Beef cattle feeding systems and measuring their sustainability in Bac Kan province, the Northern Mountainous Region, Vietnam

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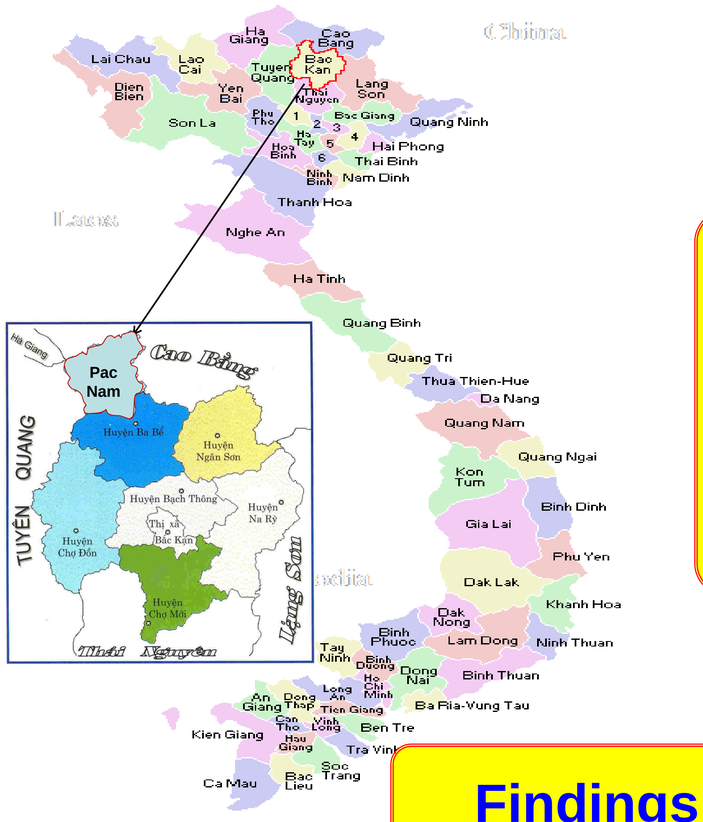
Introduction

Small farmers are possibly both victims of and contributors to the un-sustainability. Thus, through the properly management of their resources in a sustainable way, farmers can help to prevent this occurrence. Sustainability is an important criterion in assessing the performance of existing farm activities and systems (McConnel & Dillon, 1997). In addition, a good understanding of existing systems is required to recommend proper improved farming systems (Beets, 1990).

Indigenous cattle in the Northern Mountainous Region of Vietnam (NMR) are often kept in free ranging, part-time grazing and Cut & carry systems. In Bac Kan, cattle production is accounted for an important proportion in the total output of livestock sub-sector (29%). Developing sustainable cattle production to enhance economic growth and livelihoods for farmers, especially poor farmers could help local people in uplands to escape from poverty.



Material & methods

Objectives

•To assess impacts of various cattle feeding systems of different ethnic minorities on different dimensions of sustainable development of agriculture on economics , environment, and society;
• To derive recommendations for development of cattle production

Study areas

Two communes: Nghien Loan and Cong Bang – Pac Nam district – Bac Kan province in the Northern Mountainous Region

Methodology

Participatory approach – Focus group discussion – Formal interview of 97 households in three cattle feeding systems – Secondary data;
ANOVA or Krusal Wallis Test and MannWhiney

Table 1: Indicator selection

	indicators	*Description*
Economics	Gross cattle margin	Gross returns from cattle production subtraction total variable costs
Society	Cattle employment opportunity	Annual employment provided by beef cattle production family labour using (days) measured over a number of TLU of cattle kept by households
	Female working time	Role of women in cattle production indicated by percentage of time working on this activity
environment	Stocking rate	Number of cattle calculated in Tropical Livestock Unit (TLU) per hectare of grassland cultivated in household
	Manure leaching out	Percentage of cattle manure not used but leaching out to surrounding environment

Table 2: Description of different cattle feeding systems

	Free range	Part-time grazing	Cut &Carry
Minorities	Tay, Nung	Tay, Nung	H' Mong, Dao
Geography	Lowlands	Lowlands	Uplands
Breed of cattle	Local Yellow cattle	Local Yellow cattle	H' Mong cattle
Herd size	02-16 head	01-12 head	02-14 head
Keeping style	Grazing without care, no or little feed supplement	Grazing half day with care, more feed supplement	Cutting feeds for bull, grazing all day with others
Breeding	Non-control or inbreeding	Non-control or inbreeding	Selected bulls
Land resource	Large land, better accessibility	Limited land, poor accessibility	-
Death, elimination	High	Low	Low
Lean meat *Male*	*70-90 kg*	*70-90 kg*	*100-150 kg*
Female	*50-70 kg*	*50-70 kg*	*70-90 kg*

Table 3: Impacts of different cattle feeding systems on sustainable dimensions of agriculture

	Free-range		*Part-time grazing*		*Cut & Carry*		*Sig*
	M	*Range*	*M*	*Range*	*M*	*Range*	
Gross cattle margin (Mil VND per household)	5.3[a]	0.1 – 17.0	4.8[a]	-2.8 – 10.4	7.8[b]	1.8 – 18.5	0.003
Family labour spending on cattle (days)	102.5[a]	11.8 – 195.0	275.5[b]	185.6 – 358.1	375.8[c]	270.0 – 517.5	0.000
Women working time on cattle (%)	53.8[a]	0-100	33.4[ab]	0-100	28.8[b]	0-100	0.017
Manure leaching out to environment (%)	47.0[a]	5-100	37.3[a]	5-100	67.8[b]	20-100	0.000
Stocking rate (Bung/TLU)	22.5	0-80	27.5	0-166.7	16.5	0-120.0	0.096

[a, b, c] within a row not sharing the same superscript letter differ (P < 0.05)

Figure 1: Measuring the sustainability of beef cattle feeding systems

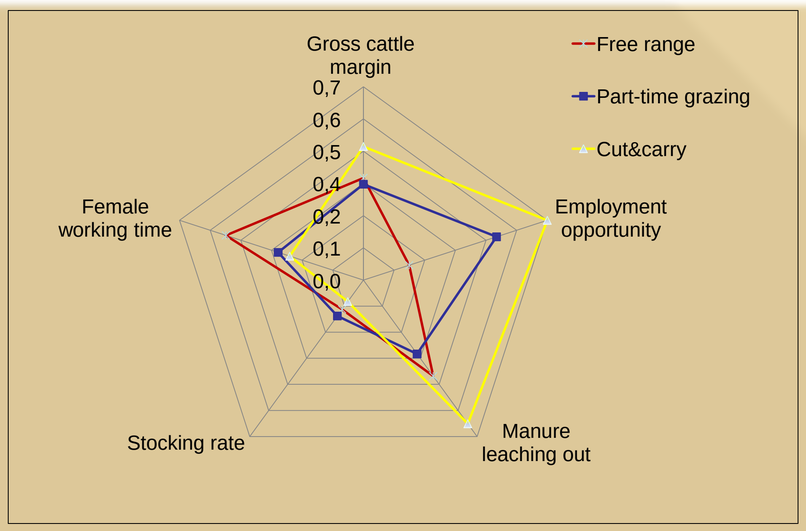


Table 4: Proportion of female working time in cattle production in different systems

Indicator	*Free range*	*Part-time grazing*	*Cut & carry*
Breeding selection	86.7	73.0	16.7
Adoption technologies	86.7	73.0	16.7
Vaccination, disease treatment	86.7	75.7	16.7
Cattle looking after	90.0	94.6	76.7
Feeding collection	93.3	91.9	83.3
Grass cultivation and harvesting	93.3	89.2	80.0
Selling decision	20.0	13.5	3.3

Findings

Conclusions

- Cut & carry system creates high employment opportunities, higher economic efficiency, larger risk on environment from unuse manure, but women occupying a great position of non vital important activities, hard work in feed collection
- Ranking second in efficiency of economics and employment opportunities is part-time grazing system, rather low rate of manure leaching out to environment, but all of important activities in female hands
- Low employment opportunities and rather poor economic efficiency are presented in free range system, but all of important activities in female hands
- High proportions of manure running out to environment among systems, indicated by lack of favourable preservation methods in households and low level of cattle manure using resulting in high pollution in study sites.

Recommendations

- Introducing techniques and modality of Cut and Carry system to increasing farmers income;
- Introducing feed storage techniques and modalities to households
- Increasing awareness of local people in manure management to protect environment and life
- Providing modalities in storage manure and use of compost manure

References

Beets, W. C. (1990). *Raising and sustaining productivity of smallholder farming systems in the tropics*. Agbes Publishing. Holland.
McConnell, D. J., Dillon, J. L. (1997). *Farm Management for Asia: a Systems Approach.* FAO Farm Systems Management Series - 13. FAO. Rome. Italy.
Sen, L. T. H. (2005). Soil conservation and sustainable agriculture: A case study of the coastal region of Quang Tri province, Vietnam. PhD thesis. In Doppler, W. and Bauer, S. Eds. Farming and Rural System Economics. 76. Margraff Publishers. Germany.
Thompson, P.B., and Nardone, A. (1999). Sustainable livestock production: methodological and ethical challenges. Livestock Production Science. 61, 111–119
Zeller, M., Lapenu, C., Minten, B., Ralison, E., Randrianaivo, D., Randrianarisoa, C. (2000). Pathways of rural development in Madagascar: An empirical investigation of the critical triangle of environmental sustainability, economic growth and poverty alleviation. *FCND discussion Paper* 82. International Food Policy Research Institute. Washington DC. USA.

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