

## General Introduction

### 1.1 Foreword

Agriculture is the mainstay of more than 65% people of Nepal. It is the major determinant of economic activities and the nation's socio-political identity (Regmi, 1999). Livestock is an integral and important component of the Nepalese farming system (Singh *et al.*, 2002). It contributes about 33% of the total agricultural gross domestic products (AGDP) in the country, which has been envisaged to increase at 45% by 2015 (APP, 1995). The Nepal Agriculture Perspective Plan (APP) with a horizon of 20 years has been effective in the country's agriculture since 1997/98 (MOAC, 1998). The plan has targeted an annual growth rate in AGDP of 5% whereas it has identified livestock sector as one of the most potential sectors with average annual growth rate at 5.5% as a whole in the livestock sector and 6.1% in the dairy sector (APP, 1995).

Cattle and buffaloes are raised for supply of animal protein (cows for milk, and buffaloes for both milk and meat), draft power (oxen/male buffalo) and production of animal manure. In relation to the amount of arable land per person, the livestock population in Nepal is one of the highest in Asia (LRMP, 1993; Shakya, 2004; AICC, 2005; MOAC, 2005). Economic importance of buffaloes in Nepal has been realized in recent years, as they have been reported to contribute 52.9% of the livestock share in the national GDP. Farmers of Nepal prefer buffaloes over cattle because of higher fat content in the milk, presence of salvage value, better adaptability to local feed resources, more resistance to diseases, and provide more manure than cattle (Joshi, 2003). APP has given first priority to milk and then to meat. Buffaloes are the main sources of milk and meat, producing about 71 and 65% of the total annual production of milk and meat (1.35 and 0.28 million mt.) respectively (AICC, 2008). However there have been only limited studies relating to improvement of their production performance (Shrest and Sherchan, 1997).

The buffaloes of Nepal can be broadly classified into three groups based on their breed characteristics (Rasali *et al.*, 1997), which are: Hill buffalo, Terai buffalo and Indian breeds. Lime, Parkote and Gaddi are the important Hill buffaloes. Lime buffaloes are found in greater number in northern Hills characterized by grey colour with chevron marks around the brisket (Figure 2.1) whereas Parkote buffaloes are found more towards the Southern Mid-hills. Parkote breeds are predominantly dark colour with no chevron marks (Pokhrel *et al.*, 1998; Rasali *et al.*, 1998; Amatya *et al.*, 2000; Shrestha, 2003). Gaddi buffaloes are found in the Far-Western

Development Region. Terai buffaloes are largely considered as non-descript type because of the lack of study of the population and breed characterizations. Apart from these indigenous buffaloes, about 10% in the Hills and little over 10% in the Terai are said to be of Indian Murrah breed or their crosses which have come to exist in the various pocket areas of the country as a result of crossbreeding program and occasional imports of buffaloes from India (Shrestha, 2004).

There has been some increase in milk production in the country as the result of the national program of crossbreeding the indigenous buffaloes with the Murrah breed for more than 40 years (Shrestha, 2004). However the adoption rate of Murrah-crosses is not encouraging (Floyd *et al.*, 1999; Rasali and Crow, 1999; Shrestha, 2004). Although the milk yield of crossbreed buffaloes was marginally better than of local breeds, farmers complained that it was only at the cost of higher feed intake and increased health care and management (Tulachan, 1997; Banstola *et al.*, 2004; Shrestha, 2004). Farmers prefer indigenous breeds because of their adaptation across different agro-climatic zones, forage digestion ability, existence in low plane of nutritional regime, cold tolerance and relatively smaller body sizes (Rasali and Joshi, 1996; Amatya *et al.*, 2000). Rasali and Joshi (1996) reported that within the indigenous buffalo population there are some high yielding individuals. The preservation and multiplication of such genetic materials are important (Wollny, 2003) for the sustainable animal production (Payne and Wilson, 1999) and long-term livestock development (Tulachan and Neupane, 1999).

Eventhough there is a profound possibility of year-round production of forage/pasture little attention has been given to this sector. Hence, most of the livestock holders face surplus green during the monsoon period (from June to August) but face the scarcity of the same during winter and summer. The technology on hay and silage production is still inside the boundaries of governmental farms and research stations. Other alternatives like urea treatment in straw, urea-molasses blocks, etc., are far from the real practice of the farmers (Rana *et al.*, 1998).

Women play a significant role in agricultural production (GEED, 2005a). Their contribution in livestock production is up to 70%. Women are not only the producers of food but also are the managers of natural resources, nutritional care of the family members (Brown *et al.*, 2001) and play major role in attaining household food security (Quisumbing *et al.*, 2004). As far as the opportunities regarding training, exposure visit, participation in meetings and seminars, etc., are concerned, males are always at the front (GEED, 2005b). It indicates that the opportunities to the needy ones are lacking, which may be one of the causes of low production in Nepal.

## **1.2 Objectives of the study**

The main objective of this study was to evaluate overall performance of indigenous and Murrah-cross breeds of buffaloes under field conditions in the Mid-hills of Nepal. More specifically, this study aims to:

1. Evaluate the milk production performance of indigenous and Murrah-cross breed buffaloes under field conditions.
2. Evaluate the fat, solid not fat (SNF) and total solid (TS) content in the milk of the buffaloes.
3. Compare and analyse the reasons of preferences of the farmers to indigenous, Murrah-cross and Murrah breeds of buffaloes.
4. Explore the gender role, participation, opportunities and constraints in buffalo farming.
5. Assess the availability of green forage and feeding systems of buffaloes in Mid-hills of Nepal.

## **1.3 Research hypotheses**

To achieve the objectives of the study, following hypotheses were tested:

1. Some elite indigenous buffaloes may perform better than the average of Murrah-cross breeds.
2. Preferences of the farmers, based on their evaluation criteria, for indigenous breeds compared to Murrah-crosses are still higher in Mid-hills of Nepal.
3. Women play significant roles in buffalo feeding, housing, milking and health-care management.

## **1.4 Outputs and contribution of the study**

This research is, perhaps, the first attempt in performance evaluation of indigenous and crossbred buffaloes in farmers' field conditions considering a sufficient number of animals for statistical analysis and inferences. This study also assesses the farmers' criteria for breed selection and their preferences along with the gender aspects in buffalo farming in highly potential agro-ecological zones of Nepal. Hence, the findings of this study are expected not only to be highly applicable in other regions of the country but also will be important referential for the policy makers in the field of buffalo research, extension and development in Nepal.