



TECHNOLOGICAL INNOVATION TO SUPPORT THE DEVELOPMENT INDONESIAN DAIRY SECTOR

**Indodairy Inception Workshop
Bogor, 17 November 2016**



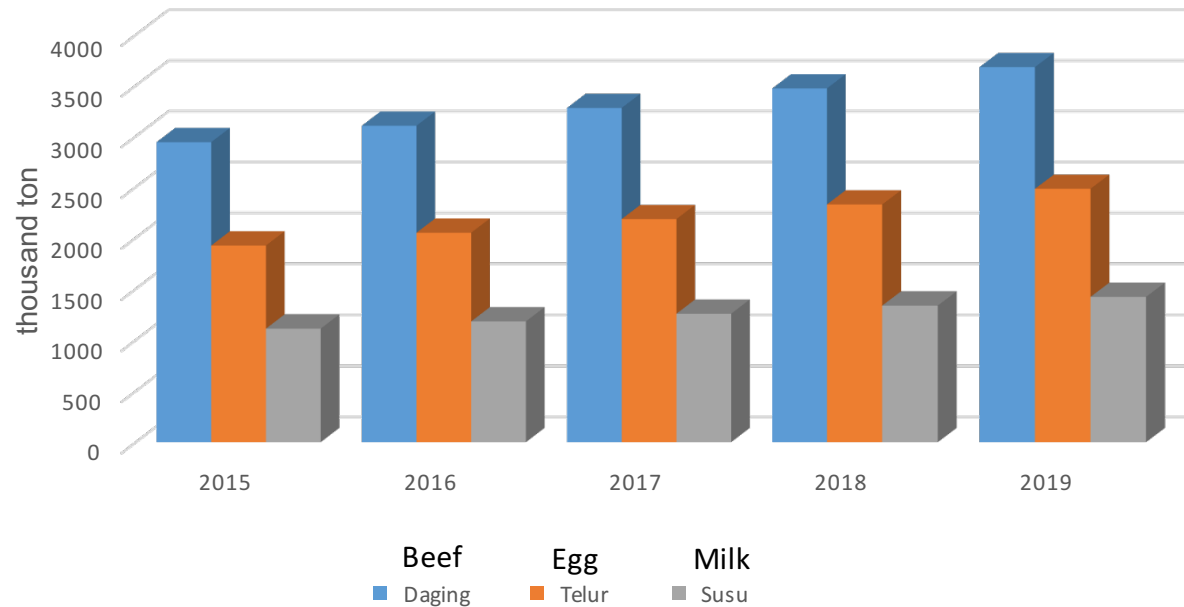
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MILK PRODUCTION IN INDONESIA

Production Target of Beef, Egg and Milk 2015 - 2019



1. Milk production: 1.01 million ton
2. National demand: 2,84 million ton
3. **Imported milk: 1,84 million ton (64.4%)**
4. Milk consumption: 11.1 kg/capita/year (6th of 7 ASEAN countries)



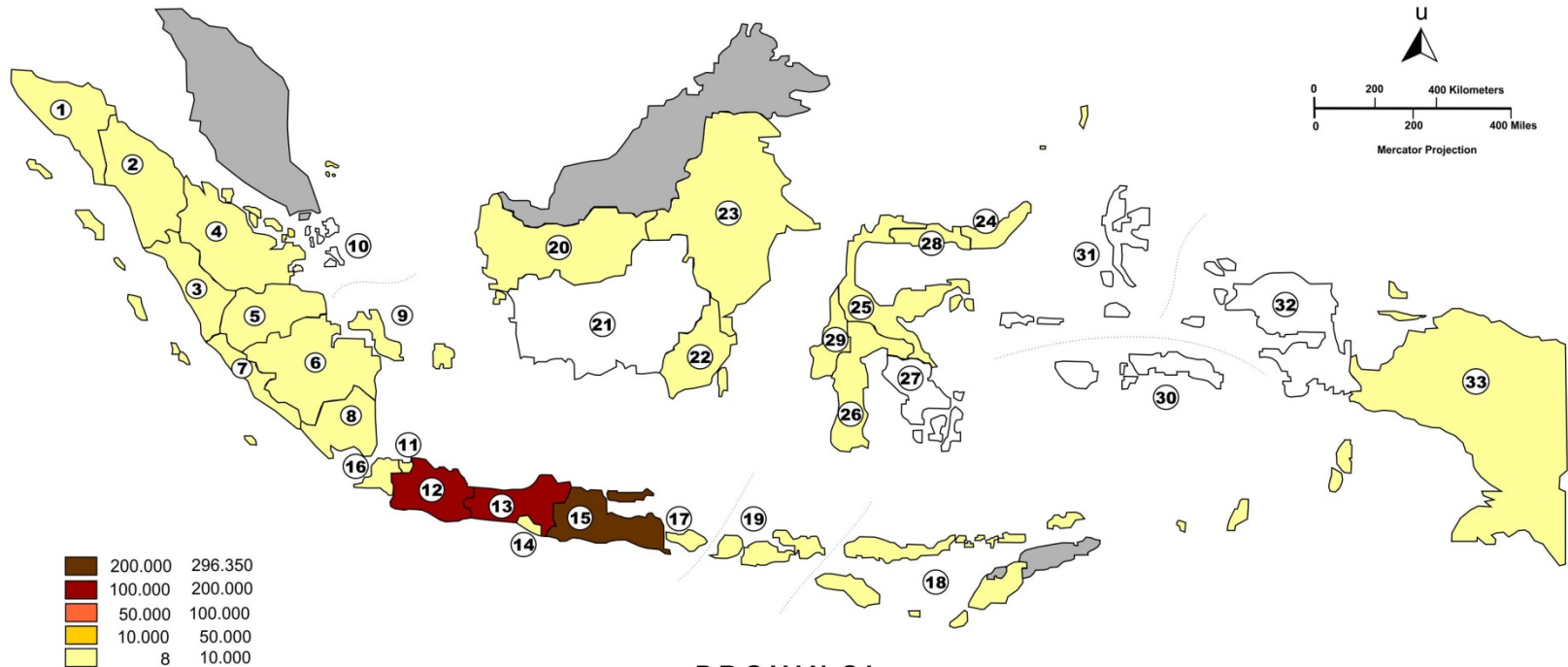
Projected Milk Demand and Production in Indonesiaia (Coordinating Ministry for Economic Affairs, 2014)

Details	2011	2015 ⁴⁾	2020 ⁴⁾	2025 ⁴⁾
Population (000)	244.776	255.881	274.944	295.428
Consumption (L/capita/year)	11	15	20	30
Total consumption (000 ton)	2.693	3.838	5.499	8.863
Dairy cows population (000 head)				
FH Cow ¹⁾	597 ¹⁾	782	1.097	1.766
non FH ²⁾ cow	14.400 ¹⁾	21.083	33.954	54.683
Buffalo ³⁾	1.305 ¹⁾	2.101	3.383	5.450
Goat ³⁾	18.000	20.000	25.000	35.000
Dairy cows productivity(L/lactation)				
FH cow	3.000	3.500	4.500	6.000
non FH cow	-	750	900	1.200
Murrah buffalo dairy	1.800	2.100	2.700	3.000
Dairy goats	75	120	150	180
Daily total production⁻¹ (000 kg)	4.000	5.200	12.325	28.871

- 1) Census 2011; 2) Betina Ongole 14%; 3) 30% female; 4) Projecton
2) Source: Coordinating Ministry for Economic Affairs, 2014



DISTRIBUTION OF DAIRY CATTLE ANIMAL POPULATION



PROVINSI

1. Aceh	31	8. Lampung	201	15. East Java	296.350	22. South Kalimantan	110	29. West Sulawesi	13
2. North Sumatera	894	9. Bangka Belitung	119	16. Banten	19	23. East Kalimantan	32	30. Maluku	0
3. West Sumatera	484	10. Riau Kepulauan	0	17. Bali	139	24. North Sulawesi	22	31. North Maluku	0
4. Riau	172	11. DKI Jakarta	2.728	18. NTT	18	25. Central Sulawesi	8	32. West Papua	0
5. Jambi	81	12. West Java	139.970	19. NTB	32	26. South Sulawesi	1.690	33. Papua	11
6. South Sumatera	154	13. Central Java	149.931	20. West Kalimantan	227	27. S.E. Sulawesi	0		
7. Bengkulu	247	14. DI Yogyakarta	3.522	21. Central Kalimantan	0	28. Gorontalo	8		



Minister of Agriculture Policy (Bogor, 15 Nov 2016)

- Milk pricing policies that benefit farmers (Permentan ... / 2016)
- Pregnancy dairy cows 500 thousand head / year, in line with SIWAB
- The provision of land for planting HPT (cooperation with Perhutani)
- Replacement program for dairy cattle rearing



I. REPRODUCTION TECHNOLOGY

OBJECTIVE :

improving reproductive efficiency of livestock that are expected to improve pregnancy rate and increase in births

1. Chilled semen :

- Preserving semen at 5 °C
- Assist the preparation of semen in the region who have difficulty Liquid Nitrogen
- There are superior males and from 10 disease-free
- The shelf life of 7 days
- The success of pregnancy 70%
- The success of the birth of 65%



2. Sperm Separation X & Y :

- Prevent freemaartin cases
- Sperm separation is done by sephadex column
- Getting calf with gender expected in the dairy cow births a female child (heifer) is expected
- The birth of a female child be 60-77%



3. Decreasing sperm concentration in Straw Frozen Semen

Impairment testing Sperm concentration (standard 25 million)



Decrease I:
Kons Sperm 20 million

Decrease II :
Kons Sperm 15 million

2 superior male with protein markers:
Genotipe AB
Genotipe BB



1. Can decrease up to 15 million
2. Birth success rate 65%



4. Nano Hormon

Technology

Homogenize estrus, IB unison



Preparat Hormon



Injection CIDR Spons



Limited:

- Quickly degraded
- Livestock stress

Nano Technology

- Particle dispersion/solid size 10-1000 nm
- Potential components hormone carriers (**hCG, PGF2 α**)
 - Hormon stability
 - protection of rapid degradation and transport of hormones
 - Release control

Spray Applicaton

- Non-invasive
- Technology breakthrough



Simultaneous
y lust, IB, and
pregnant



5. Microencapsulation of Spermatozoa

- ❑ Encapsulation of cells → strategy to entrap living cells in a semi-permeable membrane
- ❑ Microencapsulation is defined from the size of the resulting capsules, where capsule with a size of 0,3-1,5 mm
- ❑ Microencapsulation research spermatozoa is still very limited and not optimal
- ❑ Mikroencapsulation spermatozoa technology:
 1. Enhancing the vitality and stability of spermatozoa membrane on a longer time. Prevent reflux spermatozoa current IBPagositocyt prevent action in the female reproductive tract
- ❑ Important to overcome the problems associated with OPTIMAL TIME MARRIED and VARIATION OVULATORY



II. Veterinary Technology

1. INFECTIOUS BOVINE RINOTRACHEITIS (IBR)

- Caused by *Bovine herpesvirus-1 (BHV-1)*
- Di Jawa Tengah dan Central Java and West Java prevalence of IBR is more pronounced than with other reproductive diseases
- Innovation:
 - IBR vaccines to prevent diseases
 - ELISA technology development for early diagnosis and monitoring of post-vaccination IBR



2. Mastitis

- 2 types of mastitis: clinical and subclinical
- Germs are resistant to tetracycline (37.46%), ampicillin (25%) and gentamicin (21.87%)
- Disadvantages: lowered milk production, increase the cost of care, treatment, increasing the milk is wasted, increasing replacement cows, calves die / grow slowly.



- **Innovation:**
 - **Isolation and identification of germs that cause mastitis**
 - **Introductions herbal medicine (betel leaf) as an alternative to antibiotics**



III. Feeding Technology

1. BIOPLUS,

- probiotics, improve the efficiency of use of forages dosage: 350 g / head, 1x 8-month pregnant mother, early dry on all livestock.
- Bioplus fiber for cattle weaning, growth, male and parent
- Biopus calf to calf that has not been weaned, accelerate the improvement of digestive system rumen

2. Calcium grease (Kalsium Lemak-KALEM)

- To improve milk synthesis and production
- 3. Mineral Zn+Caroten)
- Prevent deficiency mineral Zn in the body



IV. Post-harvest technology

- Suppression of bacterial contaminants milk through hygienic milking techniques
- Buffalo milk processing technology improvements in West Sumatera (dadiah)
- Dried starter manufacturing technology for yoghurt and dadiah



4. Technology of quick calculation of milk bacteria
5. Research the production of fresh white cheese (fresh white cheese), low fat content of vegetable fat enriched probiotic *L. casei*, has the potential to prevent heart disease
6. Research dried fermented milk probiotic (*L. casei* and *Bifidobacterium longum*), containing probiotic bile salt resistant and low pH gastrointestinal tract, are rich in calcium and phosphorus



7. MILK PROCESSING

1. Fermented Milk (preventing diarrhea, gastroenteritis)
 - Lactic acid *L.bulgaricus* + *S. thermophilus*: yoghurt
 - kefir grains *Streptococcus*, *Lactobacilli*: kefir
 - c. rennet / animal enzymes: cheese. plant enzymes: Dried. D. inside bamboo: Curds
2. Milk pasteurization and sterilization
 - Pasteurized: LTLT, HTST, UHT
 - sterilization: UHT 137-1400 C 2-5 seconds
3. Butter: Churning cream
4. Milk caramel: caramelize the sugar + milk
5. Ice cream: a mixture of various materials
6. Milk tofu: milk which is not fresh



CLOSING

- IAARD has resulted in food technology, reproduction, breeding, disease diagnostics and are ready to be applied
- Application of various technologies that will be able to improve the efficiency of milk production by up to 25% (decrease in feed costs, increasing productivity, accelerating time mating)
- Application technology joint dairy cattle farmers will increase milk production, improve the marketability and income of farmers



Thank You

