Integrated Approach for Improving Small Scale Market Oriented Dairy Systems in Pakistan: Economic Impact of Interventions

A. Ghaffar

Animal Sciences Institute (ASI), National Agricultural Research Centre (NARC), Islamabad

Corresponding author: A. Ghaffar. ASI, NARC Islamabad Pakistan – Tel. +92-51-9255423 - Fax: +92-51-9255034 - Email: parc@isb.paknet.com.pk

ABSTRACT: The International Atomic Energy Agency (IAEA) launched a Coordinated Research Program in 10 developing countries including Pakistan involving small scale market oriented dairy farmers to identify and prioritize the constraints and opportunities in the selected dairy farms, develop intervention strategies and assess the economic impact of the intervention. The interventions in animal health (control of mastitis at sub-clinical stage and reduction in calf mortality), nutrition (balanced feed) reproduction (mineral supplementation), and general management (training of farmers) were identified and implemented in a participatory approach at the selected dairy farms. The calf mortality was reduced from 35 to 13 percent up to the age of 3 months. Use of Alfa Deval post milking teat dips reduced the incidence of sub-clinical mastitis from 34 to 5% showing economical benefits of the interventions. Partial budget technique was used to analyze its impact in the registered herds. The farmers recorded monthly quantities of different feed ingredients and seasonal green fodder offered to the animals. From this data set total metabolizable energy requirements and availability from feed were computed which revealed that animals were deficient in metabolizable energy in all locations. This was also confirmed by seasonal variation in body condition scoring. At some selected farms the mineral mixture supplement was introduced which exhibited increased milk yield by 5 % in addition to shorten service period by 30 days. Three sessions of training were arranged to train the farmers to care new born calves, daily farm management and detect the animals in heat efficiently to enhance the over all income of the farmers. The overall income of the farm was increased by 40%.

Key words: Mixed livestock farming system, Market oriented, Interventions, Economic benefits.

INTRODUCTION - Livestock is an important sector of agriculture in Pakistan, where it accounts for nearly 50% of agricultural contribution and about 11% to the GDP (Anonymous 2006). The importance of the role of livestock in the rural economy may be realized from the fact that 30-35 million of the rural population is engaged in livestock rearing and deriving 30-40 percent of their income from livestock. Cattle and buffalo population of 21.01 million heads are maintained at a herd size of 5 to 20 animals by 2.7 million households (ACO, 1996). In recent years, peri-urban farming has emerged as an important production system for large ruminants in the country. Previous studies on livestock production systems in Pakistan have identified...
the areas for improvement in various dairy production systems. These include poor nutrition, inadequate reproductive management and prevalence of diseases in particular. Results of nutritional studies both on experimental station and on-farm have shown clear economic advantage of using locally formulated supplements. The use of progesterone measurement in milk or blood of cows by radioimmunoassay (RIA) has shown positive results in identifying and rectifying constraints in artificial insemination (Anzar et al. 2003). However, the uptake and use of such technologies by the farmers were not adopted by farmers because of economic feasibilities calculated were general and has no relevance to the farmers’ specific needs. Therefore an integrated approach that can use the available knowledge and have the capacity to identify the gaps is essential to address the increasing demands of dairy farmers.

Dairy systems in Pakistan are becoming more market-oriented industry with large daily turn over. The peri-urban farmer community is generally more sensitive towards demonstrated interventions. Moreover, availability of hard cash and relatively short duration in financial return, the response of farmers can be expected encouraging. This study involved the farmers from the planning stage. Its focus was on assisting them to identify and prioritize the major constraints in their production systems, develop interventions, and use the partial budget technique to evaluate economic benefits to the farmers.

**MATERIAL AND METHODS** - This project was implemented in two phases – Phase-1, to conduct participatory rural appraisals (PRA) economic opportunity surveys (EOS), and develop intervention strategies and Phase-2, to implement intervention strategies and assess its economic benefits.

Experimental Sites - Three Union Councils Golra, Rawat and Sihala in Islamabad were selected which represented the rain-fed small-scale market oriented livestock production system in the country and five areas namely Wahgray, Minhala, Barki, Rakh Chandrai, and Chung, were selected in district Lahore. Among these five sites, Rakh Chandrai, represent the peri-urban dairy production system, while other four places represent mixed market oriented dairy systems. However, during the intervention phase emphasize was in the surroundings of Lahore area where farmers were more keen to implement the interventions.

Interventions - Based upon the PRA and EOS, interventions included control of calf mortality by providing early anthelmintic (Albendazole/ Levemisol) treatment from 3 weeks of age to one year with 3 months interval, sub-clinical mastitis control using Alfa Deval post milking teat dips. To diagnose sub-clinical mastitis, a simple White Side Test (4% solution of NaOH) was used on monthly basis for all milking animals with the farmers at that time. Managemental and nutritional interventions included Peri-partum feed supplementation and recording body condition scoring. Health related interventions were implemented to all 57 registered farmers. While nutritional interventions were limited to selected eight farmers at 3 locations. During the monthly visit to registered farmers’ data on number of milking animals, total milk sold, total feed and medicine expenses were recorded and computerized. In addition the quality of concentrates and green fodder offered were also recorded and computerized. The body condition scoring of animals were recorded on quarterly basis on the scale of 0-5. The weight of the animal was estimated by measuring heart girth. The average milk yield was computed by taking average of total milk yield of all lactating animals. The data thus generated was analyzed using partial budget technique to assess impact of interventions.
RESULTS AND CONCLUSIONS – Calf mortality - The buffalo calf mortality data recorded by the farmers themselves from July 2003-October 2006 is presented in Fig. 1.

There is a significant decrease in calf mortality rate up to the age of 3 months from 2005 to 2006 at all experimental sites. This decrease is attributed to better management and early anthelmintic treatment of calves. The cost of drenching involved for each calf was US$ 11 and in return the value of the calf at one year of age was US$167.

Sub clinical mastitis control - The use of Alfa Deval Teat Dips reduced the incidence at sub-clinical stage as evident from the data not shown here due to space limitation. During the PRA and EOS sub-clinical mastitis incidence was much higher (Ghaffar et. al. 2007) before using teat dips. These high number of negative sub-clinical mastitis test is attributed to the use of Alfa-Deval Teat Dips over a period of 10 months.

The cost of teat dipping is nominal and benefits are much higher. Monthly income and expenditure per animal as recorded by the farmers themselves for a period of 22 months is shown in Fig 2. It is evident that per animal profit was higher for wahgray as their cost was minimum and animals were fed home grown seasonal green fodder. To determine the quality of fodder and nutritional requirements of the Animals, the intake in terms of MJ were compared with its requirements and it was concluded that all animals were under fed at all locations. The over all impact of interventions could be realized by comparing the overall profit from the registered dairy farmers before and after the interventions (Fig. 3).
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