



LIVING WITH FLOOD IN THE MEKONG DELTA, VIETNAM

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THE MEKONG RIVER DELTA



Mekong River Delta is in the most southern of Vietnam.

The MD is considered as a biggest agriculture and aquaculture production region of the nation.



Research questions

- How the Local Government and local people in the adapt to flood?
- If the local government's policies and measures meets the people's desires? and
- What the government should provide to support local people in flood adaptation?

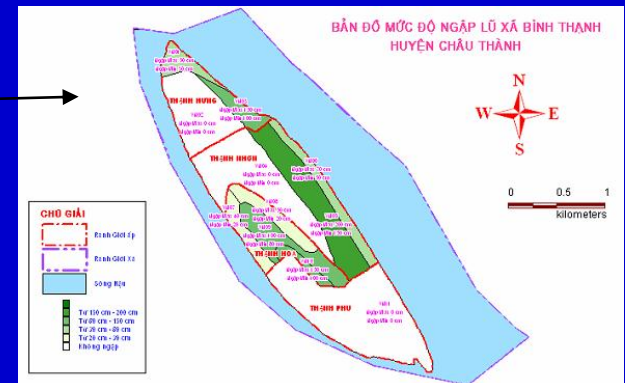
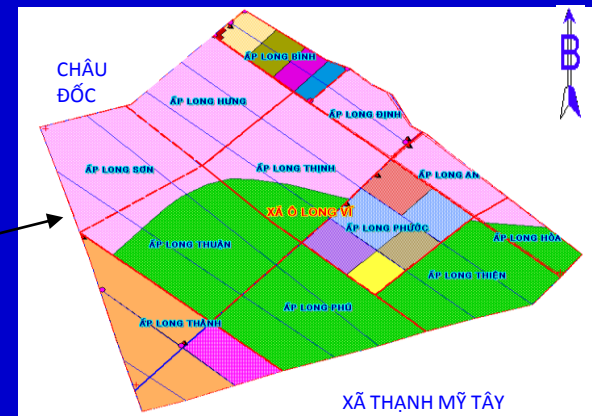
The study areas

O-Long-Vi village, Chau Phu district, An Giang province

- Area: 7065 ha
- Population 11484 inhabitants

Binh Thanh village, Chau Thanh district, An Giang province

- Island village with area of 437 ha
- Population of 7665 inhabitants



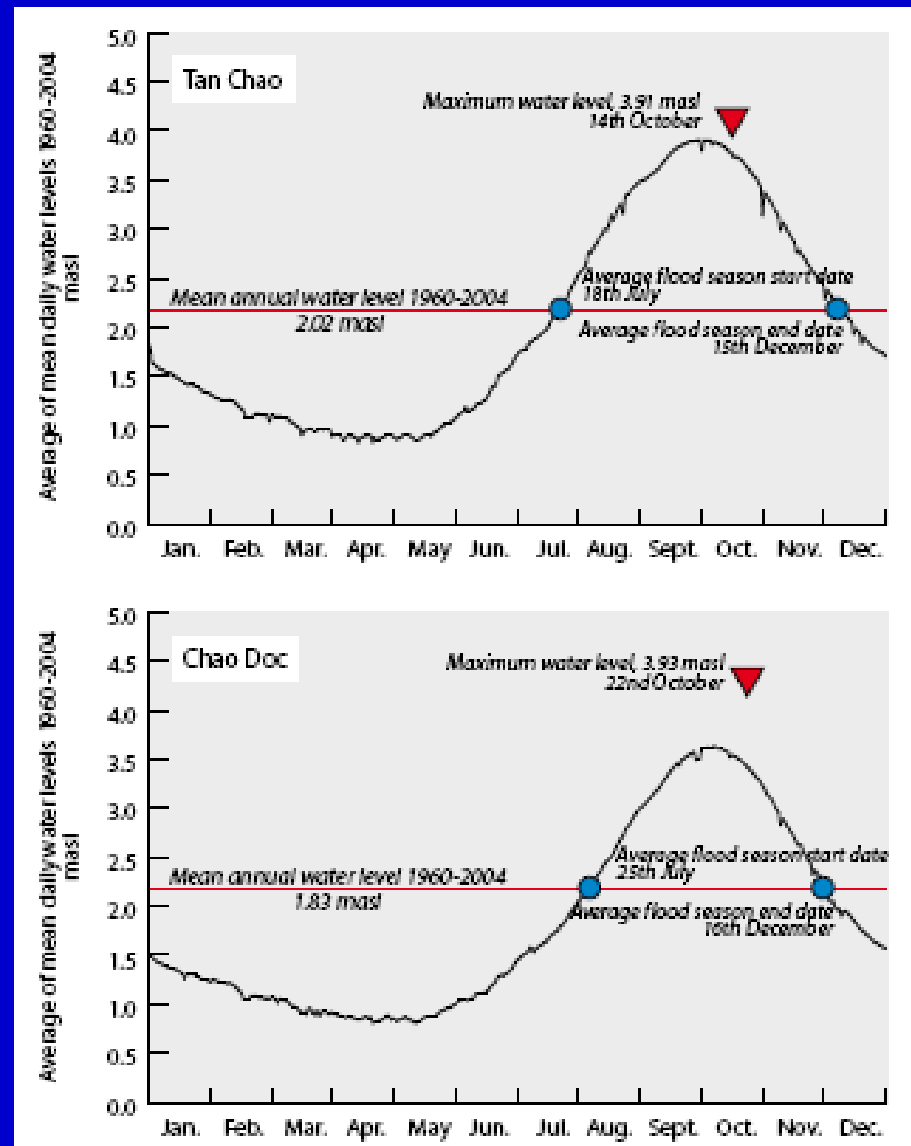
Methodology

- Select study areas: no-dyke, semi-dyke and full-dyke villages.
- Interviewed the authorities from the province, district and village levels.
- Focus group discussion (farmers in full-dyke, semi-dyke, no dyke areas)
- Individual interview (118 rich, medium, poor farmers in no-dyke, semi-dyke and full-dyke areas)
- Mapping (GIS).
- Statistical analysis.

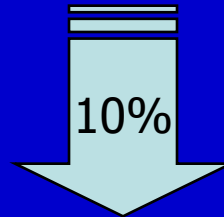


The flood

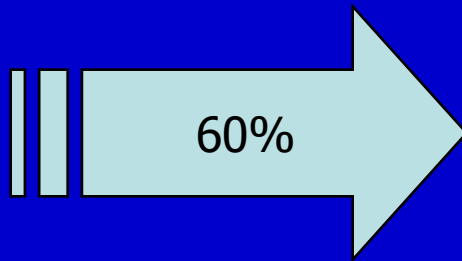
- Average discharge of the Mekong river during the wet season is about 39,000 m³/sec.
- About 1,2 - 1,9 million of hectares of the Delta can be flooded where farming becomes impossible.
- Annual floods are always a part of the life of natural and people .



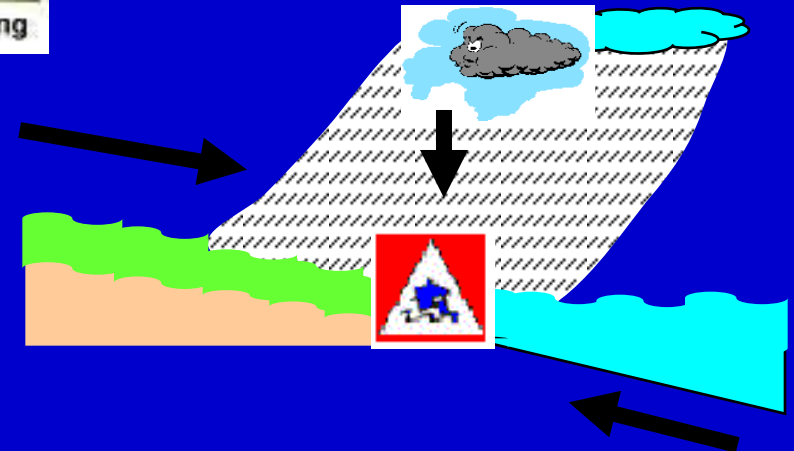
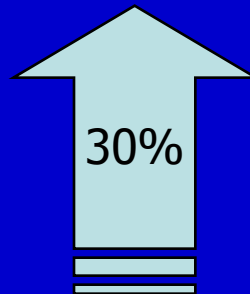
High Flood in the MD will happen when 3 major factors come at the same time:



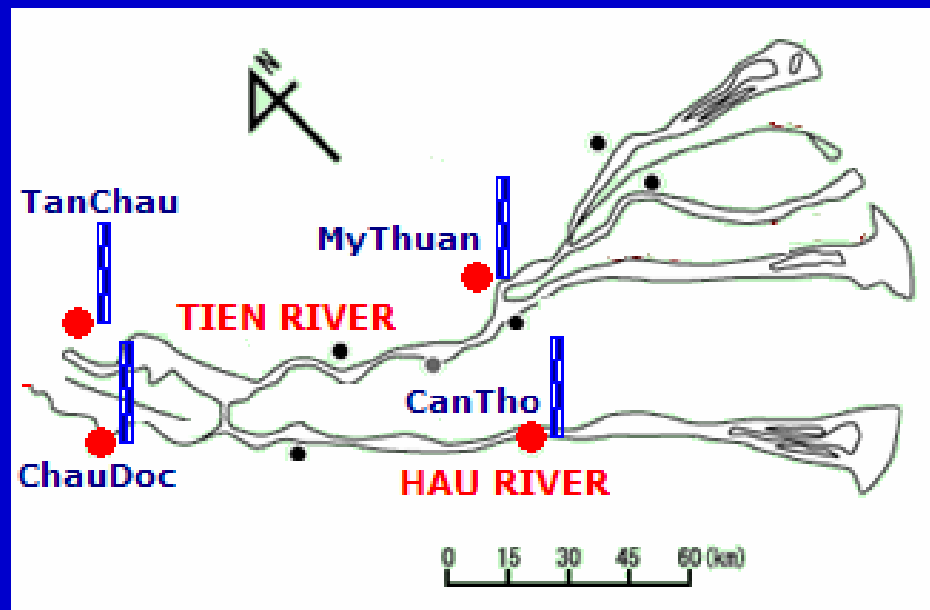
High flow discharge from upstream



Heavy rainfall continuously



High tidal flow from the East Sea



WATER ALARM LEVELS (meter) IN THE MEKONG RIVER

| <u>Gauging Station</u> | <u>Level I</u> (Potential flood) | <u>Level II</u> (Dangerous flood) | <u>Level III</u> (Very dangerous flood) |
|------------------------|-------------------------------------|--------------------------------------|--|
| <i>Tien River</i> | | | |
| Tan Chau | ≥ 2.80 | ≥ 3.40 | ≥ 4.00 |
| My Thuan | ≥ 1.40 | ≥ 1.50 | ≥ 1.60 |
| <i>Hau River</i> | | | |
| Chau Doc | ≥ 2.50 | ≥ 3.00 | ≥ 3.50 |
| Can Tho | ≥ 1.50 | ≥ 1.60 | ≥ 1.70 |



MD Flood damages

| Water level (m) | | |
|-----------------|-------------|-------------|
| Year | Tân châu | Châu Đốc |
| 2000 | 5.06 | 4.90 |
| 2001 | 4.78 | 4.48 |
| 2002 | 4.82 | 4.42 |
| 2003 | 4.06 | 3.50 |
| 2004 | 4.41 | 4.02 |
| 2005 | 4.36 | 3.90 |
| 2006 | 4.17 | 3.71 |
| 2007 | 4.08 | 3.56 |
| 2008 | 3.75 | 3.20 |
| 2009 | 4.12 | 3.52 |
| 2010 | 2.91 | 2.46 |
| 2011 | 4.70 | 4.03 |



The flood in 2000:

35 times bigger than that of flood year 1950; 1,17 times compared to flood year 1996 (N.D.Tuan, 2000) .the most damaging floods in 70 years.

760,000 houses are submerged; 67,000 families have been evacuated; 319 people have been died, of which 236 were children. The net loss has been evaluated at 2,670 billion VN Dong.

2011: Water level was lower than flood in 2000 but caused longer inundated in downstream because of upstream closed dyke system

Living with flood



Local government flood mitigation measures

1. Structural measures:

- Full-dike protected system: Height designed based on the measured and calculated flood peaks. Ensures the safety for the people's daily activities and cultivation in the whole duration
- **Semi-dike protected system:** The top height of the dyke is designed to ensures the second crop have been harvested before flood water exceed the field

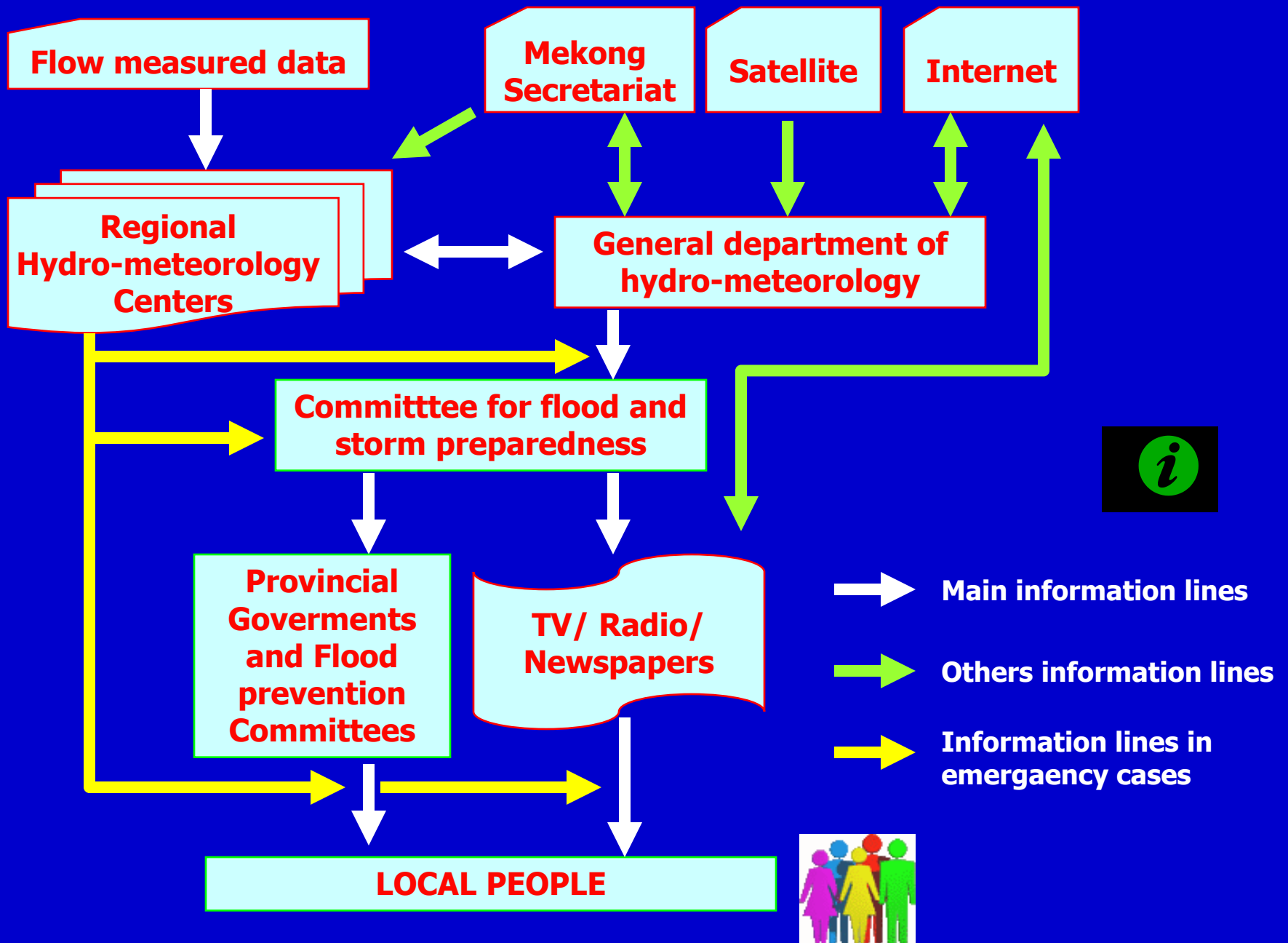


Local government flood mitigation measures

2/ Non-structural measures

- Shifting of cropping calendar→ the Summer-Autumn crop can be finished before the early flood.
- Changing the cropping pattern and animal husbandry that suitable to the flood condition.
- Improving the post-harvest technology.
- Planting more trees along the roads and dikes to reduce the flood damages.
- Excavating people in the potential erosion areas or in the depth flood areas into the flood protected residential areas.
- Distributing Life vest
- Supporting health care boats





Local people living with flood



Moving Animal



**Teaching children
to swim**



Rising house



**Control flood by
sand bags**



Taking children to school



Local people living with flood



Fishing in flood zone



Raising fish in the paddy field



Catching yellow snail



Planting aquatic vegetable



Raising ill in the net

Farmer's adaptation to flood

(Logistic analysis, Exp(B))

| Variable | Food | Fishing tools | Boat and life vests | Aquaculture | Fishing | Trading on boat | Grow short rice crops | Insert one vegetable crop between 2 short rice crops | Grow aquatic plants |
|---------------------|------|---------------|---------------------|-------------|---------|-----------------|-----------------------|--|---------------------|
| <i>Dyke system</i> | | | | | | | | | |
| No dyke | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Semi-dyke | 0.88 | 1.02 | 1.03 | 0.00 | 0.12 | 0.34 | 0.79 | 1.57 | 1.11 |
| full dyke | 0.50 | 0.80 | 0.34 | 0.36 | 0.42 | 0.36 | 0.22 | 0.00 | 0.11 |
| <i>income group</i> | | | | | | | | | |
| Poor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Rich | 5.82 | 0.26 | 0.36 | 4.01 | 0.61 | 0.54 | 0.81 | 0.00 | 4.85 |
| Medium | 2.16 | 0.88 | 0.92 | 2.51 | 0.61 | 0.54 | 0.99 | 0.49 | 3.37 |

- Food preparation is considered more on semi-dyke and no-dyke areas. The rich and medium are more able to prepare food compare to the poor who are strongly depended on the natural fish sources (fishing tools, fishing).
- Farmers in the semi-dyke and no-dyke area have to prepare boat and live vest for transportation and fishing during the flood season. And the medium and poor use boat more since they need it for their main source of income: fishing and trading on boat.
- Aquaculture: Since aquaculture requires high investment and maintaining costs, Rich and the medium farmers are easier to do (4 and 3 times compare to the poor)
- Agriculture adaptation: Farmers in no-dyke and semi-dyke use short rice varieties to ensure their harvesting before flood season and insert one vegetation crop between 2 short rice crops.

Farmer's adaptation to flood

(Logistic analysis, Exp(B))

| Variable | Pilehouse | Raise basement | move tree | Embankment | Move animal | Children protection |
|---------------------|-----------|----------------|-----------|------------|-------------|---------------------|
| <i>Semi-dyke</i> | | | | | | |
| No dyke | 1 | 1 | 1 | 1 | 1 | 1 |
| Semi-dyke | 1.18 | 0.65 | 0.12 | 0.12 | 0.79 | 3.08 |
| full dyke | 0.62 | 1.05 | 0.19 | 0.27 | 1.79 | 0.23 |
| <i>income group</i> | | | | | | |
| Poor | 1 | 1 | 1 | 1 | 1 | 1 |
| medium | 0.46 | 2.12 | 1.09 | 0.51 | 0.99 | 0.30 |
| rich | 1.15 | 0.86 | 0.33 | 6.77 | 0.50 | 0.83 |

- Since semi-dyke area is still inundated during flood season, pile house is the most selection and it seem more interested by the rich and the poor farmers. The medium farmers prefer more on raising house's basement. Actually the poor's pile house is made by very cheap local wood while the rich build strong concrete pile house.
- The medium prefer rising basement than others
- The medium and poor want to move their animal to higher place while the rich have stable house and cage do not need to move their animal.
- Children in the no-dyke areas are move to the safe place while people in the semi-dyke area take care of their children themselves in the same place. The poor more care about their children because of their worse living condition.

Farmer's perception to Government measures

| Measures | Advantages | Disadvantages | Recommendations/supported needs |
|-----------|--|--|---|
| Full-dyke | <ul style="list-style-type: none"> • Protect crops, assets whole year round • Good condition for animal husbandry, • Better transportation infrastructure, • Generate more jobs • Safe for children, women | <ul style="list-style-type: none"> • Reduce the soil fertility, • Reduce fish source, • Increase crop disease, • Water pollution, • High construction cost, • Influences to the water regime of the upstream and downstream areas → bank erosion | <ul style="list-style-type: none"> • Apply to small areas or residential areas. • Financial support, technical training (The rich & medium) • More jobs, boats and fishing tools (the poor) |
| Semi-dyke | <ul style="list-style-type: none"> • Prolong the cropping calendar (ensure the second rice crop and start the first crop earlier). • Increase the soil fertility, • Remove pollution, • Increase fish sources, reduce the wave so that farmer can grow fish • Less affect to the upstream and downstream. | <ul style="list-style-type: none"> • High maintaining cost • Living condition is still difficult (drinking water, house, transportation). | <ul style="list-style-type: none"> • Apply widely to ensure 2 rice crops per year • Better road, electricity, drinking water supply • Better crop and animal varieties • Strengthening the dyke system, technology transfer (the rich) • Job training for women, capital for animal husbandry (the medium) • Job training, boat and fishing tools • More job, fishing tools (the poor) |

Most of farmer agree on the government 's non-structure measures for flood management

Lesson learnt

- Local authorities in the study areas show their strong leadership on flood mitigation and adaptation
- When the government well understand of the different effective of the flood adaptation and mitigation measures to different income groups, they can make right supports to each group to increase the efficiency of the measures
- Government and people have experiences on flood adaptation and they understand clearly the damages and benefits from flood so that the flood adaptation and mitigation measures can be flexible to get more benefit and minimize the damages.
- The motto “Living together with floods” is a general concept. The application to each real situation varies by individuals and local. (different measures can be changed throughout historical, cultural, socio-economical tasks in terms of human progress)

Lesson learnt

Key questions should be pointed out in future :

- ❖ What are the different point of views of the upstream and downstream farmers on "living with the flood" in the Delta regional scale?
- ❖ How can the local governments (districts to districts, provinces to provinces) compromise the general benefits and reduce the long-term negative environmental impacts?
- ❖ How far the MD governmental authorities and local residents aware of the hydrological and ecological changes due to the upstream hydropower dams development and climate change impacts to the local socio-economic in the future?



Flower village in Dong Thap in a flood season

**Thank you very much
for your attention**