

Development of balanced diets using local feeds for smallholder Kenyan pigs: Implications for livelihoods, human health and gender

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Outline

- Introduction
- Challenges
- Objectives and methods
- Results - diets
- Summary



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Study area

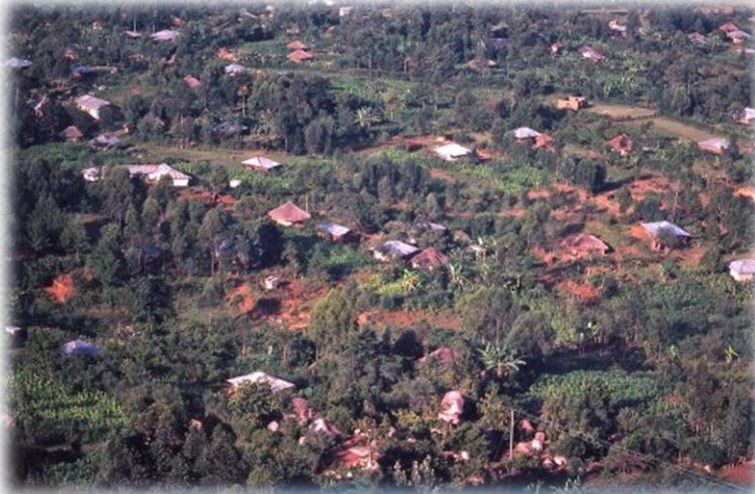


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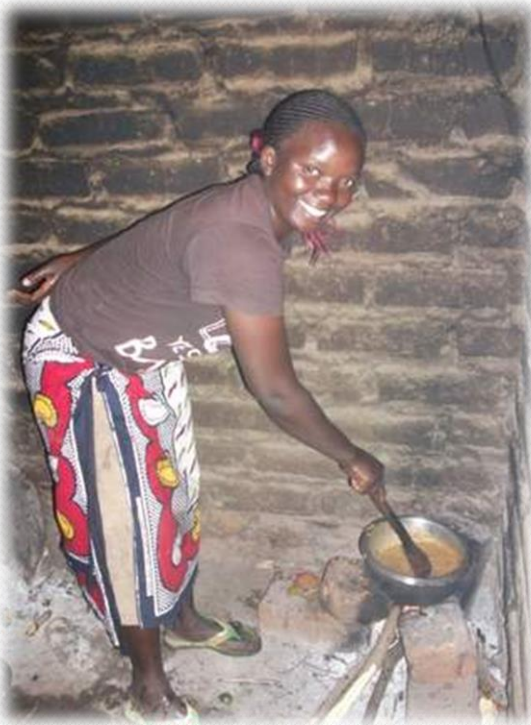


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Smallholder pig sales

Reasons pigs sold	Number of pigs sold	
	2007	2008
School fees	11	12
Medical fees	7	7
Family was hungry	2	6
Buy seeds for planting	3	8
Funeral costs	3	4
No feed for the pig	0	2

Pig/pork industry challenges

- Lack of feed – seasonal
- Lack of knowledge
- Human/pig competition
- High cost
- Low average daily gain
- Small litters
- Sold at low weight
- Butchers need 30kg pigs
- Waste e.g. blood, overripe fruit
- Diets are needed



Photo credit: ILRI and C. Dewey

Objectives

- Local feedstuffs - nutrient value and availability
- Pigs' nutritional needs
- Develop balanced least – cost diets



Photo credit: N. Carter

Feedstuffs' nutritional value

- 58 samples - 17 feedstuffs
- Literature – 17 feedstuffs
- Dry matter, crude protein, fat, fibre, calcium, phosphorous
- Digestible energy estimated (NRC 2012)
- Lysine approximated from CP and Lysine: CP similar feed



Photo credit: N. Carter

Local feedstuffs



Photo credit: C. Dewey and N. Carter

Local feedstuffs



Photo credit: N. Carter

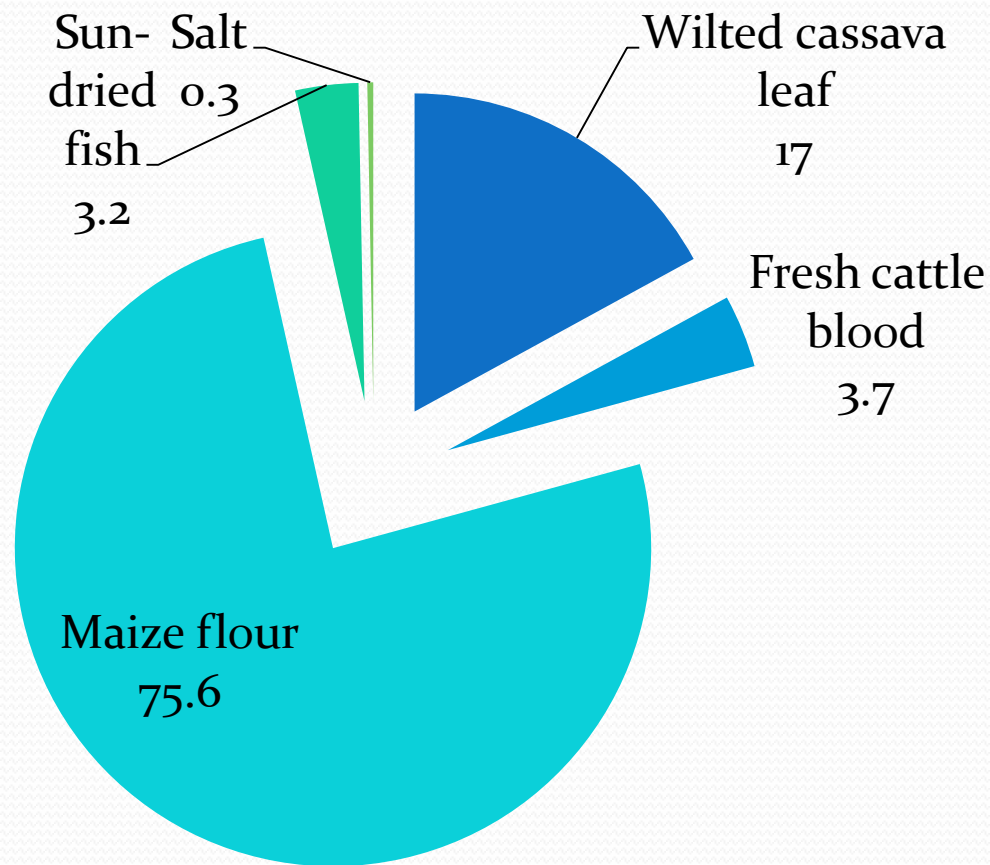
Pigs' nutritional needs and diet formulation

- The National Research Council (NRC 2012) model
 - Published indigenous pig growth performance data
 - Growth observed in indigenous Kenyan pigs
-
- A least-cost diet formulation system
 - Based on Skinner et al (2012)
 - 34 ingredient choices with \$/kg
 - Seasonal availability – 3 seasons

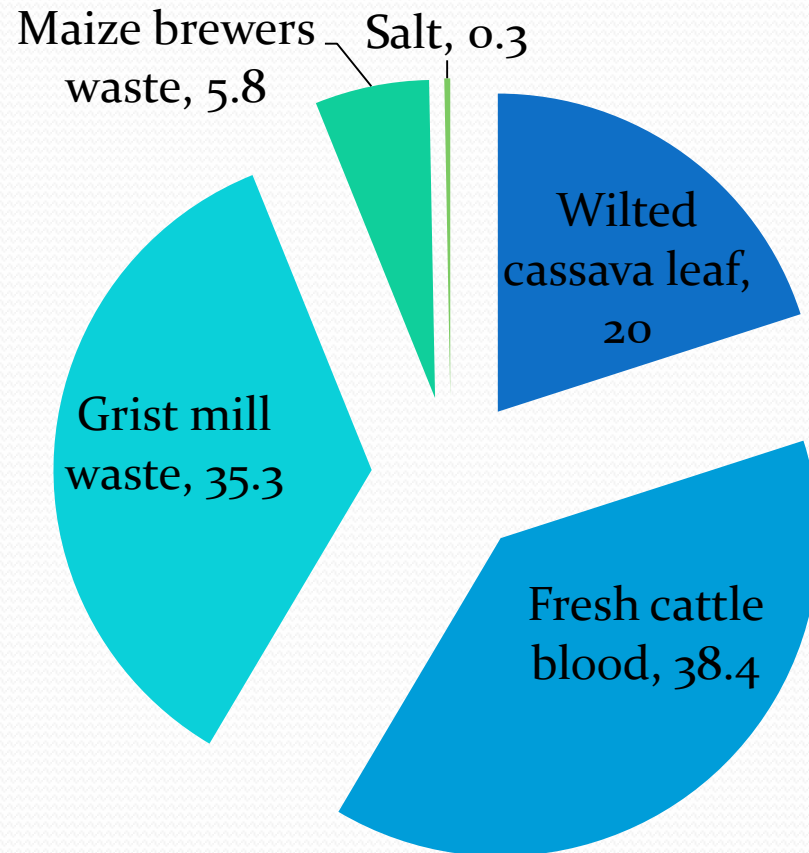


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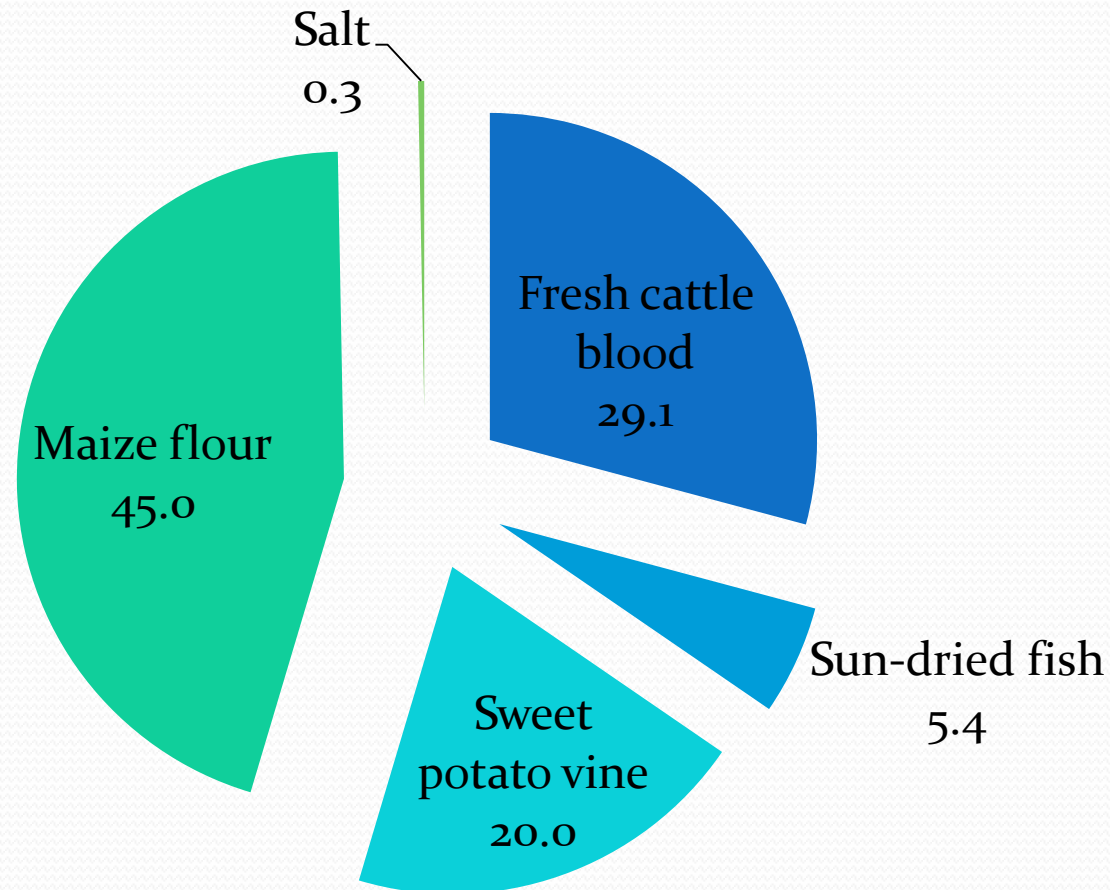
Dry season diet - least-cost (% of dry matter)



Dry season diet - no human food (as % of dry matter)



Wet season diet – least cost with SPV (as % of dry matter)



Wet season diet – no human food (as % of dry matter)

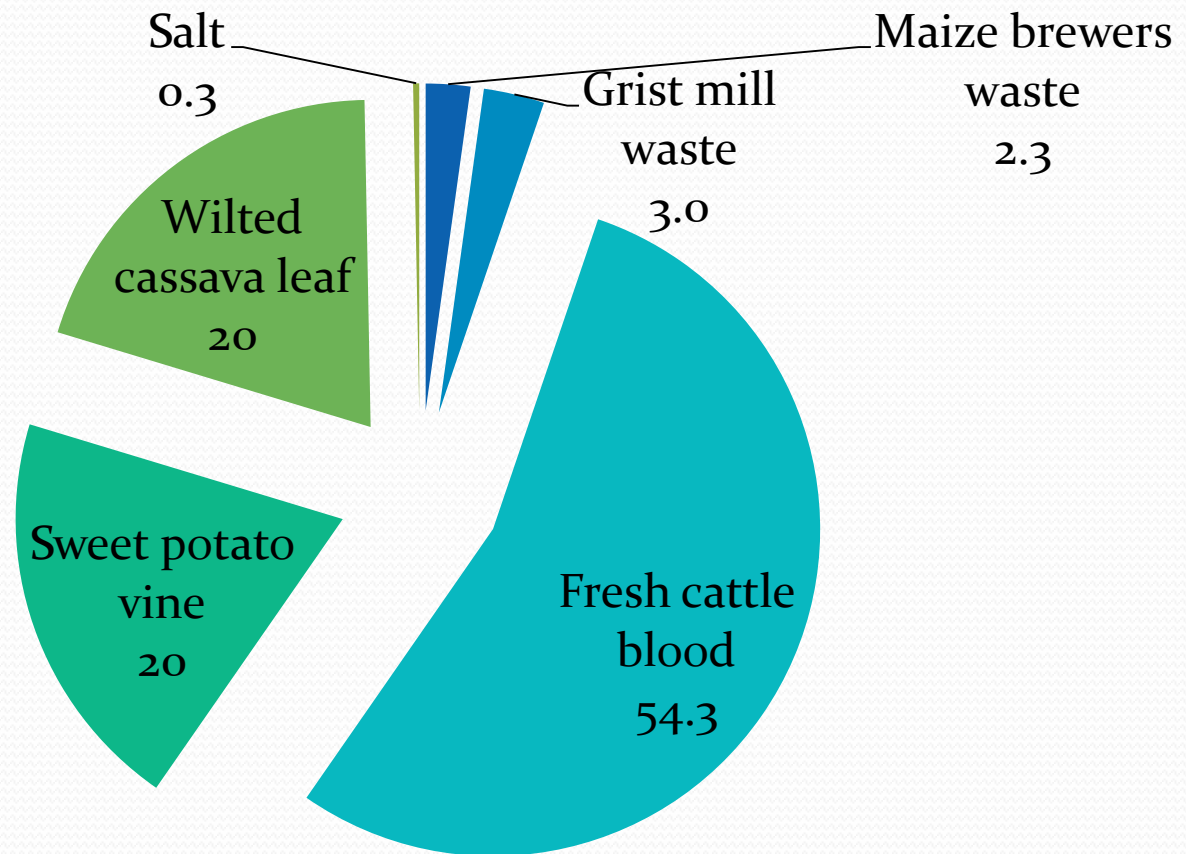




Photo credit: doomsteaddiner.org , ILRI, C. Dewey ,and N. Carter

References

Dewey, C.E., Wohlegemut, J.M., Levy, M., and Mutua, F.K., 2011. The impact of political crisis on smallholder pig farmers in Western Kenya, 2006–2008, *Journal of Modern African Studies*, 49, 3, 455–473.

Kagira, J.J, P.W.N. Kanyari, N. Maingi, S.M. Githigia, J.C. Ng'ang'a, and J. Karuga. 2010. Characteristics of the smallholder free-range pig production system in western Kenya. *Trop Anim Health Prod* 42 865-873.

Mutua, F.K., C. Dewey, S. Arimi, W. Ogara, M. Levy and E. Schelling. 2012. A description of local pig feeding systems in village smallholder farms of Western Kenya, *Trop Anim Health Prod*, 44, 1157–1162.

Carter, N., Dewey, C.E., Mutua, F.K., de Lange, C., Grace, D. Average daily gain of local pigs on rural and peri-urban smallholder farms in two districts of western Kenya. *Trop Anim Health Prod* 45 (7) 1533-1538.

Feedipedia. *Animal Feed Resources Information System*. Institut National de la Recherche Agronomique (INRA), Centre de Cooperation Internationale en Recherche Agronomique pour le Développement (CIRAD), Association Française de Zootechnie (AFZ) and the Food and Agriculture Organization of the United Nations (FAO). www.feedipedia.org.

National Research Council of the National Academies. 2012. Nutrient Requirements of Swine (2012). The National Academies Press, Washington, D.C.

Skinner SA, Weersink A, and deLange CF, 2012. Impact of Dried Distillers Grains with Solubles (DDGS) on Ration and Fertilizer Costs of Swine. *Canadian Journal of Agricultural Economics* 60: 335–356.

Acknowledgements



Feedstuffs' nutritional value continued

- Protein and lysine sources: blood, sun-dried fish, cassava leaf, sweet potato vine, and forages/weeds (*Amaranthus sp.*, *Bidens pilosa*, *Commelina africana* L)
- Highest fat : avocado
- Highest digestible energy: avocado
- Highest calcium source: amaranth
- Highest fibre very high: cattle rumen contents, forages/weeds

	Mean body weight (kg)	ADG (g/day)	FCR	DE (kcal/kg dry matter) ¹	Actual body protein deposition (g/day) ³	Body lipid deposition to body protein deposition ratio ³	% SID ⁴ lysine requirement per kg dry matter ⁵
Estimated performance of local pigs	14 (8-20)	200	2.96	3700	24.9	2.86	0.72
	27.5 (20-35)	311	2.92	3700	38.5	2.86	0.72