



**Development flood damage models for residential
building in Can Tho city**
(private household and small business)

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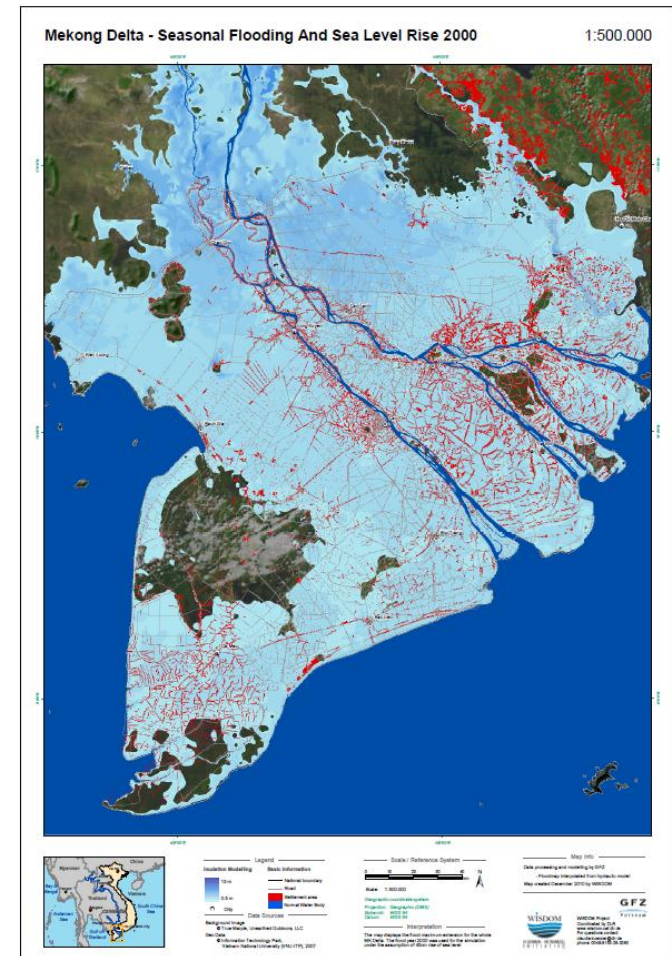
Flood in Mekong delta

The delta is a flat, low-lying area of 3.9 million ha with rich natural resources.

Flood is an annual event and affects to people lives.

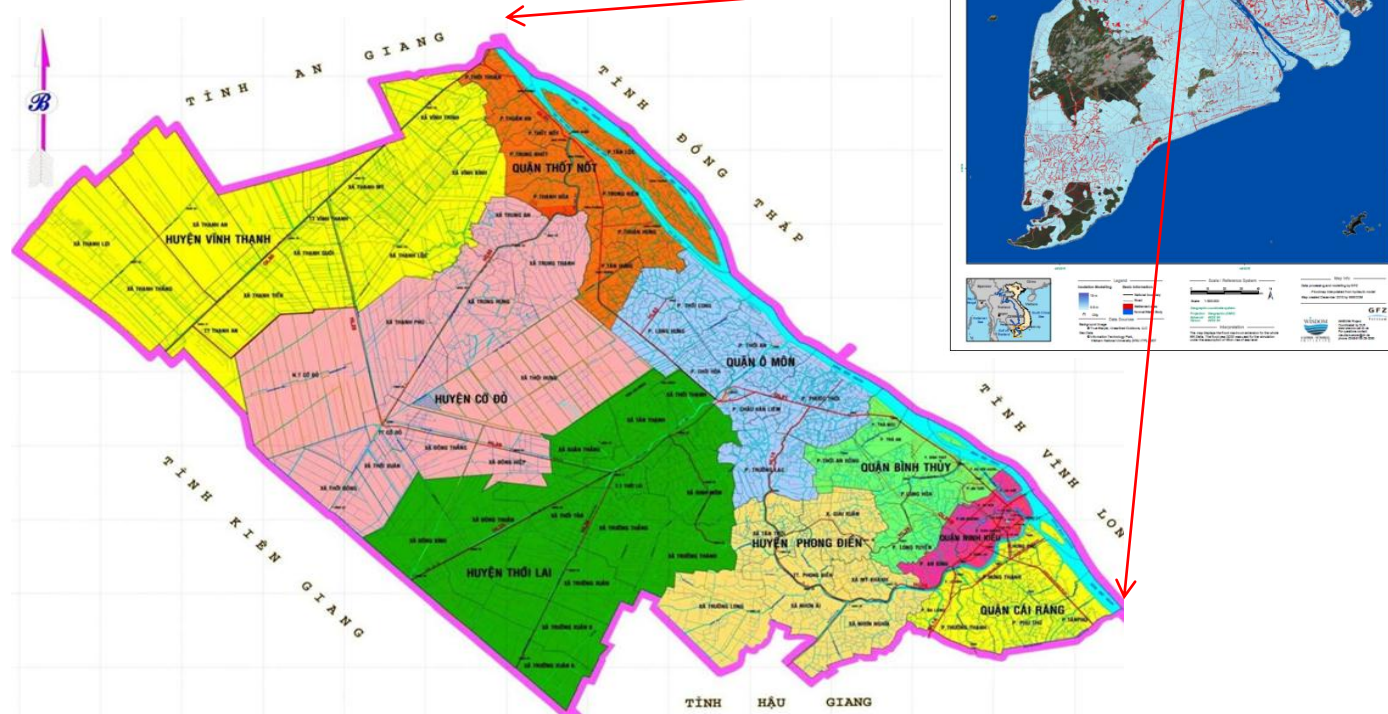
Climate change is expected to increasing the flooded area significantly.

Construction planning with several levels



Can Tho city in Mekong delta also has annual flood. Beside, Can Tho is a flood-tide-influenced city

Flood protection project for Can tho city is planned now.



Central idea in flood loss estimation is the concept of stage-damage-functions or loss functions.

Damage models are developed for defined regions or countries.

Damage models for residential buildings are based on empirical or synthetic damage data.

No flood damage model available for the Mekong delta.

Objectives



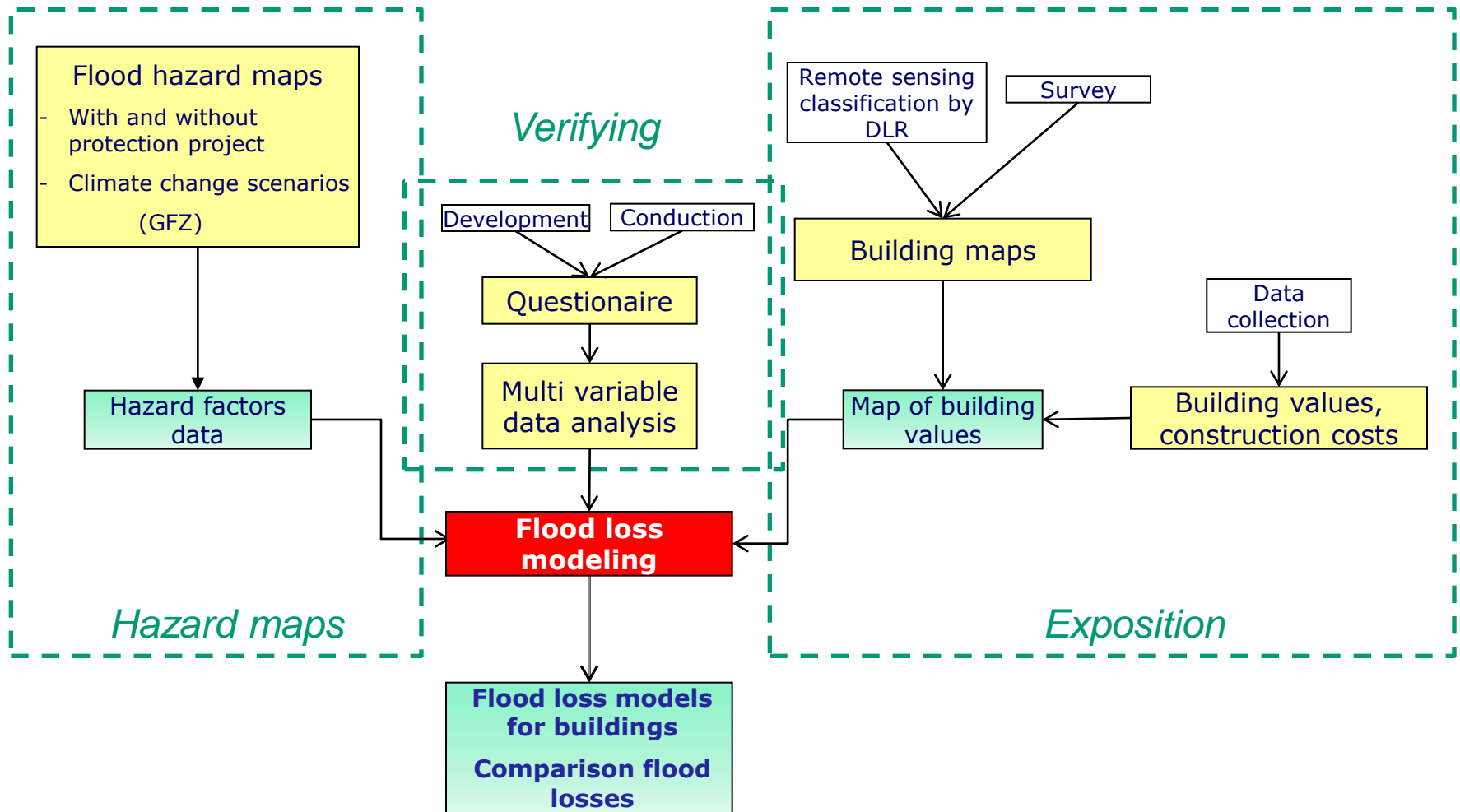
It is the main objective of this research to strengthen our understanding of flood damaging processes concerning residential buildings in the flood-tide-influenced cities in the Mekong delta.



Specifically, the most important factors determining the flood damage to residential buildings will be identified, a flood damage model for residential buildings will be developed and a flood risk analysis will be undertaken in Can Tho city.

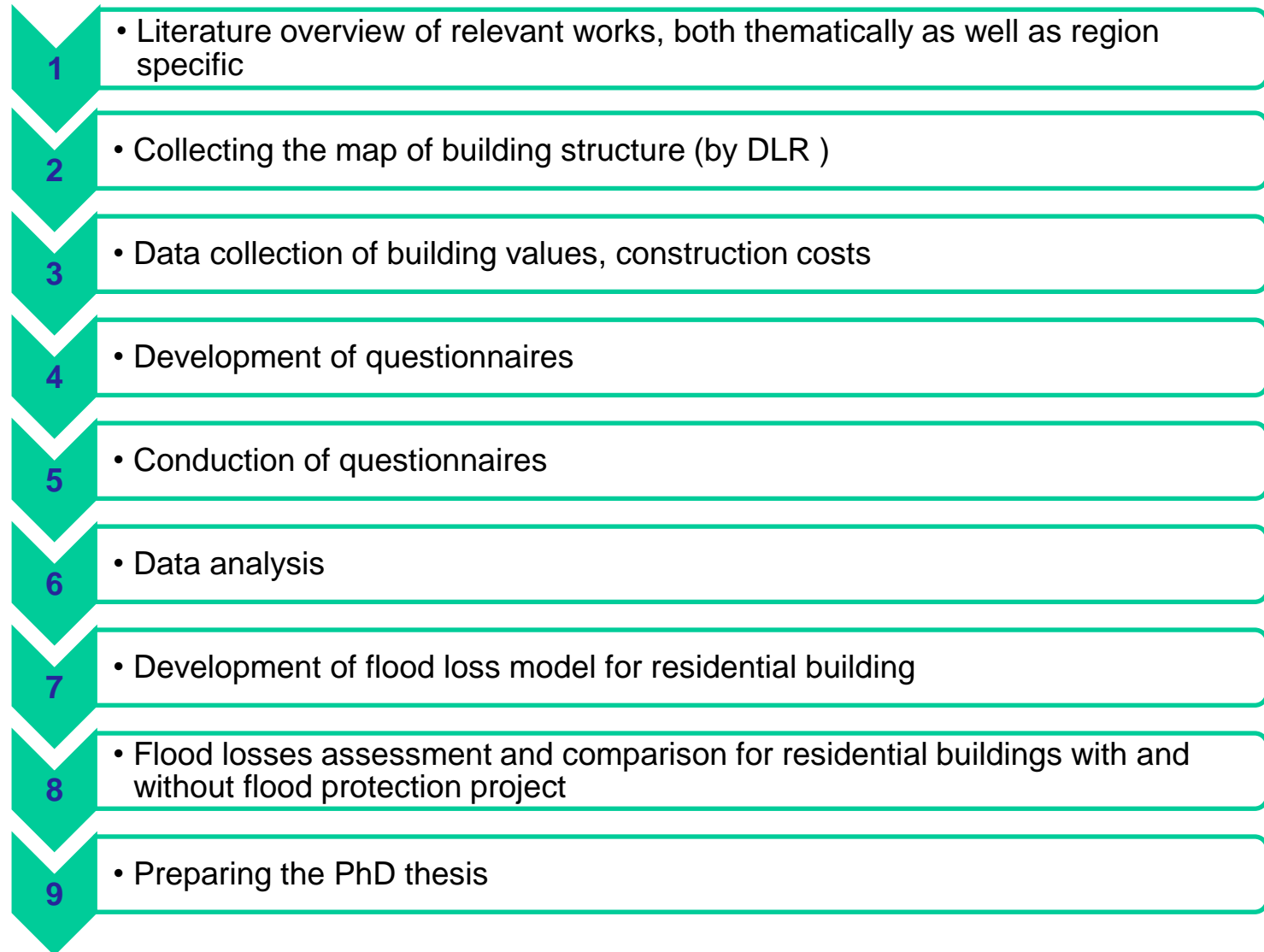


A comparative risk analysis with and without a planned flood protection measure will reveal the damage reducing potential focused on residential buildings of the flood protection project.



Developing flood damage model for private household

Developing flood damage model for the small business



Focus on:

Flood damage in Vietnam

- ❖ Area affected
- ❖ Month/Year
- ❖ Type of flood
- ❖ Process
- ❖ Among of damage
- ❖ What was affected
- ❖ Flood mitigation

Damage estimation methodologies

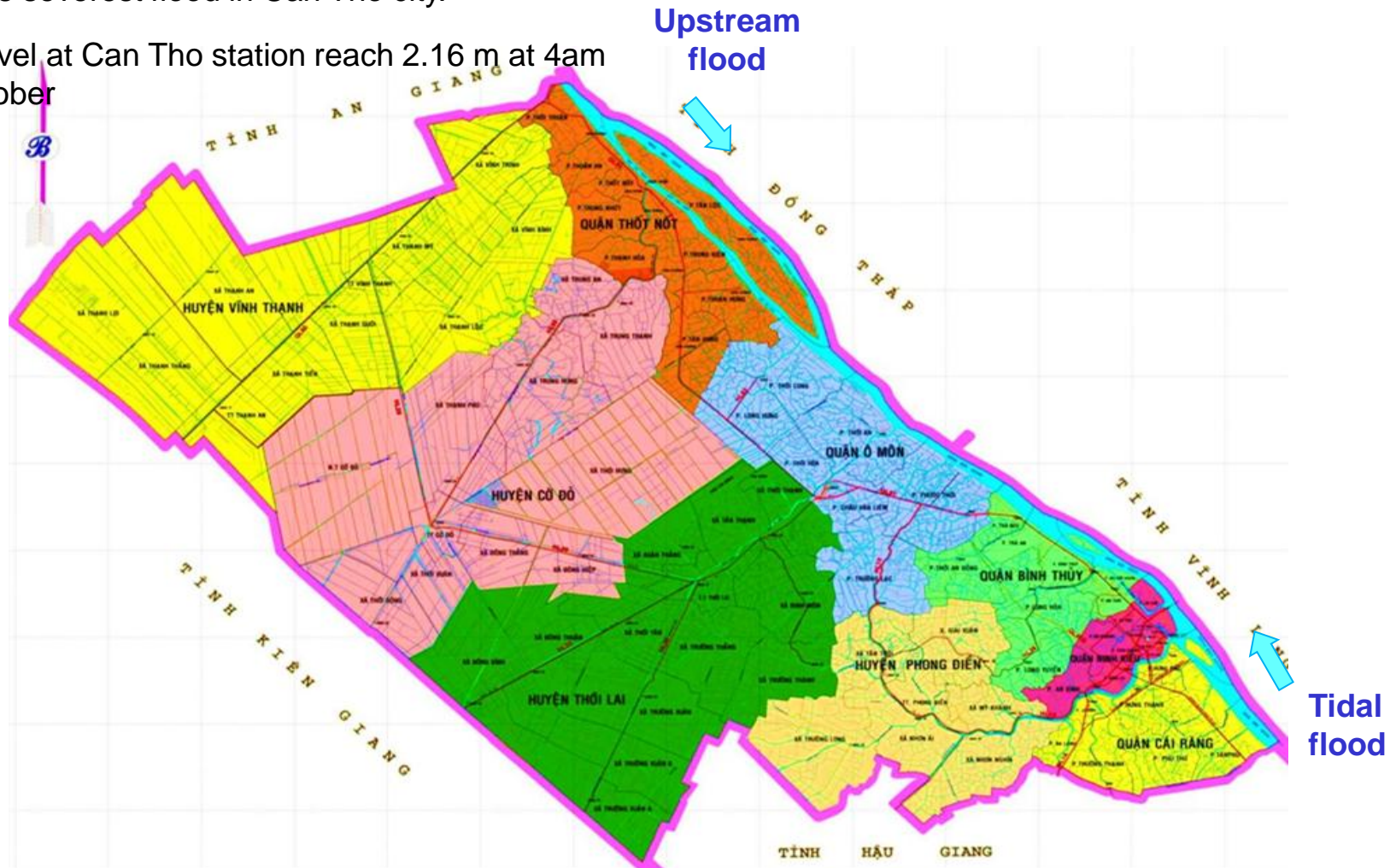
- ❖ Author
- ❖ Model used
- ❖ Source of model/Develop on what/Basic
- ❖ Where applied
- ❖ For which economic sectors
- ❖ Validation
- ❖ Parameters used

Flood damage models for residential building in Can Tho city will be developed base on Flood Loss Estimation Model (FLEMO) of GFZ

- ❖ Data related to flood in Mekong delta, as well as in Can Tho city
- ❖ Annual statistic of Can Tho city in 2009 and 2010
- ❖ Latest housing price list in 2010 and 2011
- ❖ Flood damage reports from 2003 to 2011.
- ❖ Flood protection planning report
- ❖ Taking expert interview with hydrologist experts, damage expert, housing expert and local government to get information related to the topic
- ❖ Data, document relevant

Flood in Can Tho city

- ❖ Flood start from August to December and flood season in 2011 is severest flood in Can Tho city.
- ❖ Water level at Can Tho station reach 2.16 m at 4am 27th October



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Rural area

- ❖ Flood comes from upstream
- ❖ Flood duration 2-4 months
- ❖ Affected to agriculture mostly, specially rice fields
- ❖ Flood depth 1-1,5 m

**Upstream
flood**



Rural area

Urban area

- ❖ Flood comes from upstream and tidal flood
- ❖ Flood duration 4-10h/day, last in 5-7 days/time, 2 times/month
- ❖ Affected to houses, roads, commercial area, agriculture area, fruit garden.
- ❖ Flood depth 20 -70 cm



Urban area

**Tidal
flood**



Flood in Can Tho city in 2011



Cai Khe Trading centre



Quang Trung street



O mon district



Field trip taken in October 2010

Private household

- ❖ General information
- ❖ Flood characteristic and flood damage in 2011 for house
- ❖ Flood mitigation
- ❖ Risk perception
- ❖ Flood management
- ❖ House situation
- ❖ Household profile

Small business

- ❖ General information
- ❖ Flood characteristic and flood damage in 2011 for house and shop
- ❖ Flood mitigation
- ❖ Risk perception
- ❖ Flood management
- ❖ Shop situation
- ❖ Shop profile

Survey site



- ❖ Ninh Kieu district: Almost wards of Ninh Kieu district, except An Hoi ward, An Phu ward
- ❖ Binh Thuy district: Tra Noc ward, Tra An ward, Binh Thuy ward, Bui Huu Nghia ward, Thoi Binh ward.
- ❖ Cai Rang district: Hung Phu ward, Phu Thu ward.
- ❖ O mon: Chau Van Liem ward

Started in January and finished in February in 2012



Total: 859 interviews
Ninh Kieu: 461 interviews
Binh Thuy: 169 interviews
Cai rang: 182 interviews
O mon: 47 interviews

In which:

473 private houses
386 small shops including groceries, eat and drink shops, service shops (hair, nail, motorbike repair, electronic repair, ...), production facilities, home appliances shops, others.

Flood damages



Damage of floor
and wall



Damage of floor
and furniture



water level in house

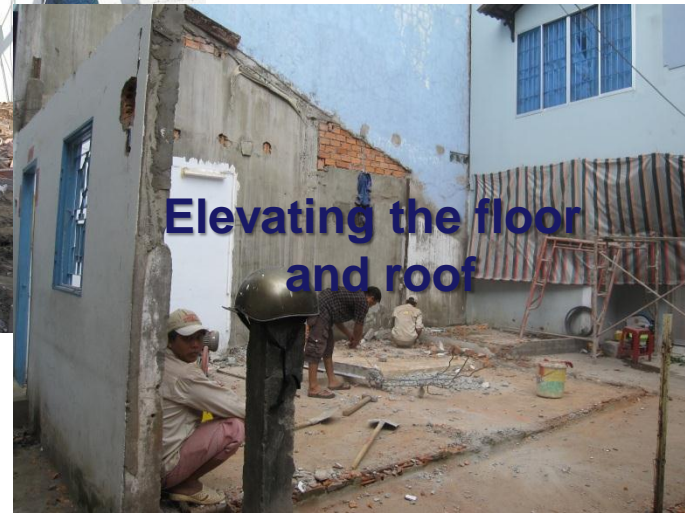


Furniture damaged



Flood marks

Repairing house after flood



Flood mitigation



- Flood damage mostly at the low elevation area, the alleys not yet upgrade, the area near by river or channel.
- The flood damage to the house partly such as wall, floor, furniture, assets.
- Flood loss to the small shop mainly in goods and assets/equipment damages, the sale decrease, shop closing.
- Households know the time flood come as their experience, but the flood 2011 was higher than expected.
- Households applied mitigation measures to avoided damages.
- Shop was opened by personal finance source of the shop owner, some other borrowed from relatives.
- There are no insurance for houses, contents or shops

- Data analysis
- Developing flood damage models for private households and small business.
- Comparison flood losses with and without flood protection project .
- Submitting papers
- PhD thesis

Thank you very much for your attention!