

SAFE FOOD FAIR FOOD in Uganda



Photo by Angella Musewa, in the field in Masaka district on April 29, 2013

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**Research
Program on
Nutrition
and Health**



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Uganda

- 36 million people (est.): 74% stake in agriculture
- > 70% of households keep at least one species of livestock; > 17% keep pigs (UBOS/MAAIF, 2008)
- Poverty: 24.5% country wide (declining) and 27% of rural population below national poverty
- Health: under five mortality 13.8% (malaria, pneumonia, diarrhoea); all ages: HIV, malaria, lower respiratory diseases, diarrhoea (WHO, 2006)
- Global Gender Gap (2013): 46 out of 135 (WEF, 2013)
- Transparency Index: Rank 140 out of 177 (TI, 2013)

1. Smallholder pig value chains in Uganda

- 3.2 million pigs (17% HH)
- Rapid growth (from 0.19 to 3.2 million pigs in past 3 decades) (UBOS, 2009; FAO, 2011)
- Per capita consumption 3.4 kg p.a.
- Large informal sub-sector
- “Piggy bank”
- Pork joint phenomenon



2. Site selection

Stakeholder workshop October 2012:

“hard facts”

- geographical targeting (GIS)
- spatial data overlays of pig population density, poverty levels and market access

“soft facts”

- Participatory selection process from 12 shortlisted districts
- ⇒ Masaka, Kamuli and Mukono districts
- Ground truthing and final selection of s/c and villages

Masaka district



- Central region
- Highest number of pigs in Central region (236,150 pigs)
- Diverse livelihood activities (cash crops, fishing...)
- High HIV/Aids prevalence
- All value chain types

Mukono district



- Central region
- Estimated pig population: 172,427
- Diverse livelihood activities
- All value chain types

Kamuli district



- Eastern region
- Est. pig population: 55,988
- Diverse livelihood activities
- Mostly rural-rural value chain type

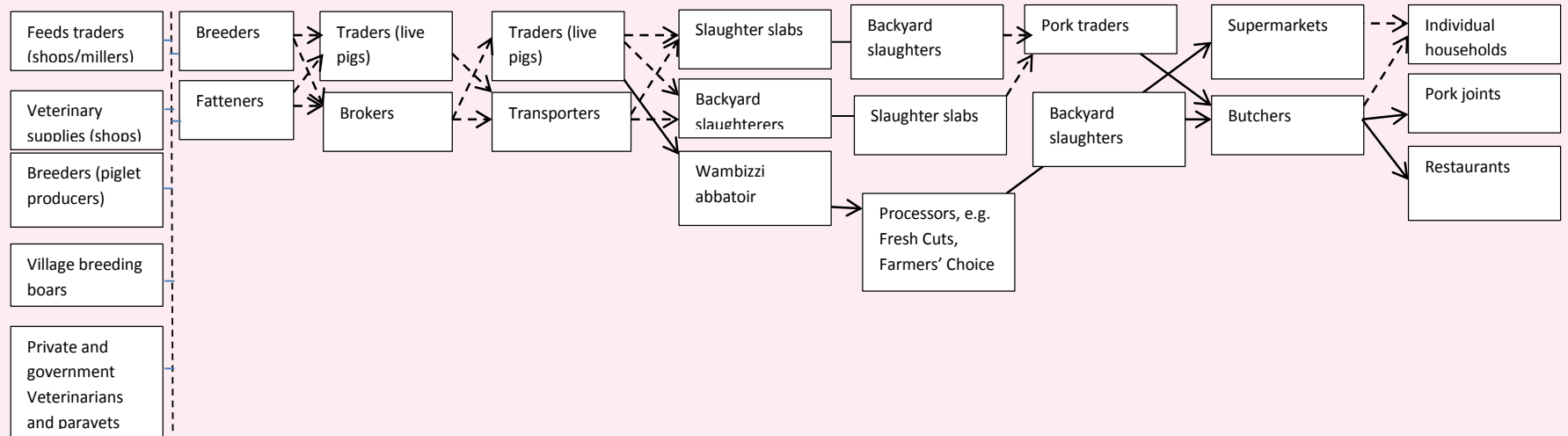
Rapid value chain assessment

- 35 villages
- Census of pig farmers per village
- 40 randomly selected (based on gender) => 1400
- Four parallel groups for FGD
 - Markets
 - Feeds, breeds
 - Animal health
 - Food safety
- Key informant interviews

101 men, 194 women participated in food safety FGDs



3. Value chain map



Research organisations (NALIRRI, Universities and IARCs)

Development projects (Government and non-government)

Financial service providers (MFIs)

NGOs (VEDCO, etc)

NAGRC

Extension (NAADS, AHSP)

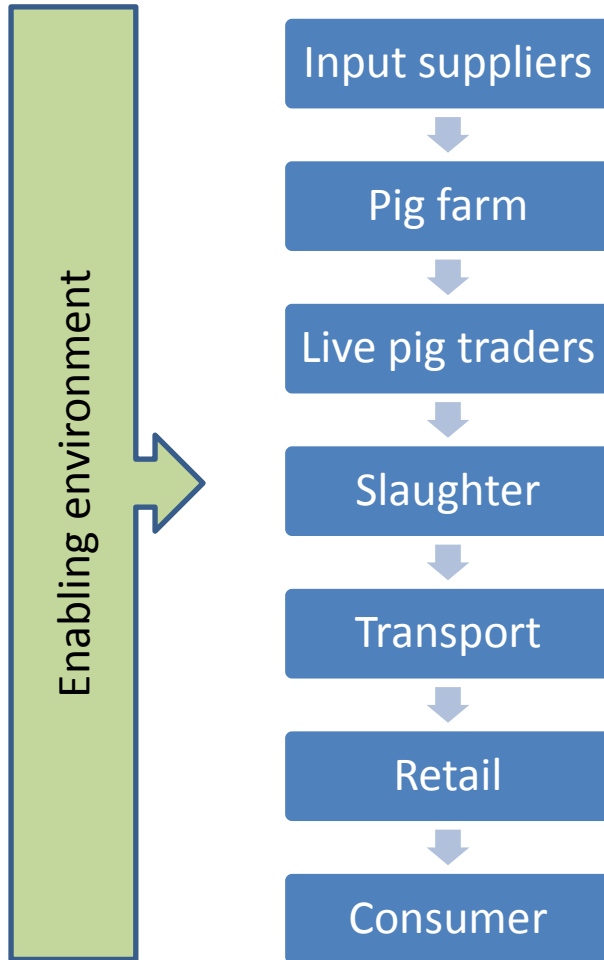
Vets/paravets (inspection)

Ministry of health (Public health dept)

Dept of animal production (National and local governments - policies)

Dept of animal production

Pig value chain in-depth assessment



- Systematic literature review
- Situational analyses
- PRAs with 1,400 pig farmers
- Questionnaire surveys with value chain actors
- Farm sero-prevalence survey 1,200 pigs
 - ASF, Taenia solium, Brucella suis, Toxoplasma gondii, Trichinella spp., Sarcoptes spp., GIT helminths, Trypanosoma spp., Ebola virus*
- Mapping of pork outlets in Kampala
- Qualitative assessment with 100 pork consumers and 200 mothers of children <5yrs
- Descriptive survey abattoir and biological sampling
 - Salmonella spp., Brucella suis*

4. Situational policy review

- No single institution with mandate for food safety
 - Ministry of Health
 - Ministry of Agriculture, Animal Industry and Fisheries
 - Ministry of Trade, Industry and Cooperatives
 - Uganda National Bureau of Standards
- Overlap of mandates; i.e. environmental health inspectors (MoH) and vets (MAAIF) both carry out meat inspection
- Only one referral laboratory
- Lack consumers' association covering pork

No comprehensive Food Law

- Food and Drugs Act: adulteration, drugs (MoH, MLG, MAAIF)
- Public Health Act (communicable diseases, sanitation, storage (MoH, MLG, MAAIF)
- Dairy Industry Act
- Plant Protection Act
- Animal Disease and Cattle Trade Act
- Uganda National Bureau of Standards Act
- ...



... pigs neglected pre- to post-harvest

- Animal breeding Act (import livestock breeds)
- Animal Diseases Act
- Animals Prevention of Cruelty Act
- Public Health Act from 1960s (incl. trichinosis)
- Policy on Delivery of Veterinary Services Veterinary Surgeon Act
- National drug Policy & Authority Act (NDP&A)
- Animal Feeds Policy (AFP)
- Uganda Meat Policy (UBP)
- The Food and Drugs Act (FDA) – offence to sell meat “unfit for human consumption”
- The Agricultural and Livestock Development Fund Act(ALDA)
- Fund-Body corporate
- Local Gov’t Act
- Uganda Standard (US) 733 Requirements for handling and transportation of slaughter animals
- US 736 Hygienic requirements for butchereries

Conclusions policy:

- Obsolete food laws – need to review
- Many laws related to VPH but not enforced
- Need for systematic monitoring of FBD
- need for provision of prerequisites
- Limited scientific evidence on pork scares
- “no critical mass” of consumers demanding pork safety
- problem of traceability (at the moment meat considered safe when stamped)

5. Systematic Literature review

- First ever systematic literature on pig/ pork zoonoses including food borne in East Africa (Prof Michael Ocaido, Head of Department of Wildlife and Aquatic Animal Resource, MUK)
- template for a SLR developed under SFFF/RIA
- 82 out of 2838 initial articles reviewed on hazard investigated, year, location, sample size, husbandry type, climate, tests used and prevalence, risk factors, impact and control measures
- Some studies on trypanosomiasis (pigs as reservoirs for HAT), only one study on *Mycobacterium bovis* in pigs and a few on non-tuberculous Mycobacteria in pigs;
- Several prevalence/ risk factor studies on porcine cysticercosis
- Few studies on *Trichuris suis* and *Ascaris suum*
- One study on Ndumu virus (first found in Uganda)

So far no information on:

- *Alaria alata*
- *Ancylostoma* spp.
- Anthrax
- blue pork
- Brucellosis
- Campylobacter
- *Coxiella burnetii* (Q-fever)
- Cryptosporidium
- ebola
- toxigenic *E. coli*
- Ectoparasites
- *Erysipelothrix rhusiopathiae*
- *Giardia duodenalis*
- hepatitis E
- Influenza
- mycotoxins
- pesticide and vet drug residues
- Rabies
- relapsing fever
- *Salmonella*
- *Sarcocystis suihominis*
- *Streptococcus suis*
- *Taenia hydatigena*
- *Toxoplasma gondii*
- *Trichinella* spp.
- *Y. enterocolitica*
- heavy metals
- Leptospirosis

HH & hazard survey at farm

Hazard	Result	at risk
<i>Brucella suis</i>	Sero+ at farm and slaughter No isolate at slaughter	Farmers, Meat handlers, consumers
<i>Salmonella</i> spp.	Isolated at slaughter and half exhibited AB resistances	Transporters, meat handlers, consumers
<i>Taenia solium</i>	Sero+ at farm	consumers
<i>Toxoplasma gondii</i>	Sero+ at farm	Meat handlers, consumers
<i>Trichinella</i> spp.	Sero+ at farm	consumers
<i>Trypanosoma</i> spp.	Isolated in blood smears	Reservoir sleeping sickness
GI helminths (i.e. <i>Ascaris suum</i> ; <i>Trichuris suis</i>)	Isolated	Farmers (potentially), slaughter
TPC at butchereries	ongoing	Consumer
Ebola	Ongoing	All vc actors
Metagenomics	Ongoing	All vc actors

6. Big questions

- **What is the role of pork products in diets?**
 - consumed in all villages in study but not main ASF (milk)
 - Rural: at special occasions
 - Urban: weekly (Mukono) to daily (Kampala)
- **What are the main hazards likely to be present in the pork value chain?**
 - Pork-borne parasites; Salmonella; faecal contamination

6. Big questions con't

- What risks do these hazards pose to value chain actors?
 - Pork-borne parasites: high and risk and big impact if undercooked/ under-roasted
 - Salmonella: high risk at transport (stress) and slaughter/post-harvest (cross contamination); problem of AB resistance
 - Coliforms due to poor hygienic handling/ lack of prerequisites: diarrhea

6. Big questions con't

- What is the relationship between pig keeping and pork eating
 - Smallholder pig farmers are not necessarily pig eaters (some Muslims)
 - Majority of pig farmers eats and likes pork
 - They rarely eat their own pigs
- How does nutritional quality and food safety change along the value chain?
 - Nutrition: “overcooking” in rural areas
 - Food safety: harvest and post-harvest quality and safety losses

6. Big questions con't

- What are trade-offs may increase safety but decrease nutrition?
 - Overcooking
 - Overconsumption (esp. with alcohol)
- Are there trade-offs, synergies, between feeds and foods
 - Synergies: Uganda (study sites) is rich in resources, rain and plant food – used to feed pigs and no competition with human food
 - Trade-offs: poor storage of (commercial) feeds: mycotoxins?

6. Big questions con't

- How is VC development (lengthening, complexity, adding value, processing, etc) likely to affect nutrition and food safety?
 - Nutrition not compromised but food safety:
 - long transport and poor handling results in stress (shorter shelf-life of meat and processed products and pathogen shedding)
 - Longer value chains make it impossible to trace back an animal to a disease-prone area
 - Processing requires prerequisites that are only available at

6. Big questions con't

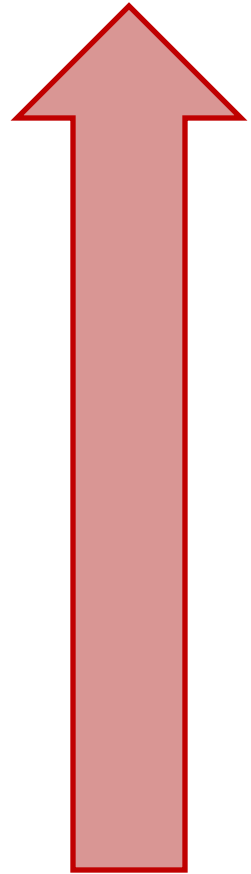
- Who gets the nutritional benefits and bears the health risks of ASF?
 - Majority consumed by men but also women and children eat pork and red offal
 - Most at health risks: pork handlers (butchers, women cooking at pork joints, house wives)
 - Consumers of undercooked pork (rural poor, drunkards)
 - Consumers of processed (formal) products

6. Big questions con't

- How do cultural practices affecting health and nutrition risks
 - Traditionally no raw pork consumption
 - Some local preservation methods (smoking, drying)
- How could investments enhance consumption of nutrients and decrease risks?
 - Put pigs on the policy agenda (pig disease control)
 - Centralized slaughter and meat inspection
 - Provision of prerequisites for butchereries (mainly water)
 - Sensitization on GHP

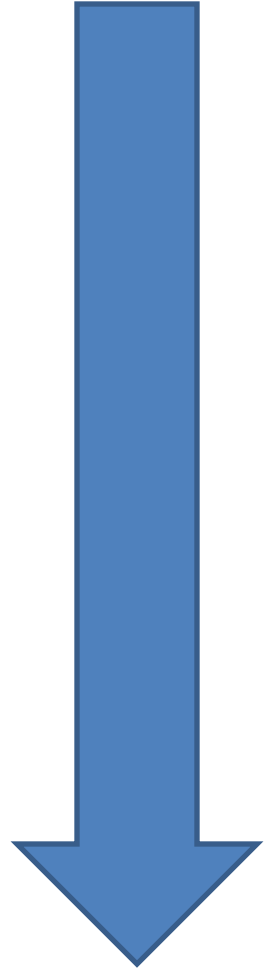
summary: practices increasing the risk for zoonotic diseases

- Misinterpreting signs in live pigs & no ante mortem
- No structured meat inspection
- Misbeliefs about pork (cures AIDS)
- Sales of pigs in case of a local disease outbreak
- Presence of arthropod vectors
- Lack of on-farm and off-farm disease surveillance exposes slaughter staff, pork handlers including housewives to disease
- Poor feed storage might compromise pork safety
- Some traditional preservation measures
- Eating pork with raw vegetables
- Roasted pork (“fast food”) vs. fried food (“slow food”)
- Some notorious village joints sell poor quality pork at lower price (frequented by “drunkards”)



summary: practices mitigating risk for zoonotic diseases

- “Better” slaughter practices in rural sites than in urban slaughter house
- Awareness of diseases transmitted from pigs/pork to people – no raw meat consumption
- Thorough cooking, reheating (more frequently in rural than urban areas)



7. Advise for value chain managers

- Engage policy to allocate staff for pig disease surveillance and control
- Promote better parasite management/ husbandry practices on farm
- Organize farmers' (women's) groups and link them with formal processors (demand for traceability is there)
- Establish centralized slaughter slabs/ houses and train inspection staff
- Find incentives not to slaughter pregnant animals (waste)
- Engage consumers and promote good quality pork – create critical mass (market survey; sensitization)
- Environmental/ slaughter waste management, especially in urban centres (i.e. biogas and water treatment)

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