

Efficient Litter Management Mechanism for Poultry Farming in ASEAN

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"Segar Halal Suci"



Poultry production in ASEAN

ASEAN's poultry production has expanded by 56% in the last decade, growing from 5.9 million metric tons (mmt) to 9.2 mmt in 2018. It is expected to reach 12.3 mmt by 2028 [1].

In Malaysia, meat demand has increased from 1.4 mmt in 2010 to 1.8 mmt in 2020 with a growth of 2.4% per annum [2].



What Does This Mean For Poultry Waste?

1

- A rising demand for chicken and eggs requires a solution which can effectively and efficiently manage poultry waste without impacting the environment or enforcing large waste collection costs on poultry farmers.

2

- Improper poultry waste treatment can lead to severe water pollution, animal diseases and the creation of new virus strains, amongst other consequences.

Examples of Improper Poultry Waste Treatment

Water disruption due to contamination caused by major cleaning up at farm to nearby river



Effected tens to hundreds of thousands of water account holders in Malaysia since 2018 [3].

Negri Sembilan duck farm suspected source of Sg Semenyih pollution [NSTTV]



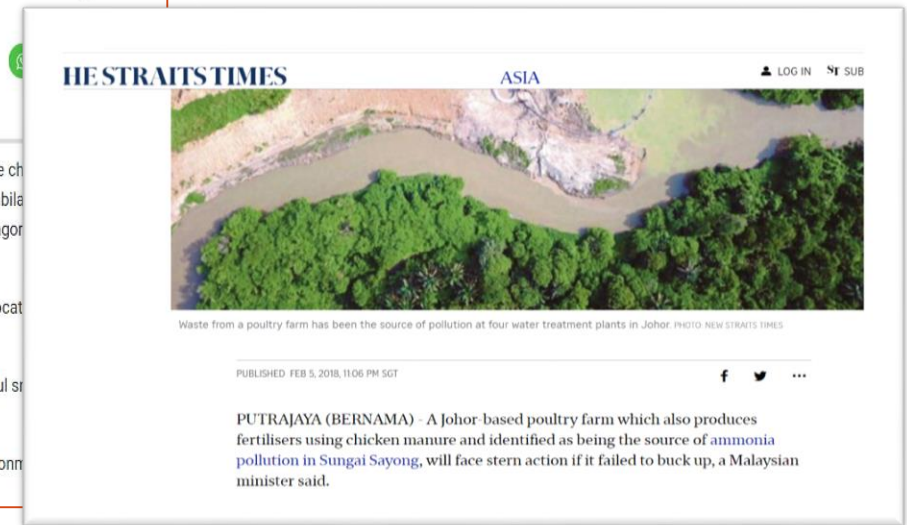
By Nor Ain Mohamed Radhi - October 5, 2020 @ 12:47pm

Selangor Environment, Green Technology, Science, and Consumer Affairs Committee chairperson Sian said a big-scale cleaning operation at the farm near Sungai Pajam in Negri Sembilan produced pollutants which entered a Sungai Semenyih tributary and forced Air Selangor to shut down two of water treatment plants in Sungai Semenyih and Bukit Tampoi.

This caused water disruptions to more than 300,000 water account holders in 273 localities in Hulu Langat, Kuala Langat, and Sepang.

"Investigations by Lembaga Urus Air Selangor (Luas) at Sungai Pajam detected a foul smell from a carcass," he told a press conference today.

Present were Luas director Datuk Hashim Osman and the state Department of Environment and Natural Resources Director AZIAH Jaafar.

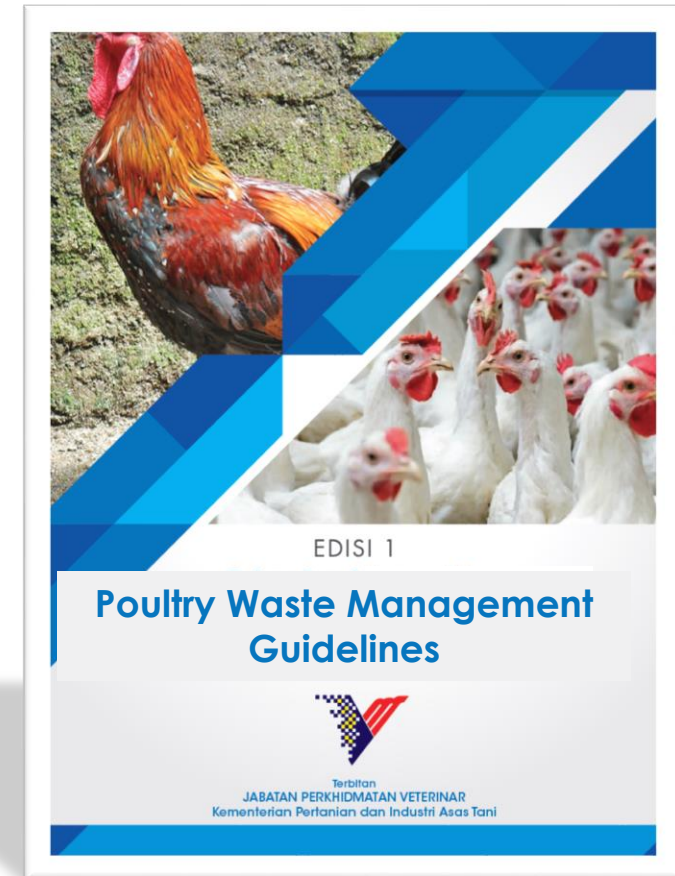


- ❖ Bird waste is high in Ammonia that can be chemically converted into dangerous nitrates [4].
- ❖ Excessive nitrates in drinking water will caused serious threats to public health [5].

Poultry Waste Management Guidelines

Existing guidelines by Department of Veterinary Services do not focus on automatic monitoring and alert system.

The guidelines only focus on farm location, farm design, floor design, chicken waste control, chicken carcasses disposal, solid waste and water waste treatment technologies such as utilization of microbe, composting methods and dealing with flies and odors.



What is Poultry Waste (Litter)?

1

Poultry litter is organic waste produced from chickens and ducks like manure, spilled feed, feathers, and bedding materials.

2

It is enriched with nitrogen, phosphorus, and potassium, though the overall composition will depend on the type of poultry, litter used, and collection and storage of the litter.

What are Poultry Litter Functions?

- 1** To absorb moisture.
- 2** To dilute excreta, thus minimizing bird to manure contact.
- 3** To provide an insulation from cold floor temperatures
- 4** To allow birds to express normal behavior such as scratching

What are the Options Available?



Hardwood Shavings

May contain tannins which cause toxicity concerns



Pine Sawdust

Excellent absorptive qualities



Sawdust

Often high in moisture & prone to mold growth



Chopped Straw

Low absorption if length $>2\text{cm}$ & has a tendency to cake



Rice Hulls

Good absorption & inexpensive option

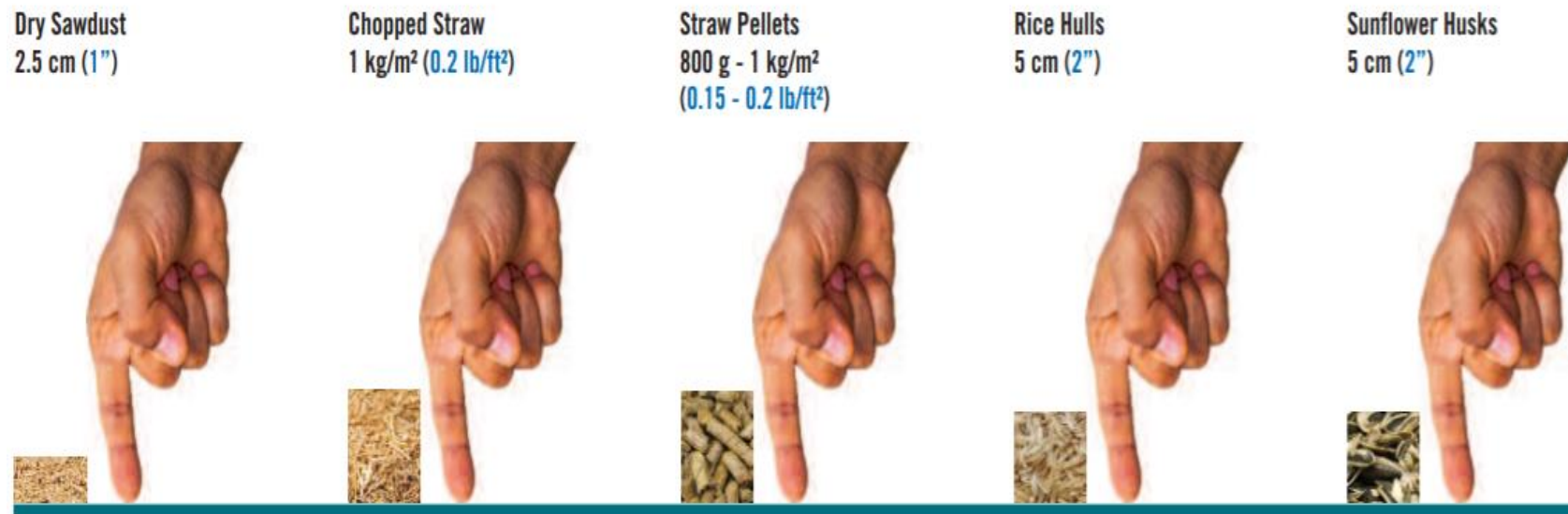


Peanut Hulls

Tend to cake and crust but are manageable

Poultry Litter Depth Measurement Guideline

- Recommendations litter depth measurement for farm with concrete floor [2].



- For optimal bird welfare and health, litter should cover the entire floor, dry and friable, where the moisture content should be **less than 25% in less than 30% of bird space.**

How Poultry Litter in Farm is Evaluated?

1.

A simple litter squeeze test

2.

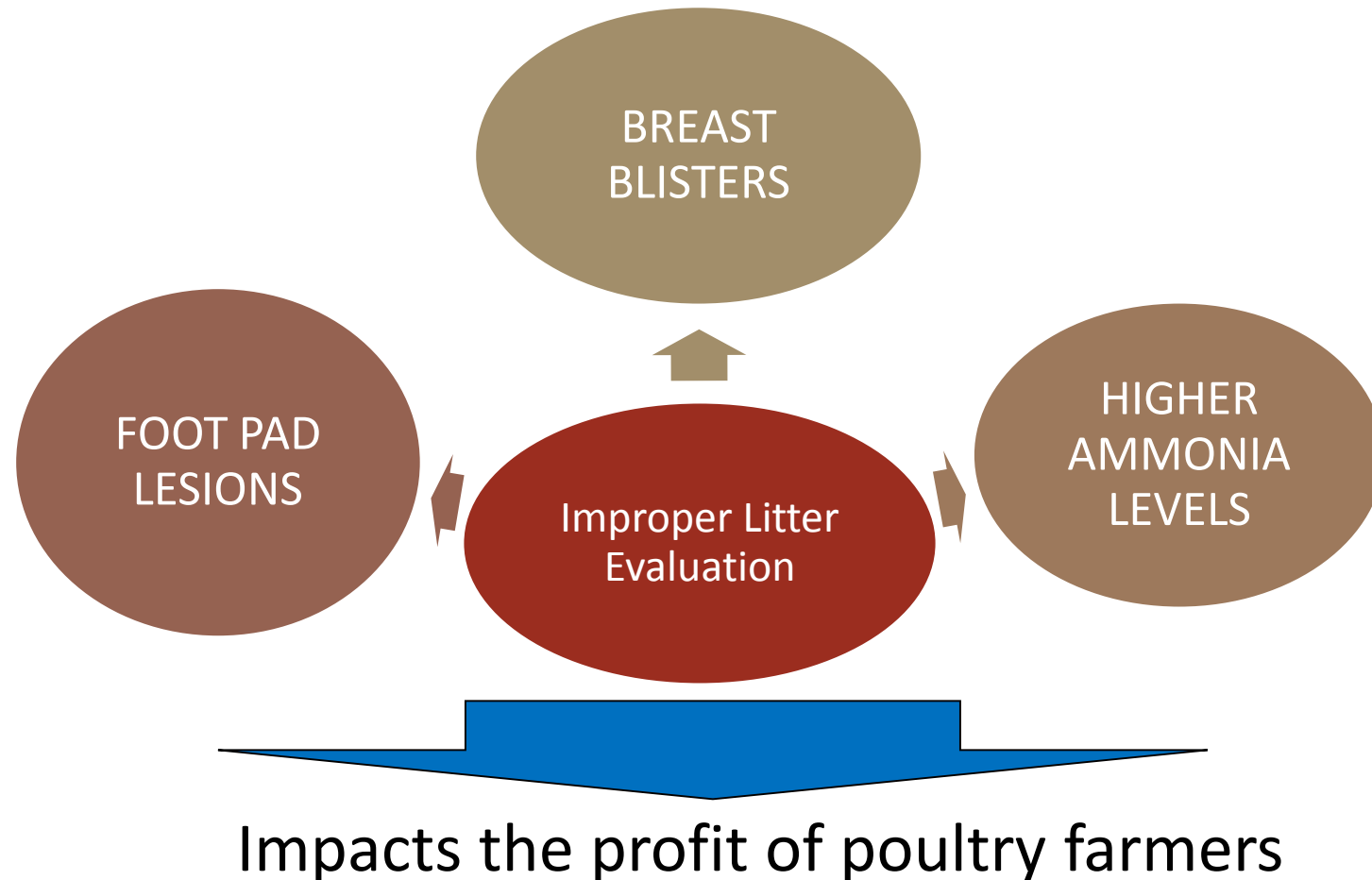
Decision is solely based on observation, where litter should be loosely compacted when squeezed in hand.

3.

Expert knowledge is needed and the decision might varies from different individuals.



Why Poultry Litter Should Be Evaluated?



The Aim and Objectives..

Aim

- To develop an efficient litter management mechanism for poultry farming in ASEAN utilizing Internet of Things (IoT) and Artificial Intelligent (AI) approaches.

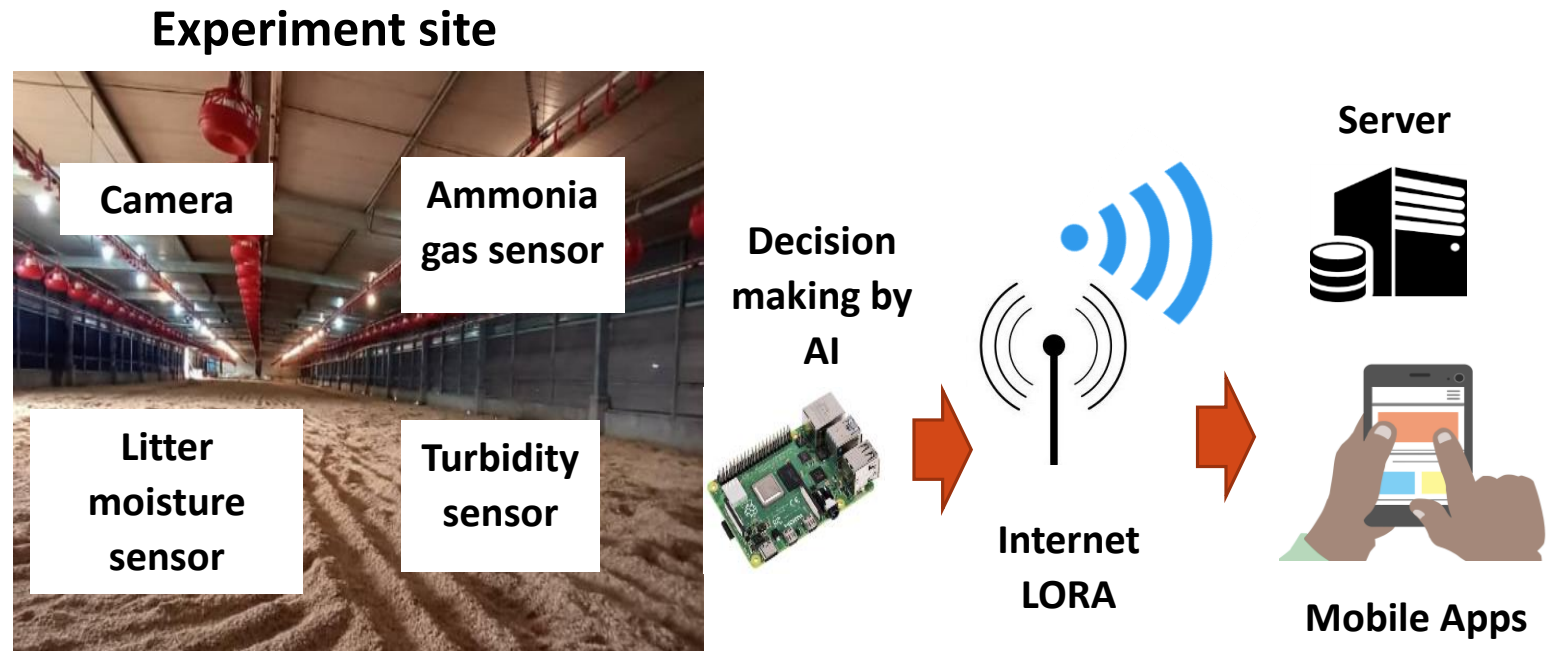
Objectives

- To design an efficient litter evaluation and management mechanism for poultry farming in ASEAN by using IoT and AI approaches.
- To develop the designed system on the selected poultry farm.
- To evaluate the efficiency of the developed system in evaluating and managing litter remotely.

Project Overview

- Deploy **IoT-based solution for efficient litter management mechanism** with the poultry farm communities.

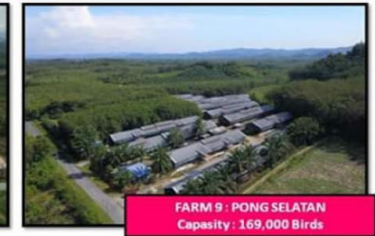
- Technological innovation:** to deploy, analyse and disseminate information using an IoT and AI based system.
- Social innovation:** to conduct social programs for poultry farm communities such as educational events related to the litter management.



Project Sites

Bismi Empire
Sdn. Bhd.

- The company has 17 farms with livestock capacity exceeding 1.8 million chickens.
- Location: Kedah, Malaysia

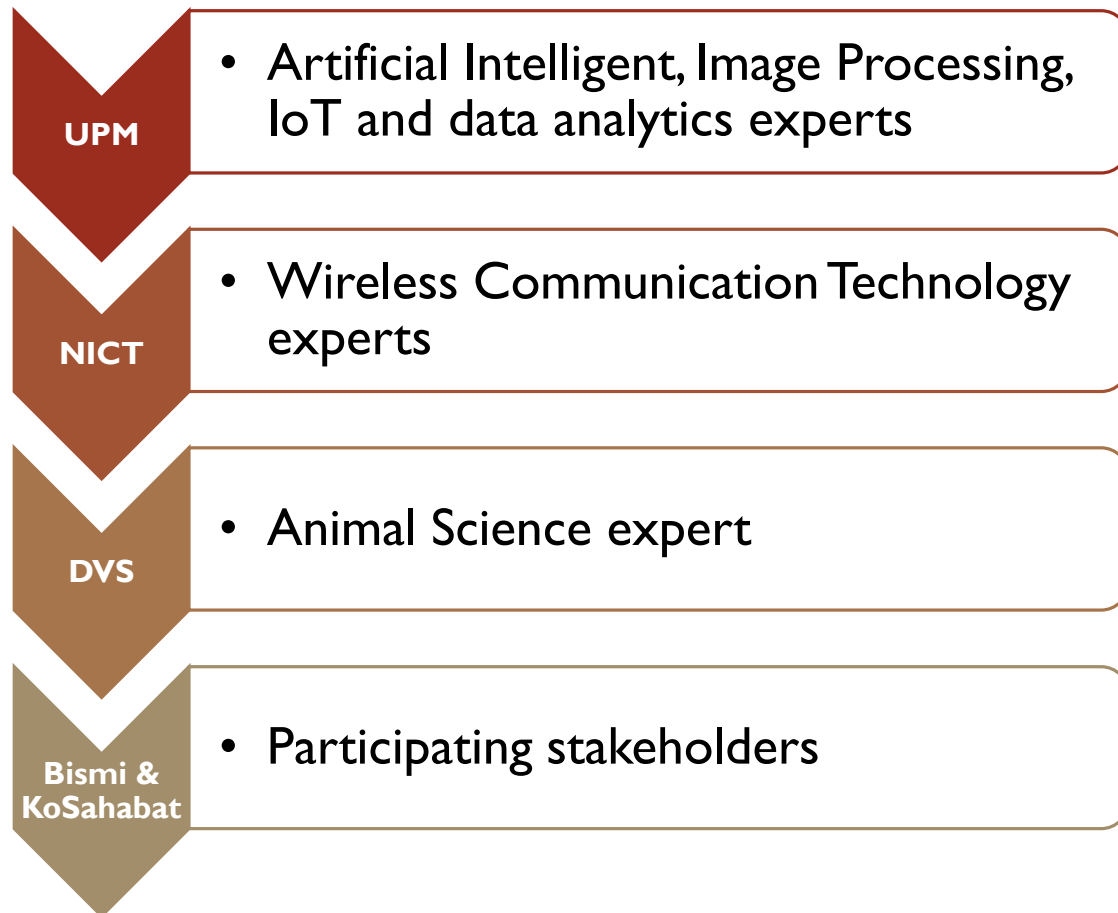


Koperasi
Permodalan
Sahabat
Terengganu Bhd.

- The company has 4 farms with livestock capacity exceeding 120,000 chickens.
- Location: Terengganu, Malaysia



Plans for Connected Project



Conclusion

Efficient litter management mechanism for poultry farming in ASEAN will benefit the environment, industry players and local communities. This can be realized through an IoT and AI based system that will trigger technology and social innovations.



References

- [1] Livestock Industry Expansion, can be accessed at <http://www.fama.gov.my>.
- [2] COBB Broiler Management Guide, <https://cobbstorage.blob.core.windows.net/guides/5fc96620-0aba-11e9-9c88-c51e407c53ab>
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- [4] Randall, DJ. "Ammonia toxicity to fish." *Marine Pollution Bulletin*, 45(1-12), 17-23 (September 2002).
- [5] Rahman, Shafiqur et al. "Manure Spills: What You Need to Know and Environmental Consequences." *North Dakota State University Extension Service*, 2011.



Thank you!

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