



Pig industry and Value Chain Study in China

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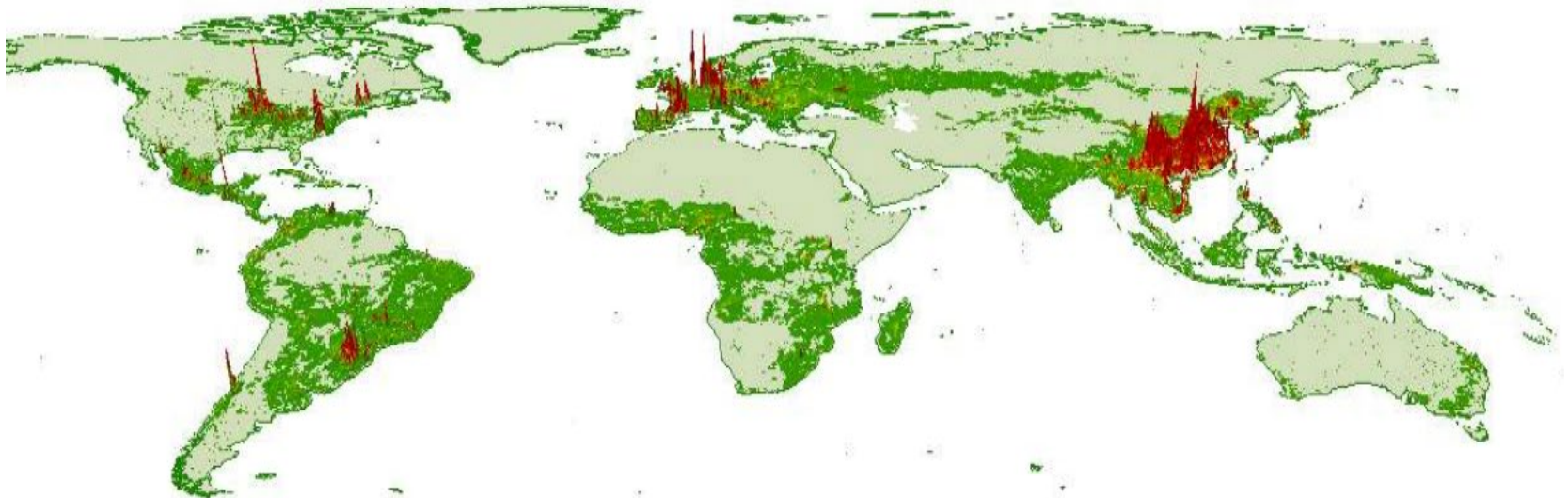
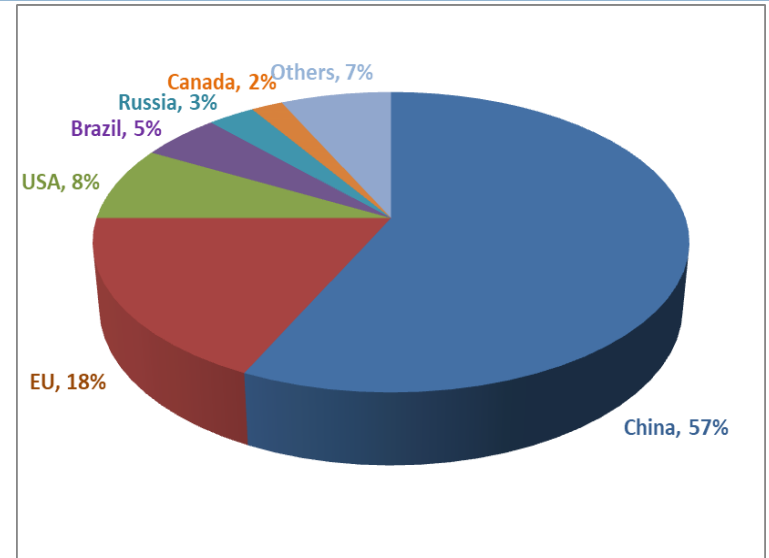
2019.04 Beijing



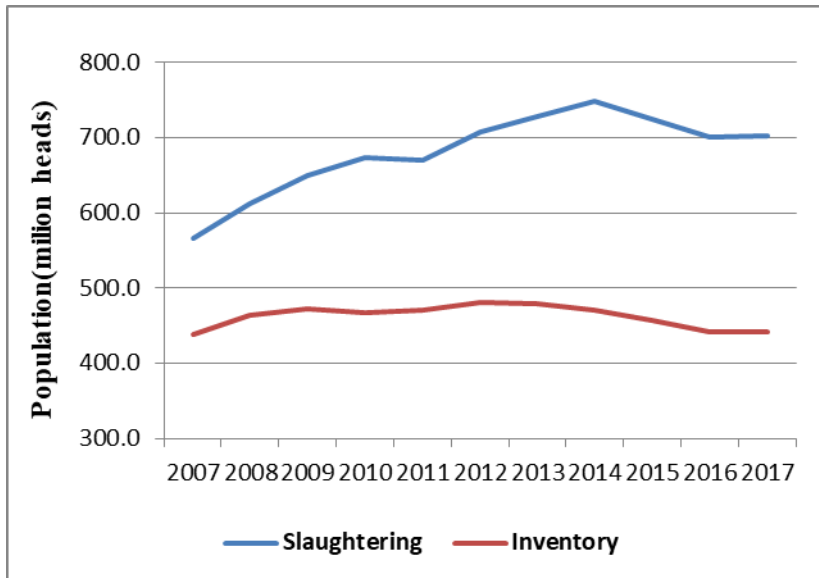
Pig industry in China

Large volume and high density

- Slaughtering is 702.0 M
 - ▣ 52% of the world
- Inventory is 441.6 M
 - ▣ 57.5% of the globe
- Number of pig farms is 42.6 M



Farm size is increasing



Farm size □ head□	Number of pig farms		
	2010	2016	Increasing
1-99	60772202	41634230	-31.5%
100-499	742772	718590	-3.3%
500-999	145175	167224	15.2%
1000-4999	65579	77737	18.5%
5000-9999	5915	7079	19.7%
≥10000	3679	4572	24.3%
Total	61735322	42609432	-31.0%

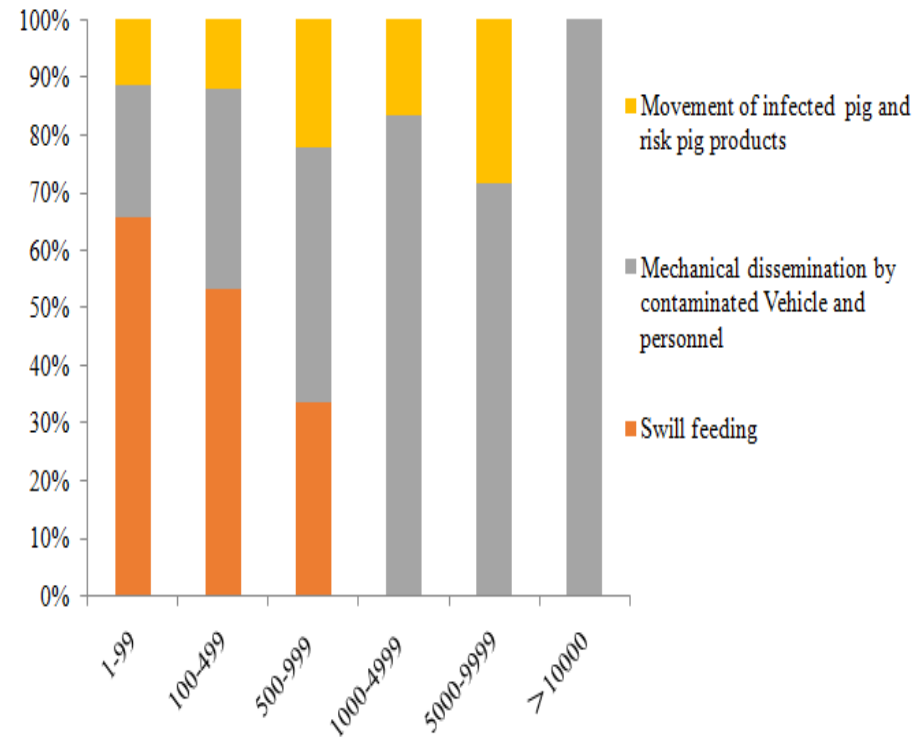
Structure of Pig industry is diverse

Farm size (head)	Proportion of slaughtering	Proportion of farm number
1-99	37.0%	97.31%
100-499	18.1%	1.69%
500-999	12.3%	0.39%
1000-4999	16.8%	0.18%
5000-9999	5.1%	0.017%
≥ 10000	10.7%	0.011%



Risk pig population is still big

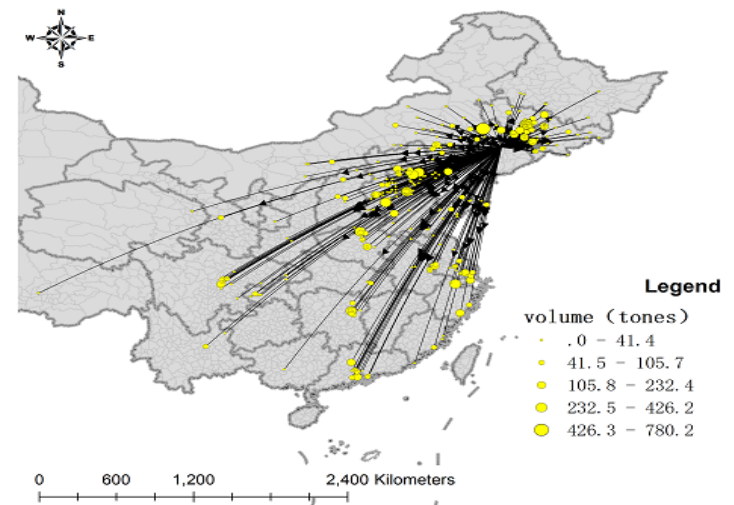
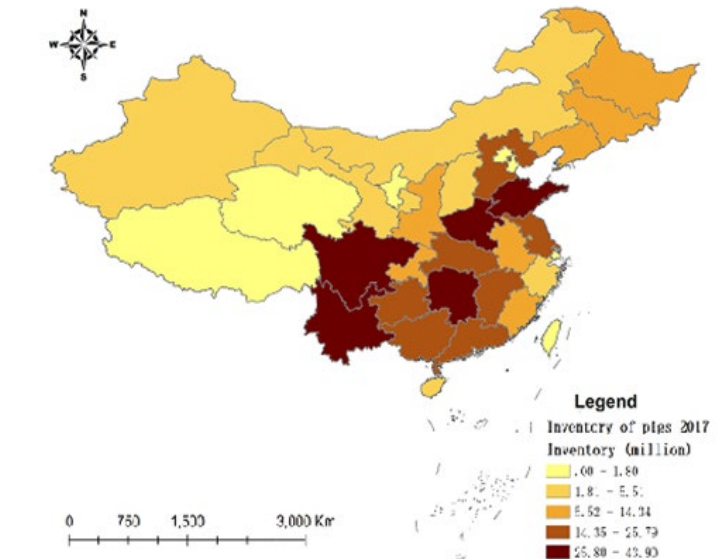
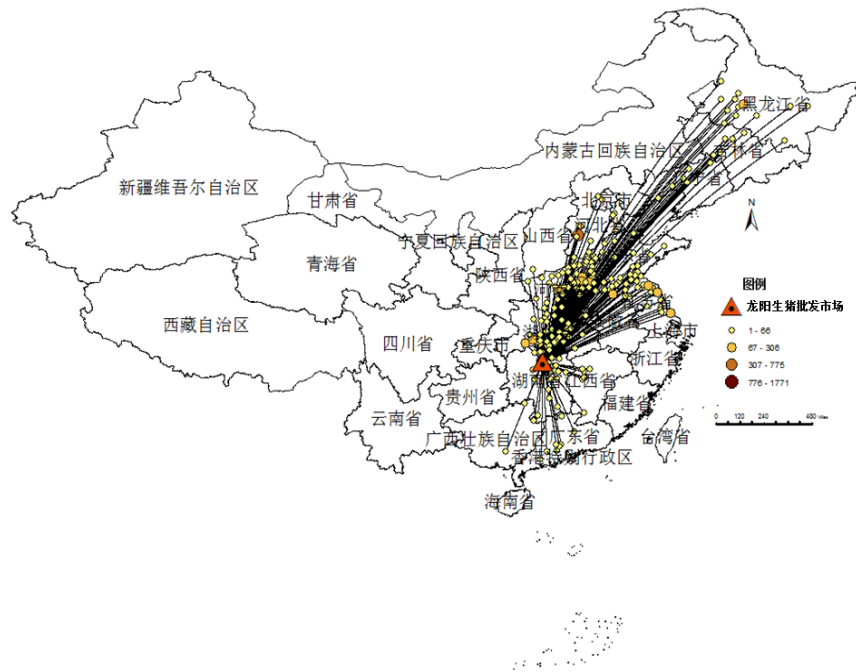
- Small-scale and backyard farms are with low biosecurity
- Feeding pigs with swill is common before 2018
 - About 20M swill-feeding pigs are slaughtered annually
 - Swill farming are backyard and small-scale farms mainly located in suburbs of cities



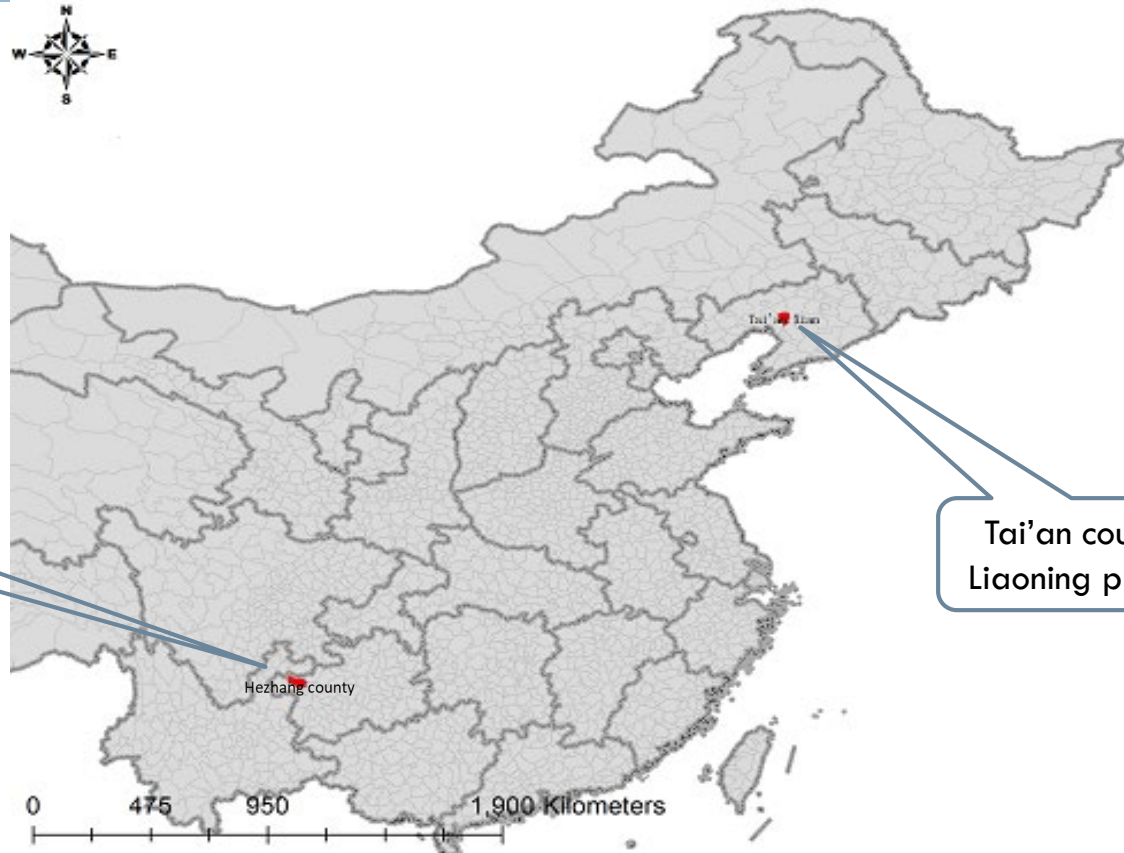
The proportions of different transmission routes for different scale farms(ASF)

Long-distance movements are frequent

- Main pig producing provinces
 - More than 10% batches and 25% pigs
- Big abattoirs
 - More than 50% products



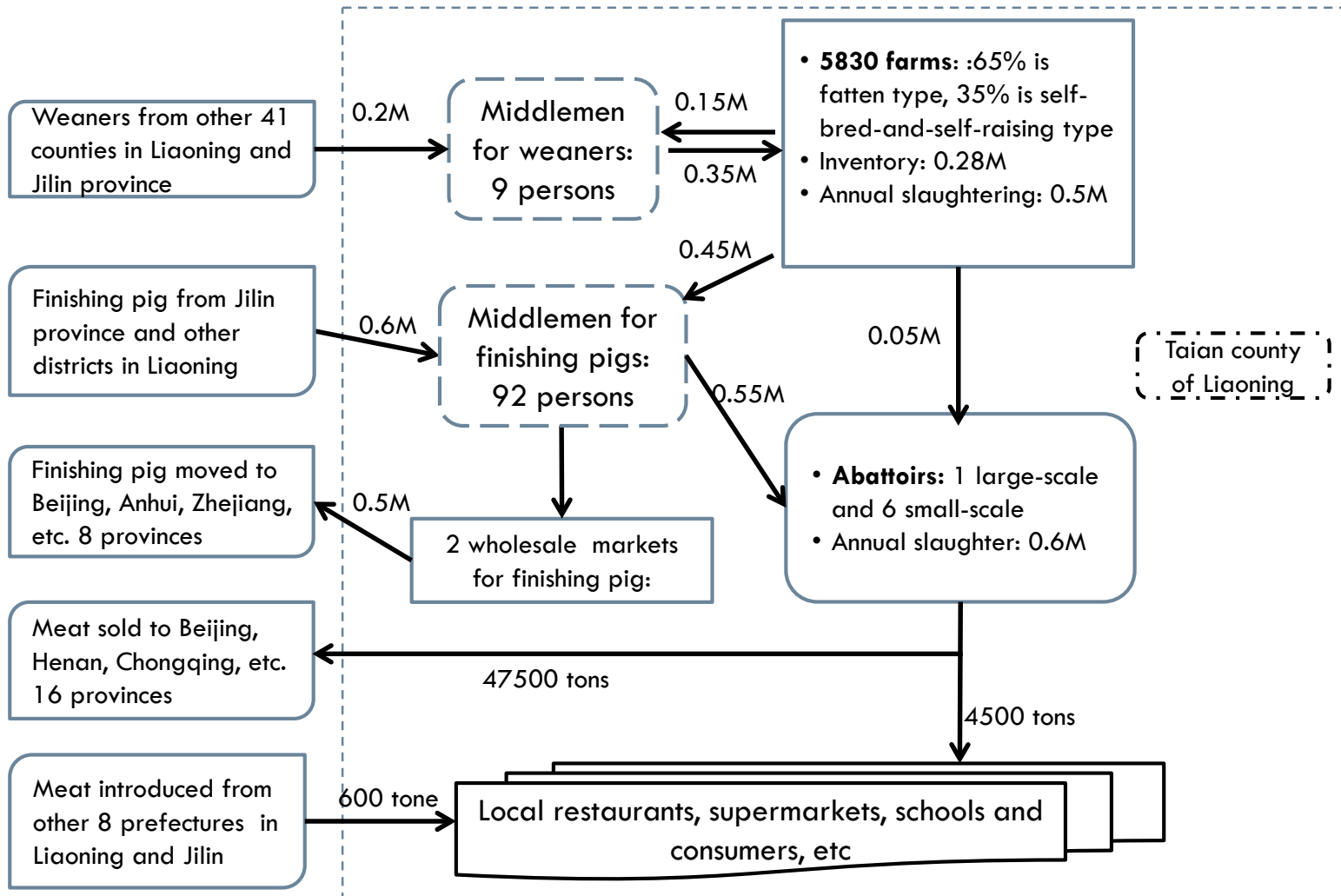
Value chain studies and SNA of pig movement in China



Hezhang county in
Guizhou province

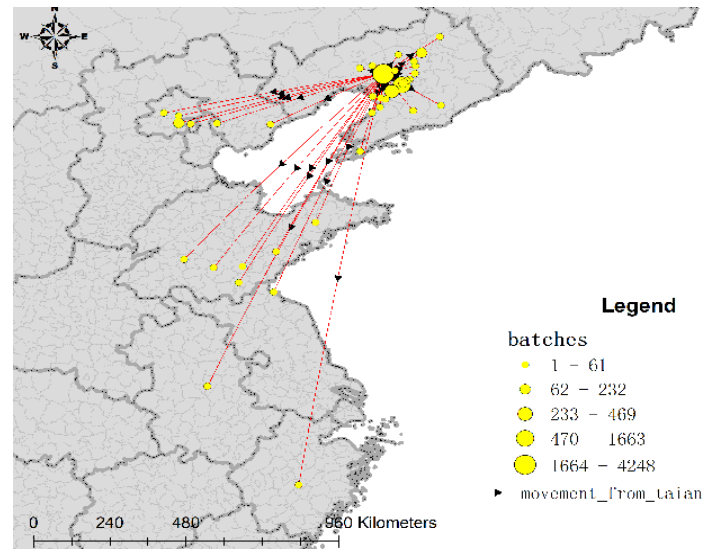
Tai'an county in
Liaoning province

Pig value chain flowchart in Tai'an

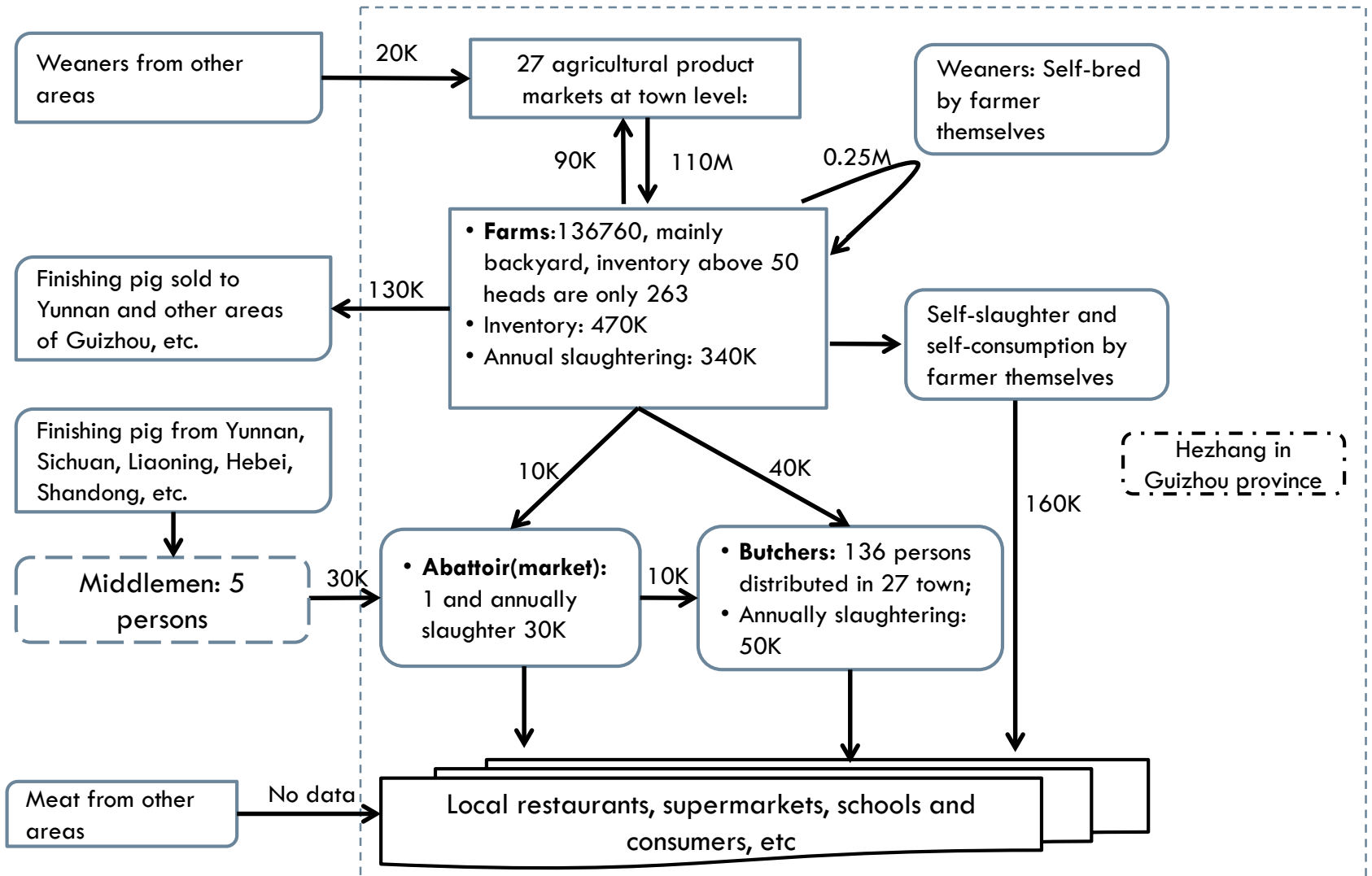


Pig value chain in Tai'an

- 0.35M weaners are sold annually to local farmers by middlemen for fattening
- Behaviors of traders with high risk of transmitting swine diseases
 - ▣ Pigs are put into cage in piggery one by one by porters hired by traders, then weighted and loaded into vehicles
 - ▣ One batch of pigs are generally from 4 to 7 swine farms, the maximum is 12 farms
- Behaviors of Insurance brokers and inspectors are also with high risk
 - ▣ Each insurance agent visits 8 to 12 farms per day



Pig value chain flowchart in Hezhang



Pig value chain in Hezhang

- ❑ Pigs are traditionally fed with homemade swill
- ❑ Pigs are self-bred and Self-slaughtered by farmers themselves and pork are processed into bacons for self-consumption
- ❑ Butchers buy pigs directly from pig farmers with their own vehicles



SNA of pig movement in Guangdong

- Objective

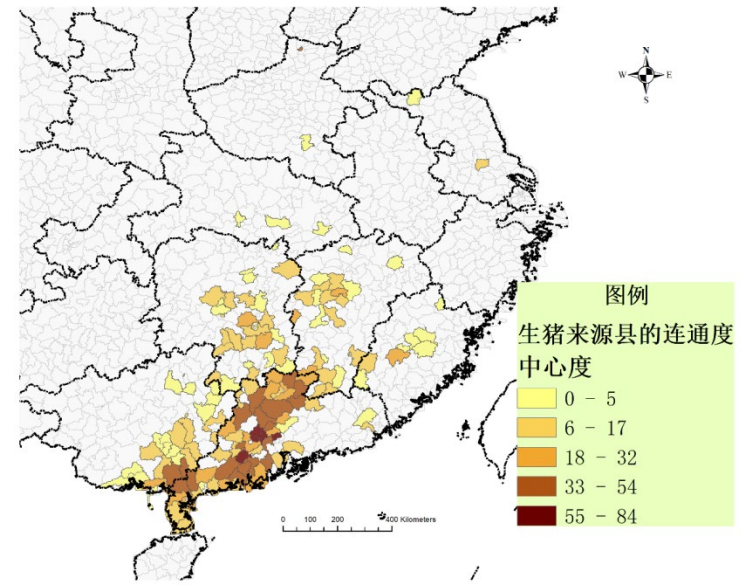
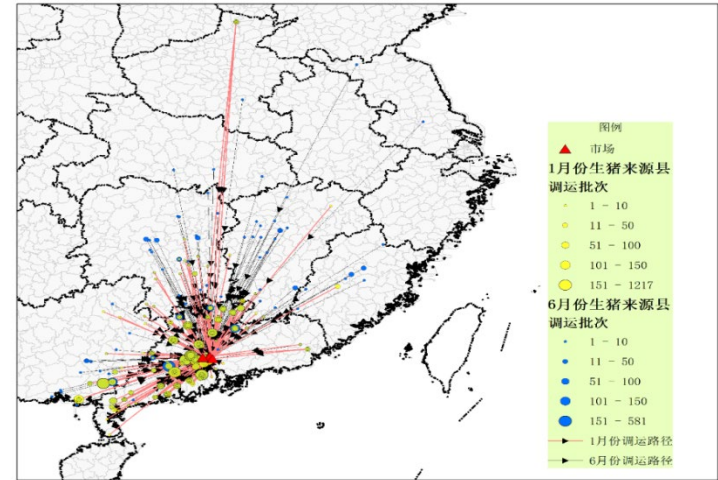
 - To learn the network of live pig movement through local pig wholesale markets and explore different control strategies

- Method and data

 - ▣ Social Network Analysis(SNA), original county of pigs used as network node which are connected by the stalls in the wholesale live pig markets
 - ▣ Data are from 4 wholesale live pig markets in Guangdong

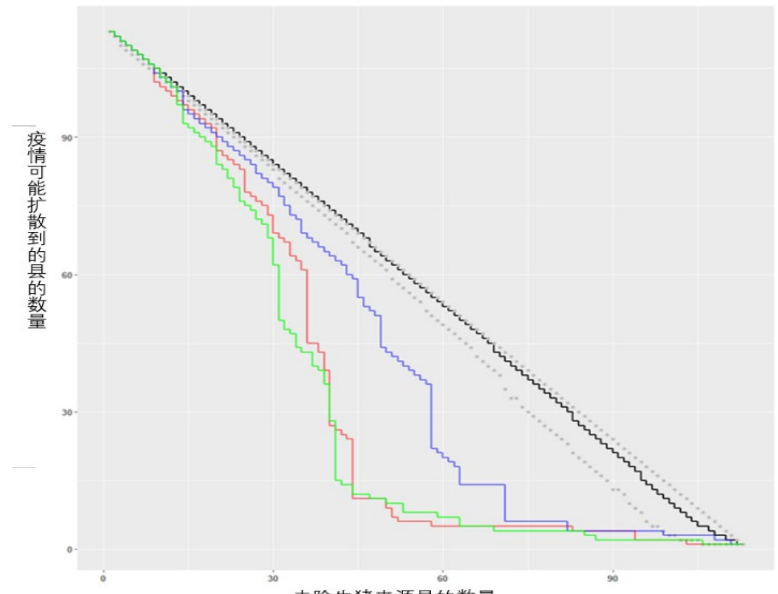
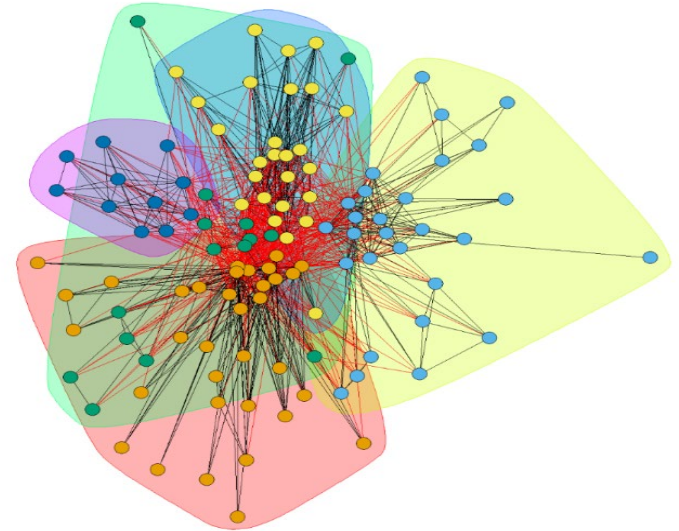
SNA of pig movement in Guangdong

- Movement network is complicated and trade frequency is high
 - ▣ Daily trade frequency and volume were up to 276 batches and 16276 heads separately
 - ▣ Pigs are from 151 counties of 8 provinces
 - ▣ 244 stalls in 4 wholesale markets
- The network is relatively stable and the impacts of some source counties on the network were high



SNA of pig movement in Guangdong

- Diseases are easy to spread via the network:
 - ▣ Diameter and average path length are 4 and 1.93 respectively
 - ▣ Edge density and transitivity are 0.18 and 0.47 separately
 - ▣ $R_0(\text{network})/R_0(\text{random})$: 1.23
 - ▣ Subgroups : 5
- Risk-based control strategy could reduce the magnitude of disease spreading effectively





Thank you