LIVING WITH FLOOD IN THE MEKONG DELTA, VIETNAM

Tran Thi Trieu, Nguyen Hieu Trung, Le Anh Tuan
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 (rich, medium, poor farmers in full-dyke, semi-dyke, no dyke areas)
- Individual interview (118 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 m$^3$/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.
The flood
High Flood in the MD will happen when 3 major factors come at the same time:

- High flow discharge from upstream: 60%
- Heavy rainfall continuously: 10%
- High tidal flow from the East Sea: 30%
### Water Alarm Levels (meter) in the Mekong River

<table>
<thead>
<tr>
<th>Gauging Station</th>
<th>Level I (Potential flood)</th>
<th>Level II (Dangerous flood)</th>
<th>Level III (Very dangerous flood)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tien River</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tan Chau</td>
<td>≥ 2.80</td>
<td>≥ 3.40</td>
<td>≥ 4.00</td>
</tr>
<tr>
<td>My Thuan</td>
<td>≥ 1.40</td>
<td>≥ 1.50</td>
<td>≥ 1.60</td>
</tr>
<tr>
<td><strong>Hau River</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chau Doc</td>
<td>≥ 2.50</td>
<td>≥ 3.00</td>
<td>≥ 3.50</td>
</tr>
<tr>
<td>Can Tho</td>
<td>≥ 1.50</td>
<td>≥ 1.60</td>
<td>≥ 1.70</td>
</tr>
</tbody>
</table>
In Tan Chau

**High Flood:** $H \geq 4.50 \text{ m}

**Med. Flood:** $H = 4.00 - 4.50 \text{ m}

**Low Flood:** $H \leq 4.00 \text{ m}
The severity degree of the floods is increasing

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.
How to live 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.
   • August-dike protected system: The top height of the dyke is designed to ensure the second crop has 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 for 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 adaptation to flood

(Logistic analysis, Exp(B)

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

- Food preparation is considered more on semi-dyke and no-dyke areas and the rich and medium are more able to prepare food compared 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.
- 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. During the flood season, poor farmers also grow aqua-plant for more income.
- 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)
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 pile house is made by very cheap local wood while the rich build strong concrete pile house.

Rise embankment requires big investment, only the rich can afford.

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.

Considering the disadvantages of full-dyke, farmers in full-dyke areas prefer semi-dyke more than the people in other areas. And all income groups are prefer the semi-dyke, especially the medium and rich.
## Farmer’s perception to Government measures

<table>
<thead>
<tr>
<th>Measures</th>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Recommendations/supported needs</th>
</tr>
</thead>
</table>
| Full-dyke  | • Protect crops, assets whole year round  
• Good condition for animal husbandry,  
• Better transportation infrastructure,  
• Generate more jobs  
• Safe for children, women | • 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 \(\rightarrow\) bank erosion | • Apply to small areas or residential areas.  
• Financial support, technical training (The rich & medium)  
• More jobs, boats and fishing tools (the poor) |
| Semi-dyke  | • Prolong the cropping calendar (ensure the second rice crop and start the fist 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. | • High maintaining cost  
• Living condition is still difficult (drinking water, house, transportation). | • 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 and better crop varieties (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
Conclusions

- **Government**
  - In general, local government have been doing a lot to support the people in the flooded area.
  - Recommendations:
    - Better flood forecasting
    - Need to have more financial and technical support (job training)
    - Invest more on August-dike protected system to protect agriculture and full-dike protection system only for residential areas
    - Focus more on the environment and the recreation in the resettlement areas
    - Aware of the affects to the downstream area: pollution, water level and bank erosion.
    - Prepare to deal with climate change
    - Operate free or low cost kindergarten for the poor
    - Better boats for taking children to school
Conclusions

• Farmers
  – The rich, the fairly rich and the average farmers are better prepared to deal with flood than the poor farmers. Rich farmer more aware of food, the average and poor farmers prepare more on fishing tools and boats.
  – Farmers can take the advantages of flood: fishing, refresh the land, raising suitable crops and aquaculture.
  – Most of farmer agree on the government strategy on flood management
  – Recommendations:
    • Aware of environmental problems at their land and downstream areas
    • Reduce inorganic fertilizer use in the full-dike protection area
    • Take care of the children or send them to the kindergarten
    • Strengthening houses (pile or basement) and boats
    • Using clean water (rain water or treated flood water)
Thank you very much

for your attention

Flower village in Dong Thap in a flood season