



FMMP-C 5

Flood Management and Mitigation Programme
- Land Management Component -

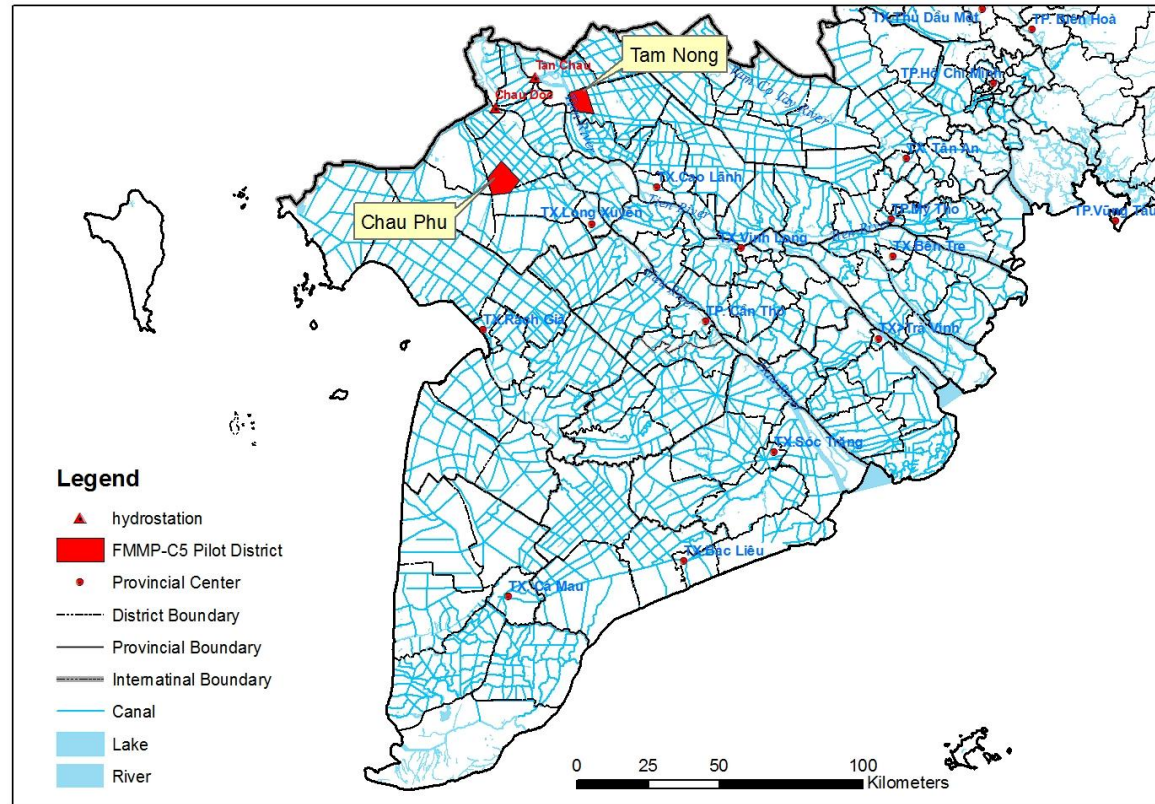
C5 Approach Implementation Experiences in Vietnam

Luang Prabang, February 2011

Contents

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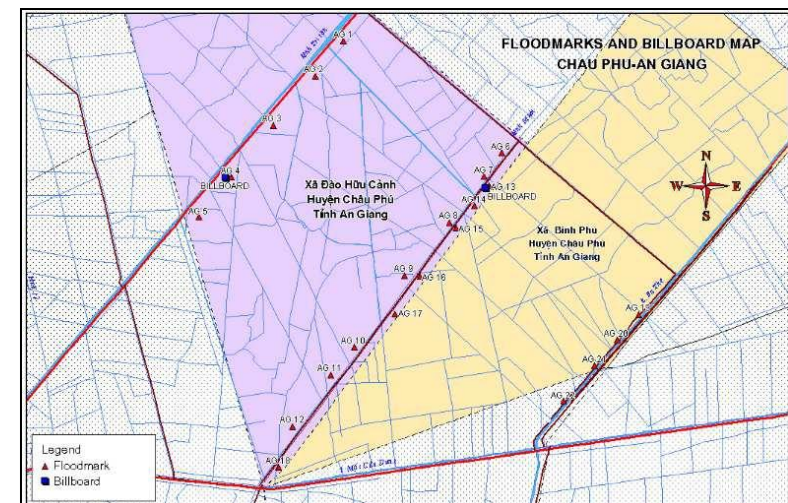
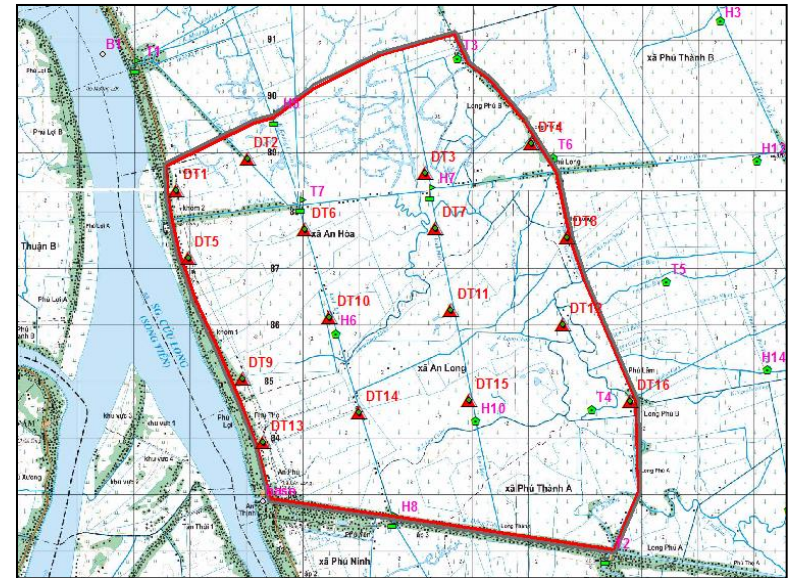
Pilot areas



- **Pilot areas in Tam Nong district - Dong Thap province and Chau Phu district - An Giang province.**
- **Every year, the study area usually flooded from August until November**

Establishment of Flood marks and Bill boards

- 16 flood marks in Tam Nong
- 22 flood marks in Chau Phu



Establishment of Flood marks and Bill boards

- 2 bill boards at Chau Phu
- 2 bill boards at Tam Nong

BẢNG THÔNG TIN VỀ LŨ LỤT Năm 2009				
Xã Đào Hữu Cảnh, Châu Phú, An Giang		Mức nước báo động trên sông Hậu tại Châu Đốc (m)	Cấp 1	2,50
Dân số : ?????			Cấp 2	3,00
Diện tích : ?????			Cấp 3	3,50
Ngày Tháng	Mức nước sông Hậu tại Châu Đốc (m)	Mức nước nội đồng tại xã (m)	Diện tích đất bị ngập (ha)	
Hôm qua	26 / 11	3,15	2,18	
Hôm nay	27 / 11	3,25	2,16	367
Ngày mai	28 / 11	3,26		
Ngày mốt	29 / 11	3,28		

*Dự án : Quản lý lũ lụt và Giảm nhẹ thiên tai (MRC-FMMP)
 Học phần 5 : Quản lý đất đai.
 Giai đoạn 2 : Tại Campuchia, Lào, Thái Lan, Việt Nam.
 Tổ chức tài trợ : Chính phủ Đức
 Cơ quan thực hiện : Ủy hội sông Mê công Quốc tế
 Tổ chức Hợp tác Kỹ thuật Đức
 Ủy ban sông Mê công Việt Nam
 Đại Khí tượng Thủy văn khu vực Nam Bộ*

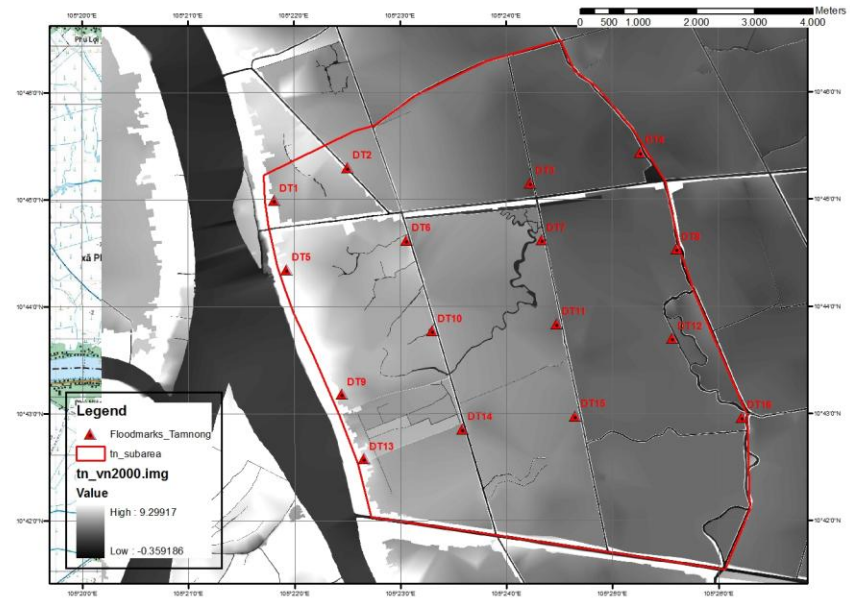
*Project : MRC-Flood Management & Mitigation Programme (FMMP)
 Component 5 (FMMP - CS / Land Management)
 Phase 2 : Cambodia, Lao PDR, Thailand, Viet Nam
 Funded by : Germany
 Executed by : Mekong River Commission (MRC)
 German Technical Cooperation (GTZ)
 Viet Nam National Mekong Committee (VNMC)
 Southern Regional Hydro-Meteorological Center (SRHMC)*



Data sources

- **DEM**

- DEM is supported by Vietnam Remote Sensing Center (VNRSC)
- Resolution: (5 x 5) m



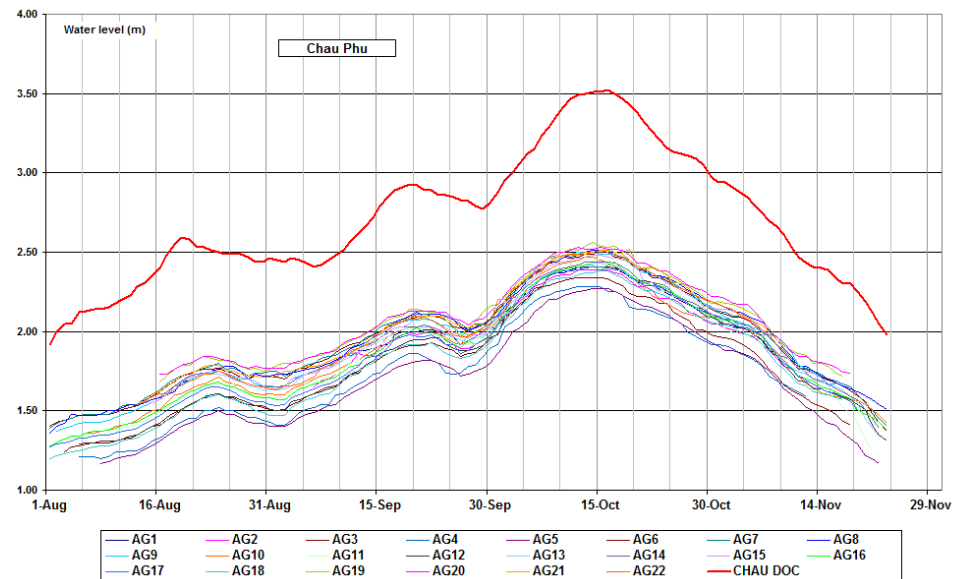
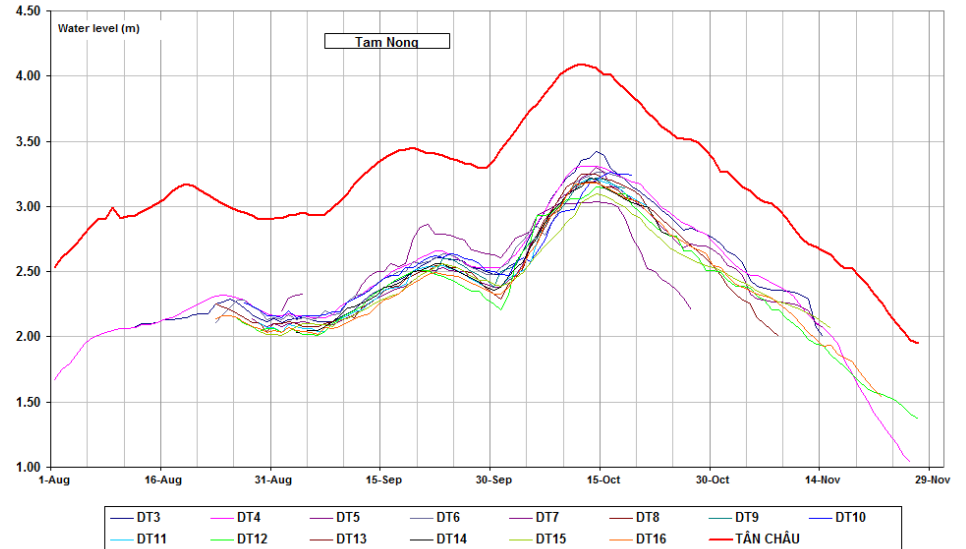
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Data sources

- Daily river levels since 1979 from Tan Chau and Chau Doc
- Daily records from flood marks during the flood season for 2009 and 2010 in Tam Nong and Chau Phu pilot areas



Processing hydrological data for use with MapStats software

- Calculate statistics from the long river records using MainStem software

TO MAKE AN INPUT FILE FOR MapStats3

Copy everything between the lines below to a new file called ExcRegression.dat and save the file in MapStats3\Data

DO NOT COPY THE LINES

Regression parameters for river level exceedence: A and B
2 stations

"Tan Chau"			
MNfirst	141.7	27.90	
MNlast	418.9	-34.78	
MNduration	262.6	-57.57	
SDfirst	7.3	5.17	
SDlast	14.4	-0.95	
SDduration	23.4	0.98	
"Chau Doc"			
MNfirst	144.5	36.02	
MNlast	412.4	-35.92	
MNduration	257.2	-67.08	
SDfirst	12.9	3.30	
SDlast	13.9	-0.77	
SDduration	20.2	2.51	

TO MAKE AN INPUT FILE FOR MapStats3

Copy everything between the lines below to a new file called PeakLevel.dat and save the file in MapStats3\Data

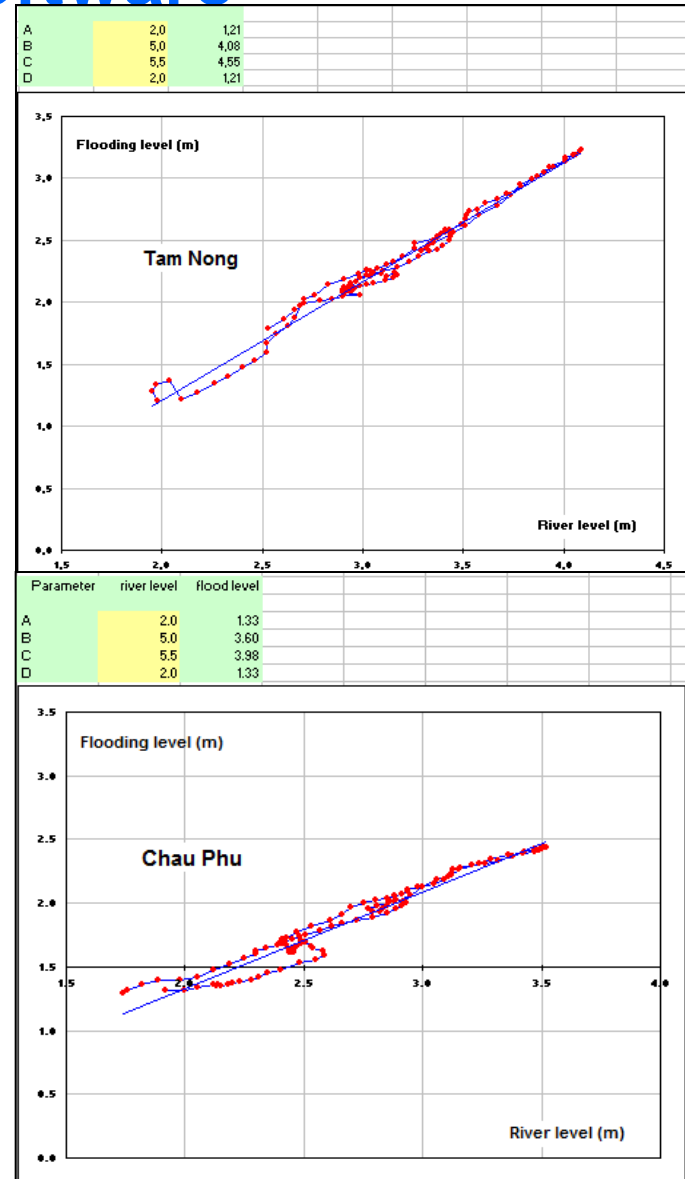
DO NOT COPY THE LINES

Parameters for peak river level: Transform, A and B
2 stations

"Tan Chau"			
"Chau Doc"			
	6.33	0.73	-0.24
	14.51	2.38	-0.05

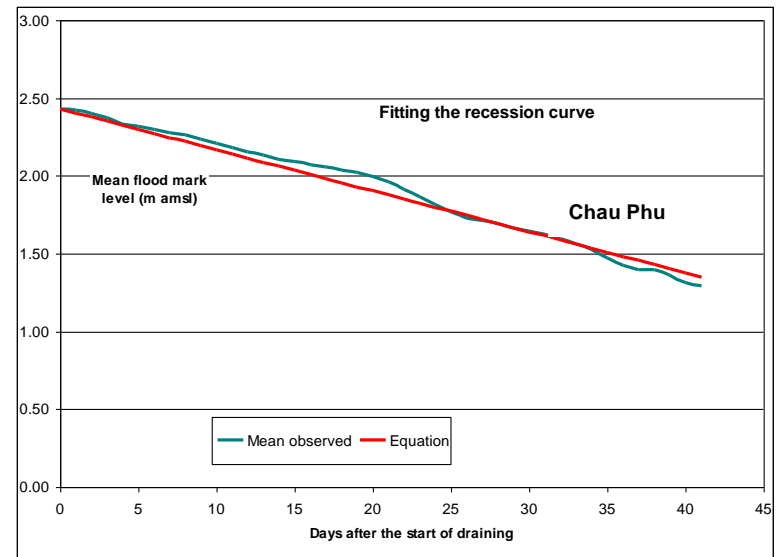
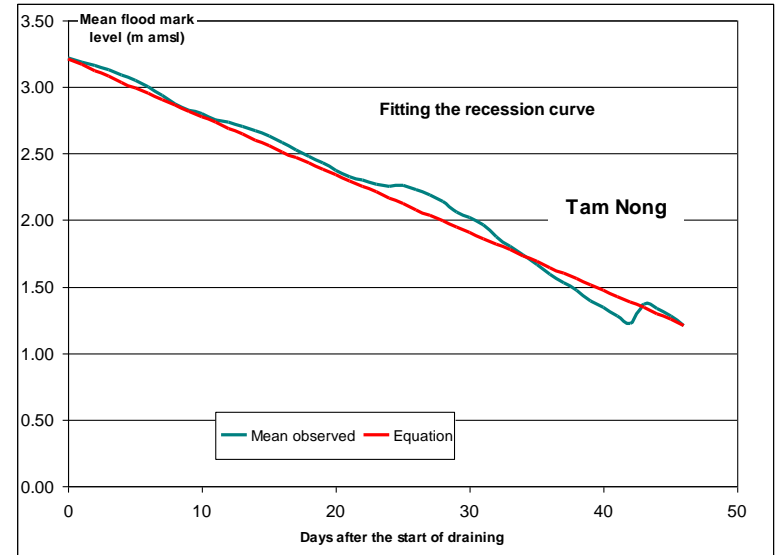
Processing hydrological data for use with MapStats software

- We transfer this statistical information to the flood plains by correlation, which is defined by analysis carried out in a spreadsheet.



Processing hydrological data for use with MapStats software

- **Flood recessions parameters**
 - To predict how quickly the floodwater recedes
 - and to know when completion of drainage takes place



Data for the MapStats program

MapStats needs several kinds of information:

Lists – district names, river stations, probabilities

Classification data – to correctly interpret the maps

Rasters – for topography (DTM) and sub-areas

Statistical data – parameters for river statistics

Correlation data – parameters for the correlation model(s)

Drainage rates – recession parameters

Any other sub-area data such as slope and time delay

Data for the MapStats program

- Input data for MapStats software.

```

Regression parameters for river level exceedence: A and B
2 stations
"Tan Chau"
MNfirst      141.7   27.90
MNlast      418.9  -34.78
MNduration  262.6  -57.57
SDfirst      7.3    5.17
SDlast     14.4   -0.95
SDduration  23.4    0.98
"Chau Doc"
MNfirst     144.5   36.02
MNlast     412.4  -35.92
MNduration  257.2  -67.08
SDfirst     12.9    3.30
SDlast     13.9   -0.77
SDduration  20.2    2.51
    
```

```

Sub areas and parameters
2 districts
"Tan Nong"
1 subarea
"TC1"
"Tan Chau"      upstream river station
"Tan Chau"      downstream river station
0               distance (km) from u/s station to reference point
2.0            1.21    model point A (river level, plain level) (m)
5.0            4.08    model point B
5.5            4.55    model point C
2.0            1.21    model point D
23.0           0.0     drainage constants
31.0           slope assumed on flood plain (mm/km)
3.10           direction of flow
543935         neutral point (UTM east)
1186407        neutral point (UTM north)
2              time delay (days)
"Chau Phu"
1 subarea
"CPI"
"Chau Doc"      upstream river station
"Chau Doc"      downstream river station
0               distance (km) from u/s station to reference point
2.0            1.33    model point A (river level, plain level) (m)
5.0            3.60    model point B
5.5            3.98    model point C
2.0            1.33    model point D
33.0           0.0     drainage constants
25.0           slope assumed on flood plain (mm/km)
5.01           direction of flow
515673         neutral point (UTM east)
1158497        neutral point (UTM north)
3              time delay (days)
    
```

```

Parameters for peak river level: Transform, A and B
2 stations
"Tan Chau"
"Chau Doc"
           6.28    0.71   -0.26
           13.04   2.23   -0.06
    
```

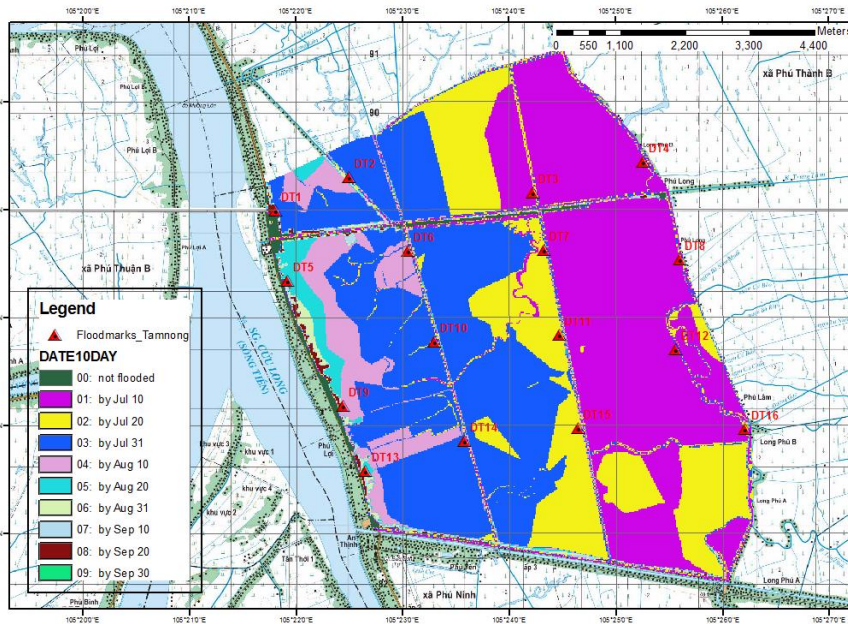
Mapping flood statistics

- **Types of maps**
 - **Maximum depth of flooding ***
 - **Probability of flooding**
 - **Start of flooding ***
 - **Date of completion of draining ***
 - **Duration of flooding ***

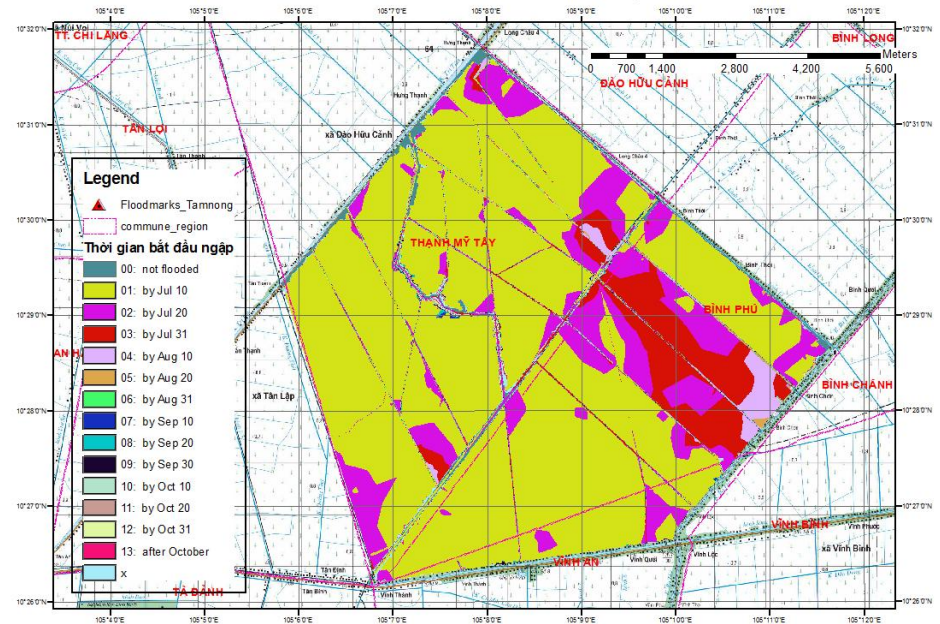
***These maps can be drawn for up to 10 different levels of risk
(probability of exceedence)**

Mapping flood statistics

START OF FLOODING IN TAM NONG 2009



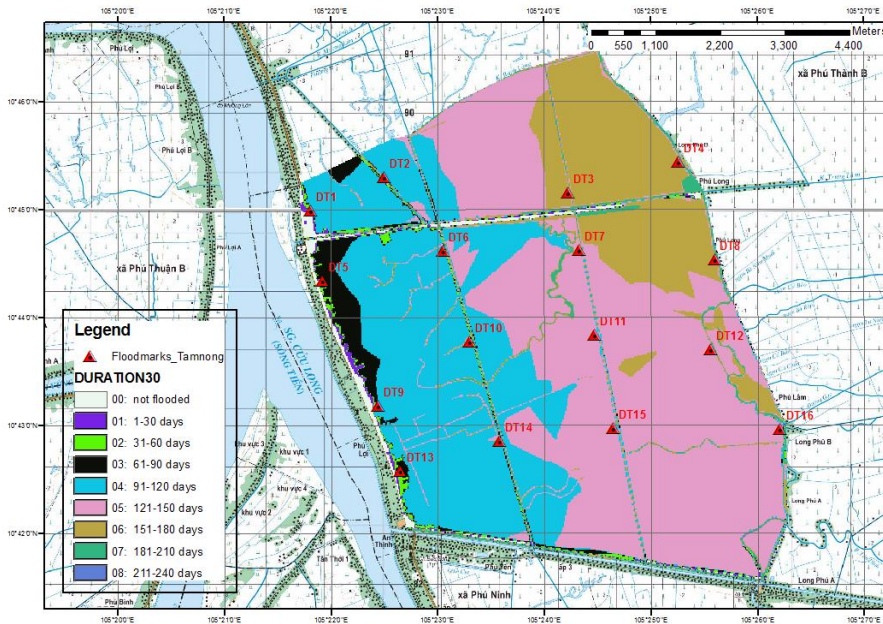
BẢN ĐỒ THỜI GIAN BẮT ĐẦU NGẬP NĂM 2009



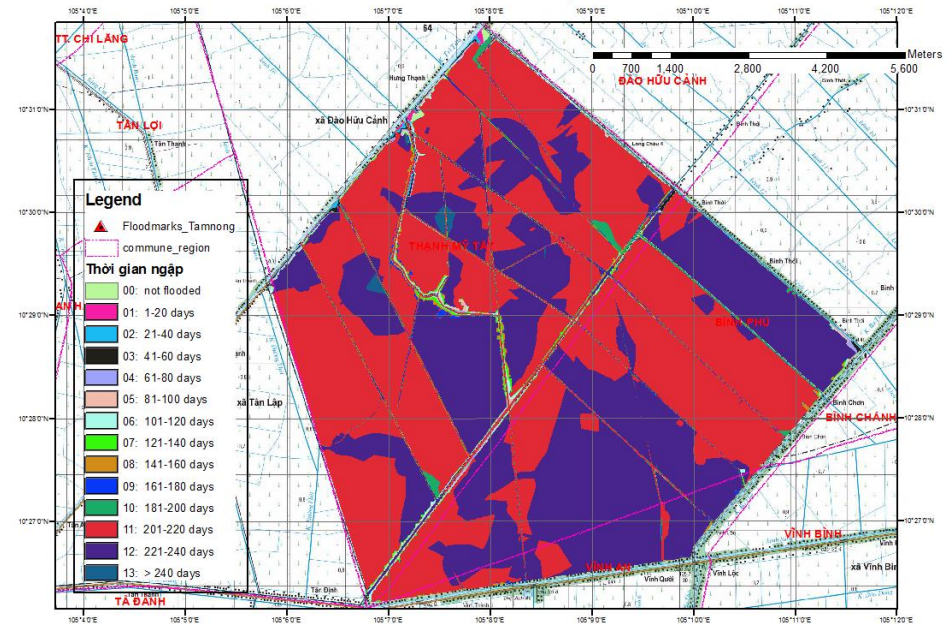
- Start of flooding

Mapping flood statistics

DURATION OF FLOODING IN TAM NONG 2009



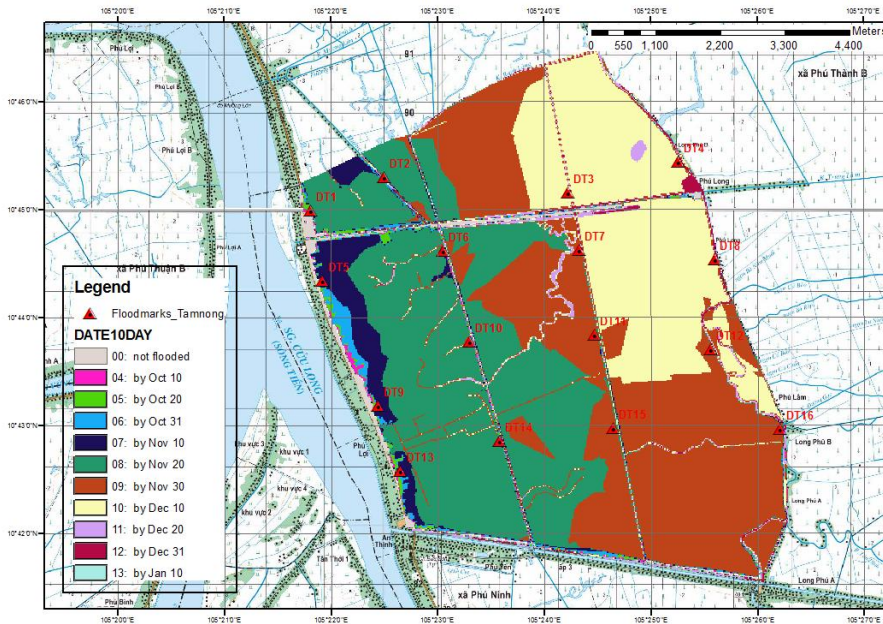
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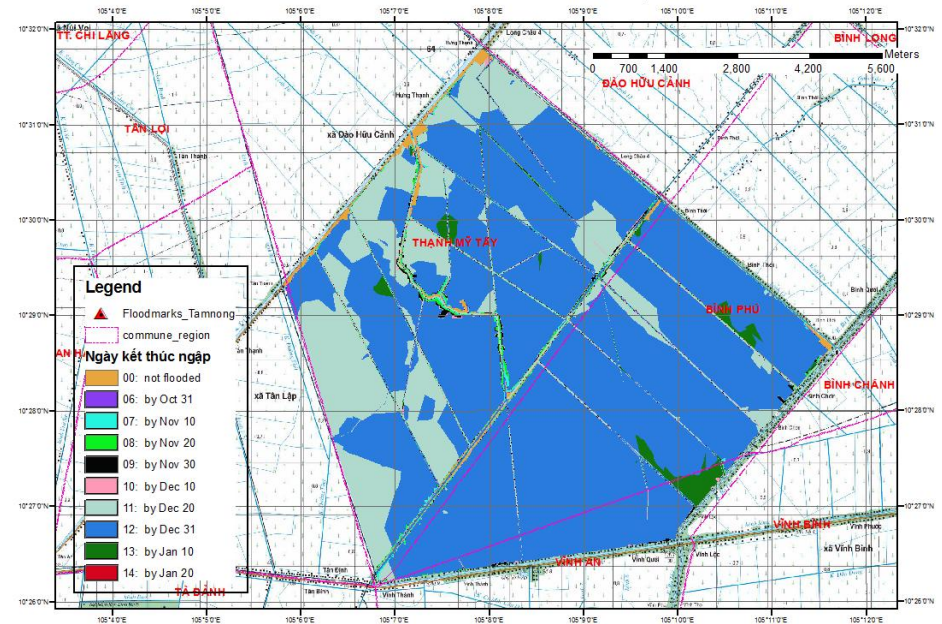
- Duration of flooding

Mapping flood statistics

COMPLETION OF FLOODING IN TAM NONG 2009



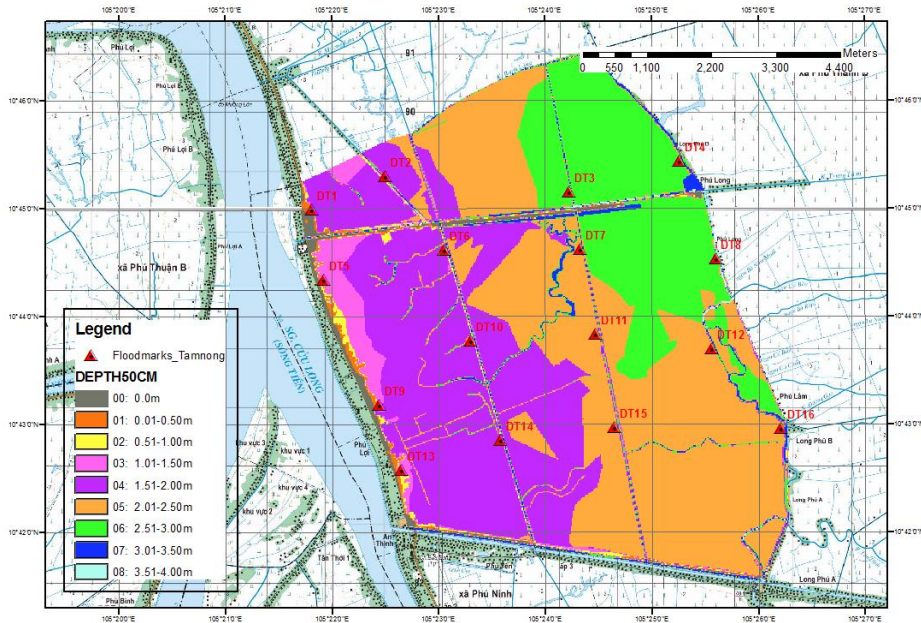
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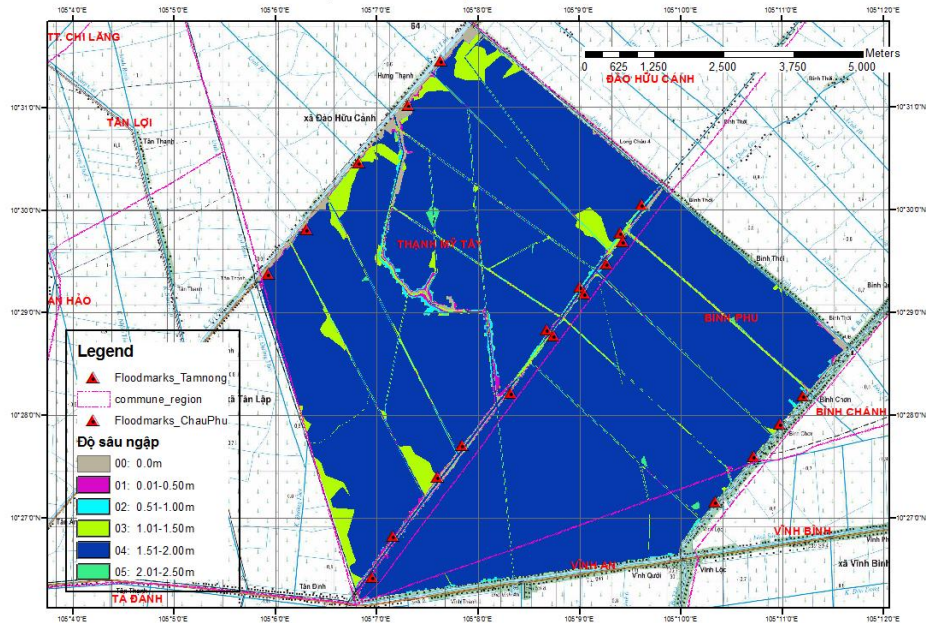
- Completion of flooding

Mapping flood statistics

MAXIMUM DEPTH OF FLOODING IN TAM NONG 2009



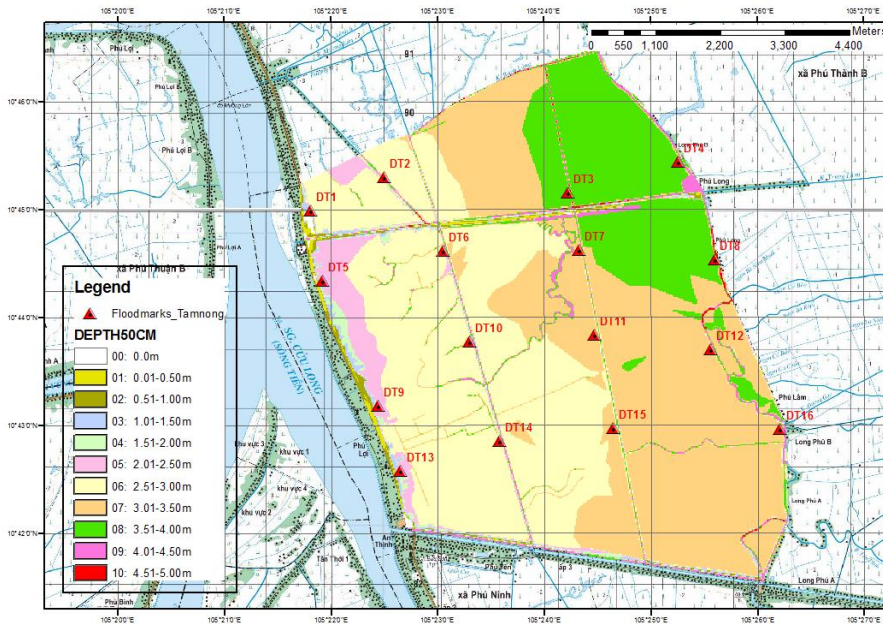
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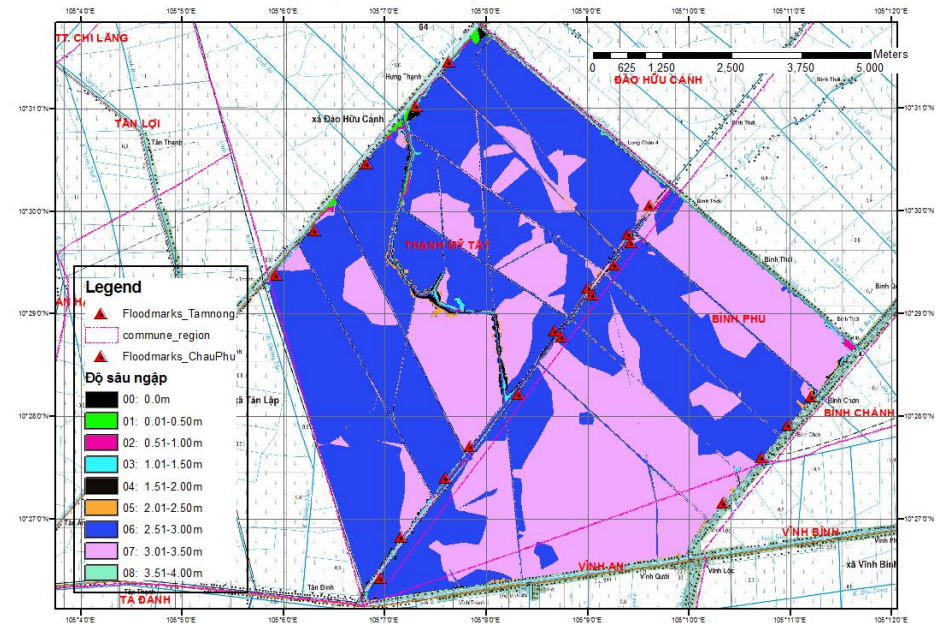
- Maximum depth of flooding

Mapping flood statistics

MAXIMUM DEPTH OF FLOODING IN 2000



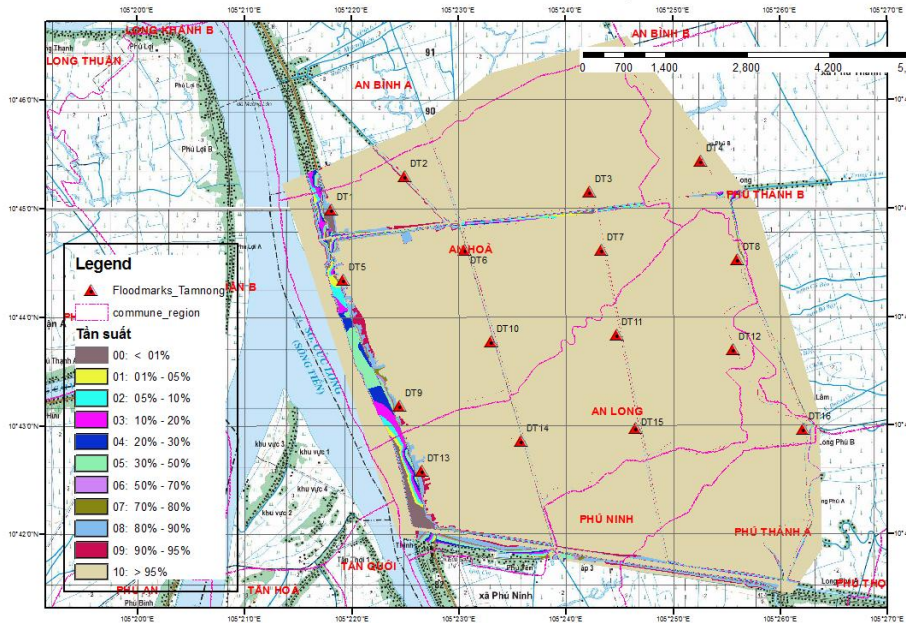
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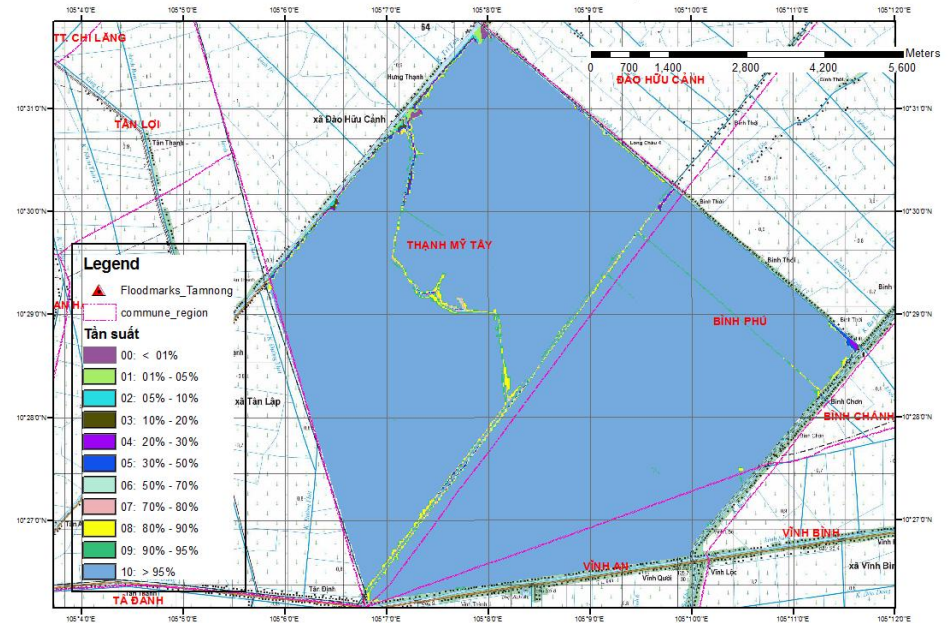
- Maximum depth of flooding (2000)

Mapping flood statistics

BẢN ĐỒ TẦN SUẤT NGẬP



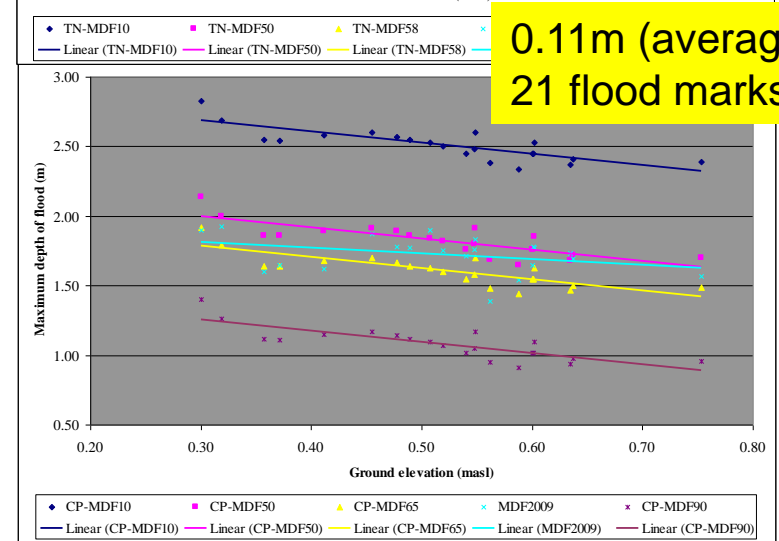
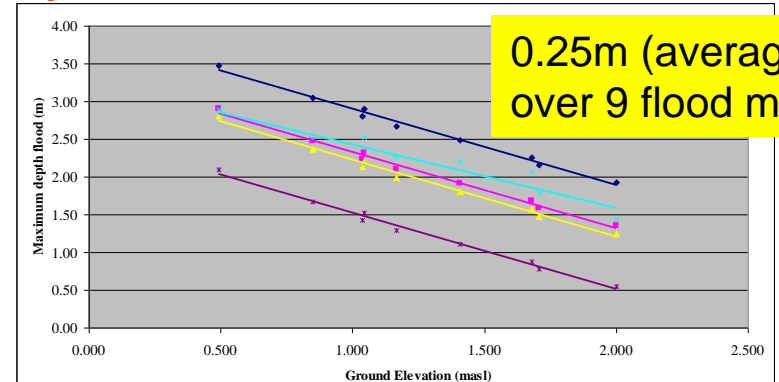
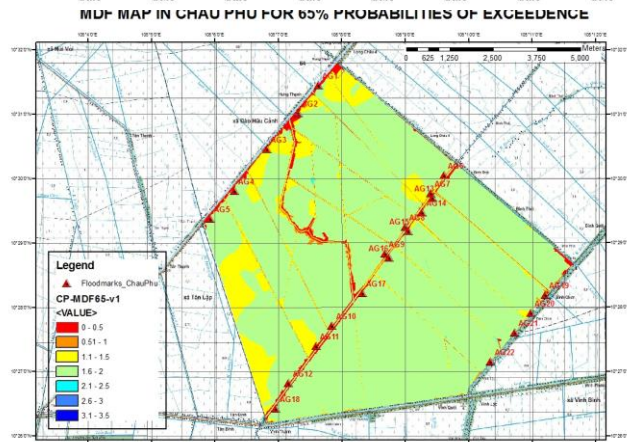
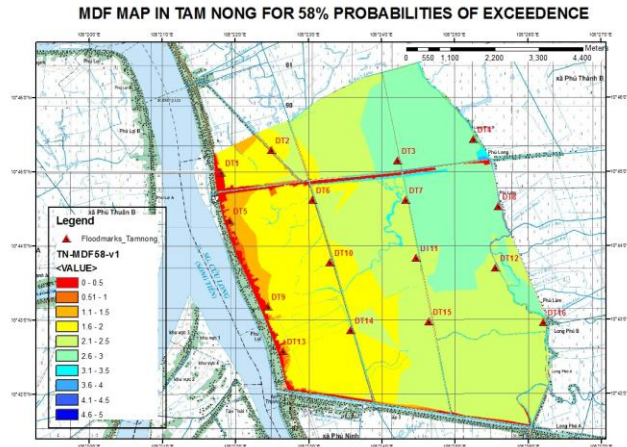
BẢN ĐỒ TẦN SUẤT NGẬP



- Probability of flooding

Validating the results

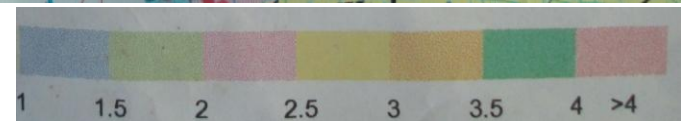
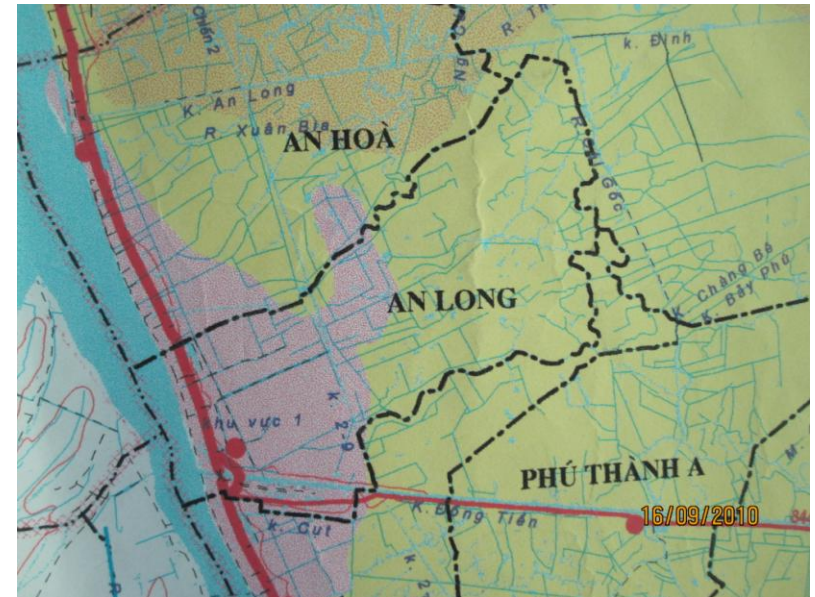
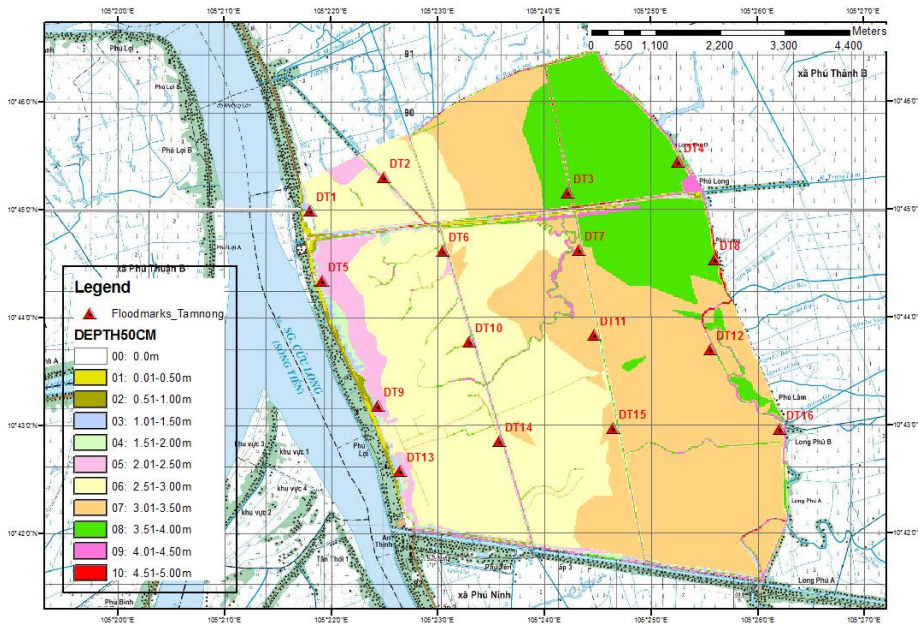
- Compare maximum depth of flooding between prediction and observation



- The maximum WL at Chau Doc in 2009 is 3.52 m (Probability of exceedence is 65%) and maximum WL at Tan Chau is 4.09 m (Probability of exceedence is 58%)
- The results of the analysis suggest that the MapStats analysis for Chau Phu and Tam Nong under-estimates the maximum depth of flooding (MDF) by a small amount.

Validating the results

MAXIMUM DEPTH OF FLOODING IN 2000



- Maximum depth of flooding (2000)

Conclusions and Recommendations

- Pilot areas have dike systems, so the result of some types of maps such as the Start of flooding, Completion of flooding, Duration of flooding... may be affected by the flood prevention in August and pumping in November.
- Because of short measured data in the flooded area (2009 and 2010), so the input parameters for the MapStats software may not be accurate. It is therefore important that the observations continue, and that they are used to evaluate and continually improve the quality of predictions.
- Results calculated maximum depth of flooding is quite consistent with the measured data.
- Five types of maps, which are made by MapStats software, are very useful for Agriculture and land management, Infrastructure planning (roads, embankments, public buildings) and Flood awareness and mitigation. Thus, we propose to continue this study apply to other areas in Vietnam.

**Thank you very much for
your kind attention!**