Adoption of improved feeding and mating strategies and their impact on productivity of Bali cattle under small holder conditions in Lombok, Indonesia

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330

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Introduction Lombok is part of the west Nusa Tenggara regency of eastern Indonesia, which is one of the country's main Bali cattle producers. Talib *et al*. (2003) reported that the most important constraints to improving productivity of Bali cattle in the region are low calving rate (52%), low calf birth weight (12.7 kg) and high calf mortality rate (15%). Consequently, the overall herd productivity is low. Panjaitan *et al*. (2008) showed that the calving rate can be improved to 85%, and calf mortality can be reduced to 5%. Another study (Dahlanuddin *et al*., 2008) showed that the growth rate of newly weaned Bali calves increased from 0.2 kg/d to 0.38 kg/d by feeding fresh *Sesbania grandiflora* (at 30% of diet). This paper summarizes results of an adaptive research project to scale out these improved management strategies to 36 farmer groups involving about 1200 farmers in Lombok from 2007 to 2010.

Materials and methods The feeding and mating strategies are part of an integrated village management systems (IVMS) consisting of a) controlled natural mating to enable calves to be born at times when feeds are in good supply and of high quality, b) mating cows from 40 days after calving, c) mating heifers when they reach 180 kg live weight, d) weaning calves at 6 months of age to reduce the nutritional load on the cow, and e) introduction of improved forages and better use of existing high quality forages, especially tree legumes. This IVMS was communicated to the farmers through a trained 'on ground team' (OGT) who worked closely with the farmers. Project activities included farmer training on feed quality and feed requirements based on the physiological status of animals, year round feed budgeting, bull feeding and mating management. The OGTs also facilitated farmers to improve pen sanitation and infrastructure to enable efficient feeding and to minimize the risk of disease and parasite infestation.

Results Controlled mating with a selected bull at 40-60 days after calving was the most commonly adopted management component (73.1% farmers), followed by better feed for cows during late pregnancy (66.4% farmers), weaning calves at 5-6 months old (60.3%), better feed for cows during lactation (41.9% farmers), better feed for newly weaned calves (38.4% farmers), planting and use of improved forages (34.5% farmers) and mating heifers at 180 kg (12.8% farmers). High adoption of mating cows from 40-60 days after calving was due to the availability a selected bull in the collective housing system and the better mating performance of the bull. There was lower adoption of improved forages and mating heifers at 180 kg because only 60% of the farmers have access to land and not all farmers have heifers or retain female calves for replacement. The most common introduced forages were *Brachiaria brizantha x ruziziensis* (cv. Mulato) and *Panicum maximum* (cv. Simuang). Mulato and Simuang are now widely distributed throughout the area. Compared to the introduced legumes (*Centrosema pascuorum, Stylosanthes guyanensis* and *Clitoria ternatea*) grasses are preferred because they are easy to establish, produce a large biomass and better regrowth. Adoption of the IVMS improved bull condition and bull mating performance (to more than 100 cows in 6 months) increased the calving rate to 86.6% (more than 30% increase), increased birth weight to 16 kg (more than 3 kg improvement), reduced calf mortality to 4.8 % (reduced by about 10%) and increased weaning weight from 70 kg to 90.2 kg. Cumulatively, these strategies increase beef production by 139% and significantly improved income of the small holder farmers.

Conclusions Productivity of Bali cattle under small holder conditions can be more than doubled by facilitating adoption of the IVMS that aims primarily to improve supply and quality of nutrients according to the physiological status of the animals. Successful adoption of the IVMS depends greatly on the ability of the field facilitators (OGTs) to communicate the management system to the farmers and provide on-going support. Adoption of improved forages by the small holders in Lombok is constrained by lack of access to land.

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PAGE 1

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PAGE 3