Animal Waste Management in Indonesia

Dr. Ir. Salundik, MSi
Faculty of Animal Science
IPB University

ILDEX INDONESIA 2019
September 18th-20th, 2019
Indonesia Convention Exhibition Bumi Serpong Damai
Tangerang Selatan-Banten, Indonesia

Introduction

In many countries, livestock plays an important role in the economic and social life :
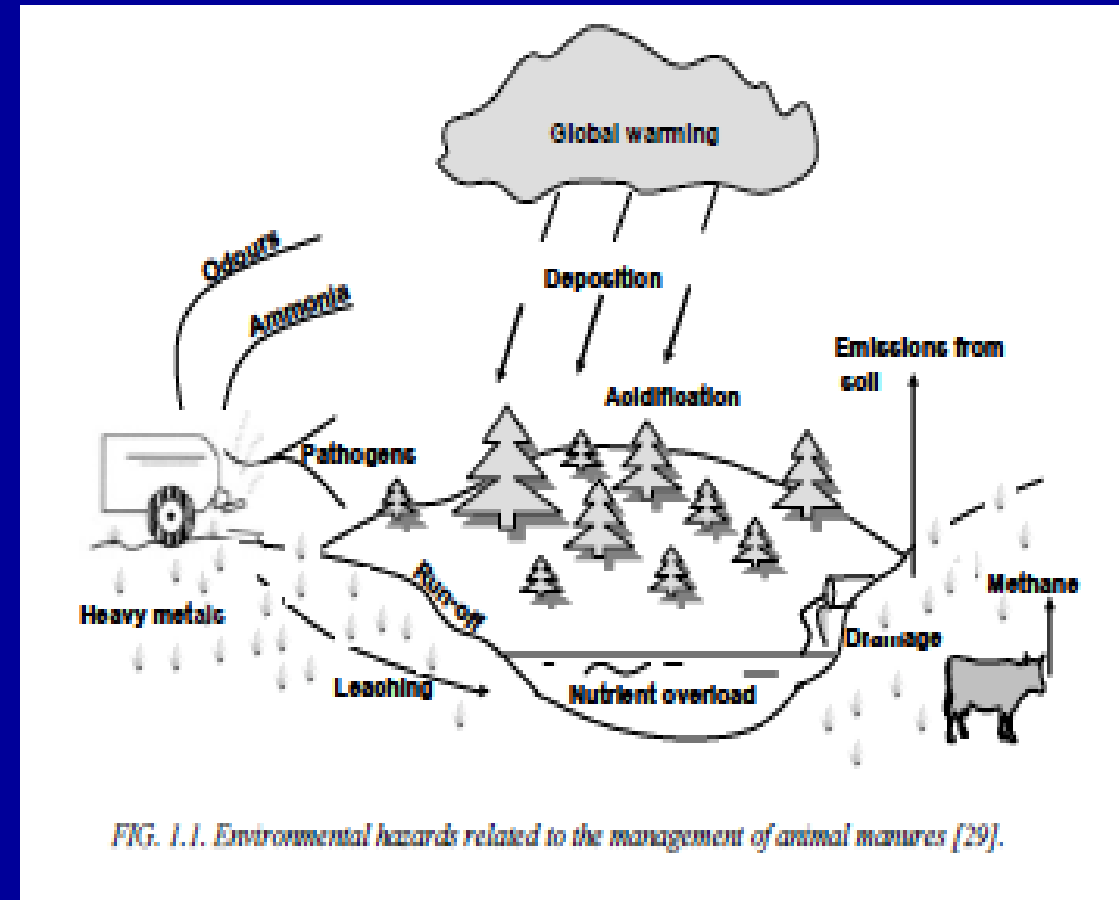- supply of nutritious food,
- job creation,
- household income,
- soil fertilizer and
- energy.

Livestock and poultry beside has a positive impact also has a negative impact on the environment with the presence of waste:
feces, urine, washing water for cages and livestock, dead animals, leftover feed (forages and concentrates), feather, and so on.

Livestock waste is considered to pollute the environment with its impact on:

- greenhouse gas (GHG) emissions, carbon dioxide, nitrate and ammonia emissions and their impact on climate change.
- reduce the quality of water and air (smell and dust),
- concern about public health issues related to microorganisms.

FIG. 1.1. Environmental hazards related to the management of animal manures [29].

Trend of animal husbandry

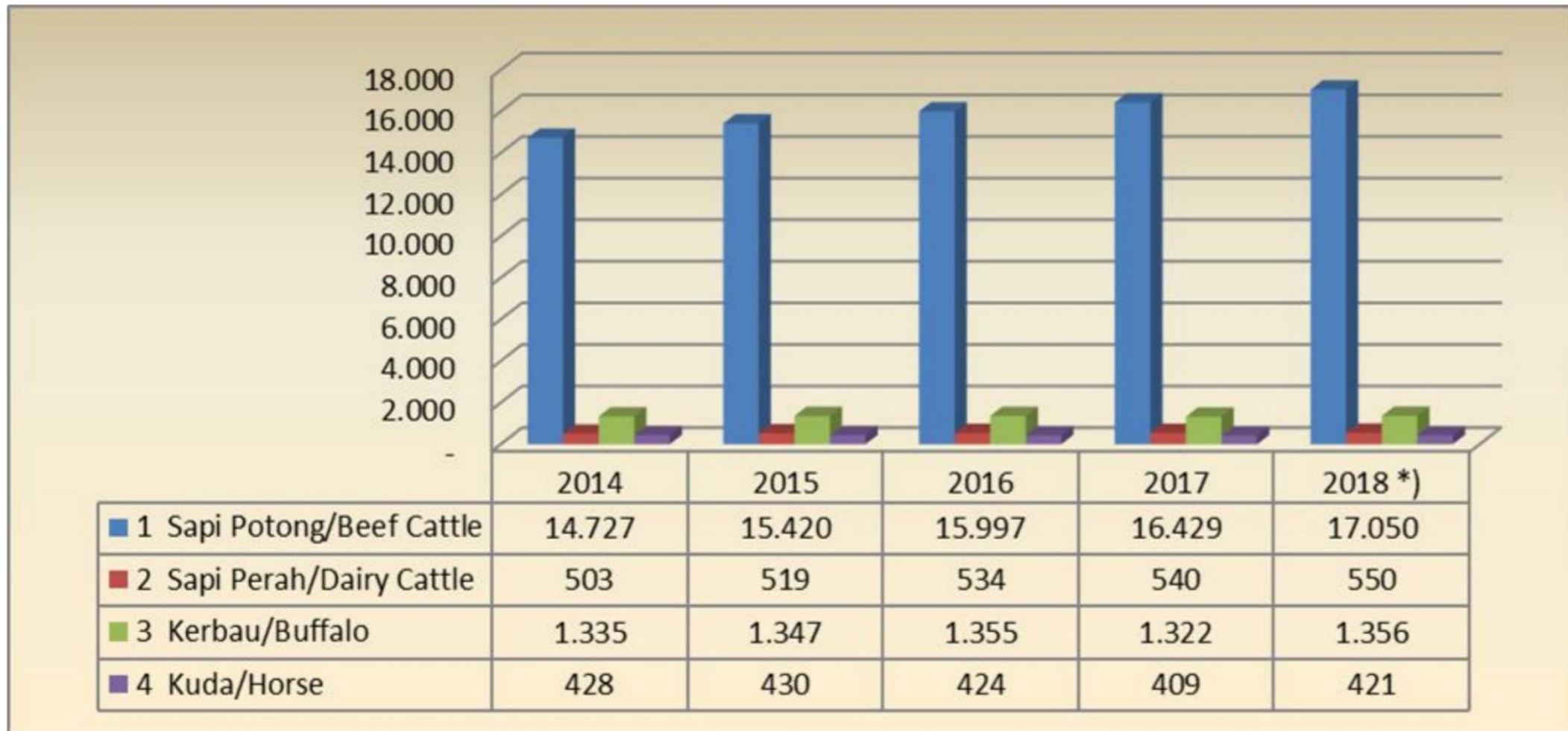The increasing demand for food from livestock products leads to :
- farms are increasing in size
- changes from extensive systems to intensive systems process in livestock production

causes accumulation amount of manure, which can cause serious environmental problems if animal manure is not managed properly.
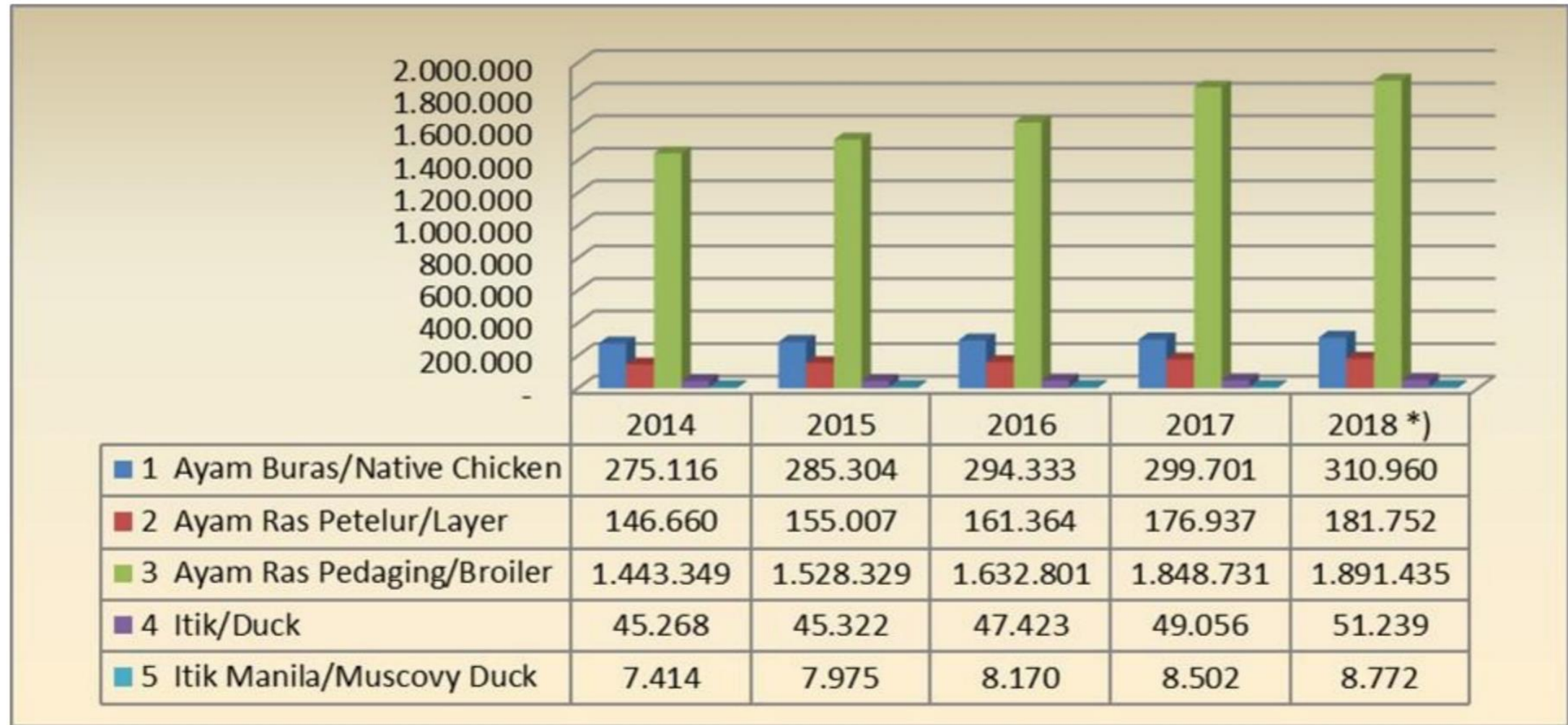
5

Populasi Ternak Besar (000 Ekor)
Population of Large Livestock (000 Head)

	2014	2015	2016	2017	2018 *)
1 Sapi Potong/Beef Cattle	14.727	15.420	15.997	16.429	17.050
2 Sapi Perah/Dairy Cattle	503	519	534	540	550
3 Kerbau/Buffalo	1.335	1.347	1.355	1.322	1.356
4 Kuda/Horse	428	430	424	409	421

Livestock and Animal Health Statistics 2018
(Dirjen PKH 2018)

Grafik / Graph 8.3

Populasi Ternak Unggas (000 Ekor)
Population of Poultries (000 Head)

	2014	2015	2016	2017	2018 *)
1 Ayam Buras/Native Chicken	275.116	285.304	294.333	299.701	310.960
2 Ayam Ras Petelur/Layer	146.660	155.007	161.364	176.937	181.752
3 Ayam Ras Pedaging/Broiler	1.443.349	1.528.329	1.632.801	1.848.731	1.891.435
4 Itik/Duck	45.268	45.322	47.423	49.056	51.239
5 Itik Manila/Muscovy Duck	7.414	7.975	8.170	8.502	8.772

Livestock and Animal Health Statistics 2018
(Dirjen PKH 2018)

Animal waste can be categorized into:
- liquid waste (up to 5% solids),
- slurry/semi-solid (5 - 25% solids),
- solid waste (more than 25% solids) and,
- gas.

Solid, slurry and liquid are very dependent on how to clean the pen and how much water is used to clean the pen.
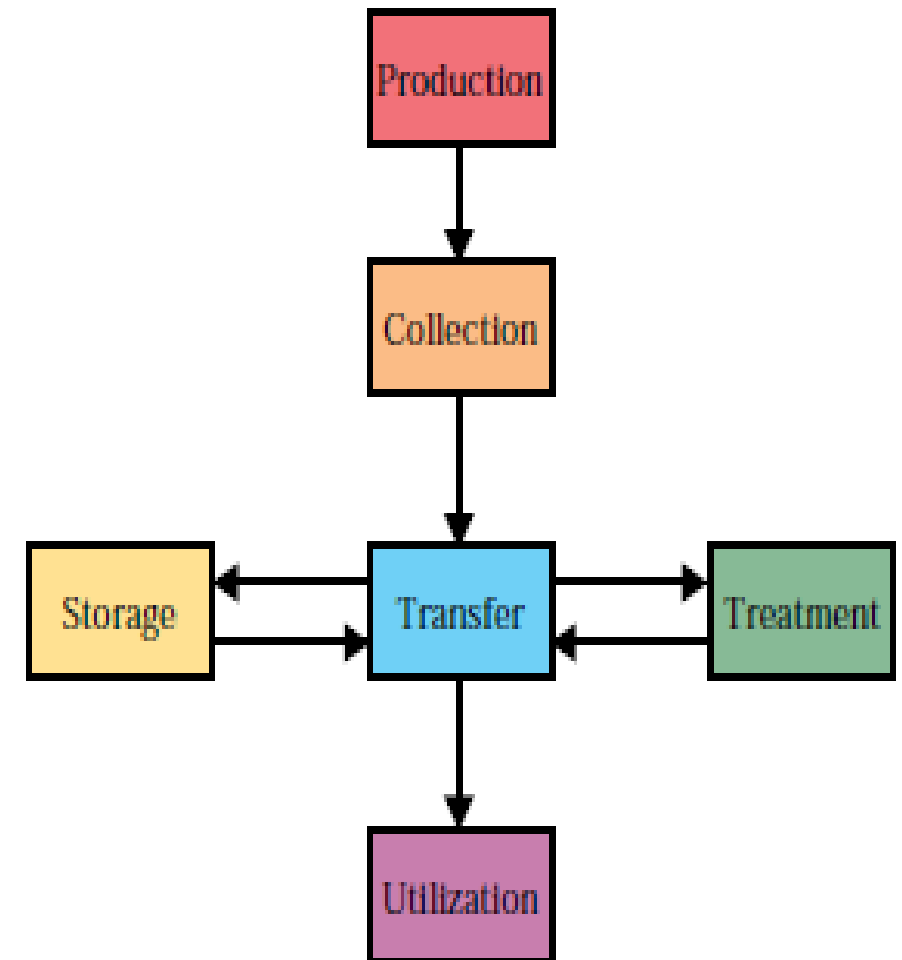
Solid content determines, how animal waste is handled.

The amount and characteristics of livestock waste depends on:
- type of livestock
- diets (digestibility, protein, fiber content)
- number of animals
- waste handling systems (added water , bedding)

Animal waste handling system:
- Production (housing facility)
- Collection and transfer
- Storage/treatment
- Transport
- Utilization

Waste handling systems

- All systems start from production
- All systems end with utilization/disposal
  - land application as fertilizer
  - treated wastewater is discharged into the river or reused to wash the cage
- No system is best

Solid waste handling system:
- mostly for poultry and horse
- Solid waste from cattle (clean the stables by shoveling dirt, after which the crumbs are watered)

Liquid waste handling system:
- mostly for dairy and swine production

Components of liquid system:
. Collection :
- flush (gutter or slotted floor)
- . Scrape
- Transfer:
  - Pump
  - Gravity channel, pipes
- Storage
  - Tanks
  - Lagoon
- Transport
  - Tank wagon
  - Irrigation system

Animal Waste Treatment

- Stabilize waste
- Odor reduction
- Nutrient managemen
- Energy recovery
- Pathogen reduction
- Reduce gaseous emissions

Livestock waste treatment in Indonesia:
Cattle, Dairy, and Swine

Generally in Indonesia, 80% are smallholder farms with less than 20 head of livestock

> varying from 1 to 20 head of cattle therefore the waste management system is very simple

The government has provided a lot of biogas installations for farmers that have livestock under 20 animals.
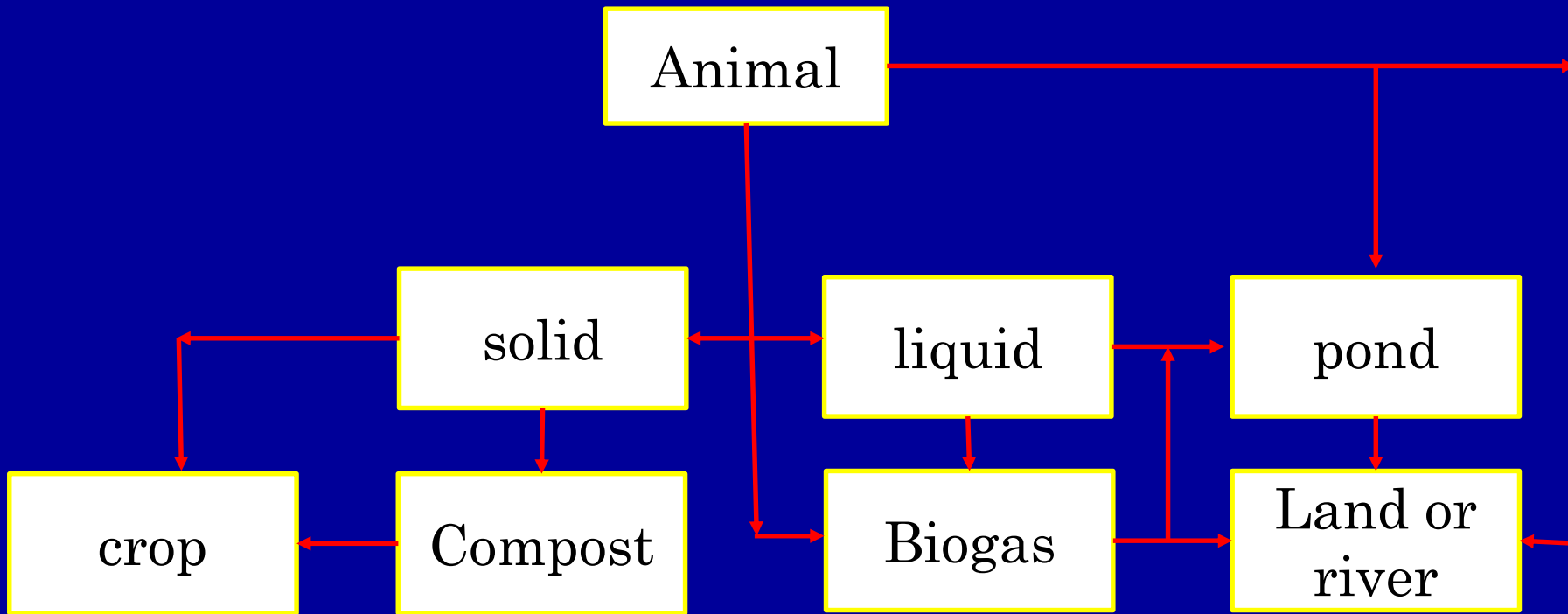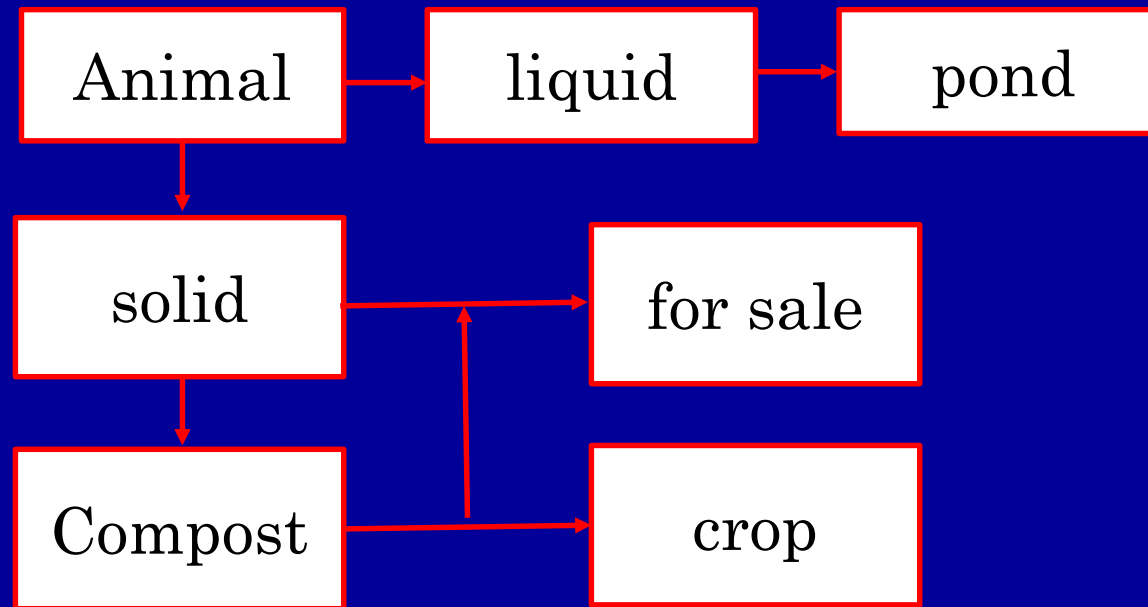
Instalasi
fiber glass
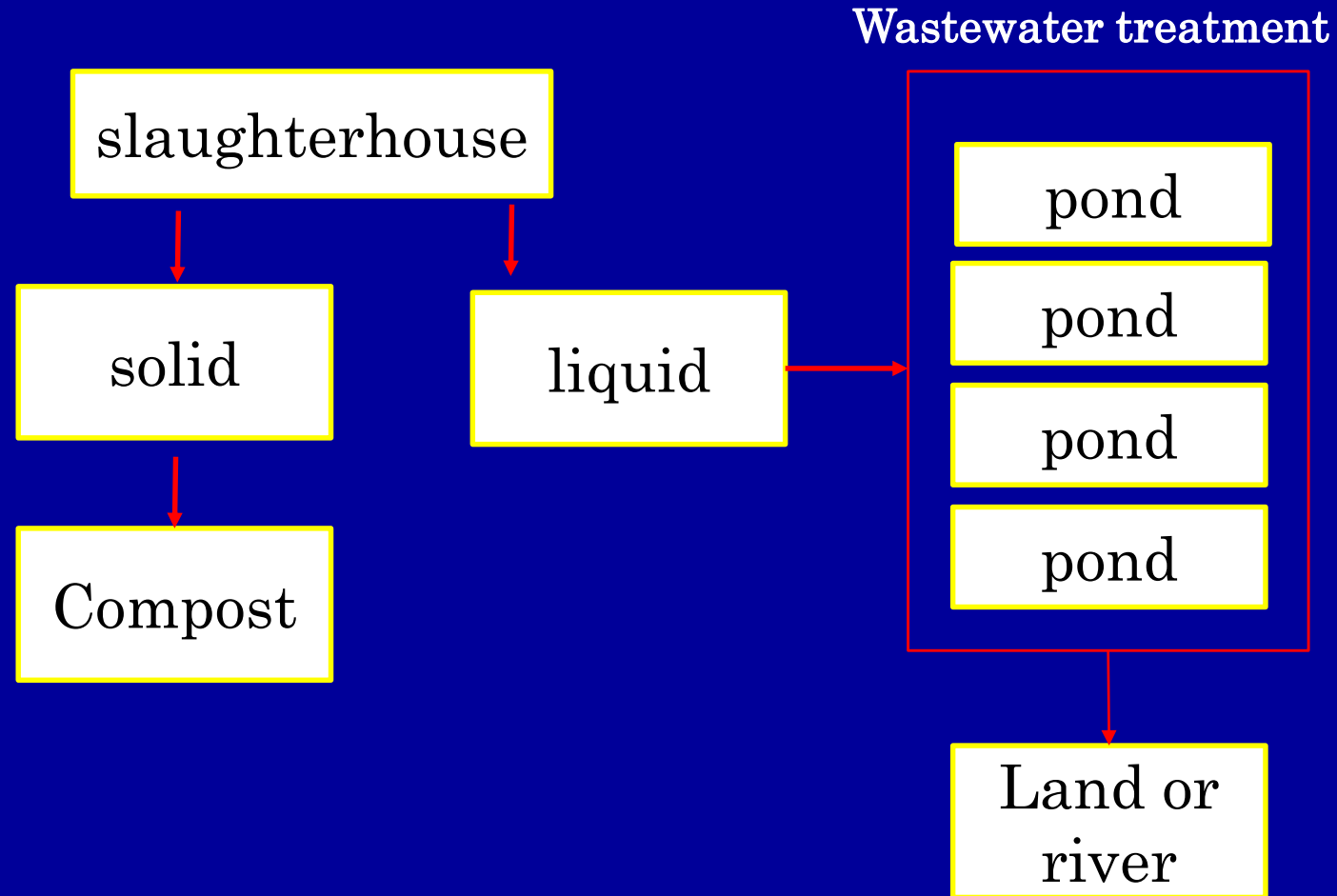4 m³

Instalasi semen

Livestock waste treatment in Indonesia:
Cattle, Dairy, and Swine

Livestock waste treatment in Indonesia: Poultry and Sheep

Livestock waste treatment in Indonesia: Slaughterhouse and processing of livestock products

Wastewater treatment

```
slaughterhouse
      │
      ▼                    ┌─────────────┐
   solid      liquid ────► │    pond     │
      │                    │    pond     │
      ▼                    │    pond     │
   Compost                 │    pond     │
                           └──────┬──────┘
                                  │
                                  ▼
                            Land or
                             river
```

Livestock waste treatment in Indonesia:
Poultry Slaughterhouse