Food safety and zoonotic hazards in pig value chains in East Africa

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Introduction

- Pig production is becoming an important activity in East Africa e.g. in Uganda national pig herd grew from 0.19 million in 1980 to 3.2 million in 2008 => increased demand for pork and pork products per capita 3.4 kg/person/year in 2007.
- This is a response to human societal stress on environmental resources: **HOW?**
- Despite this positive trend little attention is paid to **pork safety** and **zoonotic diseases** that can be got from pigs. **WHAT IS EXPECTED?**

Methodology and outputs of the study

- However, little information was available about the magnitude of these gaps.
- It is against this background, that the first-ever systematic literature review was done on available data since 1990 East Africa (Uganda,Kenya, Tanzania, Rwanda and Burundi). Identified 82 relevant studies out of an initial 2838 articles retrieved.
- **EXPECTED OUTPUTS: i)** Known facts, **ii)** unknown, **iii)** specialists (GURUs) and **iv)** Way forward (for research, make pork safe, control zoonotics and production diseases of pigs => increase pig production output).

Findings

A) Zoonotic diseases

1) **Trypanosomosis** (*T. brucei rhodensiense*), no *T.b. gambiense.* In Uganda (S.E. Uganda) and Western Kenya pigs were playing a major role as reservoir HT. No studies done in other countries

2) **Tuberculosis:** *M. bovis* has been isolated in Uganda (Mubende district) in 2% of pigs with suspected tuberculous lymph nodes. No studies in other countries

3) Non-tuberculosis mycobateria:

The first report of isolation of non-tuberculous Mycobateria (1: ***M. avium*, 2: *M. Terrae* and 3: *M. asiaticum*** in lymph nodes in pigs in East Africa has been done in Uganda in Mubende district. Important infections: 1: human AIDS patients (50%); 2: urinary tract and joints; 3: Pulmonary pneumonia

4) Ndumu virus: Emerging (Uganda), been of virus mosquitoes

5) Leptospirosis: One study, Tanzania Morogoro Municipality, 4.42% *Leptospira* organisms were detected in live pigs.

6) **Campylobacteriosis:** one study done in Tanzania found a prevalence of thermophilic *Campylobacter* of 66.7% in slaughtered pigs and 10.6% in dressed carcasses.

6) **Relapsing fever:** Endemic in Tanzania with pig-soft tick *(Ornithodoros porcinus* and *O. moubata)* - human cycle of *B. duttoni* occurring and is listed among the top ten causes of children mortality under five in Tanzania.

7) Helminths: *Ascaris suum* in Uganda (1), Kenya Tanzania (3); *Trichuris suis* demonstrated to be hybridising with *T. trichuria* in Uganda (1).

8) Ectoparasites: No studies, only 1 done in Tanzania; only speculation for jiggers (*Tunga penetrans*)

Pork safety

1) **Porcine cysticercosis**: High prevalence in Uganda, Tanzania and Kenya using abattoir surveys, lingual examination, p/m examination and Ag-ELISA serological test

-Prevalence of **neuro-cysticercosis** (cause of epilepsy) in humans has been done only in Burundi.

-No active control measures and education for NC was being done in humans

2) Helminths: Echinococcosis (Tanzania(2 studies) 4.2%, 0.4%), *Taenia hydatigena* (Tanzania (1 study), 1.4%)

3) Salmonellosis: No explicit studies have been done to characterise *Salmonella* organisms in pigs and pork in E. Africa except one study in Kenya.

-Studies have been done to demonstrate multidrug resistance of *Salmonella* isolates from pigs in Uganda and Kenya

4) Blue pork: of concern in Uganda since 2002, but the cause of this condition is not known up to today. Why? No funding.

RISK FACTORS

- Free ranging of pigs exposes them to the risk of pathogenic diseases like cysticercosis, trichinellosis and toxoplasmosis and zoonoses (e.g. trypanosomosis, brucellosis) which can compromise pork safety
- Most of the rural pigs are housed in unhygienic muddy environments which predispose to soil and water-borne contaminants

Informal slaughtering e.g. backyard and home slaughter (no inspection and poor handling of pork). Source: Muhangi et al. 2013

- Lack of government policies on food safety e.g. Uganda has a draft food safety bill which awaits approval since 2009. Like in most African countries the draft bill has a number of ministries and institutions involved in food safety issues with apparent lack of coordination and clear mandates.
- Lack of functioning food-borne disease surveillance systems; Kenya is just testing, Uganda has a plan. WHO has developed a Plan

The way forward

1) Proper studies should be done:

i) on diseases shown to be present in some countries, no research done on other countries

ii) on pig diseases no research done:

-Potential reservoirs like brucellosis, Q-fever, *Streptococcus suis*, rabies, anthrax and influenza.

-Make pork unsafe like *Taenia hydatigena,* trichinellosis*, T. gondii*, *Sarcosystis suihominis*, *Cryptosporidium* spp., *Alaria alata, Giardia duodenalis,* hepatitis and blue pork

iii) assess pesticide and antibiotic residues, heavy metals and mycotoxins

iv) isolate and characterise major pork bacterial contaminants: *Y. enterocolitica*, *Salmonella* species, *E. coli and Enterococcus* species

v) determine prevalence of common known pig zoonoses e.g. Neurocysticercosis (NC) in humans

2) Efforts made to educate them about common pig zoonotic and unsafe pork diseases e.g. NC and control of trypanosomosis in pigs

3) Raising pigs in simple hygienic housing made of local materials and design

4) Develop effective food safety policies that create an efficient system that guides the necessary food safety actions which need to be taken to produce safe pork.

5) Field and laboratory based food-borne disease surveillance systems should be developed, strengthened and facilitated to monitor zoonotics and pork safety hazards associated with the pig value chain. HOW?

THANK YOU

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