area of the country.

Intensive Dairy Farming: It is specialized milk production system undertaken by private sectors and mostly concentrated in the capital and regional cities of the country. Exotic pure bred and crossbred are the main sources of milk. However, of all milk production system, it produces a very minimal amount of milk.

Challenges of Dairy Research and Dissemination

To search pertinent solution for the challenges, scholars have studied at various times on constraints and challenges; adoption and impact studies of dairy sub sector. The central challenges of the dairy sub sector of Ethiopia link to policy, research, extension, farmers, technology, infrastructure, market and actors` linkage problems. In line with these aspects, the prevailing challenges of the dairy sub sector are summarized as follows;

Policy: Some challenges of dairying in Ethiopia emanated from the inconsistency in policy approach among different regimes. Following the changes of the government regime in the country, three different policies and strategies have been introduced in the dairy sub sector. In relation of dairy development, the main features of each regime are summarized as follows:

I. Imperial regime (before 1974): It was an era when exotic dairy cows were introduced to the country. During this period the government supported the large indigenous commercial farmers in peri-urban areas.

II. Socialist regime (1974-1991): It followed a centralized economic system and state farms. There were a support to smallholders and large scale state farm productions.

III. Free market (1991 and onwards): It aimed at increasing milk production through the introduction of liberalized markets and private sector investment. Following a strategy of Agricultural Development Led Industrialization, a shift of focus was made from urban to rural areas (Getachew and Geda, 2001; Ahmed *et al*., 2003). However, in the dairy sub sector, urban and peri-urban areas are getting more benefit from the existing dairy extension intervention.

Different development polices and strategies were terminated along with their regime due to ideological variations among the governments. Each regime continued to introduce new development approach to the dairy sub sector as there were complete variations among their development approaches. The inconsistency in development approach affected the development of the dairy sub sector of the country. Though similar development approach has been adopting since 1991, with relation to livestock sector, there was no comprehensive policy direction that gives broad map to various sub sectors of livestock. Particularly dairy research, extension and development policies were lacking despite their having great potential in translating the dairy development efforts into action. In line with this (Yilma *et a*l, 2011) point out that the dairy development of Ethiopia is affected due to the absence of an operational breeding strategy and policy.

Research: The research has been making effort to generate various improved dairy practices in the areas of improved dairy management practices; feeds and feeding practices; breeding practices and animal health practices for the last more than five decades.

However, the responsiveness of research system to farmer constraints and priorities remains unsatisfactory. It is also a witness that KAM (2012) using Knowledge Index (KI) ranks Ethiopia 140th out of 145 countries in ability to generate, disseminate and use knowledge. EARO (2006), now IARI (the apex organization of national agricultural research of Ethiopia) also states that “despite decades of research and development efforts, with the aim to provide farmers new technologies to improve their farming practices, agricultural productivity for both crop and livestock production is still very low.” .

The main factors that affect agricultural research in developing counties including Ethiopia are: lack of qualified research personnel, inadequate resources and inappropriate resource allocation (Tanvir *et al* 1994; Ponnusamy and Kumaran, 2008). The authors further state that lack of qualified personnel in the research organizations affects the technology development which ultimately affects agricultural extension work as the poorly developed technology is difficult to be accepted or adopted by the farming community.

Extension: Modern agricultural extension system was introduced in Ethiopia in 1950s. Though different extension systems were used previously, the country has formulated Participatory Demonstration and Training Extension System (PADETES) in 1995. PADETES promote packages on cereals, livestock, high economic value crops, improved postharvest technologies, agro-forestry, soil and water conservation and beekeeping developed for different agro-ecological zones (Anandajayasekeram *et al*, 2008).

The main factors that affect agricultural extension work in developing countries, including Ethiopia are:, low extension worker farmer ratio, lack of practical skills on the part of extension workers, poor in-service training facilities, multiple work role of extension workers, lack of incentive for extension work, limited recognition of the role of the research system in scaling up; inadequate communication plans for promotion of uptake and scaling up; inadequate evaluation for uptake and use of agricultural knowledge; inadequate budgets for promotion of uptake and scaling up; failure to link reward and incentive systems to impact; and ineffectiveness in the

extension systems and the technology dissemination processes. Similarly, weak extension works on scaling up is often cited as a major reason why many existing proven technologies are not widely available for uptake by farmers. (Tanvir *et al* 1994; Ponnusamy and Kumaran, 2008; ASARECA, 2010). In the extension efforts of decades, the dissemination status of improved dairy practices was insignificant. For instance, CSA (2010) estimate indicates that the indigenous breeds accounted for 99.19 per cent, while the hybrids and pure exotic breeds were represented by 0.72 and 0.09 per cent, respectively. Likewise about 0.15 per cent of rural livestock holders use improved forages (alfalfa and Napier grass); and the use of industrial by-products like oil cake, bran and brewery residue is negligible (0.8%) (CSA, 2008). A number of factors such as, limited supply of inputs (feed, breeding stock, artificial insemination and water), poor marketing infrastructure, lack of marketing support services and market information, absence of producers organizations, inadequate veterinary service provision, managerial and financial constraints, inefficient heat detection and improper timing of insemination, inappropriate infrastructure, limited availability of credit to the dairy farmer, unavailability of land, and natural resources degradation have contributed to un exploitation of dairy potential of Ethiopia (Yilma et al, 2011; Berhanu 2012; Ulfina *et al.* 2013).

Farmers: To address the needs of the resource poor farmers, the agricultural technology generation process should consider the social, economical, cultural and agro ecological situations of the clientele. Ban and Hawkins, (1996) also notes that farmers often accept the experiences on the demonstration farm that are valid for their conditions.

Some major factors that affect clients‟ access to extension services are: low economic status of the majority of the farmers to afford improved dairy practices (wealth status), gender, farming system, land ownership and farm size, other factors such as cultural constraints, education, age, access to credit and risk taking ability which affect farmers‟ access to and benefit from extension services (Anandajayasekeram *et al.* 2008). Illiteracy and small land holdings of extension clientele also affected the adoption of improved dairy practices (Tanvir *et al* 1994). Access to agricultural technologies requires knowledge of the existence of the technology, the ability to assess its suitability for the farming system, ability to use the technology; and ability to profitably sell surplus produce (Center for Development Research, 2012). Several studies on agricultural technology adoption (Workneh, 2011; Million and Belay, 2004; Endrias, 2003; Tesfaye *et al.,* 2001; Getahun *et al*., 2000) identify that factors such as technological, agricultural policies, institutional and demographic related variables affected adoption of technologies by resource poor farmers. Insufficient end-user involvement is also the main factor that affects the effectiveness of the improved dairy practices dissemination (Ponnusamy and Kumaran, 2008; ASARECA, 2010).

Market: The availability of ready market for dairy products triggers adoption decision of farmers. In the absence of well established market for dairy products, dissemination of improved dairy practices, particularly cross bred is difficult to meet its target. In the dairy extension intervention, market needs to be a precursor to the promotion of the practices. The absence of effective market for dairy products in Ethiopia affected the development of dairy. In line with this, several studies boldly indicated the persistent problem of market for dairy products (Yilma et al, 2011; Berhanu 2012; Ulfina *et al.* 2013).

Actors' linkage: In Ethiopia, the importance of linkage for increasing the agricultural productivity of stakeholders was recognized in 1980s. Since then, different efforts were done to strengthen the linkage among actors of agricultural production. For instance, Research-Extension Liaison Committees (RELCs) were established in 1986 with the main objective of creating an appropriate forum for the stakeholders of participants in agricultural development of the country. RELC was restructured to strengthen the loose linkage between research and extension, particularly to improve the participation of farmers in the linkage activities. As a result, Research-Extension and Farmers Advisory Council (REFAC) was established in 1999.

The results of the historical review reveal that research-extension linkage was generally weak and that neither research nor extension was sufficiently conscious of the need to understand the constraints and potentials of different farming systems as a basis for determining relevant technology and technology-development requirements (Belay, 2008). As a fact, REFAC was restructured in 2008 and named as Agriculture Development Partners Linkage Advisory Council (ADPLAC). It is mainly to strengthen linkage activities among the stakeholders of agricultural technology generation, development and dissemination.

ADPLAC is multi actors‟ linkage platform which includes, research, extension, farmers, private sectors, cooperatives, NGOs etc; and organized at federal, regional, zonal, district and Peasant Association (PA) levels. Though immense efforts were done to improve the linkage among the key actors of agricultural development, weak linkage was prevailing in the agricultural system of the country. Budget constraints, absence of commitment from the actors, coordination problem, frequent restructuring without in depth study, frequent shift of job (staff turnover), poor representations of actors and absence of external pressure from policy makers are the main causes for weak linkage. The study by (ASARECA, 2010; Yilma *et al*, 2011) also confirm the weak linkages among agricultural stakeholders in Ethiopia.

Infrastructure: It includes facilities that are required to undertake dairy research/extension activities such as work office, laboratory, transport, road, communication, demonstration site, farmer training school etc. In the process of making intervention in the dairy development, infrastructure needs to be a precursor to the whole efforts made for improving the dairy sub sector. Dairy development of the country is imbedded due to poor infrastructure (Simeon and Nega, 1997; Berhanu, 2012).

Technology: In the adoption process of improved dairy practices**,** availability, affordability, compatibility and adaptability of the technology are the main factors for stimulating farmers to decide the adoption of the technology. Likewise, the marketability and profitability of the products of the practice are the main inspiring factors for adopting the farm technology. The main challenges for the development of dairy farming in Ethiopia are: genetic limitation, inadequate animal feed resources, high cost of dairy heifers/cows, unavailability of improved dairy stock, inadequate A.I. services, shortage of feeds and cost of concentrates, disease and use of traditional technologies (Yilma *et al*, 2011; Ulfina *et al.* 2013; Berhanu (2012;).

Impact of Dairy Technologies

Future Agricultures Consortium (FAC) (2011) clearly points out those lessons from across Africa show that the effectiveness of agricultural technology generation and dissemination institutions depends crucially on their relevance and responsiveness to farmer needs.

In many part of Africa, realizing the potential of agricultural research to reduce poverty has been elusive (Forum for Agricultural Research in Africa/FARA/, 2006). It reached on such conclusion presenting as evidence the existing prevalence of poverty, hunger and malnutrition among farm families, in many parts of Africa. Agricultural research in Africa had generally yielded few benefits for poor people because it was elitist and out-of-touch with rural realities (Sumberg, 2004). The production of agricultural technologies by research, even if they „work" in the experiment station, is absolutely no guarantee for diffusion (Roling, 2006).

The adoption of dairy technologies has significant impacts on livelihood indicators such as household income, nutrition, food security, health care and access to education. The authors further state that there is strong linkage between higher incomes and improvement of livelihood resulted from the introduction of dairy technologies. The income of dairy farmers is significantly raised due to the adoption of different dairy technologies most importantly improved breeds (Kassahun and Jeilu, 2012). The higher income of the farmers is highly attributed in Ada"a and Lume districts of East Shoa Zone, Ethiopia to the sale of milk. In the majority of dairy producing households, the income from dairying is more sustainable and regular. Moreover, the authors concluded that adoption of dairy technologies is a significant determinant for the increase in the household income of dairy farmers. Hence, there is a need for good fit between the nature of technology, its mode of transfer and the farmer"s capabilities for absorption, assimilation, diffusion and improvement and emphasis should be on building consensus and synergies amongst various stakeholders in all public and regulatory matters as well as developing public and private partnerships (Ponnusamy and Kumaran, 2008).

Research and Extension Efforts for the Development of Dairy Sub-sector

The inception of research organization in Ethiopia coincides with the establishment of Imperial College of Agriculture and Mechanical Arts in 1953, now Haramaya University. However, the organized research institute was established in 1966 with the name Institute of Agricultural Research (IAR), then Ethiopia Agricultural Research Organization (EARO) now Ethiopian Institute of Agricultural Research (EIAR).

The federal, regional research centre, higher learning institutions and NGOs have generated, verified, demonstrated and popularized different dairy technologies. The packages of practices for dairy production in Ethiopia are:- Management practices (separate cow house, rotational grazing, stall feeding, de-worming, record keeping, udder washing, Milk processing); feeds and feeding practices (Sesbania, Napier grass, vetch and oat mixed, straw urea treatment, hay making, silage making, supplementation with concentrate, supplementation with grain, supplementation with Noug (*Guizotia abyssinica*) cake; Breeding practices (Artificial Insemination), Castration of bulls, Bull mating, Use of crossbred cows); and animal health practices(Vaccination, Application of acaricides).

However, agricultural production of the country is characterized by low productivity and low level use of agricultural technologies (EARO, 2006). Aldernburg (2007) also argues that the processes of communicating, sharing and scaling up agricultural knowledge require focus beyond the range of research, extension services and farmers to other stakeholders.

The Ethiopia government has designed mechanisms to improve the access of the farmers to agricultural technologies. The first effort is establishing agricultural extension wing in the research organization which is mandated to undertake extension research, technology demonstration and popularization. Agricultural Development Partners Linkage Advisory Council the then Research-Extension Advisory Councils at different stages (federal, regional and zonal levels) are also established. Though different extension systems were used previously, the country has formulated Participatory Demonstration and Training Extension System (PADETES) in 1995. The main objectives of PADETES are: increasing production and productivity of small-scale farmers through research-generated information and

technologies; empowering farmers to participate actively in the development process; increasing the level of food self-sufficiency; increasing the supply of industrial and export crops and ensuring the rehabilitation and conservation of the natural resource base of the country. Currently, PADETES promote packages on cereals, livestock, high economic value crops, improved postharvest technologies, agro-forestry, soil and water conservation and beekeeping developed for different agro-ecological zones (Anandajayasekeram *et al*, 2008).

Though such efforts are made, farmers‟ utilization of improved dairy technologies is minimal and stagnant. Similarly, as a result, the gap between resource rich and resource poor farmers is increasing. On the other hand, the field-level extension service has a strong foundation of Farmers Training Centers (FTCs) and trained development agents (DAs) already in place in the field. Roughly 8,489 FTCs have been created throughout Ethiopia, and about 62,764 DAs have been trained in total, with a reported 45,812 staffed on location (IFPRI, International Food Policy Research Institute, 2010). In Ethiopia, there are about 12.9 million rural households. As a result, the current development agent/farmer ratio is about 1:300 at the household level which is probably makes the country to have the highest development agent-farmers ratio. However, the coverage of Artificial Insemination technology is about one percent in the past five decades efforts of research and extension works.

Currently, in Ethiopia scaling up program of improved agricultural technologies and best practices is launched. Scaling up is a means for disseminating the technologies to reach a large farming community within the specific period of time. As the concept of scaling up and dissemination is interrelated, the available literature of scaling up can be used for dissemination and vice versa The term scaling up is defined as the effort to bring more quality benefits within very to more people over wider geographical areas with more equitable and sustainable manner (IIRR, 2000). Hartmann and Linn (2008) also defines scaling up as means of expanding, adapting and sustaining successful policies, programs and projects in different places and over time to reach a greater number of people.

In Ethiopia context, scaling up/out is conceptualized as the wider dissemination and adoption of improved agricultural technologies with impacts and benefits over substantial areas by large numbers of farmers. Korten (1998) identifies scaling up process as three successive stages i.e. effectiveness (developing a solution that works), efficiency (finding a way to deliver the solution at an affordable cost), and expansion (developing a way to provide the solution on a larger scale). As noted in (Global Forum for Agricultural Research 2000) the dimensions of scaling up are: institutional, geographical/spatial, technological, temporal dimension and economic dimension.

Scaling up is the most important approach for agricultural technology promotion in Ethiopia mainly due to the existing challenges of food security and rural poverty**.** In the Ethiopia context scaling up involves different development institutions (GO and NGO) and private sectors i.e. to reach the large community with agricultural technologies. Though evaluation was not undertaken on the status of scaling up of improved agricultural technologies and best practices, it is being undertaken within the existing agricultural extension system and the prevailing constraints of extension system impedes its effectiveness.

Policy Implications

Developing qualified research staff is essentially required in view of inadequate qualified research personnel in the Ethiopian dairy research. The better strategy would be developing culture of collaboration program with experienced countries in dairy research whereby the dairy researchers can be capacitated through experience sharing and staff exchange program.

In the dairy research and extension efforts of decades, its responsiveness to clientele constraints and priorities indicates the need for revisiting of the current dairy research, extension and actors linkage strategies to strategically address them, which in turn, contributes much for livestock development of the country in general, and dairy development in particular.

To address the needs of the resource poor farmers, dairy sub sector needs homemade policy that demands the attention of dairy professionals and actors to initiate “dairy movement” in the country.

Research–extension and other actors‟ linkage problems are persistently continuing due to lack of an organization that fully takes accountability. Hence, linkage needs its own independent organization that entirely takes roles and responsibilities of executing the activities of linkage. Otherwise the strength and weakness of linkage relies on personal initiatives that could not be sustainable in the long run.

In the dissemination process of improved dairy practices, market needs to be a precursor to the dissemination of the practices. Establishing milk collection centers and linking with dairy processing industry are the area that needs high priority.

The majority of farmers did not access the AI services as it is yet confined to urban and peri urban areas. To address this, the district (implementation area) needs to be categorized into different dairy development zones and AI technicians need to be assigned to each dairy development zones accordingly. Provision of AI service is a new area of business that creates job opportunity for the rural youth. In the other way, promoting farmer-to-farmer extension helps to fill the gap of AI technician. The approach can also be sustainable in serving the farmers as less job shifting (turn over) occurs by farmers.

CONCLUSION

Dairy is a common farming enterprise and income-generating activity in Ethiopia which can be improved by

addressing the challenges in dairy development. The study identified various problems of the dairy sub sector that needs pertinent solution to exploit its potential for improving the livelihoods of the farmers. Policy, research, extension, technology, market, infrastructure, farmer and actors linkage are the main areas where the dairy development challenges exist. Among frequently cited problems of dairy sub sector, some of them are: lack of qualified personnel in research and extension organizations, low economic status of the majority of the farmers to afford improved dairy practices, absence of ready market, high cost of cross bred and absence of an operational breeding strategy and policy. Inter alia low productivity, low level use of agricultural technologies and low adoptions of improved dairy practices are the major features of the dairy sub sector. Dairy technology generation and dissemination process is less considering social, economical, cultural and agro ecological situations of the clientele. In the globalized competitive world farmer should be made competent by facilitating the collaboration between the research, extension and other actors.

Putting into consideration the dairy development efforts made for decades, the question of stagnant development of dairy sub sector; and less adoption of improved dairy practices need an urgent comprehensive response from the professionals of the respective actors.

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