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Local fodder resources in the feeding management of smallholder pig producers in mountainous regions of Northern Vietnam

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Introduction

Due to unfavourable agricultural production conditions and land scarcity in the uplands area of Northern Vietnam, livestock husbandry in general and pig husbandry in particular appear as an important opportunity to sustain livelihoods for smallholder farmers. Widely varying management practices of small-scale pig producers are leading to different levels of pig performances. With increasing utilization of improved local as well as exotic breeds accompanied by improved husbandry management practices, smallholders increasingly rely on external inputs (Rodriguez and Preston, 1997). Due to the uncertainty of future resource availability and competing demand for cereals between humans and livestock, the use of local fodder resources and management practices adapted to the specific small-scale farm production conditions are necessary to optimize resource utilization. The aim of the present study was to determine the seasonal availability, utilization and constraints of local fodder resources in the pig feeding management in different production systems from the smallholders' point of view.

Material and methods

The seasonal availability of fodder resources and their utilisation were evaluated applying a seasonal calendar (e.g. see Groeneweg et al., 2006). Data were collected by group discussions in nine villages belonging to three production systems of different production intensity, remoteness and ethnicity, i.e. a demand-driven system, a system in transition and a resource-driven system. In a first step farmer groups determined the seasons of one farming year. Secondly, all fodder resources used in feed rations for pigs were listed and subsequently scored according to their seasonal importance on a scale from one (not used) to four (high importance). The importance of fodder components per system and season was compared on basis of an index (e.g. see Takyi, 2008). Indices for single fodder components per village and season were calculated by dividing the assigned scores by the sum of scores (multiplied by 100 per village and season).

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Results

Farmer groups in eight villages divided the farming year into four seasons (spring, summer, autumn, winter), whereas farmers in Tong Tai, one village in the resource- driven system, differentiated three seasons only (warm, wet and cold season).

A high number of different feedstuffs were used in pig feeding in all systems, i.e. 15 different fodder resources in the demand-driven system, 17 in the system in transition and 11 in the resource-driven system. The most important fodder components for all systems were maize, cassava, sweet potato leaves and banana stem. In the demand-driven and resource-driven systems rice bran was ranked very high during the whole year, but had less importance in the system in transition (Table 1).

Table 1: Indices of highest ranked fodder components, total and per system

Fodder component	Index			
	Total	DD	TR	RD
Maize	11.1	11.7	10.1	11.4
Cassava	9.9	9.0	8.2	12.6
Sw. pot. leaves	9.7	10.3	7.8	10.9
Banana stem	9.0	9.0	9.5	8.6
Rice bran	8.0	11.4	4.6	8.0
Taro leaves	6.8	7.4	9.0	4.0

DD = Demand-driven system, TR = System in transition, RD = Resource-driven system

Throughout the whole year smallholders of all systems supplied concentrate feed to the pigs, except for one village in the resource-driven system, and little seasonal variation was observed. The utilization of local fodder resources shows a higher variation caused by system and season. In the system in transition and the resource-driven system forest vegetables were essential fodder resources particularly in summer and wet season. While edible canna root was important in the resource-driven system, the use of taro leaves during the whole year was common in the system in transition (see Table 2 and 3).

Table 2: Seasonal ranking of fodder components in the demand-driven system, in the system in transition and in the resource-driven-system

Fodder component	Index											
	Spring			Summer			Autumn			Winter		
	DD	TR	RD	DD	TR	RD	DD	TR	RD	DD	TR	RD
Maize	**10.7**	**10.8**	15.0	11.5	**9.9**	9.1	**12.5**	**10.2**	11.1	**11.9**	**9.7**	**14.8**
Banana stem	**10.7**	10.1	5.0	8.3	9.2	9.1	5.2	8.9	**22.2**	**11.9**	**9.7**	11.1
Rice bran	**10.7**	4.7	10.0	11.5	4.6	4.5	**12.5**	4.5	5.6	10.9	4.5	11.1
Cassava	8.3	8.8	15.0	7.3	8.6	**18.2**	9.4	7.6	5.6	10.9	7.7	**14.8**
Sw. pot. leaves	8.3	7.4	**20.0**	**12.5**	8.6	4.5	11.5	8.3	5.6	8.9	7.1	**14.8**
Concentrate	7.1	5.4	.	6.3	5.3	.	6.3	5.1	.	5.9	5.2	.
Dried fish	4.8	4.1	.	4.2	3.9	.	4.2	3.8	.	4.0	3.2	.
Soya bean	4.8	4.1	.	4.2	3.9	.	4.2	5.1	.	4.0	3.9	.
Taro leaves	3.6	8.8	.	11.5	9.2	.	10.4	8.9	.	4.0	9.0	.
Edible canna root	.	.	**20.0**	.	.	**18.2**	.	.	5.6	.	.	**14.8**
Forest veg.	.	6.1	5.0	.	8.6	**18.2**	.	8.3	**22.2**	.	7.1	3.7

DD = Demand-driven system, TR = System in transition, RD = Resource-driven system (here only results from village Pa Dong)

Table 3: Seasonal ranking of fodder components in the resource-driven system, Tong Tai

Fodder component	Index		
	Warm	Wet	Cold
Sw. pot. leaves	**14.3**	10.0	6.7
Cassava	10.7	**13.3**	**10.0**
Forest veg.	10.7	10.0	**10.0**
Maize	10.7	13.3	6.7
Concentrate	7.1	6.7	6.7
Edible canna root	7.1	6.7	6.7
Rice bran	7.1	10.0	6.7
Taro leaves	7.1	6.7	**10.0**
Banana stem	3.6	3.3	**10.0**

Discussion

Smallholders' fodder rations for pigs in the investigated production systems are composed of various local fodder components partly supplemented by concentrate fodder. Main components of the described local rations, namely maize and cassava were also determined by Lemke et al. (2006). Fodder rations based on local resources for pigs kept under similar conditions in Central Vietnam are described by Loc et al. (1997). They are considered to be critical in the term of protein quantity and quality. While in the demand-driven system and partly in the system in transition, farmers have the financial resources to purchase protein-rich supplement feed, such as soybeans, concentrates or dried fish, this is hardly the case for pig keepers in the resource-driven system.

Variations in the rations can not only be observed according to the systems but also the seasons. While in this study farmers described the summer or wet season as the time of better fodder supply due to the higher availability fresh field and forest vegetables, it is also the time of declining farm-grown fodder stock before the successive harvest (Lemke, 2006).

The seasonal calendar in the group discussions of dynamic interactions between small holder pig keepers and the researcher, served as a successful means to document the local feeding management from the farmers' point of view. The results of the seasonal calendar as a tool of qualitative research rather aim to describe and understand the specific situation of a finite study site than to be extrapolated to a wider area (Catley et al., 2002).

Conclusion

The feeding management of pigs as applied by small-scale farmers in different production systems in the uplands of northern Vietnam shows a high variability. In particular, farmers of the resource-driven system are highly dependent on local fodder resources due to financial constraints to purchase supplement fodder. While maize and cassava compete for use as human food, animal feed and for marketing, banana stem and sweet potato leaves are agricultural by-products with no or low opportunity costs. However, fodder ranking reveals a high importance of maize and cassava in all systems. Seasonal variations could be mainly observed in the availability of fresh field and forest vegetables. In formulating strategies to improve the local feeding management seasonal availability of fodder resources and related limitation of nutrients have to be considered.

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