

Pig Manure Management in Asia

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Purpose of Session

Knowledge sharing of following topics on **pig manure management** considering the **common and different situations** (natural/social) in WEPA countries

- Pig industry in WEPA countries
- Impacts of pig industry to water environment
- Uniqueness of pig manure management

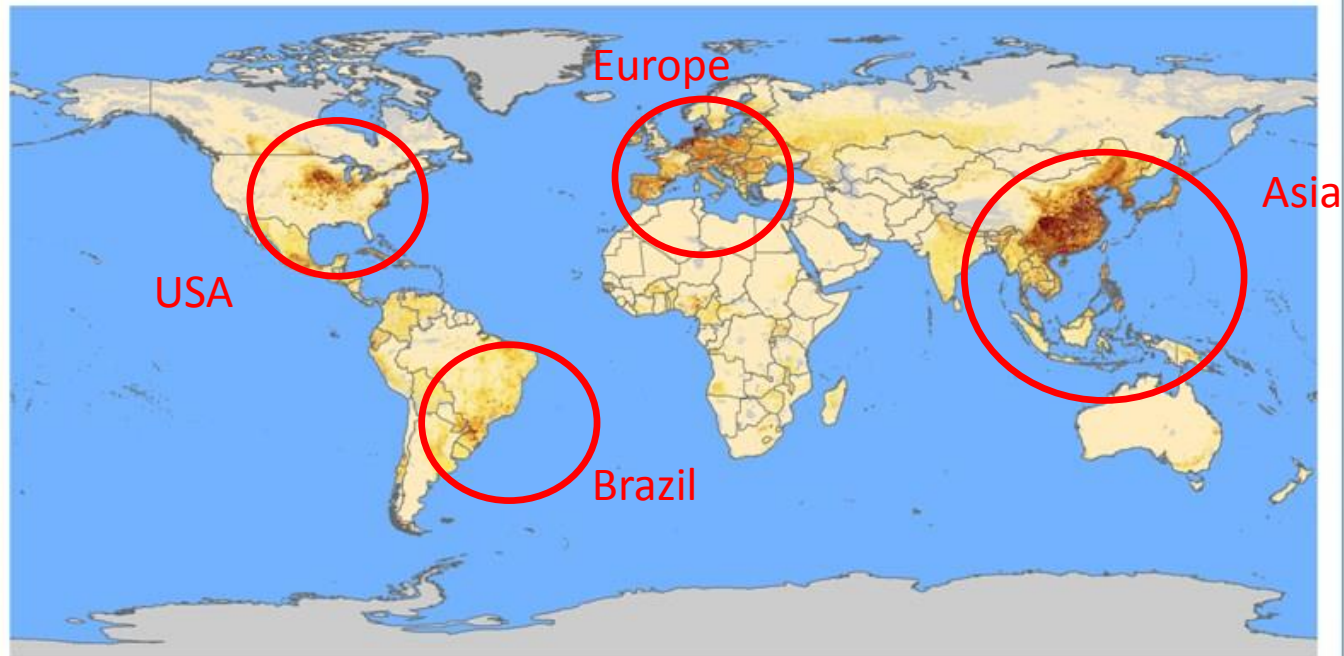
Pig Industry in WEPA countries (Outlook)

- **55** % of global pig production (2011)
- About **580 million** heads (as of live pig in 2014) in WEPA countries
- **Rapid increase of pig population** in China, Vietnam, Myanmar
- **Few exported pigs**: Most of pigs are consumed in each country. Pig production increase is supposed to be due to human population increase and change of food culture
- **Increase of large scale producer**: China, Japan, Thailand, Vietnam
- **High pig density around big cities**: China, Thailand, Vietnam, Philippine



Pigs density map matching FAOSTAT 2005 (modelled)

AGRICULTURE AND CONSUMER PROTECTION DEPARTMENT
Animal Production and Health Division

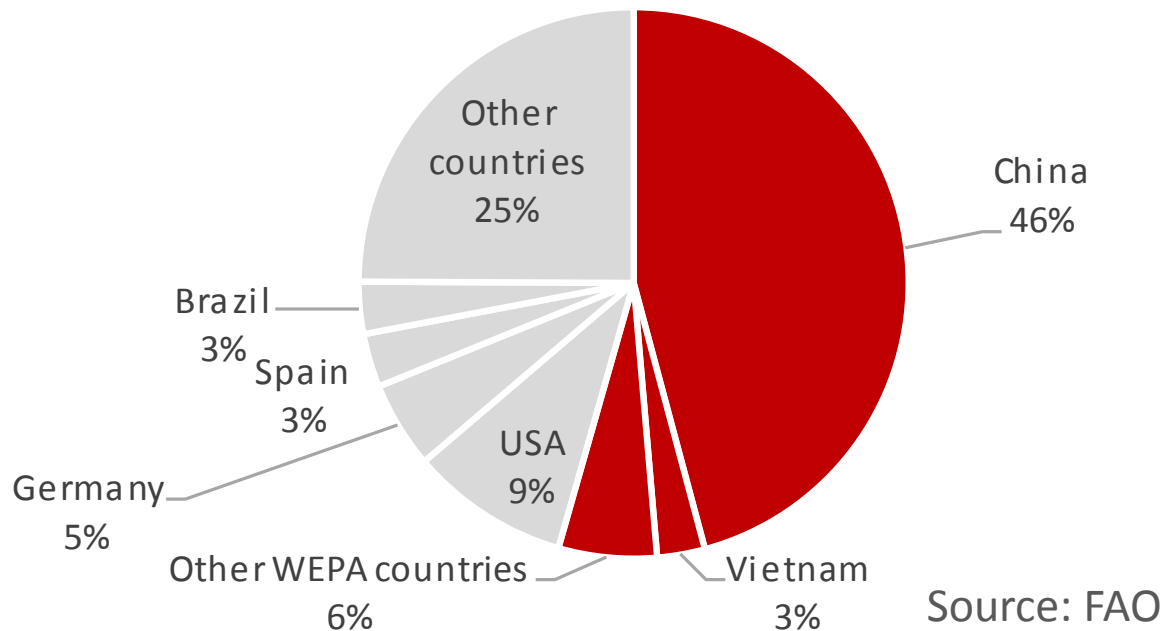


Number per square km



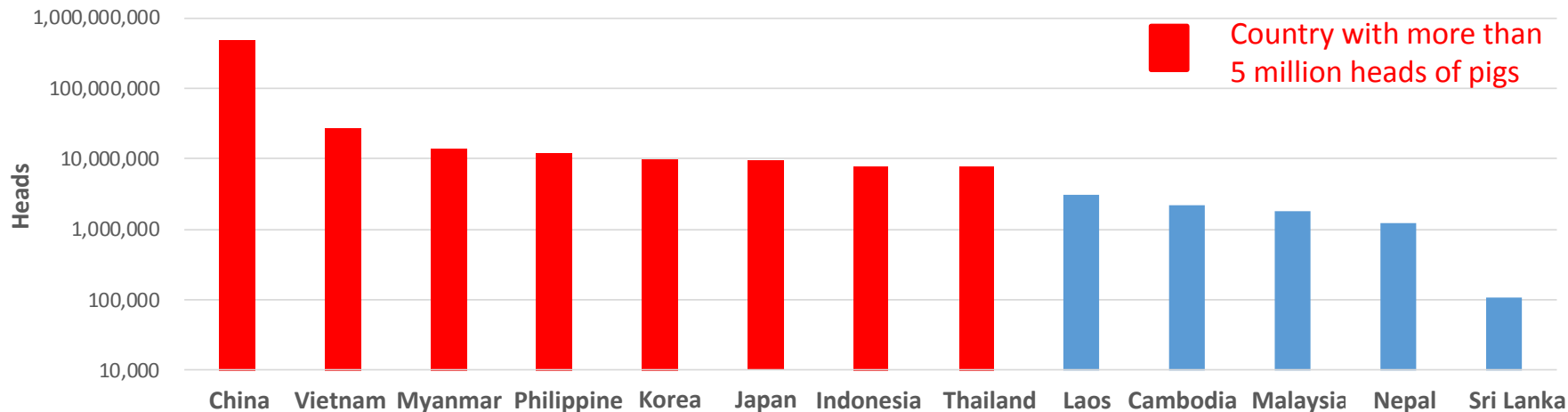
Source: Gridded Livestock of the World

Global Pig Production in 2011



Total Production over the world: 110 million tones

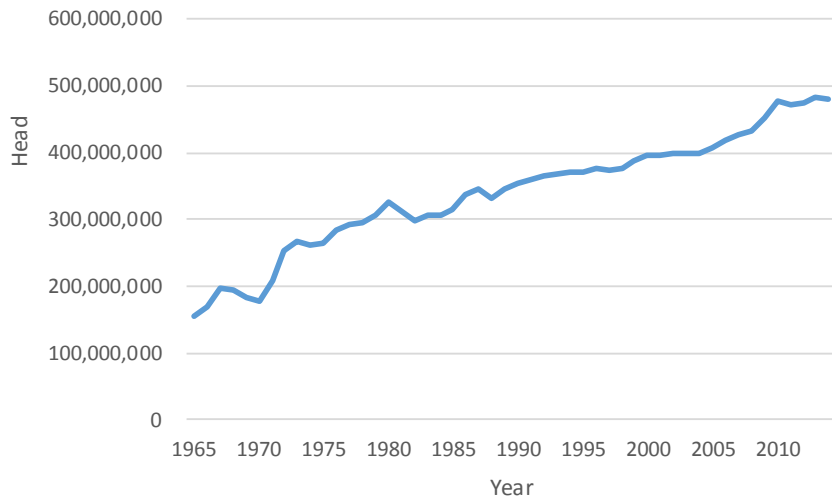
Number of Live Pig in WEPA Countries (2014)



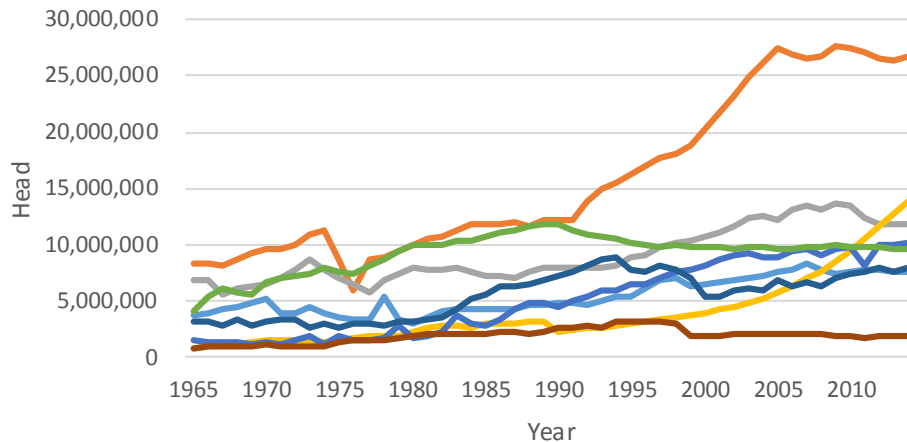
Source: FAO

WEPA total: About 580 million heads

Change in Number of Live Pig in WEPA Countries



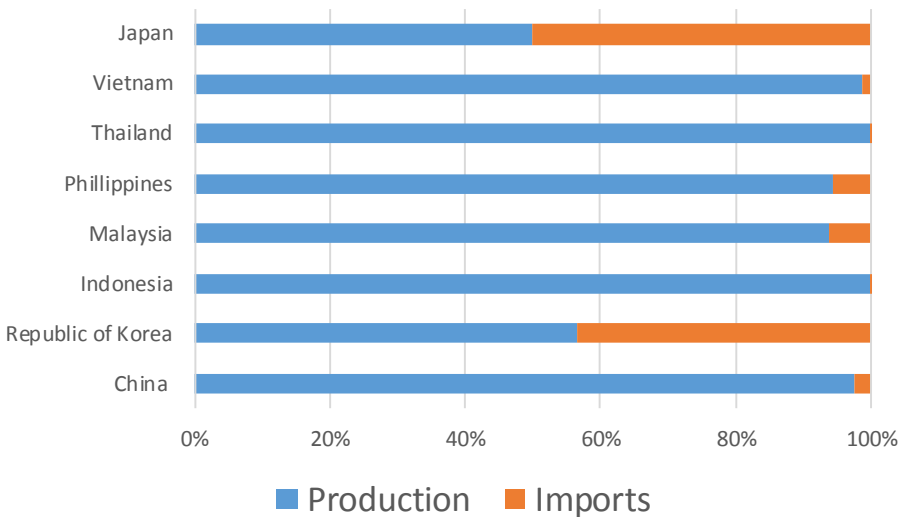
China



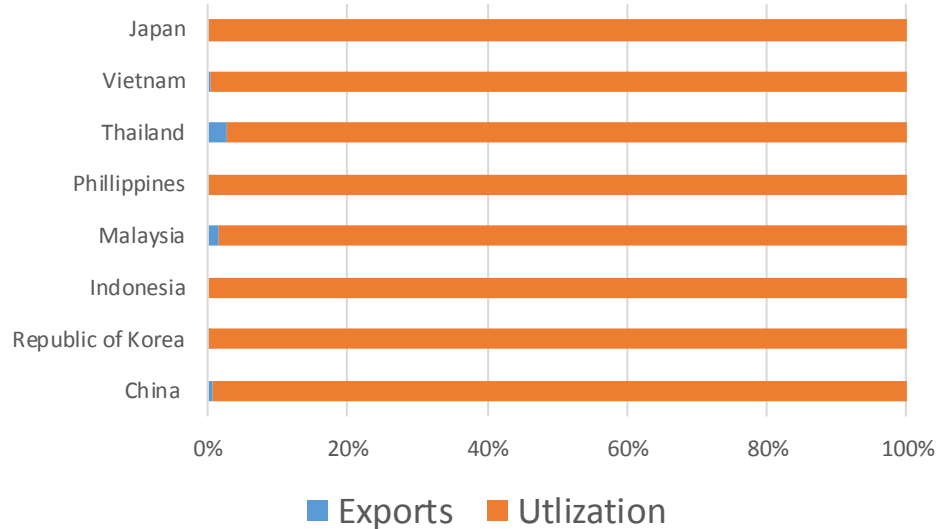
Other selected WEPA countries

Source: FAO

Pig meat import/export in WEPA countries (2011)



Production/Imports



Utilization/Exports

Source: FAO

Size of Pig Industry in WEPA countries

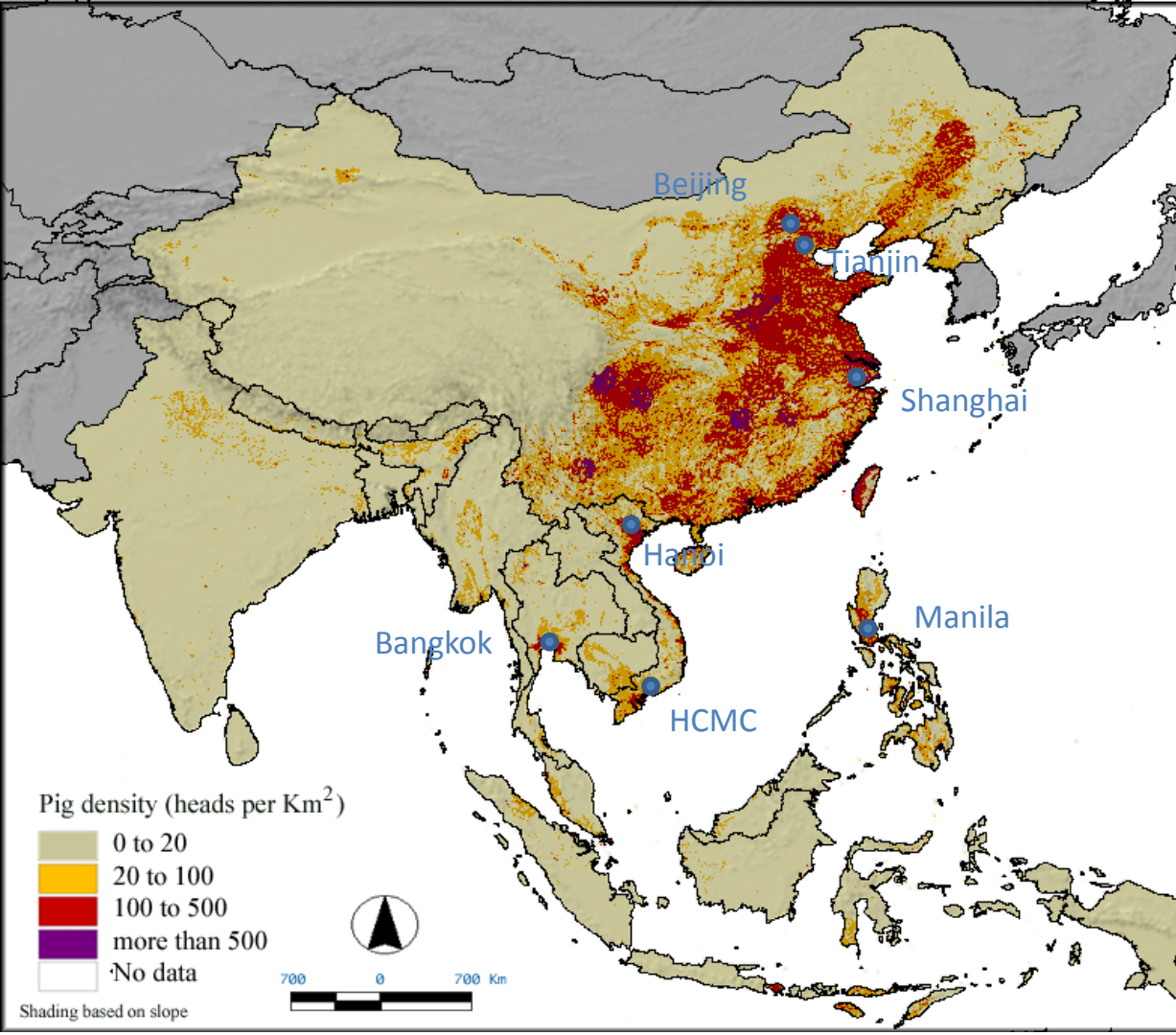
Share of pigs slaughtered by farm size in Thailand (1993 and 2013)

Number of pigs slaughtered	Pigs slaughtered by farm size (%)	
	1993	2013
1-500	73	25
>500	27	75

Source: Agricultural Census and FAO

Same trend in China, Japan and Vietnam

Pig Density in Asia



Source: FAO, LEAD Project

Supposed Issues caused by Pig Industry related with Water Environment

- **Pollution load increase** from pig industry to water environment
- **Change in pattern of pollution loading** from pig industry to water environment
- **Severe negative environmental/social impact** from pig industry **in the city near high pig density area** in addition to pollution from domestic wastewater

Cases of Water Environmental Pollution caused by Pig Industry reported in WEPA Countries

Thailand

- According to Pollution Control Department in 1999, 23 % of BOD loading in **Tha Chin River (western part of Bangkok city)** was caused by pig industry. In 2000, water quality at Tha Chin River became critical as the level of DO has dropped to near zero in the most part of the river. In addition, there was complaint that pig production is a cause of water pollution in **Bangpakong River** in the eastern region. Consequently, in 2001, PCD added the pig industry in the regulated list (source : FAO).

Philippine

- In **Balanac River, which is a tributary of Laguna de Bay** and Benig River in Tarlac located in Luzon, water pollutions caused by pig industry were reported, and therefore DENR investigated these rivers. In addition, river waters in Lantapan, Bukindo in Mindanao have also become polluted with E.coli and there was suspicion that the pollutants must have come from human and livestock waste (source: FAO)

Cases of Water Environmental Pollution caused by Pig Industry reported in WEPA Countries

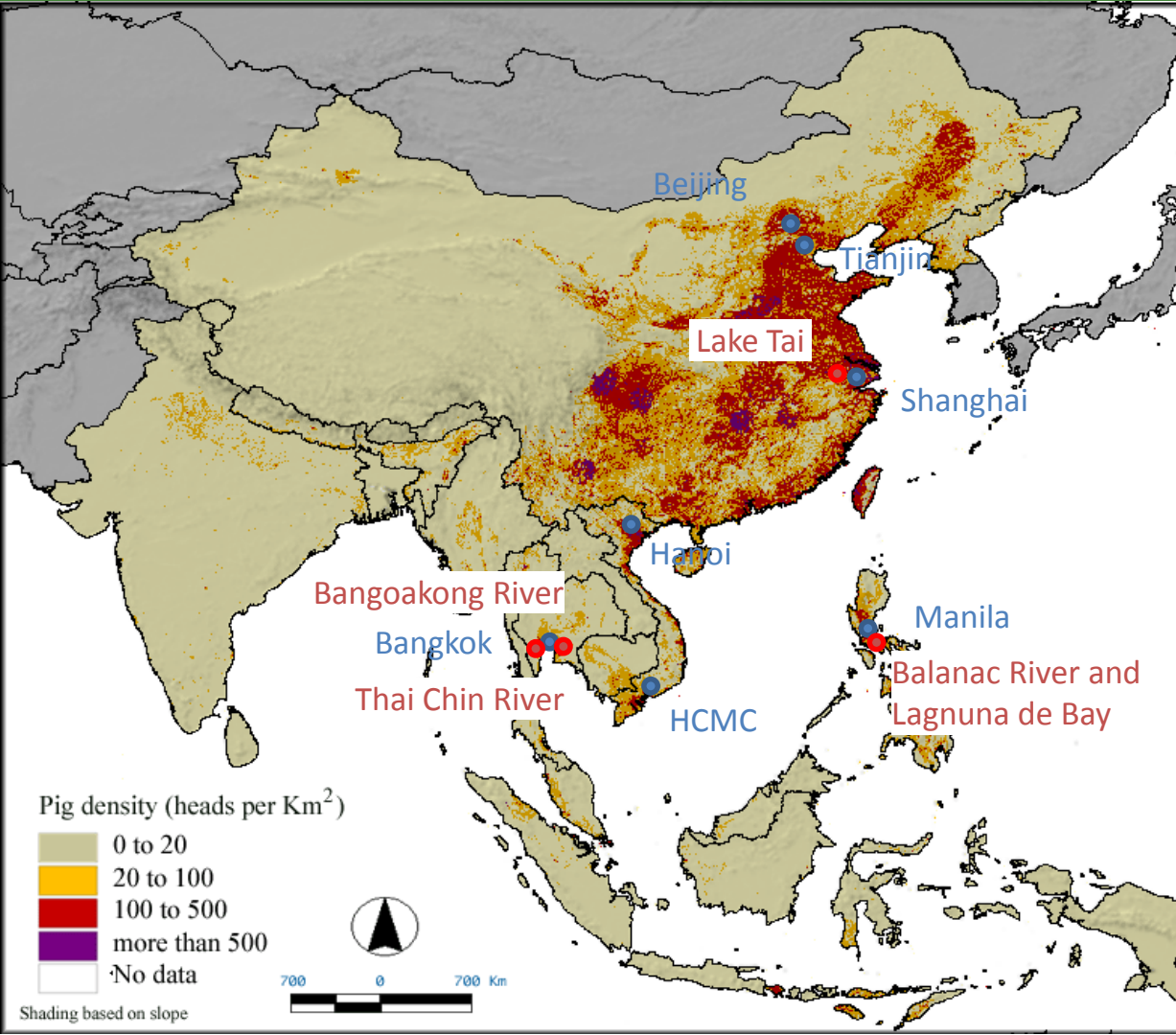
China

- According to 12th National Five Years Plan of Livestock Pollution Prevention, 59 % of total pollution load to **Lake Tai** is reported to be caused by agricultural sector, mainly from livestock industry. In addition, Chinese government conducted national pollutant inventory survey in 2009 and 2010. The result of the survey in 2010 illustrated that 45% of COD load and 25 % of NH3 load were from livestock industry. Consequently, Chinese government started to intensify livestock pollution prevention from 12th National Five Years Plan.

Vietnam

- ????

Pig Density in Asia



Source: FAO, LEAD Project

How to manage pig manure?

Today's Program

13:05-13:35

“Progress of WEPA Action Program on Pig Wastewater Management in Vietnam”

Ms. Quyenh Huong, ESI, Vietnam

13:35-13:55

Coffee Break

13:55-14:25

“Swine waste management in Thailand ”

Dr. Chao Nokyoo, Pollution Control Department, MONRE, Thailand

14:25-14:55

“Environmental management of Pig excreta in Korea”

Dr. Eugene Chung, Senior Researcher, National Institute of Environmental Research, Korea

Contents of Each Presentation

- Current situation of pig farm
- Impact of pig manure to the environment
- Issues on pig manure management
- How to overcome or improve the issues

Consideration Points in Sharing of Knowledge on Pig Manure Management in Asia

- **Waste** Management and **Wastewater** Management
- **Difference of Pollution Loading** by Different **Pig Sizes** and Different **Breeding Methods**
- **Antibiotics Use**
- **Biogas Production**

Feed →

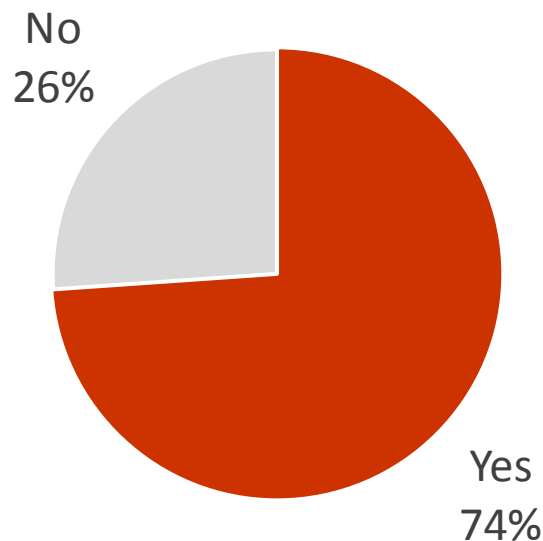


Manure

Urine
(wastewater)

Feces
(waste)

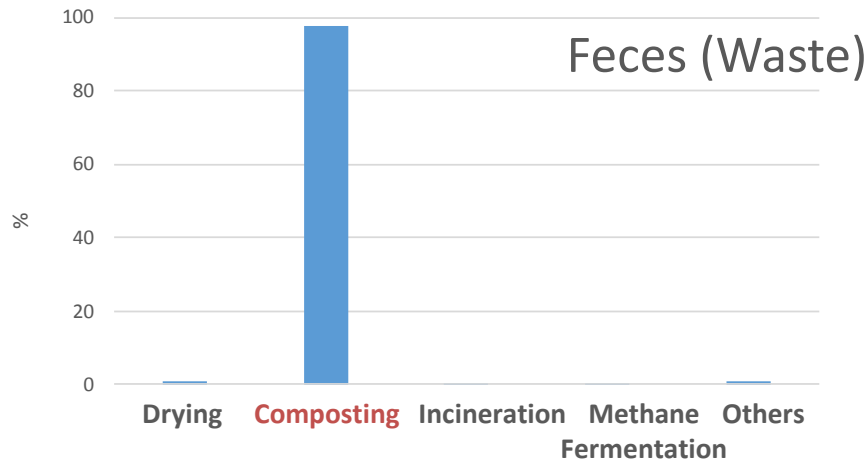
Methodology of Pig Manure Treatment in Japan (2009)



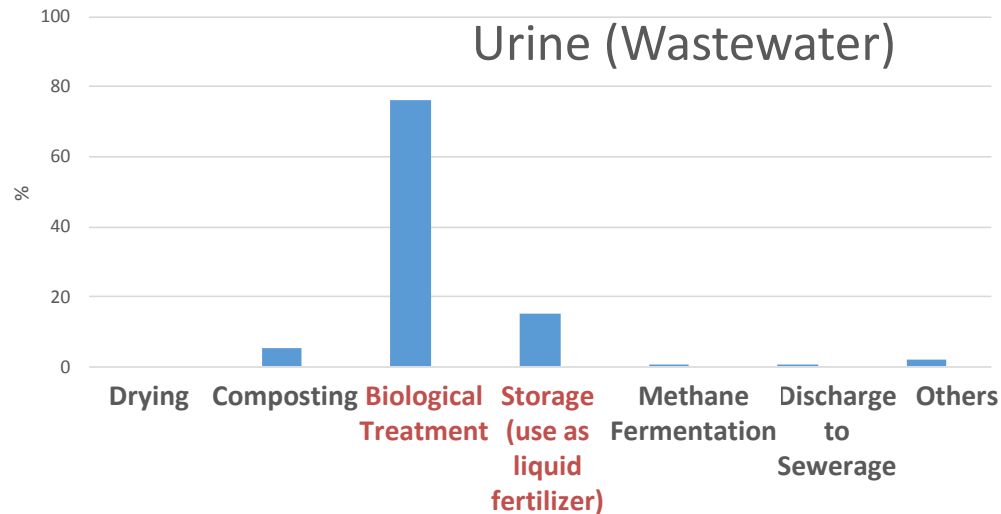
Source: Ministry of Agriculture, Forestry and Fisheries, Japan

Separation of Feces (Waste) and Urine (Wastewater) at Primary Treatment Stage

Methodology of Pig Manure Treatment in Japan (2009)



Composting

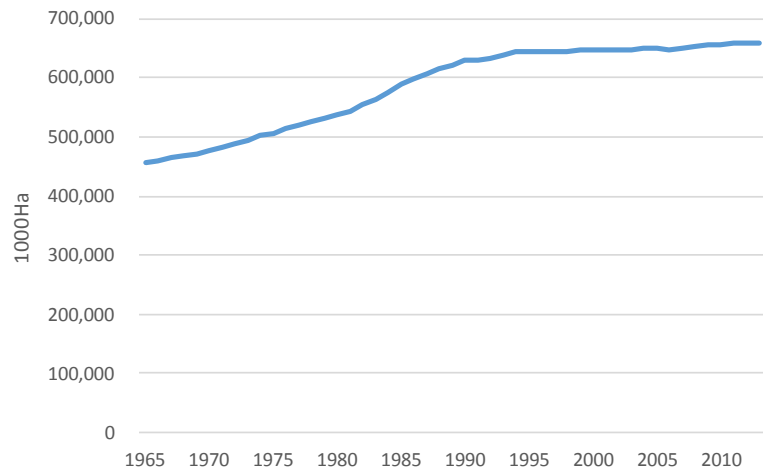


Treatment/Storage and Discharge/Use as Fertilizer

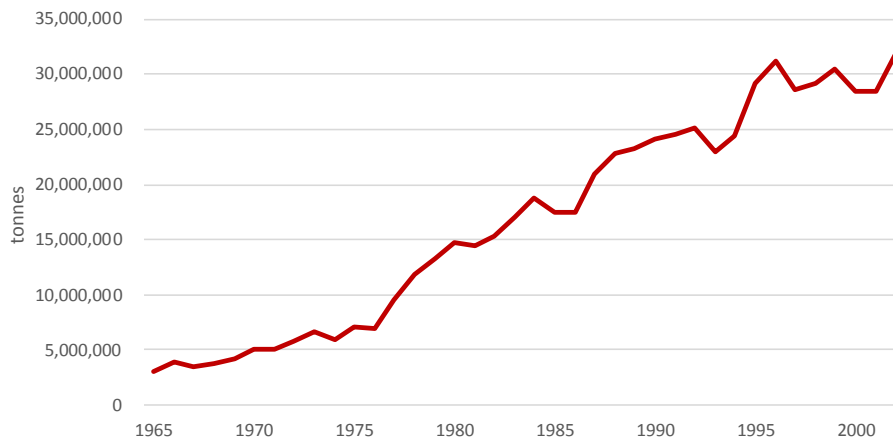
Source: Ministry of Agriculture, Forestry and Fisheries, Japan

Treatment Methodology at Secondary Stage

Issues in Use of Composting and Liquid Fertilizer



Agricultural land



Consumption of Nitrogen Fertilizer

Source: FAO

Change of Agricultural Land and Nitrogen Fertilizer Consumption in WEPA Countries

Pollution Load Unit by Different Pig Types (Thailand)

Country	Pig Type	Manure Volume (l/head/day)	BOD (mg/l)	COD (mg/l)	SS (mg/l)	TKN (mg/l)
Thailand	Breeder	64	800	1,700	900	350
	Fattener	24	3,500	7,400	4,700	700
	Nursery	20	2,500	5,400	3,000	350

Source: Pollution Control Department, MONRE, Thailand

Pollution Load Unit by Different Breeding Methods (Japan/WHO)

Country	Breeding Method	Manure Volume (l/head/day)	BOD (mg/l)	COD (mg/l)	SS (mg/l)	TN (mg/l)
Japan	Pig House with Water Washing	118	1,927	1,378	1,268	456
	Pig House without Water Washing	3	14,848	7,879	17,576	7,273
WHO	Solid Floor/Water Washed	40	2,253	-	5,000	500
	Slotted Floor/Pit Manure	8	11,750	-	8,571	2,607

Source: Ministry of Land, Infrastructure, Transport and Tourism (Japan) , WHO

Thank you in advance for your active discussion