

Crossbreeding and intensification of smallholder crop–cattle farming systems in Bhutan

T. Samdup^{a,b}, H.M.J. Udo^{a,*}, C.H.A.M. Eilers^a, M.N.M. Ibrahim^{a,c}, A.J. van der Zijpp^a

^a Animal Production Systems Group, Wageningen Institute of Animal Sciences, Wageningen University, The Netherlands

^b Council for Renewable Natural Resource Research of Bhutan (CoRRB), Ministry of Agriculture, Thimphu, Bhutan

^c Faculty of Agriculture, University of Peradeniya, Peradeniya, Sri Lanka

ARTICLE INFO

Article history:

Received 23 January 2009

Received in revised form 20 May 2010

Accepted 22 May 2010

Keywords:

Mixed farming

Crossbreeding

Technical performances

Gross margins

Agro-ecological conditions

Bhutan

ABSTRACT

This paper evaluates the effect of livestock intensification through crossbreeding for dairying in Bhutan, where crossbreeding policies aim to improve smallholder livelihoods. It is also expected that crossbreeding will reduce dairy imports, and will reduce the environmental impact on forests and other common property resources. Since 1985, breeding policies have promoted the Brown Swiss crossbred for high altitude areas and the Jersey crossbred for other areas with suitable agro-ecological conditions. From 1998 onwards, farmers were allowed to choose their desired cattle breed irrespective of the agro-ecological conditions. Data on household, cropping and livestock activities were collected through interviewing 183 households in extensive, semi-intensive, intensive, and intensive peri-urban areas in the years 2000 and 2004. Herd composition on the study farms reflected the policy of promotion of crossbreds in areas with suitable agro-ecological conditions, as well as the preferences of the farmers and their cultural values. The change in livestock breeding policy in 1998 had no apparent impact on the breed composition of the herds. Crossbred cows had 2.4–4.6 times higher milk off-takes than local cows. The livestock gross margins were 1.4–2.4 times higher in the intensive than in the semi-intensive and extensive areas. Crossbreeding has contributed to the higher livestock gross margins in the intensive areas. Cattle management was characterized by high reproductive wastage and poor survival. Crossbreeding has not reduced cattle numbers per farm, but lactating crossbred cows are mainly stall-fed and, so, crossbreeding reduces grazing pressure on common property resources. Crossbreeding has not yet been able to reduce the gap between supply and demand of dairy products in Bhutan. In areas with suitable market conditions, farmers will continue with crossbreeding for dairying, as it is a regular and reliable income source.

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1. Introduction

Intensification of livestock production is widely promoted in developing countries, both to meet increasing demand for

livestock products and to contribute to the development of rural households (Delgado et al., 2001). In Asia, roughly 80% of the increase in livestock production occurs on large commercial farms (FAO, 2005). However, the large majority of rural households are smallholder farmers. Can the increase in demand for livestock products help these farmers to improve their livelihoods?

In Asia, Bhutan follows a unique development concept of Gross National Happiness (GNH). GNH strives for a balance between the socio-economic, ecological, cultural and good governance dimensions of development, rather than for

* Corresponding author. Animal Production Systems Group, Wageningen University, P.O. Box 338, 6700AH Wageningen, The Netherlands. Tel.: +31 317 48 27 47; fax: +31 317 48 55 50.

E-mail addresses: tashi_samdup2001@yahoo.com (T. Samdup), henk.udo@wur.nl (H.M.J. Udo), karen.eilers@wur.nl (C.H.A.M. Eilers), mibrahim@pdn.ac.lk (M.N.M. Ibrahim), akke.vanderzijpp@wur.nl (A.J. van der Zijpp).

economic development only (Rinzin et al., 2007). Crossbreeding local cattle with higher-yielding exotic dairy breeds is an important tool for intensifying smallholder farming (Udo and Cornelissen, 1998; Tulachan et al., 2002). This is not different in Bhutan. Policies directed at crossbreeding local cattle with exotic dairy breeds are expected to contribute to improvements in the livelihoods of smallholder rural households without causing ecological damage or interfering with cultural values (MoA, 2002). Livestock intensification is also expected to reduce the wide gap between supply and demand of livestock products. To become self sufficient Bhutan would have to increase dairy production by 20% and to double beef production (Samdup and Rai, 2007).

Bhutan has wide differences in ecological conditions and in access to markets. The 1985 national cattle breeding policy differentiated between the agro-ecological zones: it proposed Brown Swiss × (local) Siri crossbreeding in the high altitudes; Jersey × Siri crossbreeding in other areas with relatively better market access; and using local breeds in remote areas that have harsh environmental conditions. In 1998, in response to farmers' requests, the cattle breeding policy was changed to provide semen and bulls of any breed to all districts based on farmers' demand.

When deciding on crossbreeding strategies, cattle are generally evaluated at individual animal level for milk production and reproductive performance (Cunningham and Syrstad, 1987; Syrstad, 1996), but if the crossbreeding is expected to contribute to smallholder livelihoods, it has to be evaluated at farm level. This paper compares the livestock sub-systems and the whole farm systems of smallholders in four

areas of Bhutan differing in ecological conditions, infrastructure, market access and crossbreeding policies to assess the effects of livestock intensification through crossbreeding.

2. Materials and methods

2.1. Study areas, farming systems and cattle breeding

Only 8% of Bhutan's land is considered suitable for arable farming and 4% is pasture land; most land is forest and natural grazing (LUPP, 1997). About 80% of the population belongs to mixed, mainly crop–cattle, farming households. The selected study areas were the Khaling, Dala, Chokhor and Chang blocks in the districts of Trashigang (east Bhutan), Chukha (south Bhutan), Bumthang (central Bhutan) and Thimphu (west Bhutan) respectively (Fig. 1). A district has several blocks and a block comprises of a number of villages. Villages which were less than 2 h walking distance from a motorable road were considered for the study.

Table 1 shows the characteristics that distinguished the four study areas. Market access varied by distance and existence or absence of motorable roads to the local and major markets. The Khaling area represented Bhutan's extensive farming system characterized by cattle grazing mainly in the forest and on natural grasslands with some night feeding, no crop irrigation, low market access, and a mild temperate climate. The semi-intensive system, represented by Dala block, was characterized by cattle grazing with some stall-feeding, crop irrigation, medium market access and a sub-tropical climate (Table 1). Bhutan's more intensive

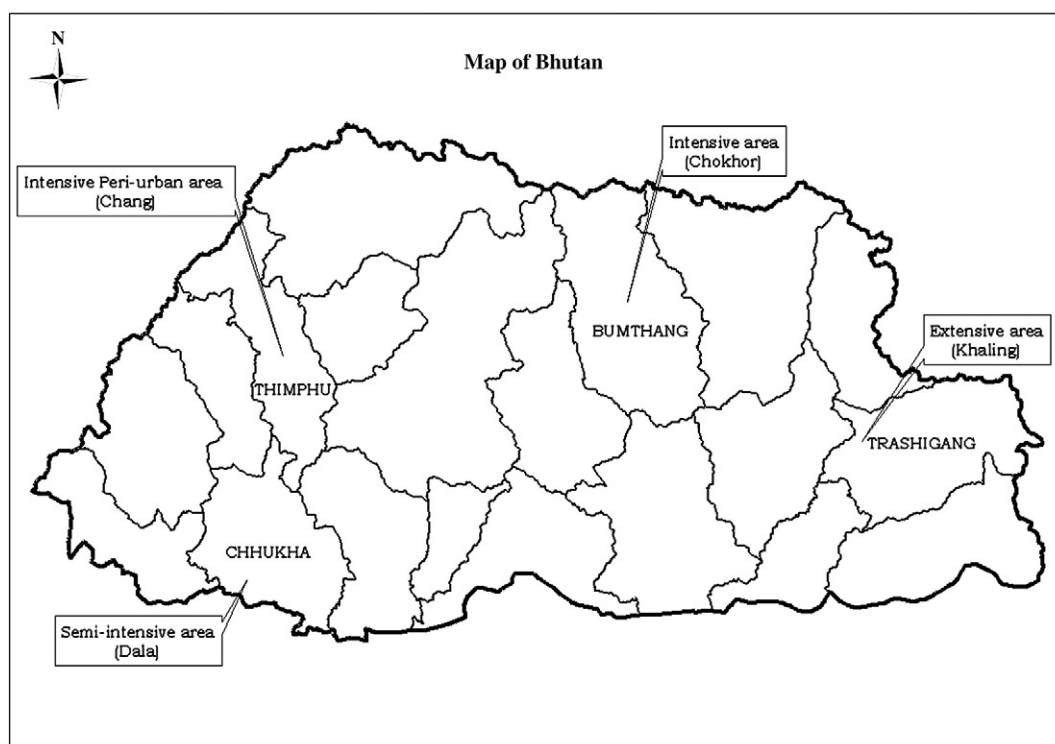


Fig. 1. Map of Bhutan and the location of the four study areas.

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