

An increase in beef demand is presenting cattle-keeping smallholders in Cambodia with an opportunity to enhance livelihoods. Examples from Vietnam show that resource-poor smallholders that plant nutritious forages on small land parcels and cut-and-carry these to feed their penned cattle can considerably increase animal production and associated income. This research aimed to evaluate whether such systems could be emulated on farms in Ratanakiri Province, eastern Cambodia, where current cattle productivity is too low for effective commercialisation, and where grazing land is gradually becoming scarcer.

Over a period of four months starting from the onset of the rainy season, weights of 37 local cattle were biweekly recorded on five farms in Pruok Village (E 106°96', N 13°57'), Lumphat District. Seventeen animals were penned and fed a mix of farm-grown forages (*Brachiaria* hybrid Mulato II, *Brachiaria ruziziensis*, *Panicum maximum*, *Paspalum atratum*, *Stylosanthes guianensis*), while twenty others, selected to resemble the forage-fed cattle in terms of initial weight (126 ± 34 kg initial weight), age (~2 years) and sex, were kept in the traditional manner, grazing on naturally-occurring grasses. Above-ground biomass yields of farm-grown forages were determined destructively during June to September 2015 and forage samples were analysed for nutrient and energy concentrations. Furthermore, manure samples were collected and 40 farmers were interviewed about their production systems and priorities.

On dry matter basis the mean crude protein concentrations in planted forages (0.4 ± 0.2 kg/m²) were 92 ± 38 g/kg. Average daily live weight gains of stall-fed cattle (70 g/day) were lower than those of grazing cattle (210 g/day; $P < 0.01$). This can be explained by both the suboptimal management of forage stands by farmers, inducing decreases in palatability and nutritional quality over time, and by farmers feeding their penned cattle insufficient forage biomass, the grazed cattle consuming larger biomass amounts. Consequently, in order to improve cattle productivity through forages, farmers must either have sufficient knowledge, skill and resources to grow and feed adequate quality and quantity of forages to animals, or use forages to complement normal grazing in the dry season. Broader agricultural and socio-economic implications of traditional systems versus zero-grazing are discussed.