

# Outbreak of Rabies in Bali: Epidemiological Aspects



Anak **Agung** Gde **Putra**<sup>\*</sup>, Ketut Gunata<sup>\*\*</sup> and Helen Scott-Orr<sup>\*\*\*</sup>

Disease Investigation Center Denpasar, Bali<sup>\*</sup>

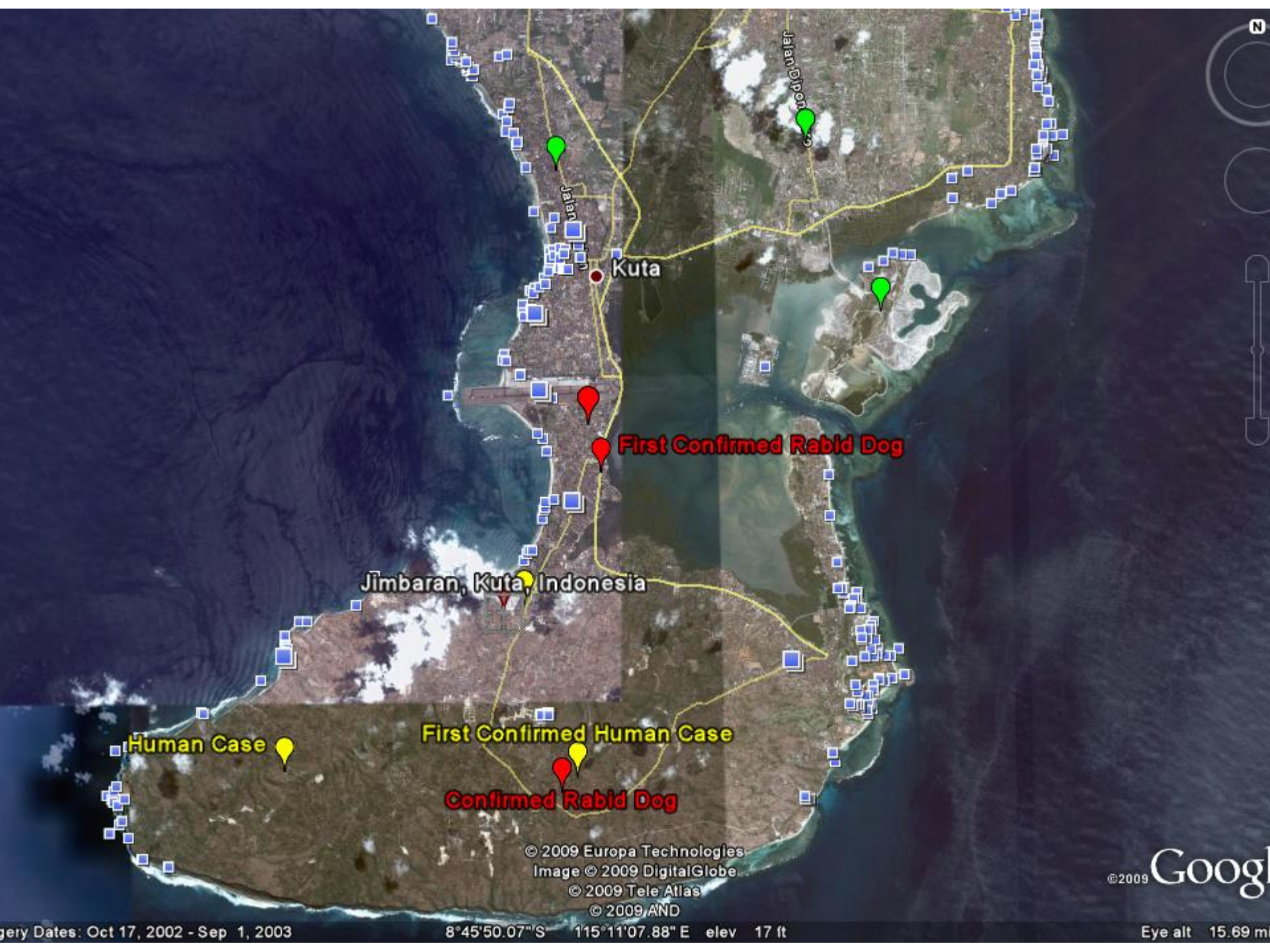
Badung District of Livestock Services, Bali<sup>\*\*</sup>

NSW Department of Primary Industries, Orange / ACIAR Project Leader<sup>\*\*\*</sup>

Presented at ACVSc-Epidemiology Chapter-Scientific Meeting, 2-4 July 2009

# Infected Area





**First Confirmed Rabid Dog**

Jimbaran, Kuta, Indonesia

**First Confirmed Human Case**

**Confirmed Rabid Dog**

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Imagery Dates: Oct 17, 2002 - Sep 1, 2003

8°45'50.07"S 115°11'07.88" E elev 17 ft

Eye alt 15.69 m



Tuban

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8°44'54.96" S 115°10'03.82" E elev 14 ft

Eye alt 12278 ft

# Bali Rabies Emergency Action Program

Legislation

Socio-Cultural Approach

Technical approach

Village

- Early detection
- Early report
- Early effective decision-making and response action
- Recovery
- Review

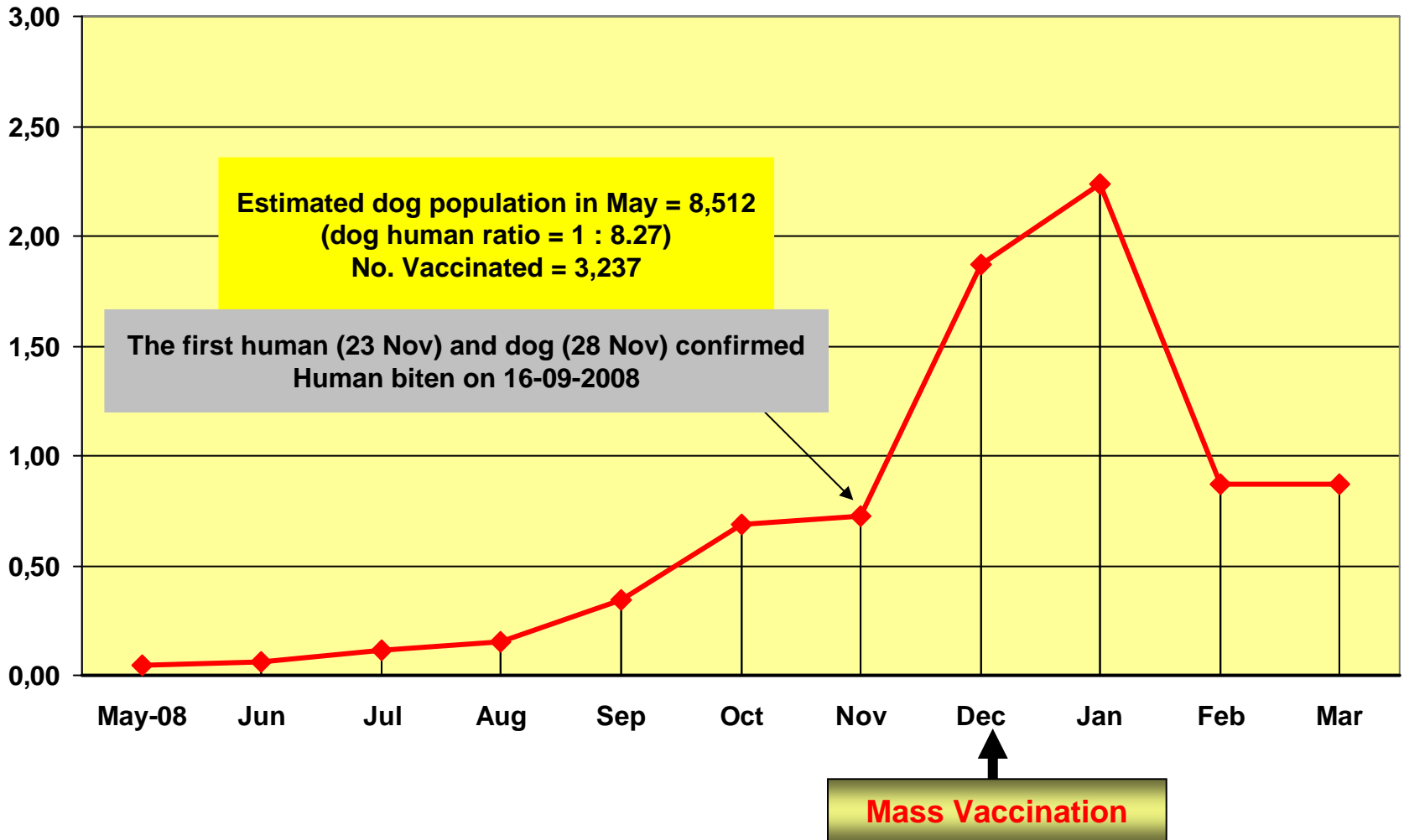
Mass Action:

- Control movement
- Targeted Vaccination
- Outbreak investigation
- Surveillance - Tracing
- Post vaccine monitoring
- Selective elimination
- Protect Monkey colonies
- Strengthening Laboratory capacity

Toward rabies freedom

Public Awareness (Communication - Information - Education)

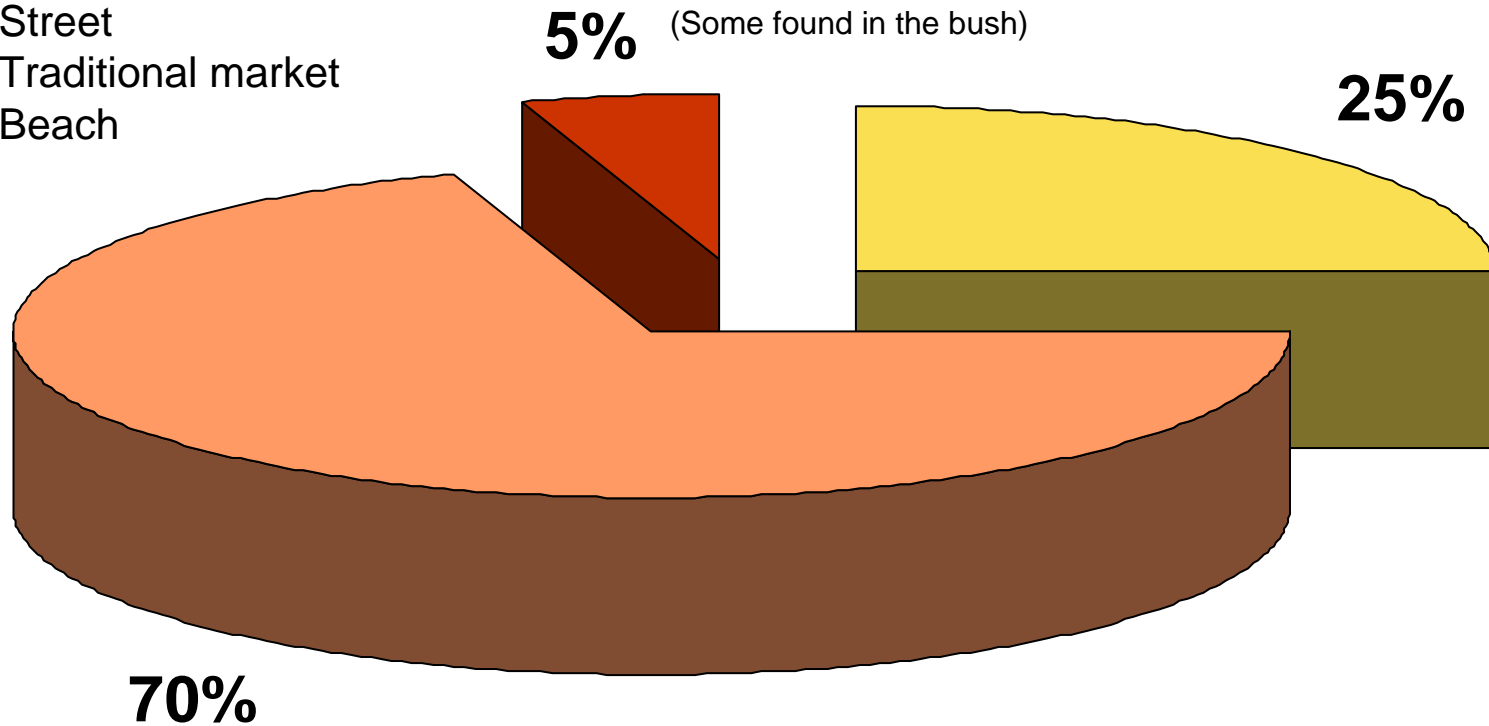
# Monthly Attack Rate (%) of Rabies in Bukit Peninsula, Bali



# Bali Local Dog

Found on the:

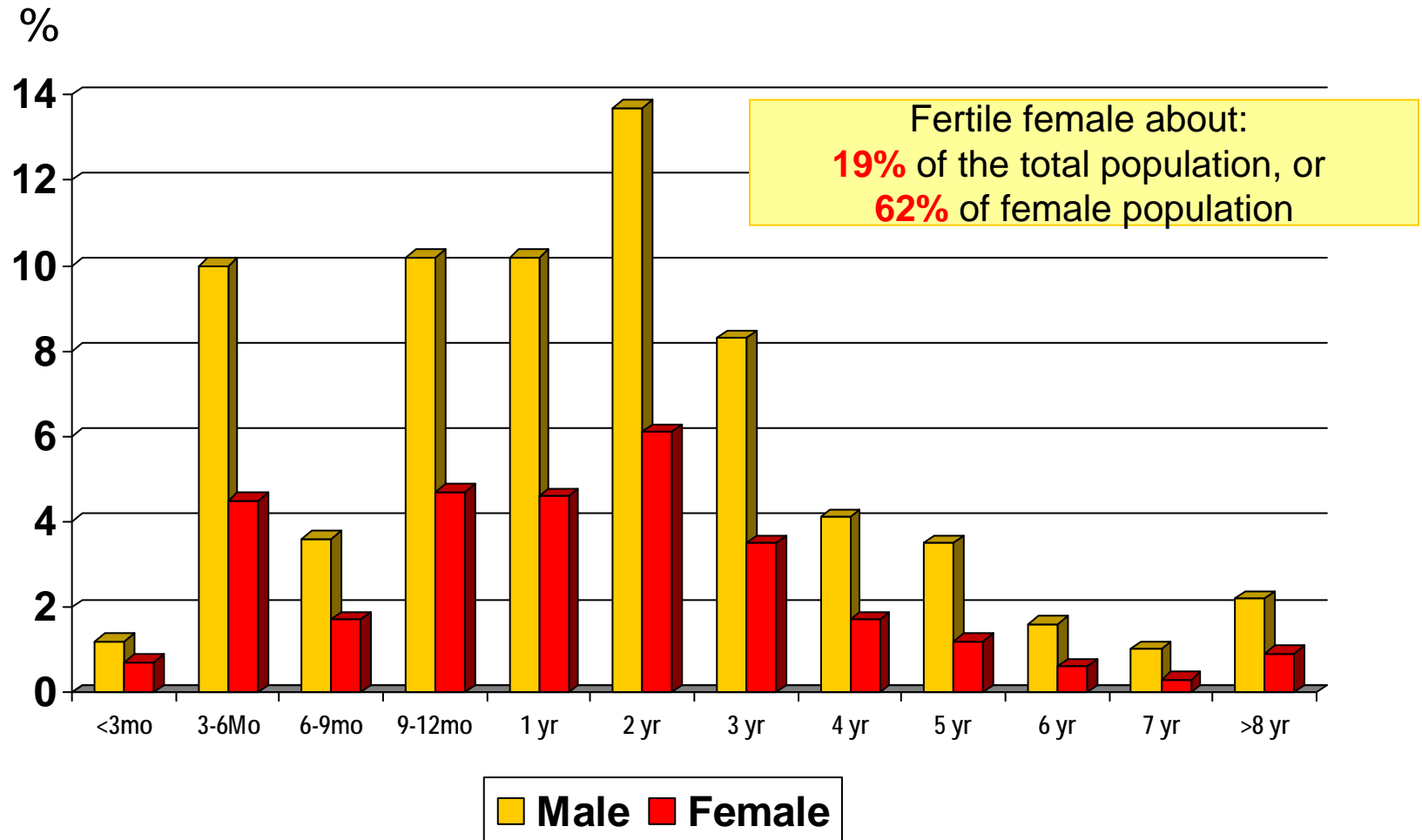
- Street
- Traditional market
- Beach



■ Owned: Home dogs ■ Owned: Stray dogs ■ Unowned dogs

# Age Structure of Bali Local Dog

## Based on observation of 20,325 dogs



# Dog Owner Attitude

- Very rarely move their dog, except:
  - Puppy
  - High breed dog
  - Dog for ceremony (“bang bungkem”)
- Discarded unwanted puppies:
  - Generally female
  - Too many



**Unowned Dog**

# Bali Local Dog

- Role/Function or Advantages:
  - ✓ Watch dog
  - ✓ Companion/hoby/pet animal
  - ✓ Garbage cleaner
  - ✓ Hunter (in the past)
  - ✓ Believe as a “magic alarm”
- Disadvantages:
  - Car/motor accident
  - Noise
  - Spread zoonotic disease (rabies)



# Dog Biology in Bali

- Breeding Season:
  - Major in March
  - Minor in September
- Home range
  - For stray dog: around the village, 1-2 km
- Character:
  - Dominant male in each village
  - Female are very agresive when they having puppies
  - Not easy to handle

# Dog Population

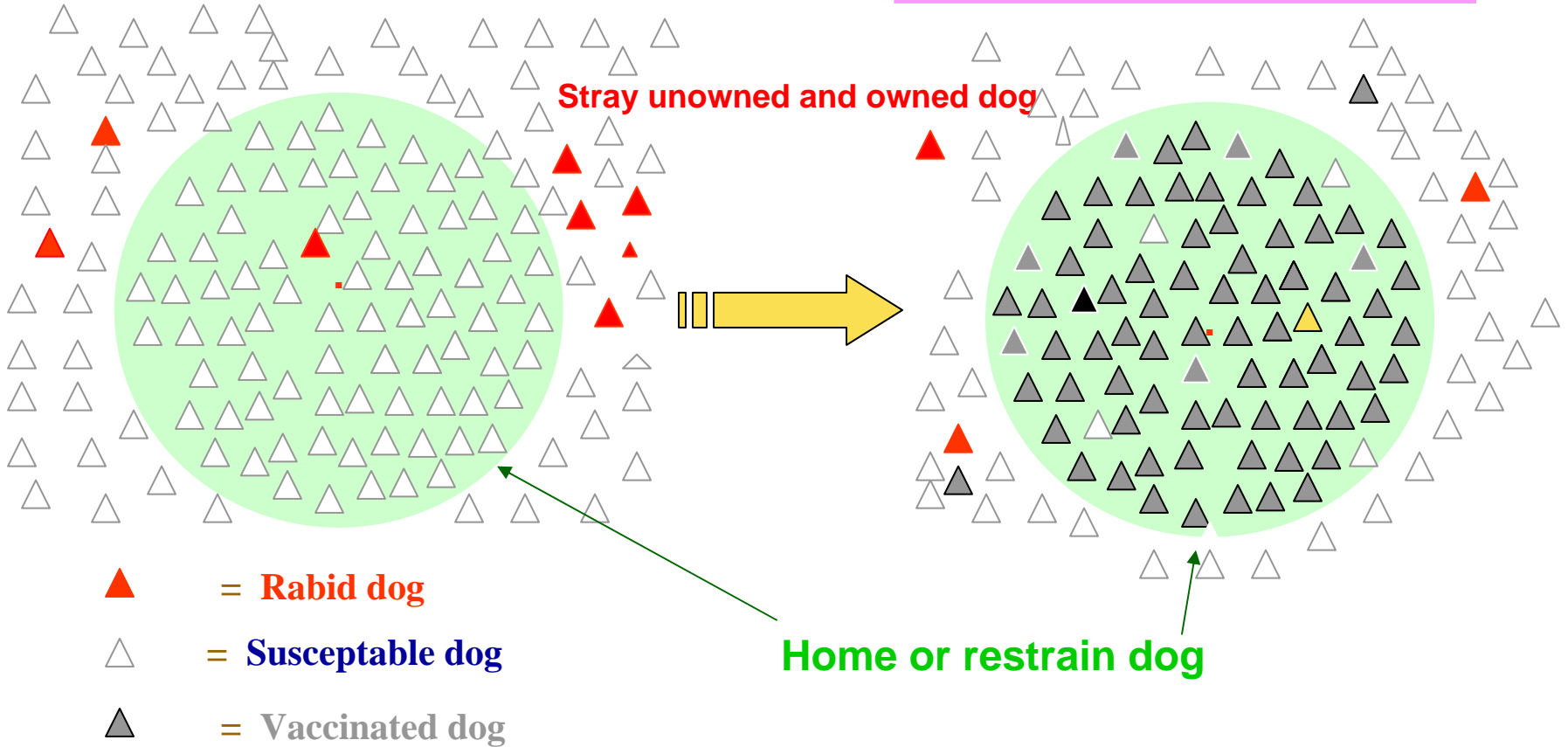
Source of Information	Area of concern	Dog Human Ratio	Population estimate
WHO, 1984	Asia	1 : 16	220,000
Dr. Teken Temadja, DGLS, 1984	Bali	1 : 4	875,000
Dr. Sofyan Sudardjat, DGLS, 1992	Indonesia	1 : 25	140,000
Yudistira Foundation, Bali	Bali	1 : 6.5	540,000
Disnak Badung, February 2009	Badung	1 : 8.27	<b>425,000</b>

Bali human population: 3.5 million

# Current Situation

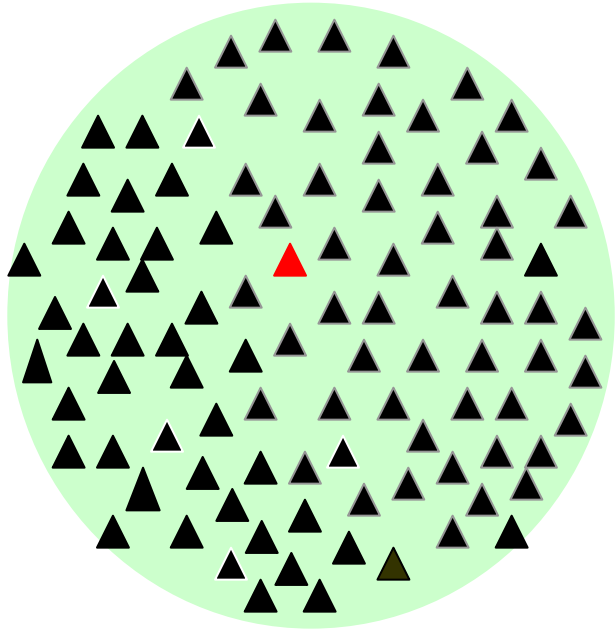
**Before vaccination**

**After vaccination**

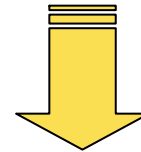
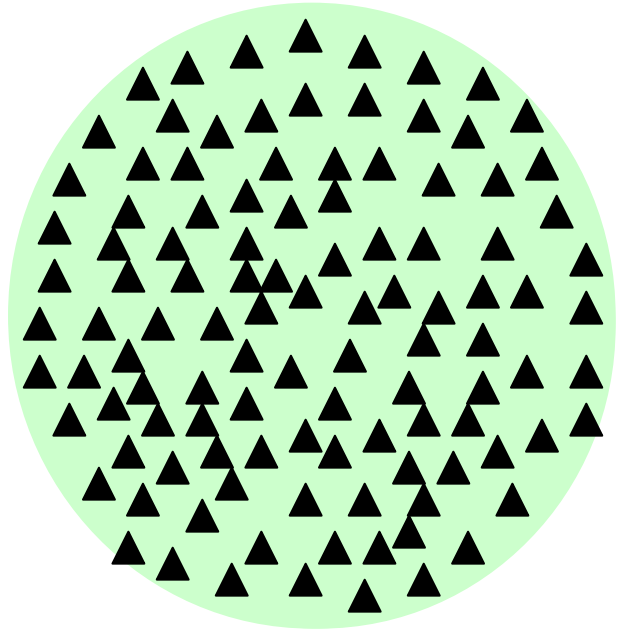


# Ideal Situation

After Second Vaccination



After Third Vaccination



Toward freedom

# Lesson Learnt

- ❖ Significant difficulties was found in eliminating rabies, and the disease tend to spread from infected area, e.g to Flores (1997), Maluku (2003), Maluku Utara (2005), Kalimantan Barat (2005) and just recently to Bali (2008).
- ❖ Poor community support and lack understanding on the knowledge of dog ecology which are considered as the dominant factors among others.
- ❖ Dificult vaccination program:
  - Need long acting single injection pareteral rabies vaccine, or
  - Oral vaccine?
- ❖ Longterm: control of dog population

# Thanks



## **Acknowledgements**

**Directorate General of Livestock Services, Jakarta  
Bali Provincial Government  
Australian Government (ACIAR, AusAID)**