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THE ROLE OF EXTENSION IN CHANGING THE DAIRY INDUSTRY IN PAKISTAN: A REVIEW

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ABSTRACT

Pakistan is primarily an agricultural based country, and livestock plays a pivotal role in its economy by providing essential items of the human diet in the form of milk, meat and eggs. The population of the country is nearly180 million, and 36 million in the rural areas depend directly on the livestock and dairy sectors. Pakistan has recently been ranked as the world's third largest milk producer, with the recent growth in per capita milk production being driven by an increase in the number of dairy animals rather than by milk yield improvement. The current growth in population and increasing demand for food has created the need to produce more milk. Pakistani dairy farmers need to be aware of the key drivers of future change so that they can plan for increasing demand. This review is focused on the key factors influencing the change in the dairy industry and the role of extension in the change process. The important factors influencing the dairy sector from extension professionals point of view is capacity development through participatory principles. From dairy farmers' perspectives, shift from traditional practices towards improved sustainability and food security. Government and NGOs need to invest in the sector and avoid duplication and infiltration of dairy programs across the country. The potential for further utilization of new technologies for farmers with the assistance of dairy extension services is highlighted.

Keywords: Dairy, extension methods, drivers of change, milk production, Pakistan, development.

INTRODUCTION

Pakistan is primarily an agricultural based country and livestock plays a pivotal role in its economy, providing essential items of the human diet in the form of milk, meat and eggs. At present, livestock contributes about 51.8 per cent of agricultural value added and 11.3 per cent to the GDP (Government of Pakistan, 2008-09). The estimated total number of livestock in 2008-2009 was 154.3 million. Foreign earnings of the livestock sector exceed 35 billion rupees annually (US$ 707 million). Pakistan has a per capita production of milk around 230 kg per year, which is more than twice that of India and about 70 percent that of the United States of America. The recent growth in per capita milk production has been driven by an increase in the number of dairy animals rather than by an increase milk yield per animal (FAO, 2001).

Pakistan has been ranked as world's third largest milk producer (FAO, 2010); however the total milk produced in the country is not fulfilling domestic human needs. The most important reason for this shortfall is that the human population and consumption per capita is increasing (at the rate of 3% annually), but the milk production is not increasing at the same pace (Government of Pakistan, 2008-09). Milk production has shown a steady increase over the past several years, but this increase in milk production is due to an increase in the total number of milk producing animals and is not due to increases in per animal productivity. Presently, Pakistan is importing dry milk products valued at Rs. 1.1 billion (US$ 22 million), which is a burden on the country's economy (Government of Pakistan, 2008-09).

The production per animal is low for several reasons. Some of these include: low genetic potential of cattle; delay in attaining puberty, scarcity of feed resources, high disease incidence; a disorganized marketing system, and the maintenance of traditional farming practices (Bilal and Ahmad, 2004). When compared with major crops, milk has a greater value than the combined value of wheat and cotton, and twice that of sugarcane and rice combined (Bilal and Sajid, 2005). This review highlights the key factors influencing change in the dairy industry and the role of extension in the change process.

Key factors influencing change: The current population growth of Pakistan and the increasing demand for food has created the need to produce more milk. The human population has exceeded 7 billion recently, which was predicted to reach 7.6 billion by 2020. Eighty five per cent of this increase will occur in developing countries (FAO, 2000). At the moment Pakistan is the world's seventh most populous country, and according to UN projections it will become the third most populous by the

year 2050 (United Nations, 2011). Keeping this in mind, extension professionals and dairy farmers in Pakistan need to be aware of the key drivers of future change so that they can plan for changing demands. Some of the key drivers of future change for the Pakistan dairy industry have been identified as milk quality and markets, animal feed, animal breeding/genetics, and capacity building through dairy extension. Figure 1 illustrates the relationships between key drivers that are likely to bring about industrial change and the linkage between primary and technological factors. Milk quality and marketing can be considered to be one of the main drivers of future change for the Pakistani dairy industry, along with quality, adulteration, marketing channels, marketing intermediaries, regulations or policies and price control were considered to be its primary drivers. In addition innovation in mechanization such as milk processing plants and milk chillers are the technological drivers.

For dairy nutrition, the primary drivers in the study were found to be feed quality, cost of production, and grain and feed cost and availability, whilst technology can contribute such things as new fodder types and ration formulation, efficient fertilizer use and certified seeds. For animal breeding and genetics the primary drivers were identified to be those that achieve optimum profitability and productivity and in this case, technology drivers include artificial insemination, breed preservation, production recording, health management and reproductive monitoring.

Finally, dairy extension is an important aspect of change, interlinked with all of the above mentioned technological and primary drivers. It plays a bridging role, through its linkages between research organizations and farmers, its role in dissemination of modern technologies (including mechanization), and its ability to collect and process farmer feedback and communicate effectively. Hence the integration of primary and technological drivers into production systems is to a large degree dependent on effective dairy extension, which can be considered to be the major determinant for future change of the Pakistani dairy industry.

Sources of Milk Production in Pakistan: The major share of production of milk in Pakistan is from buffaloes (66 %) followed by cows (32 %) and sheep and goats (2 %). The major buffalo breeds are Nili-Ravi (79% of total Buffalo population) and Kundhi, while Sahiwal and Red Sindhi are the dominant cow breeds. The vast majorities (about 80%) of dairy farmers in Pakistan are smallholding farmers and up to 43% of dairying households in Pakistan maintain herd sizes of 1-2 animals while another 37% of the households maintain herds ranging from 3-5 animals. Some 90% of milk production comes from these smallholder farmers. Milk marketing is the main issue for the dairy production in Pakistan and approximately 97 % of the dairy farmers are not linked with formal dairy market and hence not progressing in economic terms (PDDC, 2006).

Milk Production and Use: According to the "White Paper" by PDDC (2006) the milk production of the country was 33 million tons with the distribution of milk production and utilization dominated by Punjab region (63 %), followed by Sind (23 %), North West Frontier Provence (NWFP) now called Khyber Pukhtoonkhwa (12 %) and Baluchistan (2%).

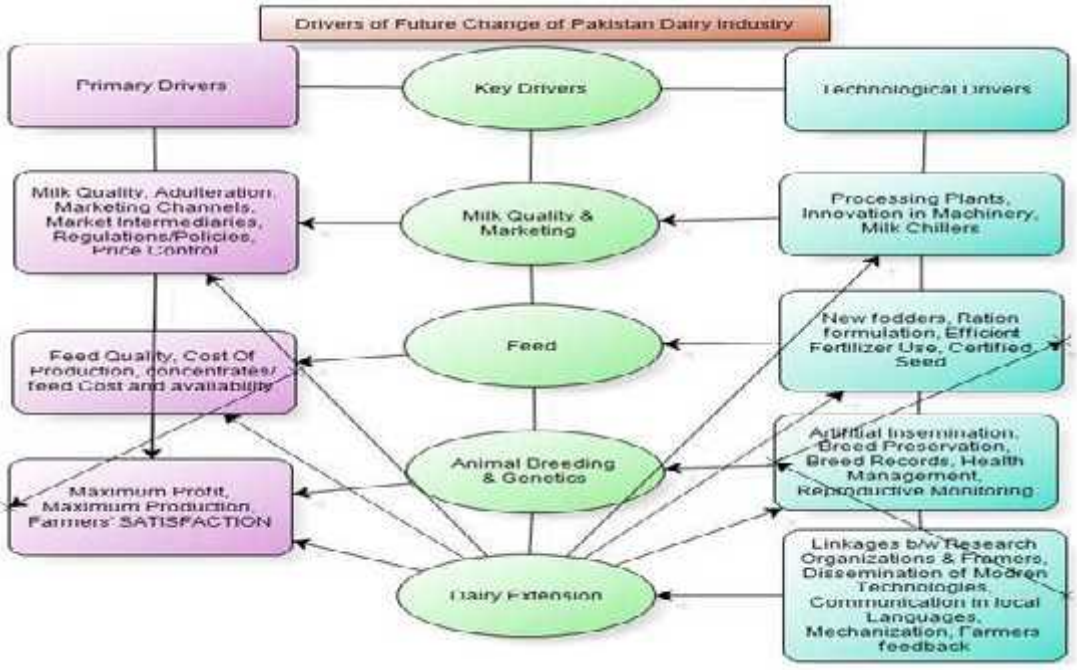

Figure 1: Drivers of Future Change of Pakistan Dairy Industry.

The role of extension in the change process: Extension services in Pakistan emphasize practices as they apply to various enterprises and historically there has been no "dairy-specific" staff employed for dairy extension. Instead, generalist agricultural extension workers have been active in the field. Consequently farmer meetings or gatherings are often not geared for specialist audiences, and it is difficult for untrained extension workers to provide the dairy-specific knowledge required. The gaps (differences in productivity and profitability) between traditional farmers and progressive farmers can only be removed with the help of effective dairy extension. Some other problems in the country which reduce the flow of information to dairy farmers are the poor linkages between research, dairy extension and educational institutions.

There are three agricultural universities, three agricultural colleges, six agricultural training institutes, and fifteen research centers at a federal level, and one research center in each province. The research institutions need to present the findings of their research to farmers in simple terms and in the regional languages. Thus the strengthening of dairy extension with personnel able to operate at the interface between research and practical application is a challenge for the expansion of dairy productivity in Pakistan.

In past many researchers (Bindlish and Evenson, 1997; Hussain *et al*, 1994; Khan *et al*,1984) have suggested that reorganization, redesigning and restructuring for agriculture extension was necessary. A report '*Dilemmas of Agricultural Extension in Pakistan*' highlighted that "in the late 1980's, the national commission on Agriculture, citing the failure of public extension to appreciably increase agricultural productivity, recommended the inclusion of the private sector for the accelerated development of agriculture" (Davison *et al*, 2001). This report also states that the private and public sector agricultural extension programs in Pakistan 'operate competing and overlapping programs'. Public and private extension providers in the country are biased in providing extension information primarily for farmers with education and landholdings. The present situation for agriculture extension suggests there is another need of reorganization, redesigning and restructuring.

Many critics (Bindlish and Evenson, 1997; Hussain, *et al*., 1994; Khan, *et al*., 1984) think that agricultural extension has not remained effective for small or medium farmers, since the majority of the services are offered to large farmers or landlords possibly in the hope that modern practices will 'tickle down' to the more poorly educated small farmers, who are not contacted. The small and medium farmers produce approximately 93 % of milk, despite having little if any formal contact with agricultural extension (Davison, *et al*., 2001). However, some dairy extension programs introduced by NGOs and government have shown positive impacts on productivity and profitability of dairy farmers. One of the government initiatives, Pakistan Dairy Development Company (PDDC), has improved the socio-economic conditions of the dairy farmers, especially small and medium dairy farmers (Ahmad *et al*, 2008).

The contribution of dairying to the national economy is of the order of Rs.540 billion, with 97% described as informal non-documented economic activity, and this value was expected to grow at 4% per year in 2006 (PDDC, 2006). The major causes associated with the under-developed buffalo farms have been identified as: i) calf losses, irregular breeding, imbalanced feeding; ii) ungainly loans and; iii) a hostile marketing system. The three causes at commercial buffalo herds throughout Pakistan, lead to annual losses to the tune of Rs.1043.67 billion (US$ 1=Rs.60) (Qureshi, 2000). In a later study Qureshi *et al*. (2002) concluded that excess intake of crude protein, associated with higher serum urea levels and low energy intake, associated with poor body condition, were the key factors for low reproductive efficiency which could be corrected by adopting a proper feeding strategy.

The recent flooding and militancy have impacted the dairy industry severely. In the last decade the industry has shown some progress towards using modern dairy farming methods with improvements in dairy extension and the employing of specialist dairy extension professionals. The objective of the extension positions was to work with farmers on their farms rather than from an office. The new extension programs and strategies are 'farmer friendly' and this initiative is expected to be one of the important drivers of future change for the industry. If both government and private sectors work together towards improving agricultural sustainability, this may contribute to a second 'Green Revolution" or 'White Revolution" in Pakistan. In addition, dairy farmers need to be innovative and embrace technological development and farm management changes in order to improve their production efficiency, while the challenge for the extension professionals will be to practice modern extension strategies and keep the farmers up to date by disseminating the recent finding of new research in easy local and non technical languages.

Conclusion and Recommendations: The current scenario of dairy farming and the projected population growth in Pakistan needs dairy extension services to sustain development and meet perceived needs. Dairy extension services are very important for achieving productivity outcomes, and dairy extension can play a major role in improving production and efficiency of the dairy industry. The public and private sectors in the country need to work hand in hand, while extension

professionals need to provide effective delivery of the services. Moreover, the dairy farmer needs to be more adoptive of the new practices and technologies in order to face the challenges of the increased demand.

Change in the industry can be effected from an extension professional point of view through working with the farmers, assisting them to bring theory into practice, as well as by adopting group and adult learning principals, and mobilizing the farmers by highlighting case studies from developed dairy industries. From the dairy farmers' perspective, there is a need to change their traditional views and practices and take steps towards improved sustainability and food security. Profitability and productivity will not increase unless the dairy farmers in Pakistan adopt innovations and mechanization. Government and NGOs need to encourage investment in the dairy sector if it is reaching its potentials as a food provider for the Pakistani nation. In addition the duplications and infiltrations of dairy programs or projects across the country must also be considered in order to utilize the available limited funds properly and effectively.

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