Comparative risk assessment of pork value chain in Nagaland, North East India

Ram Deka, Delia Grace, Anna Fahrion, V. Padmakumar, Lucy Lapar

7th ASAE Conference, Ha Noi, Vietnam
14th Oct 2011

ILRI

International Livestock Research Institute

The study area

Location	Nagaland, NE India
Topography	Hilly
Human Population	2 million
Pig Population	0.65 million
Pork eating population	84% of the population
Per capita consumption	Highest in the country (8.37 kg per annum)
No. of organized slaughter house	Nil
Clean & hygienic practices in slaughter & selling place	Poor
Govt. monitoring mechanism	Non functional

INDIA

NAGALAND

Mon
Mokokchung
Wokha
Tuensang
Zunheboto
Dimapur
Phek
Kohima

Objectives

- To assess the human health problems associated with the pork value chain;

- To identify the pork value chains/ farming sub-systems which has high risk;

- To identify the critical control points in the value chain;

- Suggest measures to overcome the risk;

The concept

Participatory risk analysis: a new method for assessing & managing risk

Three stages: risk assessment, risk communication and risk management

Risk assessment: pathway approach (rural & urban) & probabilistic method

Risk ranking: priority list of hazards (seriousness of the problem, likelihood, stakeholders concern & other impacts)

Priority List of Hazards

- ***Staphylococcus aureus***: cause of sever gastro-intestinal illness

- ***Listeria monocytogenes***: cause septicaemia, abortion & foetal abnormalities

- ***Brucella suis***: Cause undulant fever in people

- ***Coliform bacteria*** (*E. coli, Salmonella cholerasuis, streptoccus suis, Yersinia enterocolitica*)

- ***Taenia solium***: cause epilepsy in adult

- ***Antibiotic residue***: allergic reaction to sensitive people, antibiotic resistance, cross resistance

Tools used

- **Participatory rural appraisal** (for pigs farming systems and disease problems)

- **Individual questionnaires** (for value chain actors and consumers);

- **Observational checklists** (practices at slaughter, transport and retail);

- **Microbiological tests** (for total bacterial contamination and faecal bacteria);

- **Rapid diagnostic tests** (for several pathogens in pork meat);

Sample size

Two main pork production chains were studied

1. Rural pork production chain (Prod- cons)

10 villages: 10 PRAs (proportional pilling), 60 producers observation check list, 60 consumers questionnaires, 20 sample (blood & faecal) analysis

2. Urban pork production chain (Prod-whol-slau-reta-cons)

4 slaughter houses: 4 slaughter check list, 45 blood samples, 45 faecal samples, 45 lingual palpation

26 butchers: 26 butcher check list/ interview, 78 meat samples (morning, noon, afternoon)

156 consumer: 156 Personal interview

4 transporters interview & check list

Which is safer: village killed or town killed pigs? (test chi 2 adjusted for clustering on butcher)

	Village	Town	Conclusion	p
Unsafe coliforms	20%	80%	Town worse	0.004
Antibiotic residues	20%	4%	Country worse	0.087

What factors have most influence on the quality of meat?

sample time	Mean TPC	Time of sample	Freq.
Early	2940	7.00am – 9.30am	25
Late	9138	1.00 pm- 3.00 pm	29

What is safer: self slaughter or abattoir slaughter

- Slaughterhouse which slaughter smaller no. of pigs have higher bacteriological quality;

- Absence of transporter at slaughter place reduce the bacterial load;

- Presence of customers at the slaughter place may increase the adoption of hygienic practices;

Do some butchers consistently produce meat of higher standard over time?

Relation between butchers & quality of pork

Quality measure (causes of diarrhoea)	ICC	ICC 95% confidence interval	interpretation
Unsafe coliform	0.27	0.02-0.51	high
Total plate count	0.05	0.00-0.28	moderate
Antibiotic residue	0.10	0.00-0.34	moderate
Other pathogens	0.002	0.000-0.230	Small to negligible

How does consumers' knowledge, attitude & practices influence risk?

- Risk mitigating practices: lengthy cooking of meat;

- Risk enhancing practices: smoking & eating without cooking;

- Poor housing & feeding of pigs: higher level of pig tapeworm;

- Poor slaughter infrastructure & lack of awareness: increases the bacterial load.

Recommendations

- Conduct collaborative study with health deptt. to assess the risk to human health;

- Assess the economic impact of pork-borne disease on people and the pork sector;

- Convince the decision makers to invest on slaughter infrastructure:

- Build awareness among all the actors involved in the pork value chain;

- Participatory assessment of the training needs & design of customized training;

- Build the need based capacity, resources and incentives of the value chain actors & Municipal Corporation

Thank you so much