

# Rearing of *Leiolepis guttata* (Cuvier, 1829) in South-central Vietnam : present state of knowledge

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# Diversity of minilivestock in Vietnam

1. Pythons,

2. Crocodiles,

3. Tortoises,

4. Monitor lizards,

5. Mabuya lizards,

6. Leiolepis lizards,

7. Porcupines,

8. Frogs,

9. True crickets,

10. Scorpions,

11. Chameleons,

etc.



**Pythons**

(Credit : Huynh Nga, 2011)



**Crocodiles**

(Credit : Le Thanh, 2013)



**Tortoise**

(Credit : Rochette, 2010)



**Pond and nest**

(Credit : Tran Tinh, 2013)

Monitor lizard



*Varanus salvator* (Laurentin, 1786)

Monitor lizard



*Varanus nebulosus* (Gray, 1831)

Mabuya lizard



*Eutropis macularia* (Blyth, 1853)



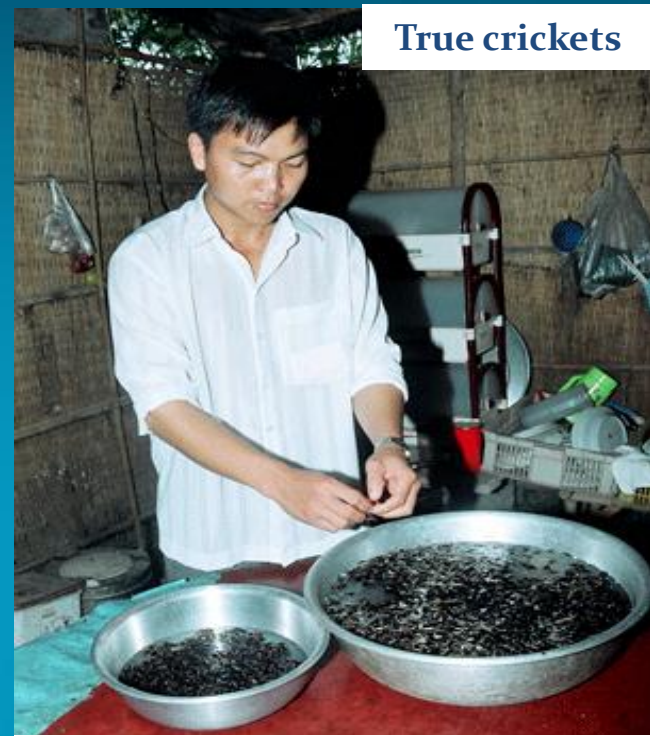
Porcupine

(Credit : Tran Tinh, 2013)



Frogs

(Credit : <http://nongnghiep.vn>)



True crickets

(Credit : <http://traidethanhtung.vn>)



Scorpions

(Credit : <http://traidethanhtung.vn>)

Chameleons, *Gekko gecko* (Linnaeus, 1758)



(Credit : <http://thegioicontrung.info>)

# Eight species of *Leiolepis* in the world



1. *Leiolepis belliana* (Gray, 1827)

2. *Leiolepis guttata* (Cuvier, 1829)

3. *Leiolepis reevesii* (Gray, 1831)

4. *Leiolepis peguensis* (Peters, 1971)

5. *Leiolepis triploida* (Peters, 1971)

6. *Leiolepis boehmei* (Darevsky & Kupriyanova, 1993)

7. *Leiolepis guentherpetersi* (Darevsky & Kupriyanova, 1993)

8. *Leiolepis ngovantrii* (Grismer & Grismer, 2010)

# *Leiolepis* in the world



1. *Leiolepis belliana*



2. *Leiolepis guttata*

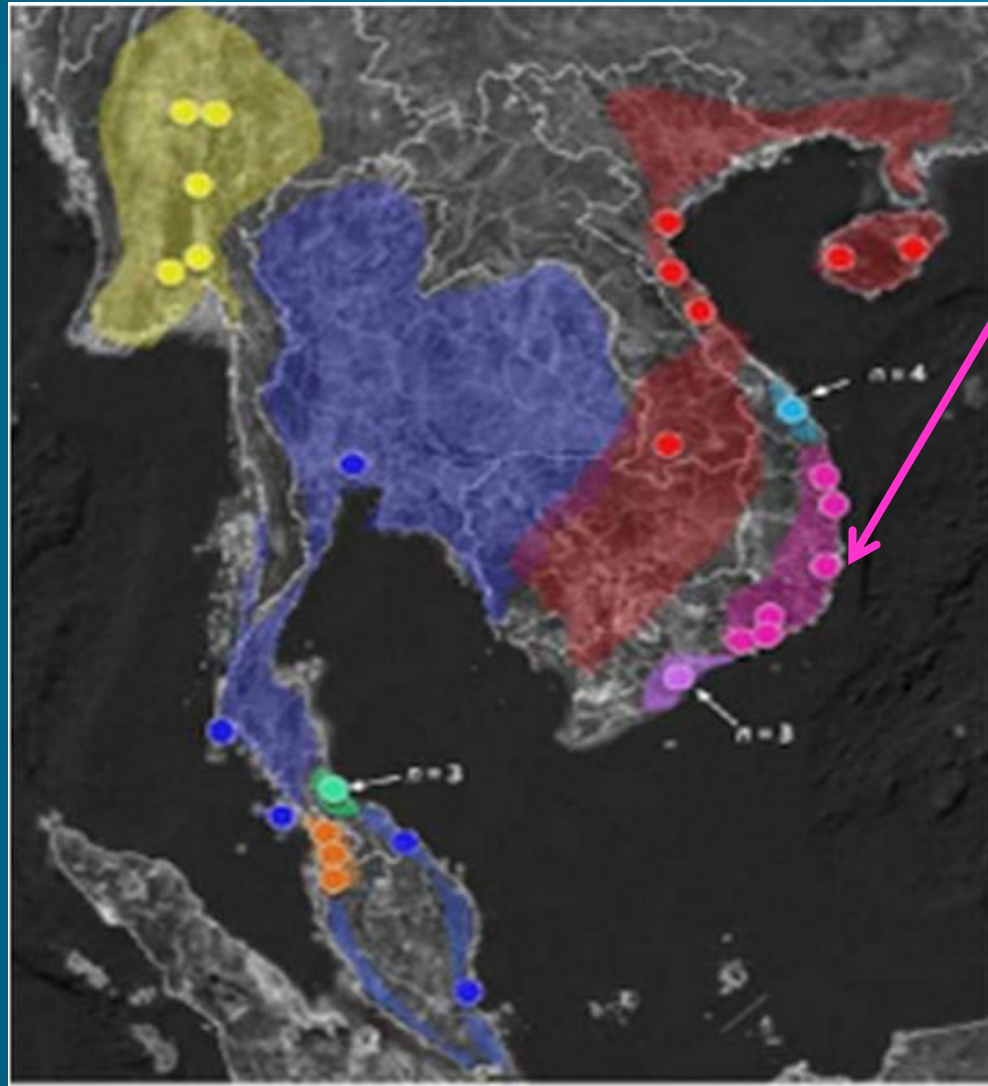


7. *Leiolepis guentherpetersi*



8. *Leiolepis ngovantrii*

# Distribution of the 8 species of *Leiolepis*



-  *Leiolepis guentherpetersi*
-  ***Leiolepis guttata***
-  *Leiolepis triploida*
-  *Leiolepis boehmei*
-  *Leiolepis peguensis*
-  *Leiolepis belliana*
-  *Leiolepis ngovantrii*
-  *Leiolepis reevesii*

(Credit : Ngo Van Tri, 2010)



# Aims of our research

1. Distribution of *Leiolepis guttata* (more accurate knowledge);

2. Natural ecosystem [a. vegetation unit(s), b. climate, c. soil, d. plant diversity];

3. Rearing (a. history , b. problems, c. enclosure);

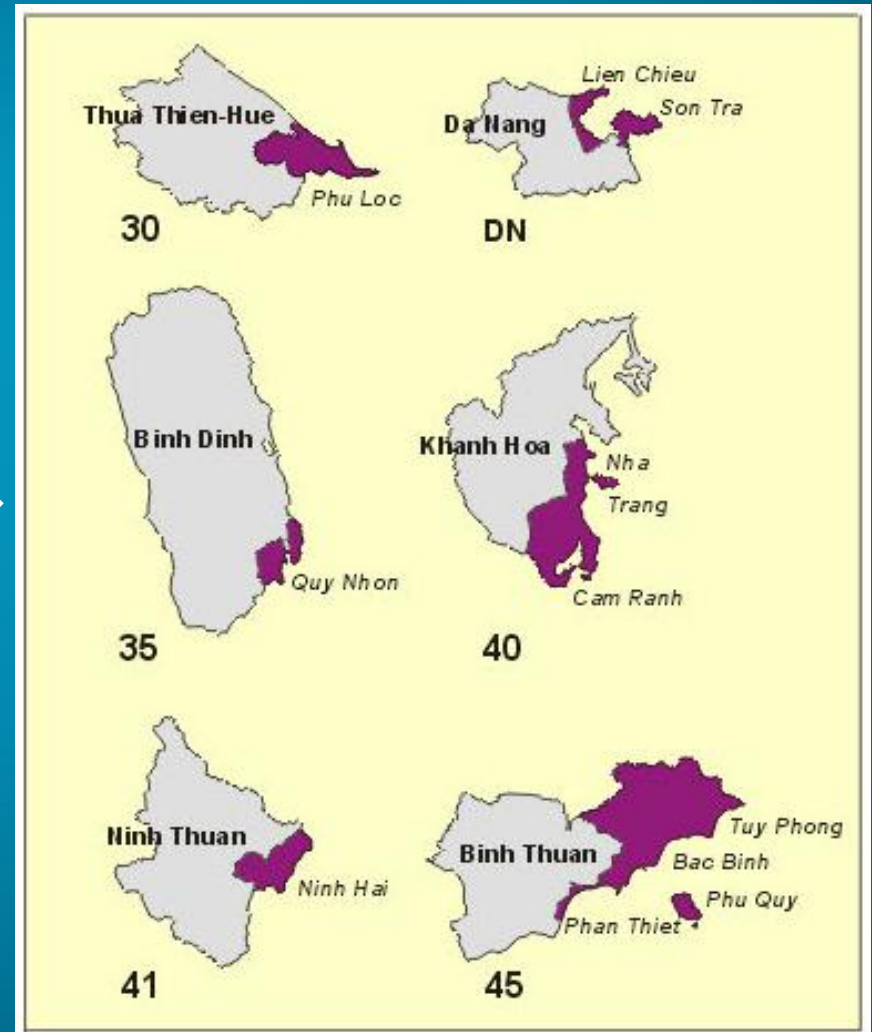
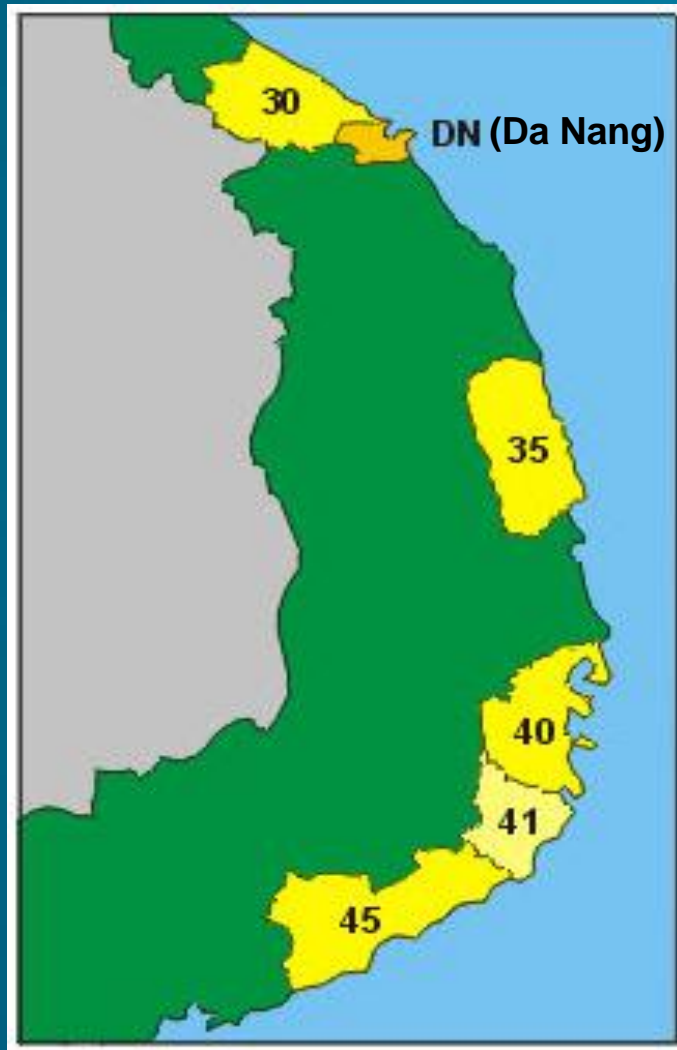
4. *Leiolepis guttata* in breeding conditions (a. plant diversity, b. edibility, c. chemical composition);

5. Commercialisation (a. actors, b. variability of market dynamic, c. supply and demand);

6. Feeding behaviour (a. cafeteria tests, b. films);

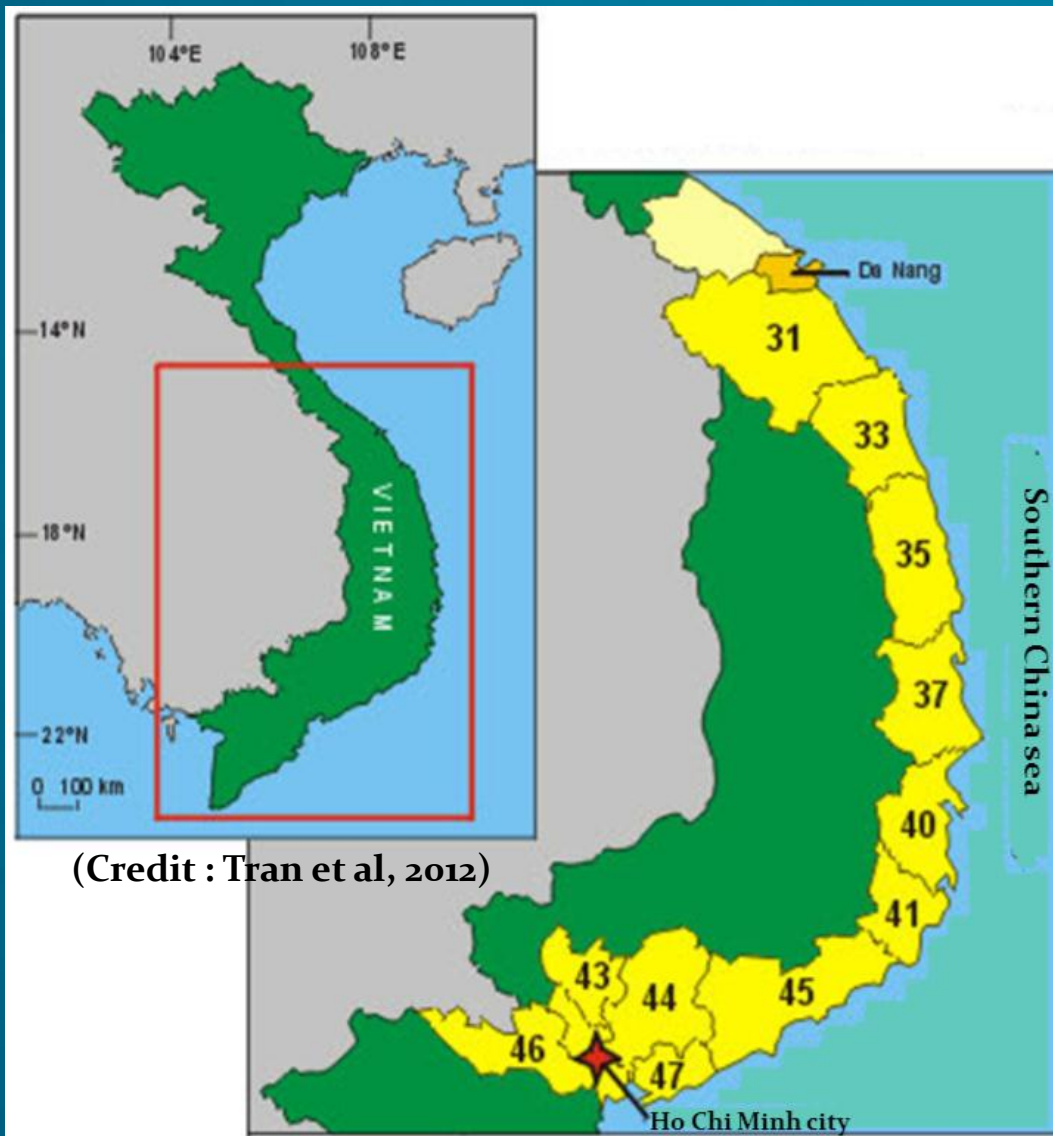
7. Meat composition (a. proteins, b. fatty acids, c. minerals).

# Updated natural distribution of *Leiolepis guttata*



(Credit : Tran et al., 2012)

# Updated map of provinces where *Leiolepis guttata* is reared



(Credit : Tran et al, 2012)

- 31. Quang Nam,
- 33. Quang Ngai,
- 35. Binh Dinh,
- 37. Phu Yen,
- 40. Khanh Hoa,
- 41. Ninh Thuan,
- 43. Binh Duong,
- 44. Dong Nai,
- 45. Binh Thuan,**
- 46. Long An,
- 47. Ba Ria-Vung Tau,
- and Ho Chi Minh city.

# Natural ecosystem

- ❑ (Sub)coastal sandy dunes of South and Central Vietnam.
- ❑ Climate : *Aw6* (Köppen), mean annual temperature 25-29°C, mean annual rainfall 775-1875 mm, 2 seasons :
  - dry season (November- April),
  - rainy season (May- October).
- ❑ Soil : white, ochre or red quaternary sands .
- ❑ Vegetation : intrication of facies from steppe to low evergreen thicket, plant species diversity > 65.



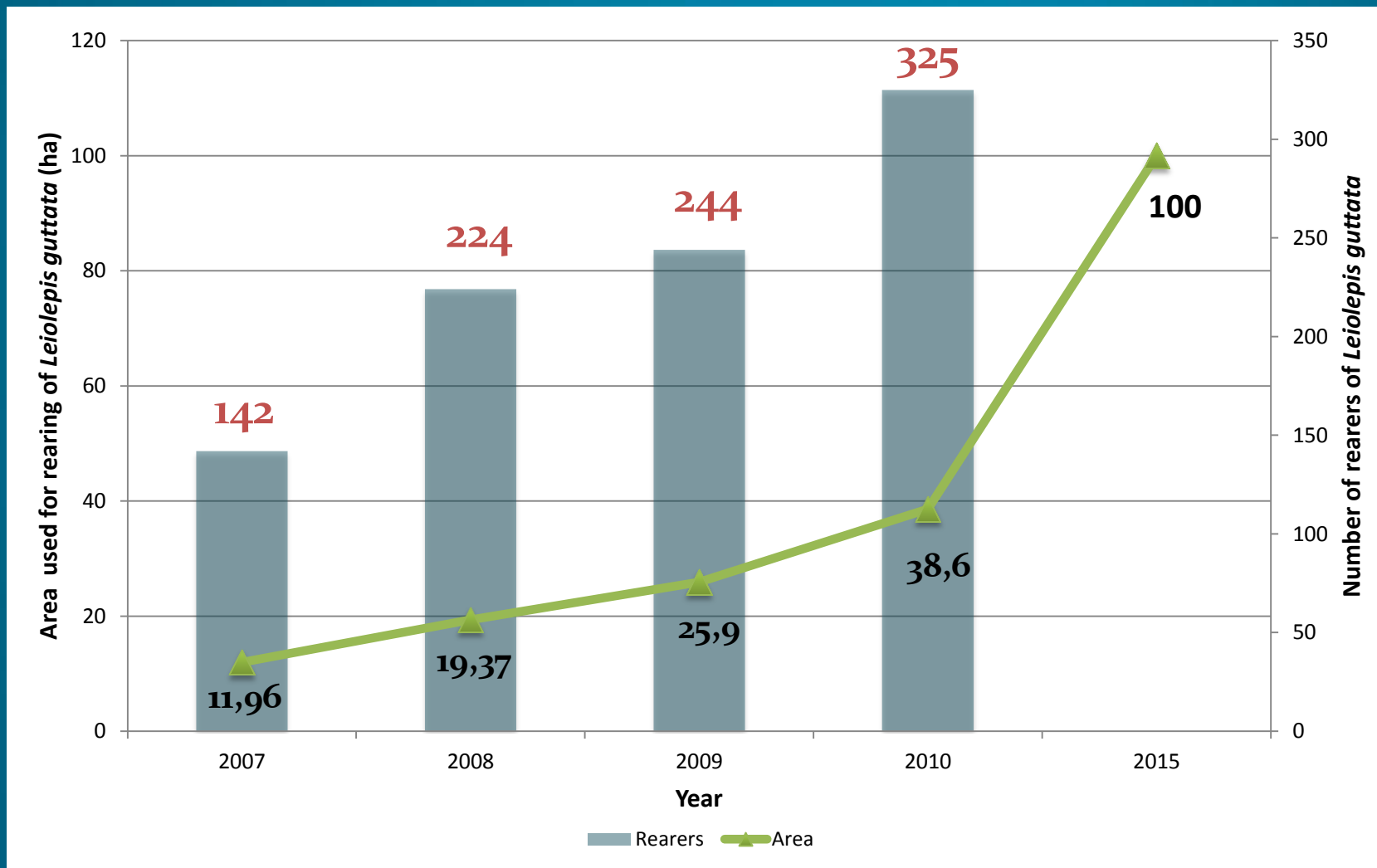
# *Leiolepis guttata* rearing history

Rearing of *Leiolepis guttata* started with a fortuitous discovery in 2004;

From 2007, the number of rearers and total area used increased on a spectacular way;

No information on best type of enclosure for its rearing suitable with environmental conditions and the investing capital available was known.

# Evolution of the number of rearers and total area used for rearing of *L. guttata* in Bac Binh district, Binh Thuan province (2007 - 2010)



(Credit : Tran et al., 2013)

# Present rearing models



(Credit : Rochette, 2010)



(Credit : HUYNH Tan Phat, 2012)

# Enclosures



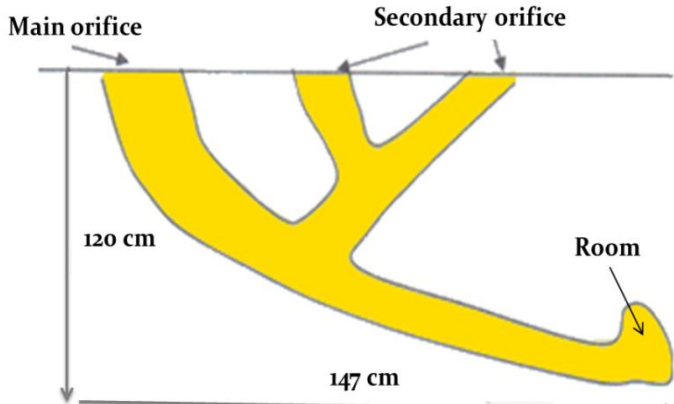
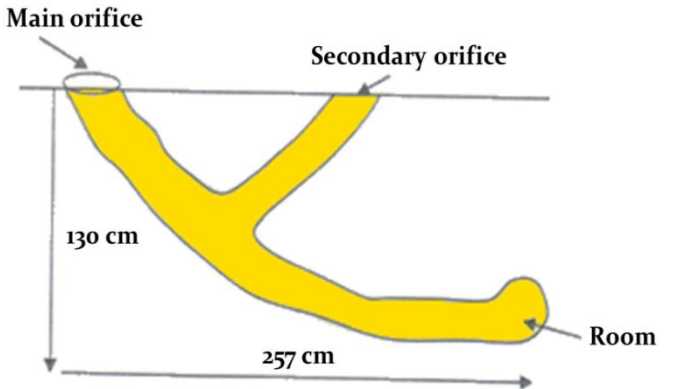
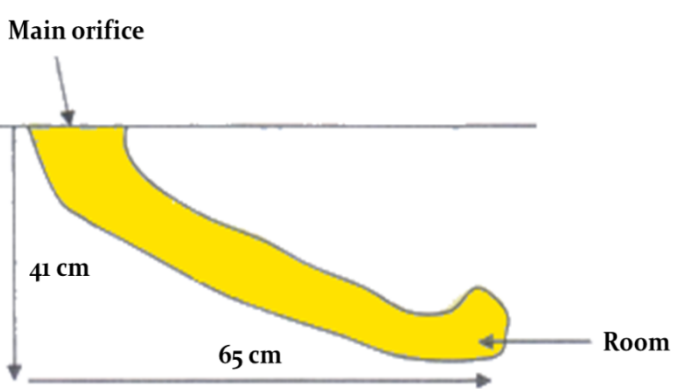
(Credit : Rochette, 2010)



(Credit : HUYNH Tan Phat, 2012)



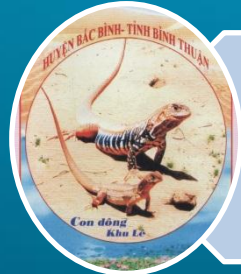
# Variability of *Leiolepis guttata* burrows



Morning view of main orifice  
(dry ochre sand)



Evening view of main orifice  
(wet soil of red color)



Male and female

(Credit : CAO Tien Trung, 2009)

# Recent rearing problems quoted were:

1. Cannibalism,

2. Parasitism,

3. Consanguinity,

4. Herd management,

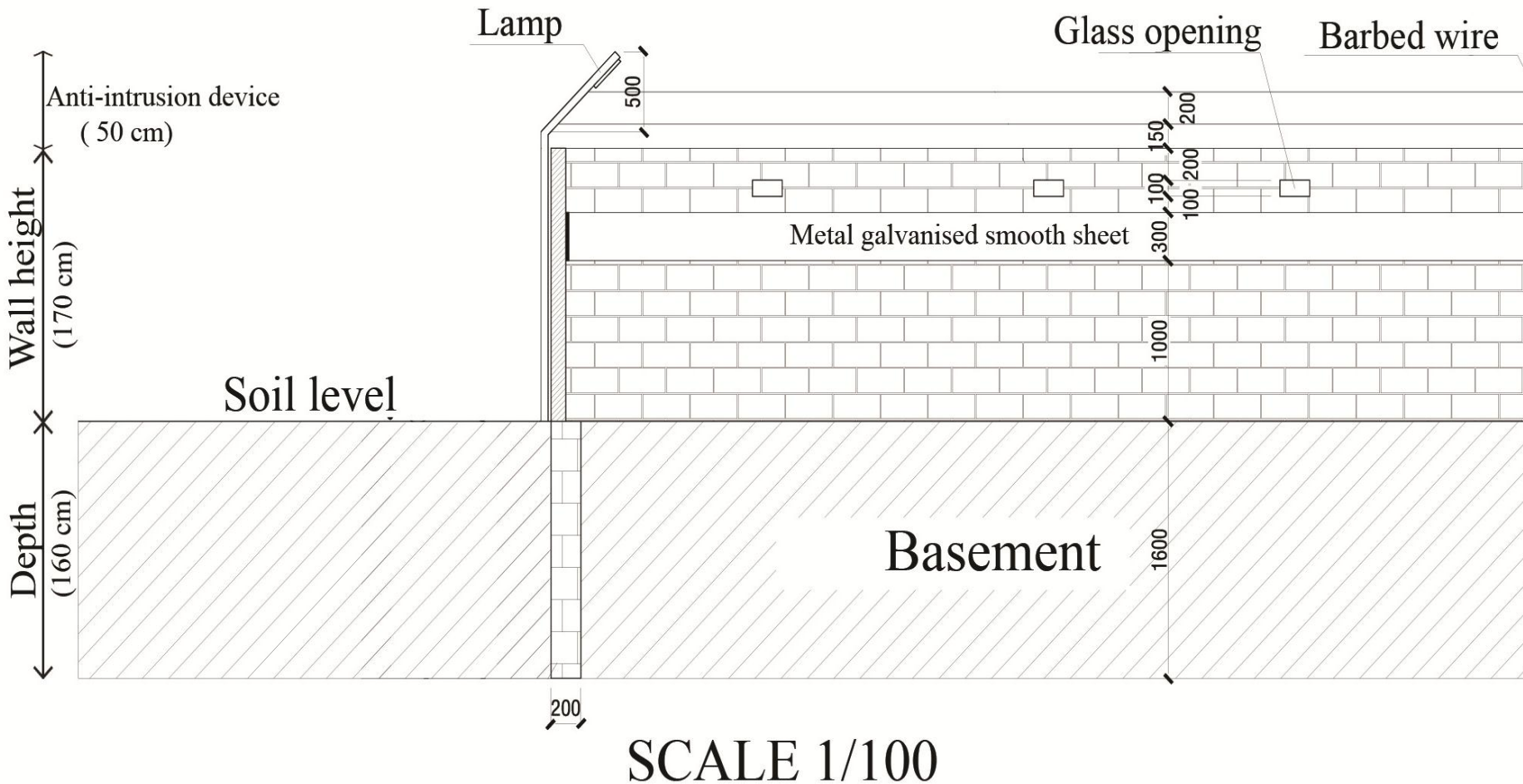
5. Food supplies (availability, diversity).

Our research allows the designing of two types of enclosure for further enclosure establishment (Tran et al., 2013).

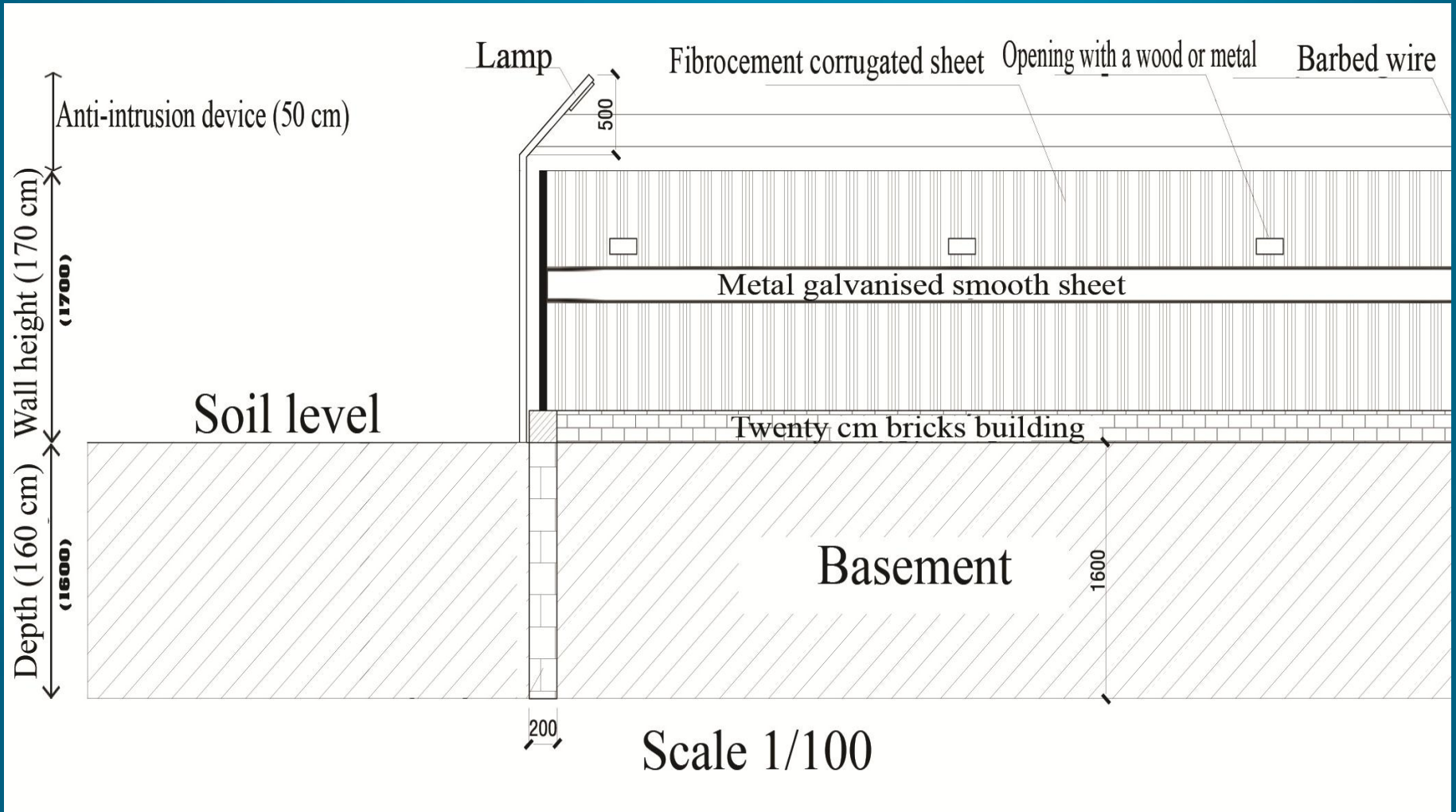
## Our recommendations are :

- ❑ Optimal area : 800 m<sup>2</sup>,
- ❑ Lizard density :
  - adults (2-3 pieces/m<sup>2</sup>),
  - youngs (5-6 pieces/m<sup>2</sup>),
- ❑ Anti-predators net, lighting, antitheft device,
- ❑ Vegetation cover ( $\pm$  50% of area): trees, shrubs, grass layer,
- ❑ Feeding dish and drinking trough,
- ❑ Watering material,
- ❑ Understructure for nocturnal insects capture.

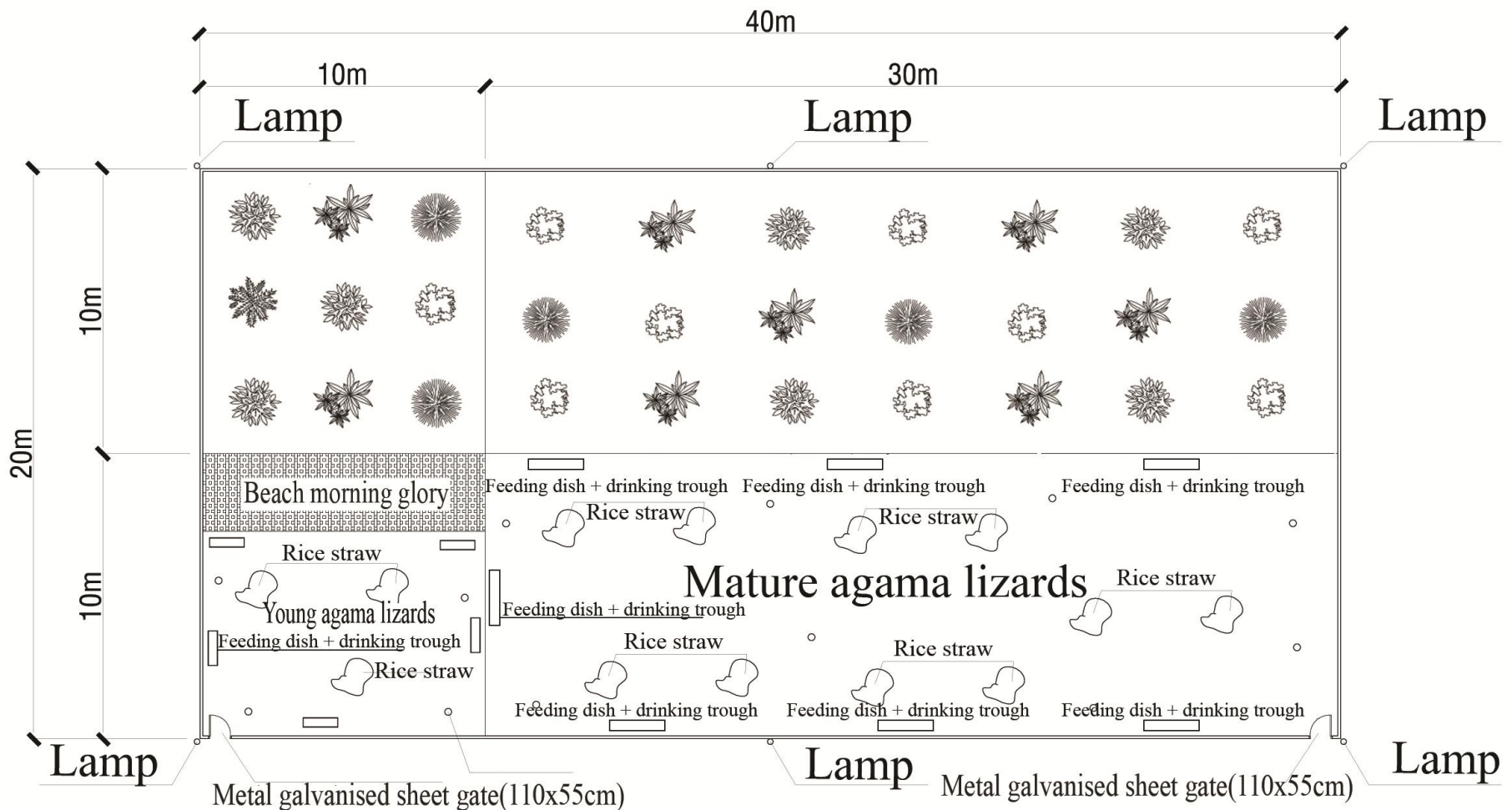
# Type T1 enclosure (bricks or breeze blocks)



# Type T2 enclosure (fiber cement corrugated sheets)



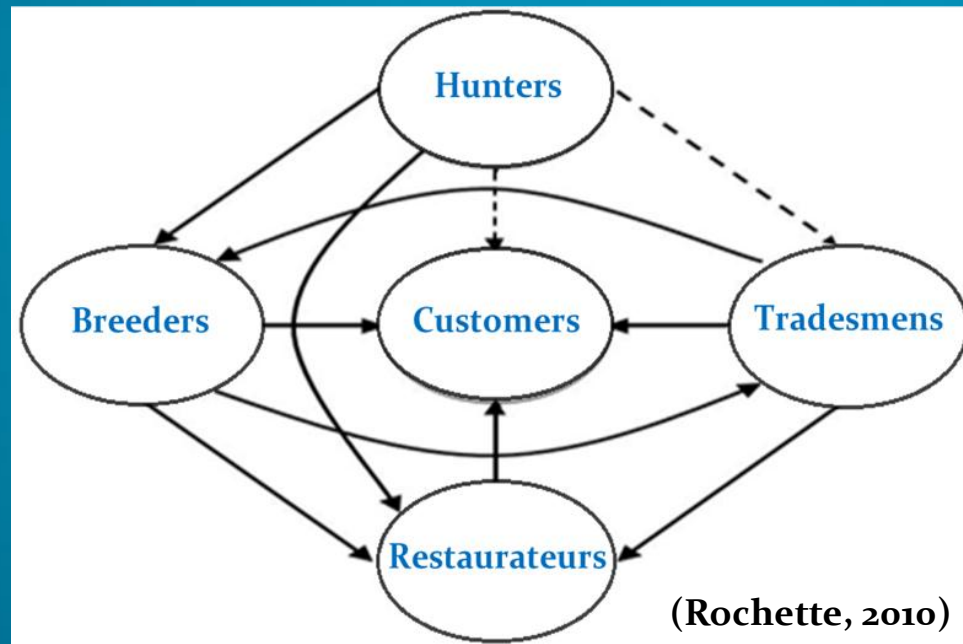
# Plan of an enclosure of agama lizards young (left part) and mature (right part)



(Credit : Tran et al., 2013)

# Present marketing problems

- Five actors involved,



- Variability of market dynamic according to rearing site location,
- Supply versus demand (market collapses).

## Price of *Leiolepis guttata* (2013)

### Reproduction

- 100% of females : 22,14 €/kg
- 2 males + 8 females : 19,55 €/kg
- 3 males + 7 females : 18,45 €/kg
- Young lizards of 7-20 days : 4,43 – 7,38 €/piece.

### Meat

- 100% of males (sometimes some old females) : 14,76 – 16,60 €/kg

1€ = 27,104.14 vnd

(Credit : <http://www.vietcombank.com.vn> , 03 june 2013)



# Diet (cafeteria tests)

- ❑ Food consumed : flowers, fruits, leaves, insects, etc.
- ❑ Distribution (twice a day) :
  - Morning : 8h-9h
  - Afternoon : 14h-15h



# Feeding behaviour of *Leiolepis guttata*

Studies on the behavior, including the sexual games and the fight of males were led on movies during tests « cafeteria »,

Six foods were chosen on base of the local availability, their cost and their chemical compositions :  
mango, true cricket, morning flory, peanut, moringa and gourd.

Film in 2 seasons (dry and wet) x 2 enclosures x 2 zones/enclosure x 15 days x  
30 minutes/day = **60 hours** ([SS-AD1A-25.04.2011](#))

Unregistered Version

<http://www.urexsoft.com>



# Conclusions and perspectives

- ❑ As rearing of *Leiolepis guttata* is one of the top 10 priorities of agricultural development in some provinces, encourage peasant-rearers to build new enclosures with financial support -linked to rearing area- of district political authorities in each province;
- ❑ Development of research devoted to the knowledge of gastro-intestinal parasitism and further on control;
- ❑ Control of consanguinity and cannibalism;
- ❑ Diffusion of informations to the rearers (books, leaflets, television, etc.);
- ❑ Adaptation of the supply to the demand in order to stabilize the prices;
- ❑ Monitoring the density of *Leiolepis guttata* in the natural environment for biodiversity protection and if necessary, promulgation of laws for the regulation.

## Meat



*Enjoy your meal*



(Credit : Tran Tinh, 2013)

## Recipes



**lizard  
soup**



**roasted  
lizard**



**grilled  
lizard**

(Credit : Rochette, 2010)