Risk assessment in the pork meat chain in Nagaland, India

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Abstract

A risk assessment study in the pork meat value chain in Nagaland, North-East India, is presented. The approach implies
a) Pathological hazards in different chains and conditions of pork meat marketing in a selected district
b) Practices and risk awareness of the actors of these chains

Introduction

A previous study by ILRI indicates that "in Nagaland, as elsewhere in the North Eastern Region, there is little or no formal infrastructure for slaughter of pigs or display of pork, which raises concerns about public health issues related to food safety"[1].

- Lack of public awareness for human and livestock health risks
- To assess these risks, implementation of a disease risk assessment strategy in the pig/pork meat value chain
- Local collaboration with the Government of Nagaland and NEPED (Nagaland Empowerment of People through Economic development)

Background

Nagaland is one of the north-eastern states of India. Pork occupies an important place in the diet of the mainly (90%) Christian population. Consequently, there is a great local demand for pork meat; imported pigs are expensive and a market is growing fast for the local black and cross-bred pigs, giving the poor a marketing opportunity to sustainably increase their household incomes. ILRI aims to support poor people to seize this market gap through collaboration with national partners. The presented work is part of a research program set up to improve the production and marketing of pigs in the Northeast of India.

Material and methods

- Pathway approach → from stable to table
- Identification of two basic chain structures of the pig market (see fig.1) in the district of Kohima, Nagaland's capital district which represents about 1/6 of the population
- Risk assessment using different tools:
  - Check lists and questionnaires
  - Participatory methods (Participatory risk assessment, PRA)
  - Rapid diagnostic tests for several pathogens
    (Total aerobic bacteria, Enterobacteriaceae, *Staphylococcus aureus*, *Listeria spp*, *Brucella suis*, Cysticercus, intestinal parasites, antibiotic residues) in
    a) Faecal and blood samples taken at slaughter level (n=93)
    b) Meat samples taken at butcher level (n=91),

with the objective to identify hazards and risk amplifying and/or -mitigating practices in these chains.

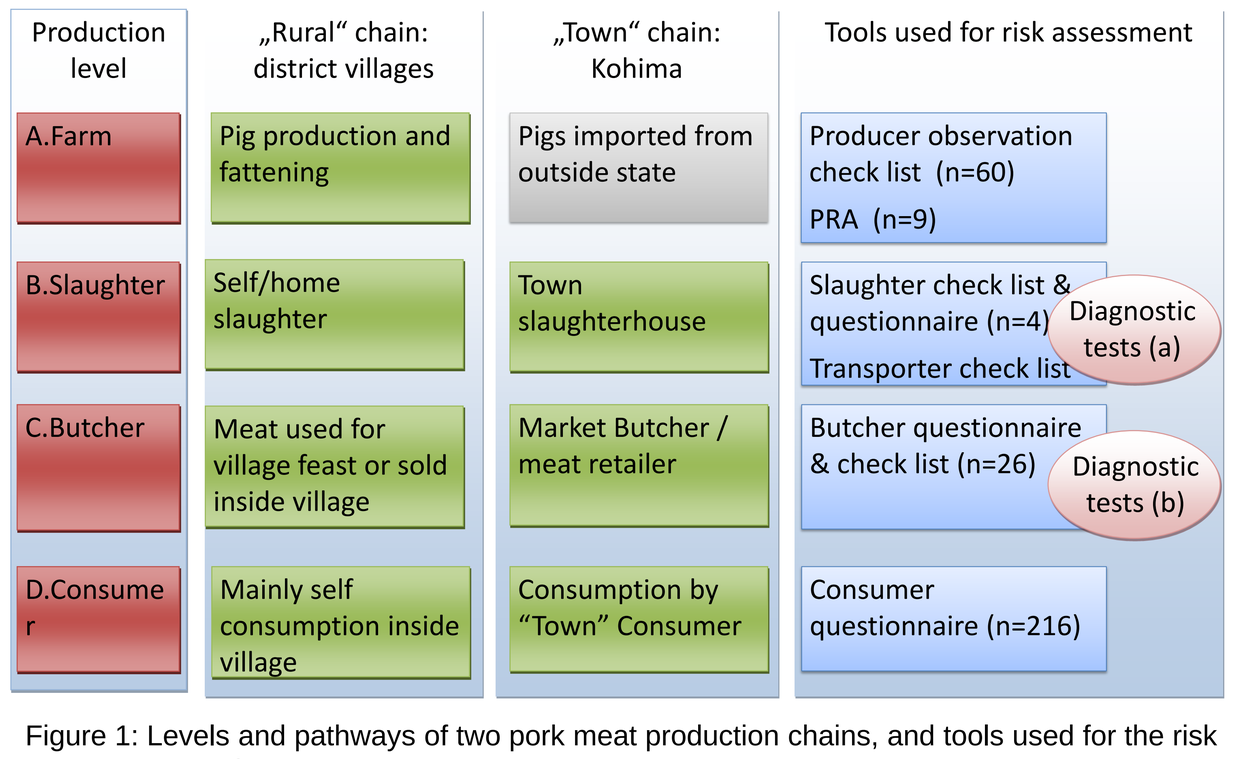

Figure 1: Levels and pathways of two pork meat production chains, and tools used for the risk assessment study.

Results

A. Farm level

- Participatory appraisal generated a list of pig diseases observed by farmers, including gastro-intestinal diseases and an acute febrile disease with high mortality
- Farmers had no access to veterinary drugs in all 9 villages visited
- Only 6% out of 70 participating farmers kept more than 3 pigs with a maximum of 6 pigs

B. Slaughter level

- All town and village slaughter is open-air (town slaughter places partially covered)
- Carcasses are generally flamed to burn off hair prior to opening
- Only 1 slaughter place with running water and partly fixed (concrete) floor
- 100% no refridgeration of carcasses/meat
- 6% pigs tested positive for *Brucella suis* (all town butchered, imported pigs)
- 7.5% pigs tested positive for Cysticercosis (all town butchered, imported pigs)
- 4% meat samples with antibiotic residues (comprising village and town pigs)

C. Butcher level

- Total aerobic bacteria counts: 46% of samples highly (> 10 000 CFU/g) and further 19,8% unacceptably contaminated (> 100 000 CFU/g); town > village
- *Enterobacteriaceae* present in 83,5% of meat samples and >1000 CFU/g in 75%; town > village
- *Listeria spp* present in 32% of samples; town > village
- Purchase time has an influence on bacterial cell counts: meat sampled early (7-9.30 am) significantly less contaminated than meat sampled later during the day ($p<0.01$)

D. Consumer level

- High pork consumption, high incidence of self-reported gastro intestinal illness:
  - 83% report illness in the last 6 months
  - 32% report illness last month
  - however, consumption of pork does not predict illness
- 99% boil meat >60 min
- 96% eat cold leftovers, most without re-heating, most after >12 hours
- 90% do not own a fridgerator
- Evidence of possible cross-contamination when preparing food

Conclusions

- Hazards and most probably risks to human and animal health are associated with pig production and pork marketing & consumption in Nagaland
- Village slaughtered pigs and village pork meat show fewer hazards than imported slaughter pigs and their meat sold by market retailers in town
- Great potential for farmers to optimize and increase the local pig production

Outlook: Risk communication, risk management

- Detailed data analysis of selected aspects to identify risks and possible intervention realms
- Capacity building of concerned actors to mitigate the risks
- Provide results to stakeholders and decision makers to promote animal health and market strategies leading to pig-promoting policy

Acknowledgements: This study was financially supported by the Sir Ratan Tata Trust & Navajbai Ratan Tata Trust.
We kindly thank the Department of Veterinary, AH and Sericulture, Government of Nagaland, especially L. H. Thangi Mannen, Commissioner & Secretary, for their support.
This poster was designed in memory of Dr Lanu Jamir, veterinarian from Nagaland.

[1] Deka, R. and Thorpe, W. 2008. Nagaland's pig sub sector – current status, constraints and opportunities

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