



Disaster Impact Assessment of Simulated Extremely Climate Events

2013 International Conference on Climate Change, Taipei, Taiwan, Jan. 15-17

Natural Disasters in Taiwan

5 Major
Disasters



Earthquake



Landslide



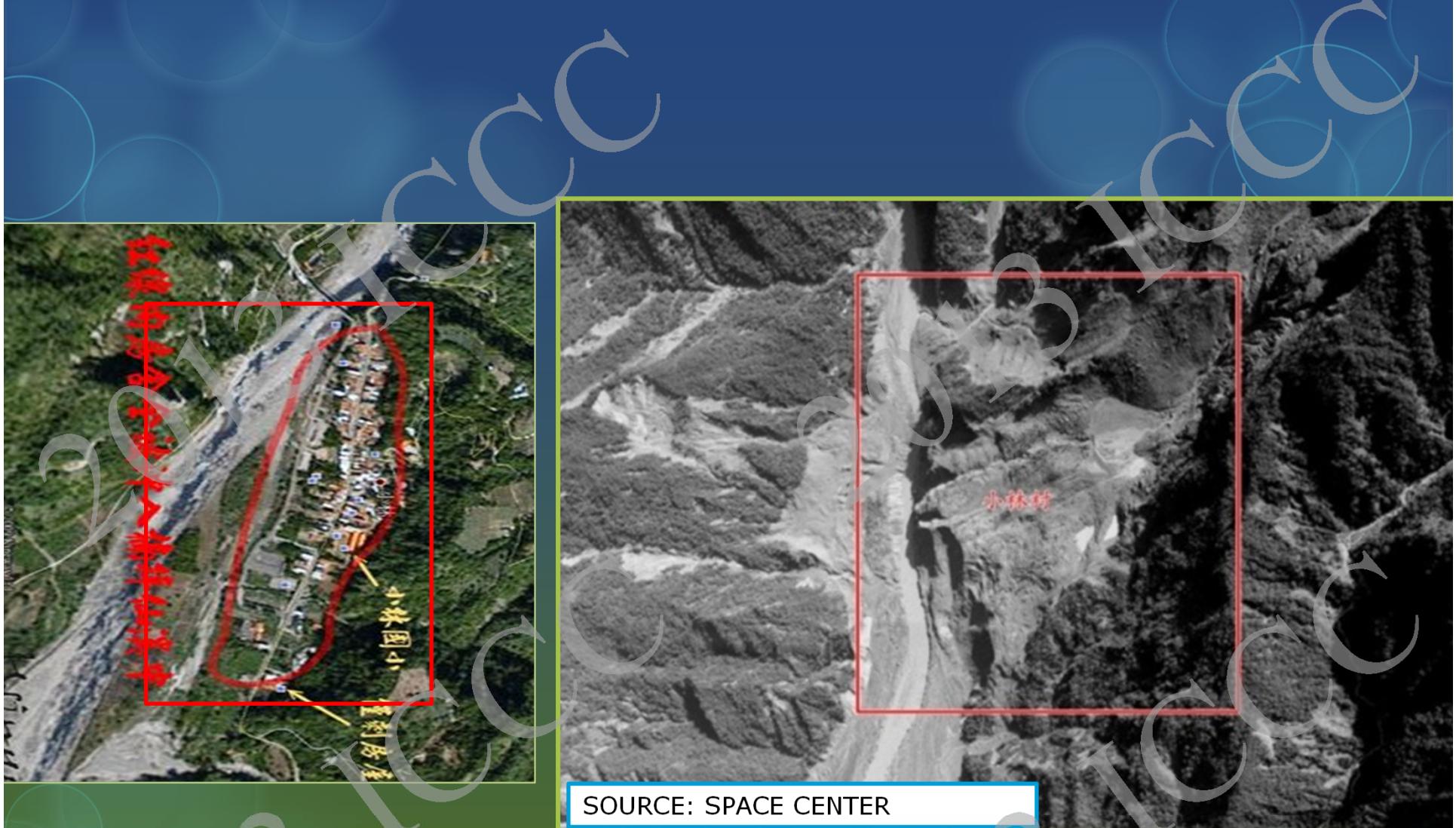
Typhoon



Flood



Debris flow





SOURCE: CHUN-HSING UNIVERSITY



SOURCE: PING-TUNG UNIVERSITY

ASSESS EXTREMELY FLOOD IMPACT

Extreme
Typhoons

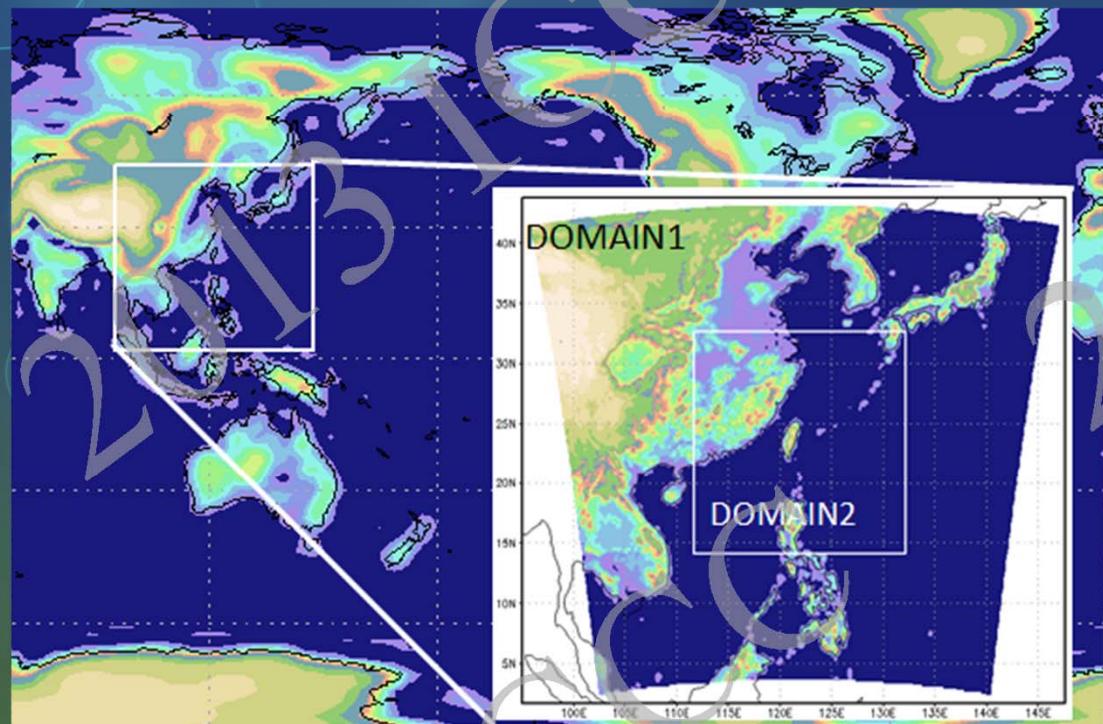
Flood
Simulation

Impact
Assessment

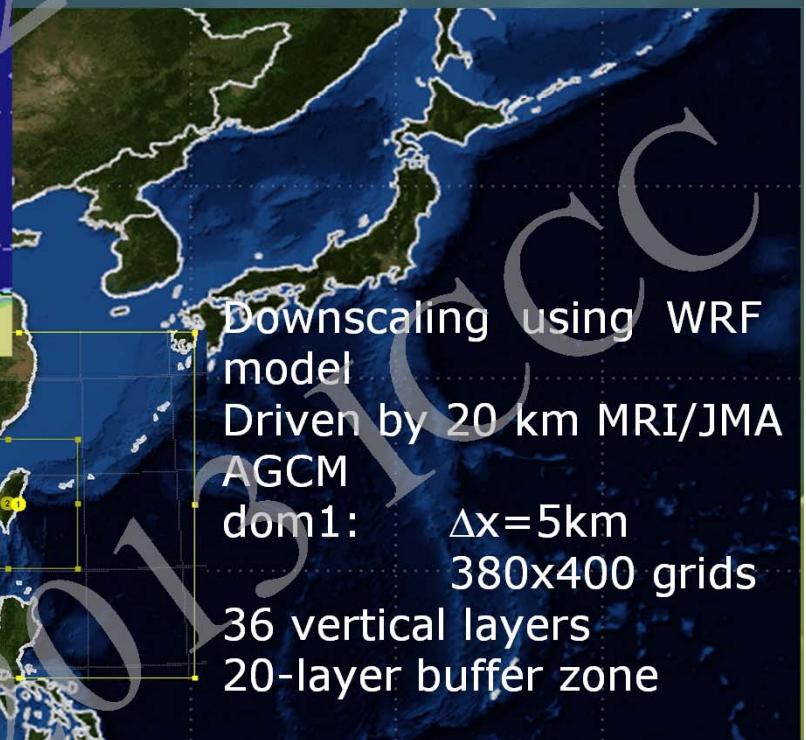
PROCESS

Extreme
Typhoons

Dynamical Downscaling

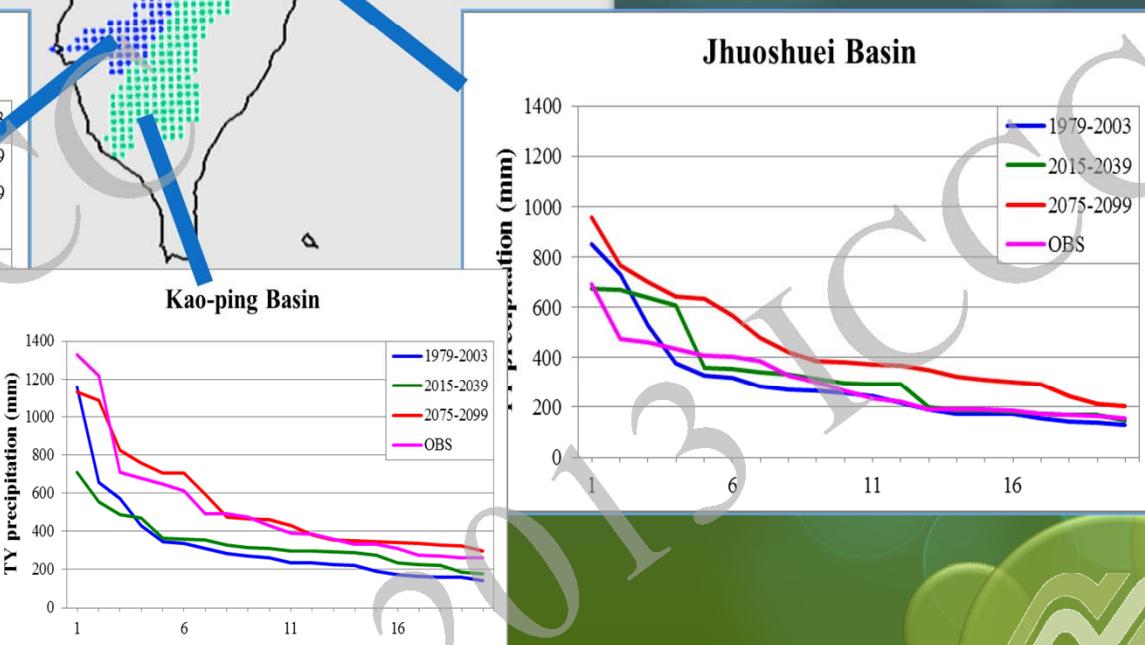
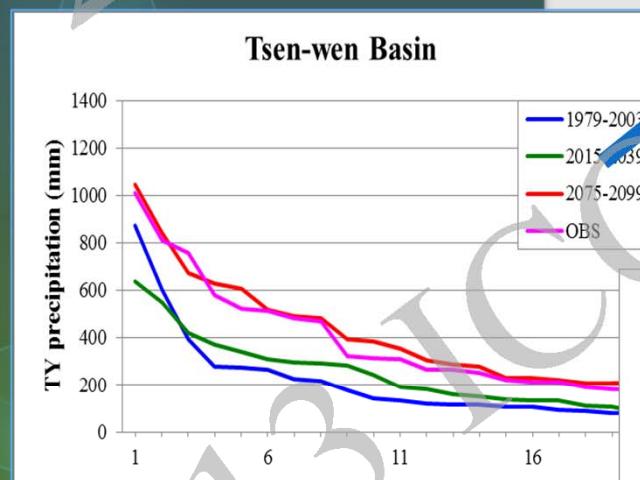
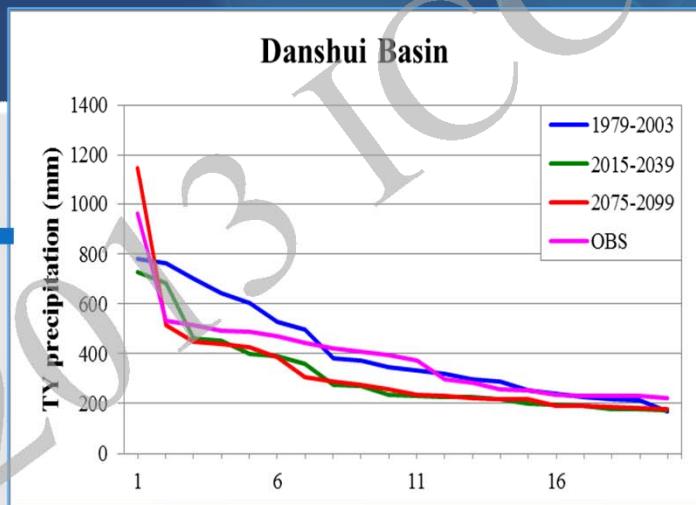
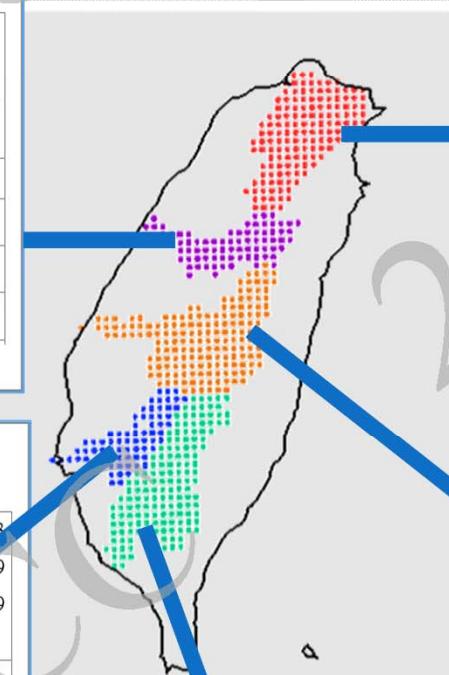
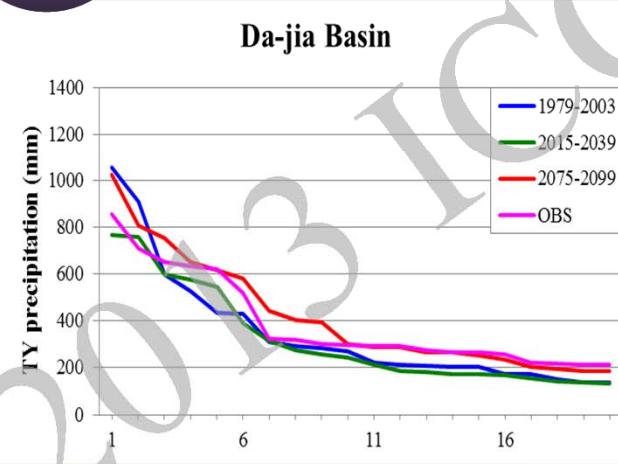


ECHAM5-WRF
& MRI-WRF



Extreme Typhoons

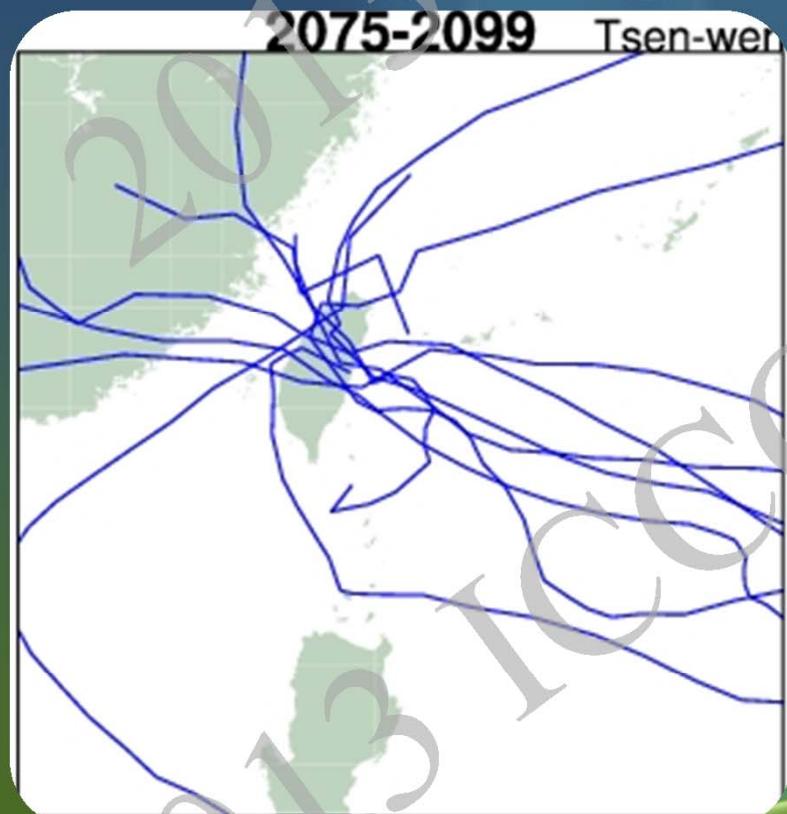
Selection of Extreme Typhoons



Top-10 typhoons for Tzeng-wen river basin



The End of Century



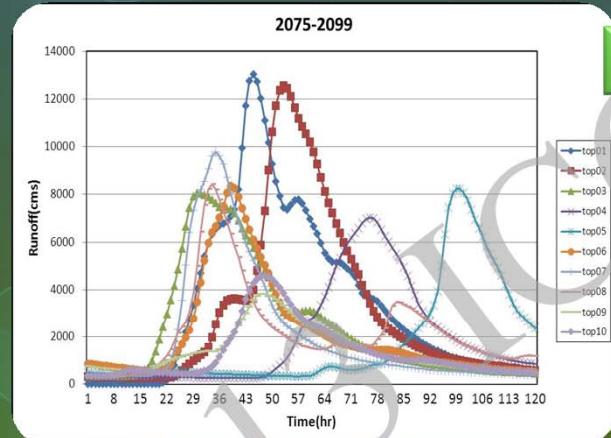


Flood Simulation

SOBEK

1. Rainfall-Runoff
2. Channel Flow
3. Overland Flow

Runoff Hydrograph



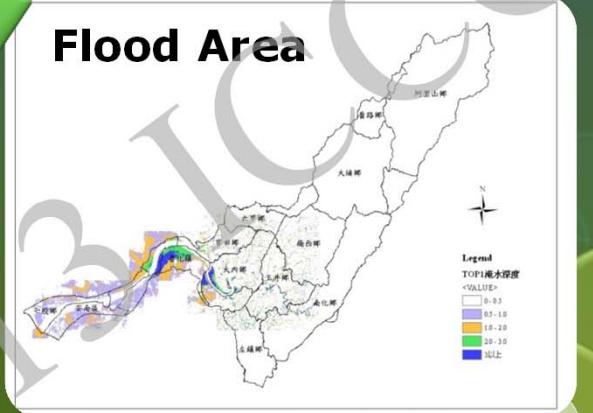
Channel Flow



Grid

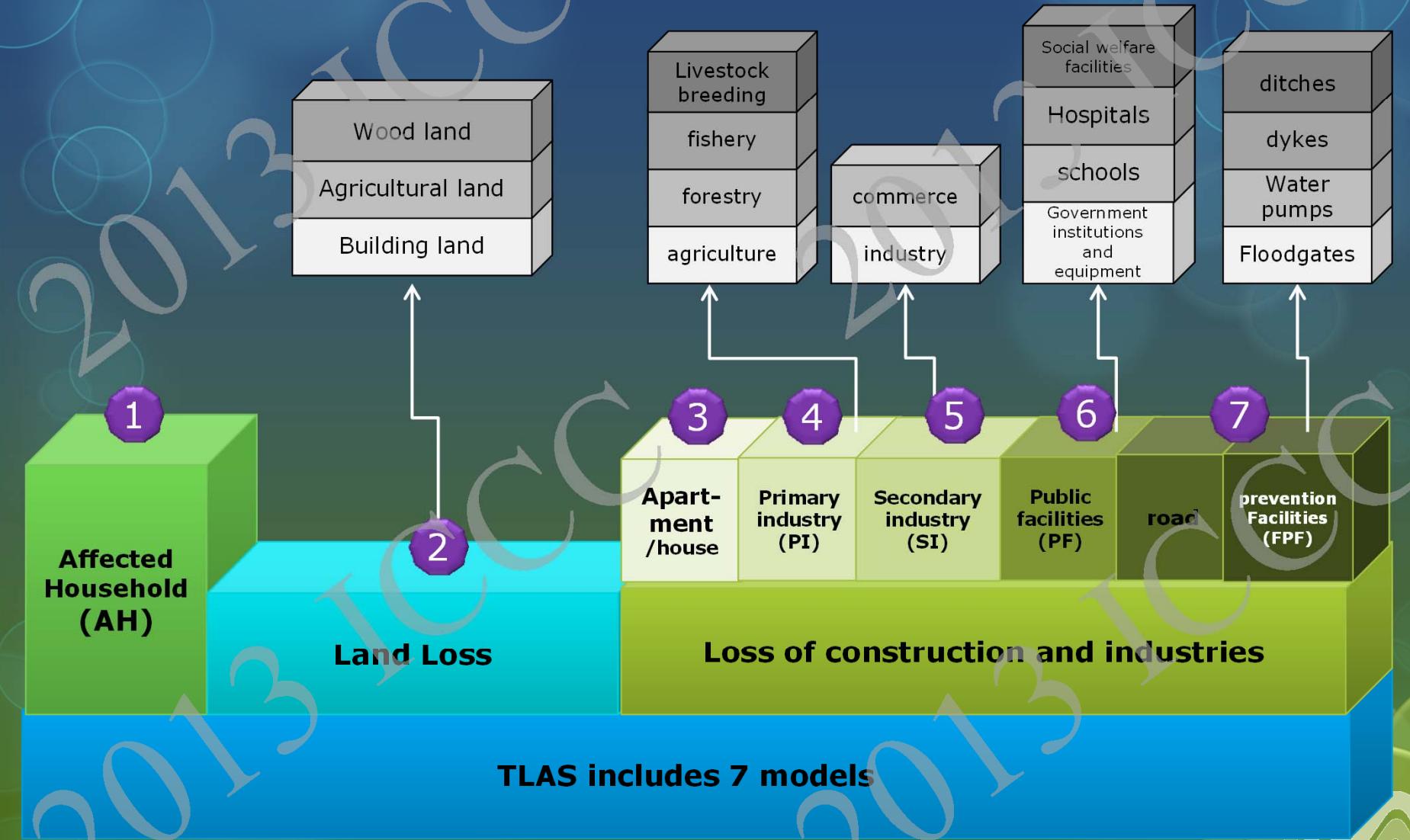


Overland Flow



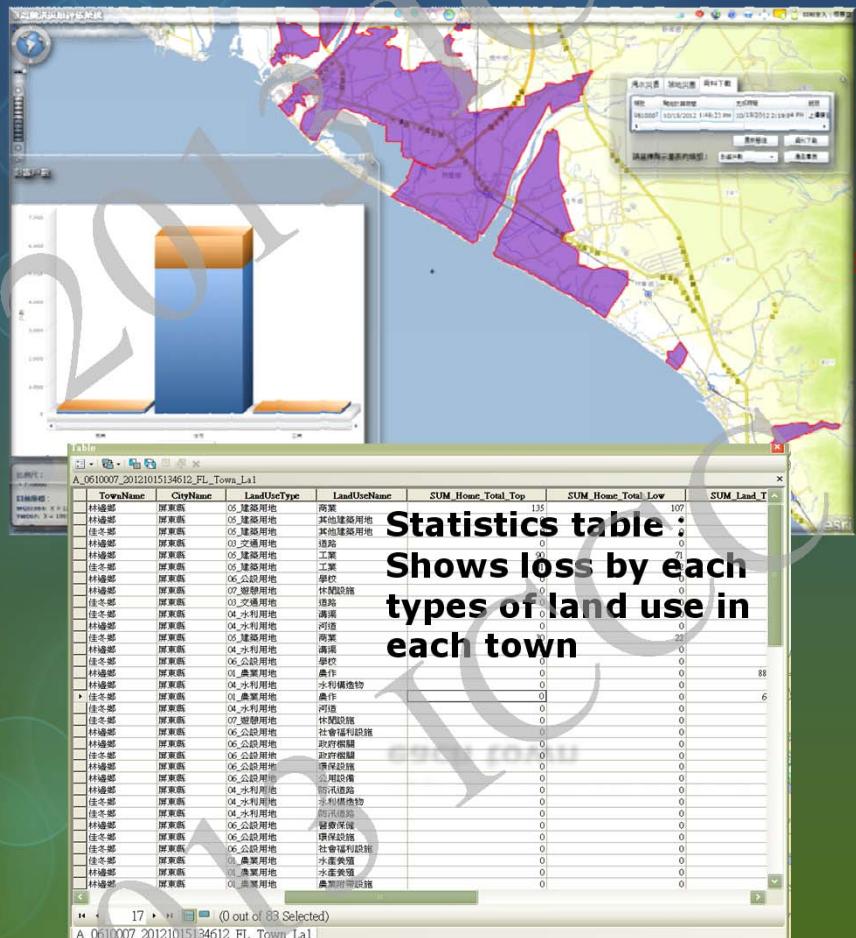


Taiwan Typhoon Loss Assessment System (TLAS)



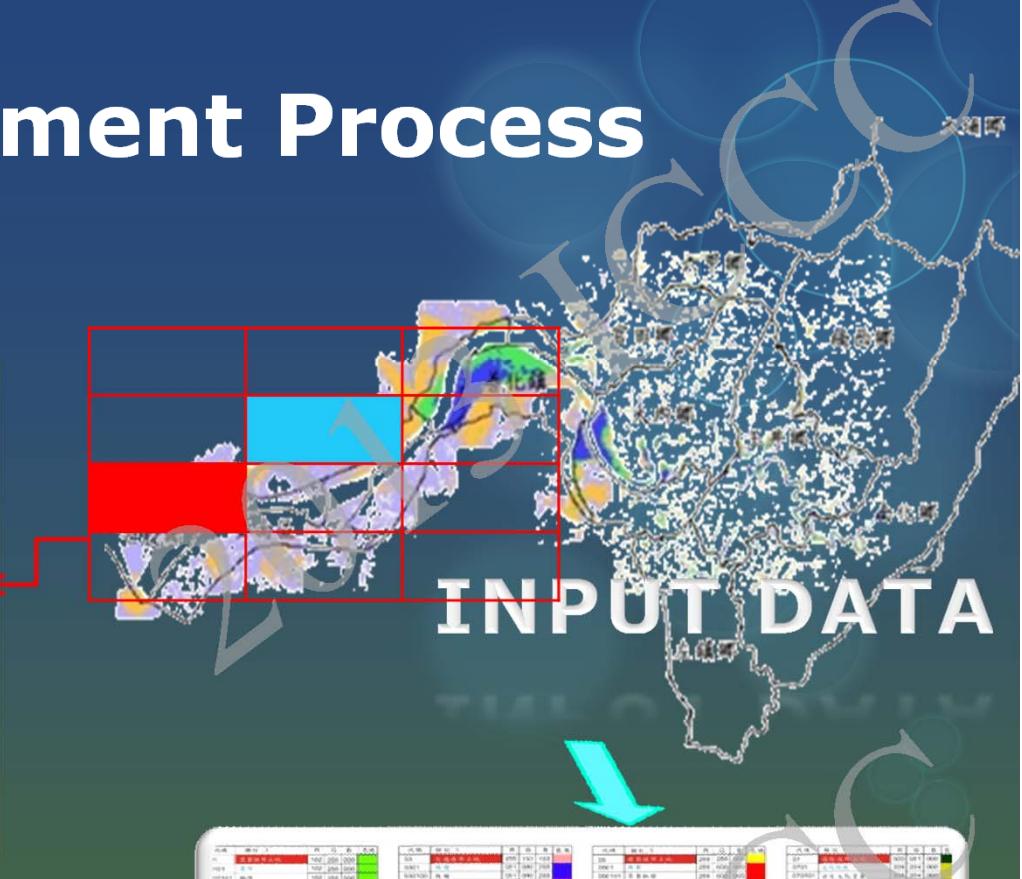


Loss Assessment Process



LOSS RESULTS

2013 International Conference on Climate Change, Taipei, Taiwan, Jan. 15-17



The system now able
to calculate loss by 27
main land-use types.

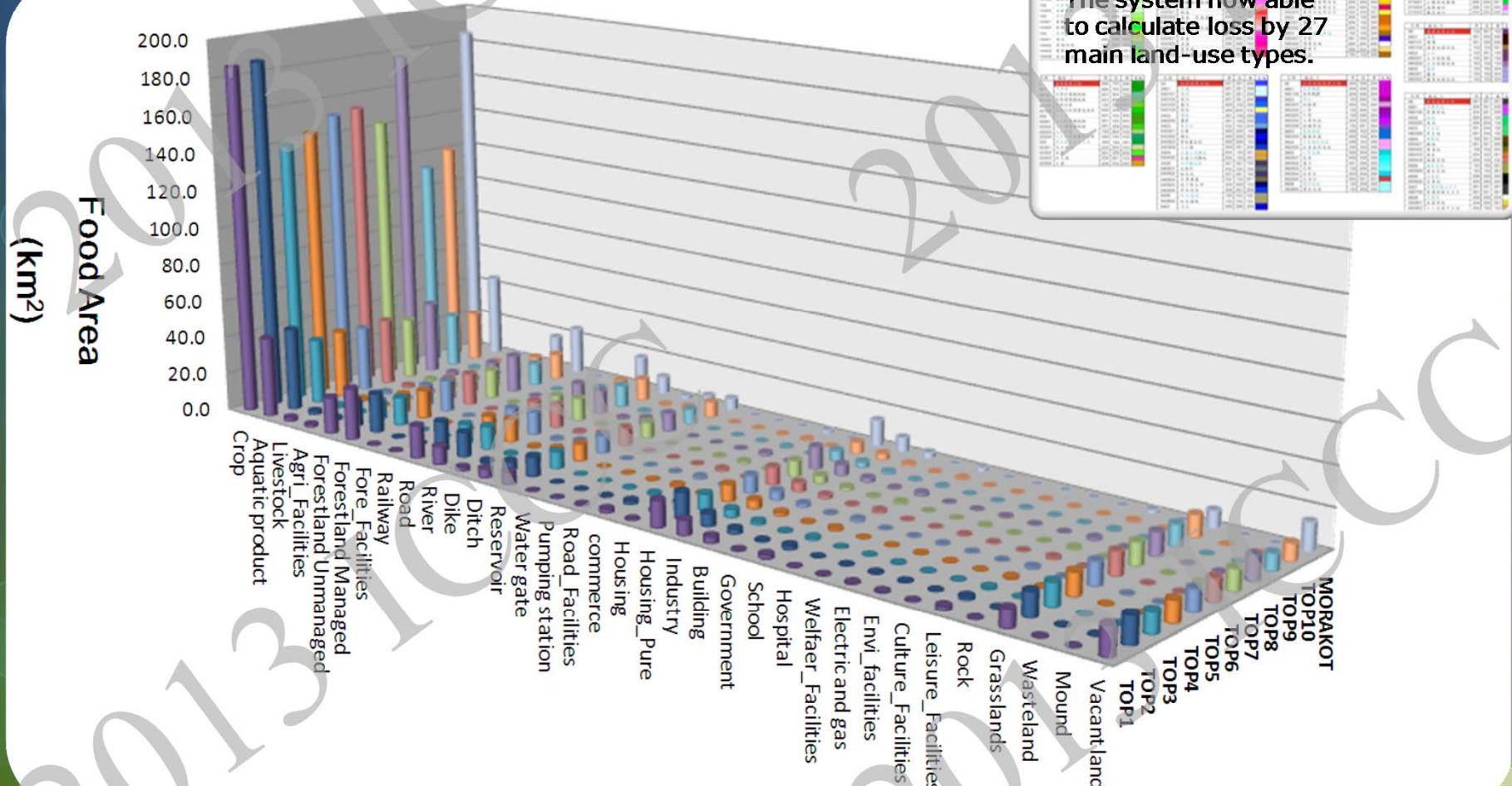
A large table showing 27 main land-use types, each associated with a specific color. The categories include residential, industrial, agricultural, and various types of public and utility lands.

Category	Color
Residential	Red
Industrial	Blue
Agricultural	Green
Commercial	Yellow
Park	Orange
Water Body	Purple
River	Cyan
Wetland	Light Blue
Forest	Dark Green
Mountain	Grey
Urban	Light Orange
Industrial	Dark Blue
Commercial	Light Green
Park	Dark Orange
Water Body	Dark Purple
River	Dark Cyan
Wetland	Dark Light Blue
Forest	Dark Dark Green
Mountain	Dark Grey
Urban	Dark Light Orange
Industrial	Dark Dark Blue
Commercial	Dark Light Green
Park	Dark Dark Orange
Water Body	Dark Dark Purple
River	Dark Dark Cyan
Wetland	Dark Dark Light Blue
Forest	Dark Dark Dark Green
Mountain	Dark Dark Grey
Urban	Dark Dark Light Orange

LAND-USE CATEGORIES

NCDR

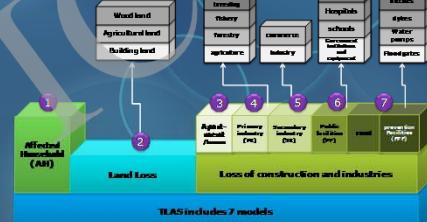
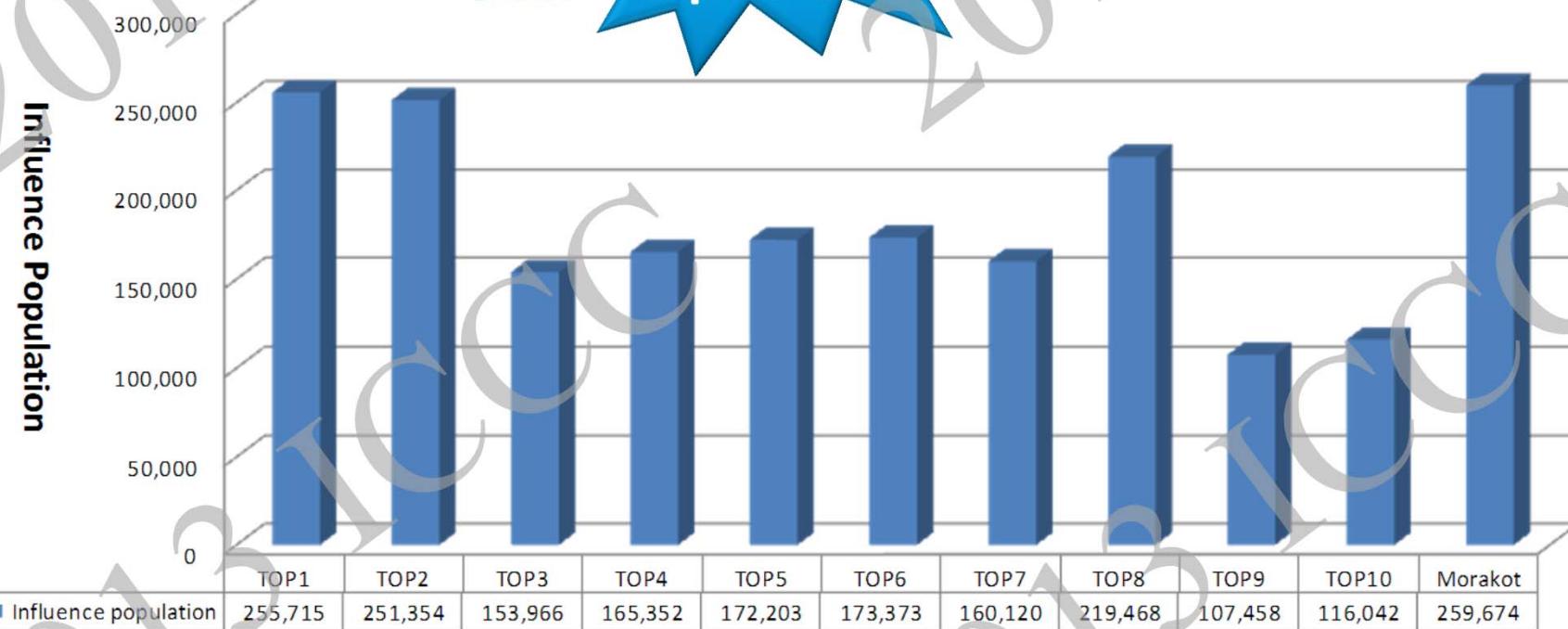
Flood Area with Land Usage





Flood Impacts

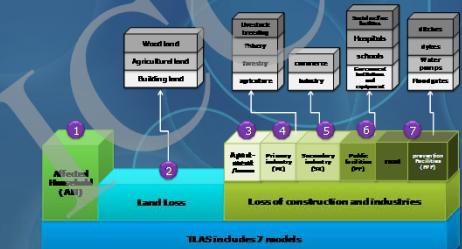
Influence Population



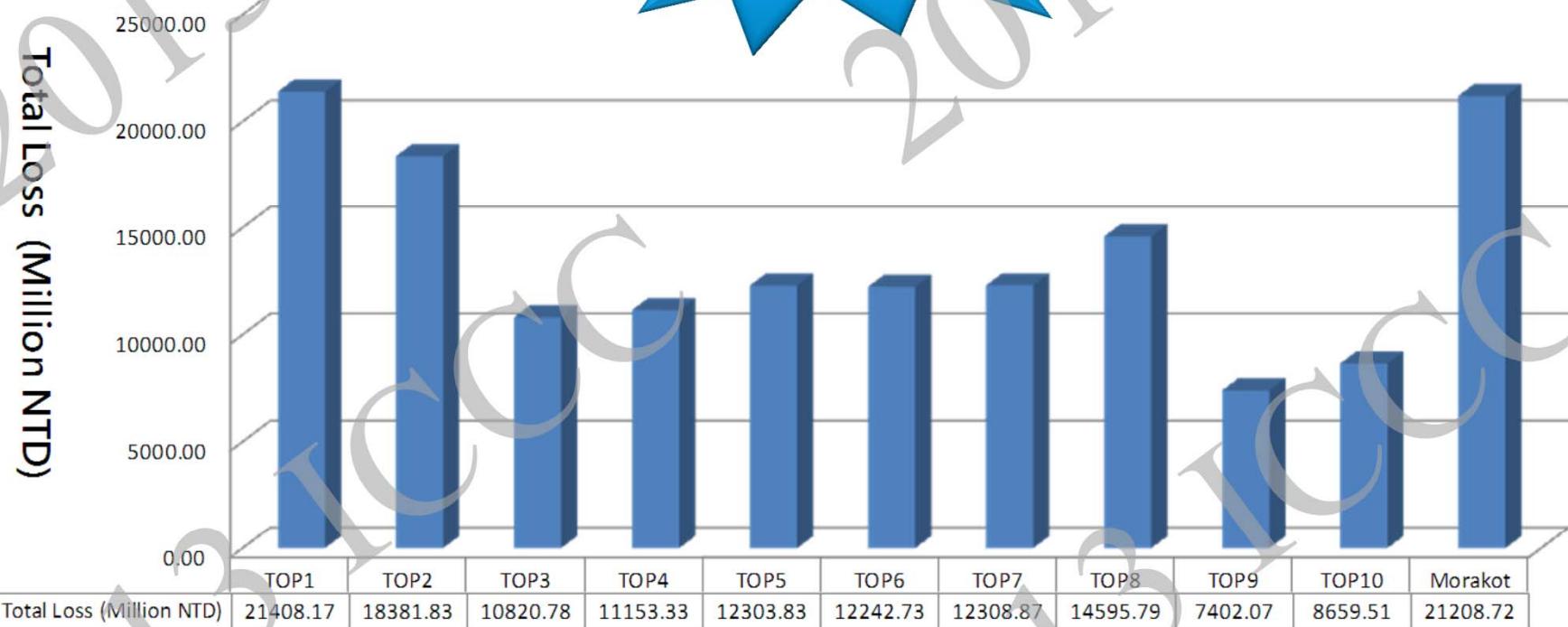


Flood Impacts

Total
Flood Loss

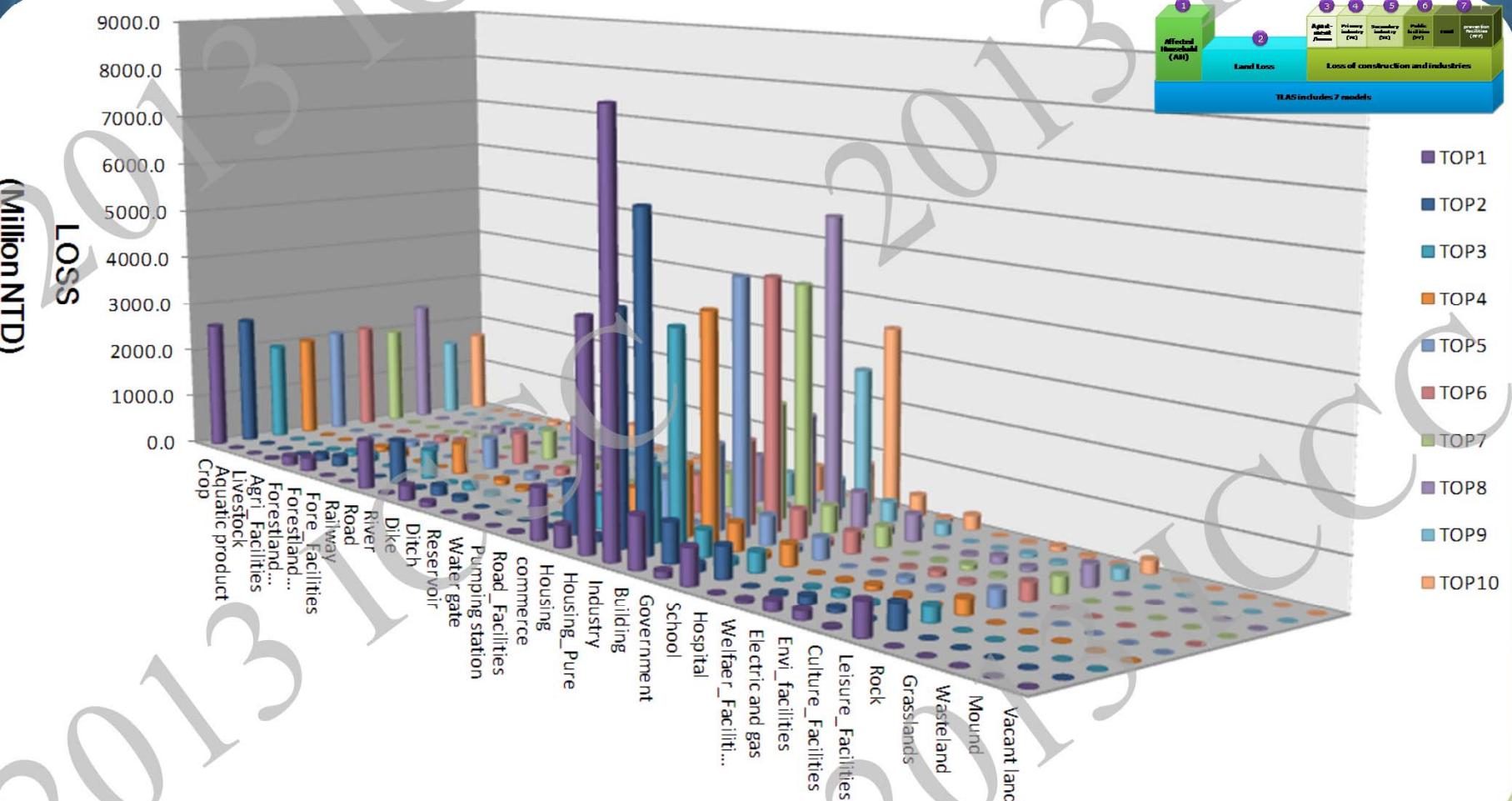


TLAS includes 7 models





Flood Loss with Land Usage



FACTOR ANALYSIS

- TOP1
- TOP2
- TOP3
- TOP4
- TOP5
- TOP6
- TOP7
- TOP8
- TOP9
- TOP10
- MORAKOT

EVENTS

Total rainfall

Maximum 3、6、12、
24、72 hours
accumulated rainfall

Total runoff

Flood peak duration

Maximum hour runoff

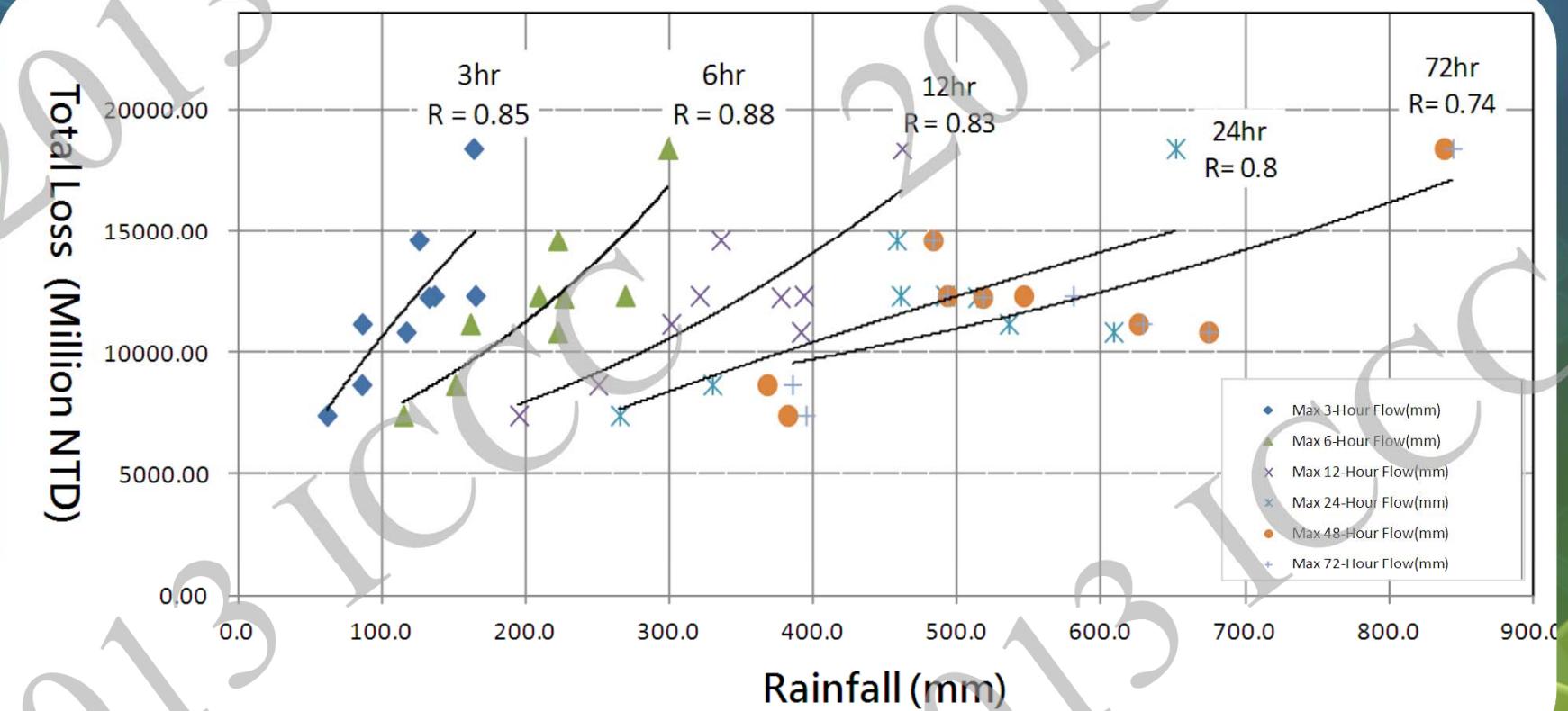
Land usage type

FFECTED FACTORS

Total
Flood
Loss

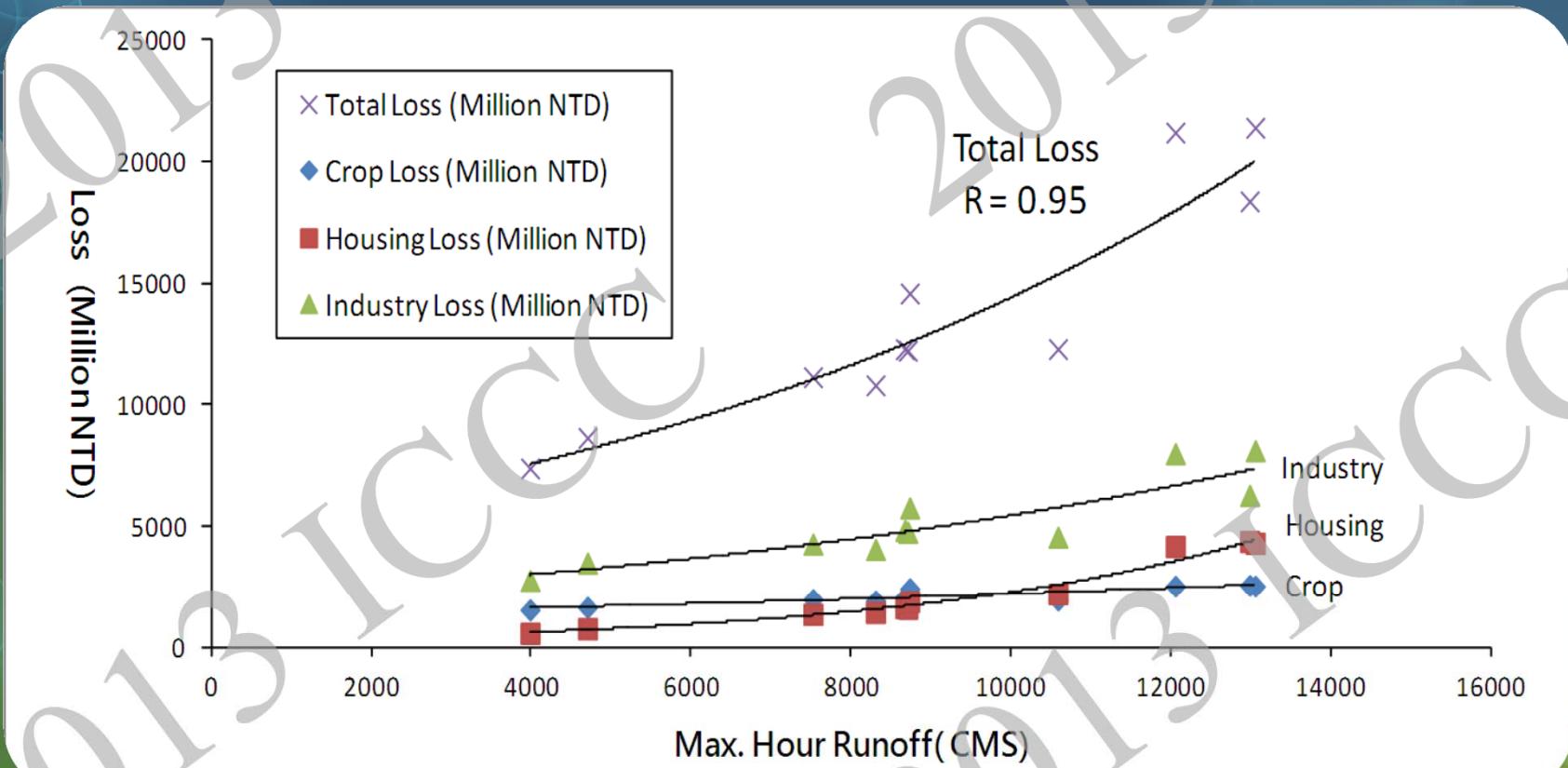
FACTOR ANALYSIS

Total Loss V.S. Rainfall



FACTOR ANALYSIS

Total Loss V.S. Maximum Hour Runoff



FACTOR ANALYSIS

Climate
Factor

Hydraulic
Factor

Soci-Economic
Factor

- Max. 6 hours accumulated rainfall

88%

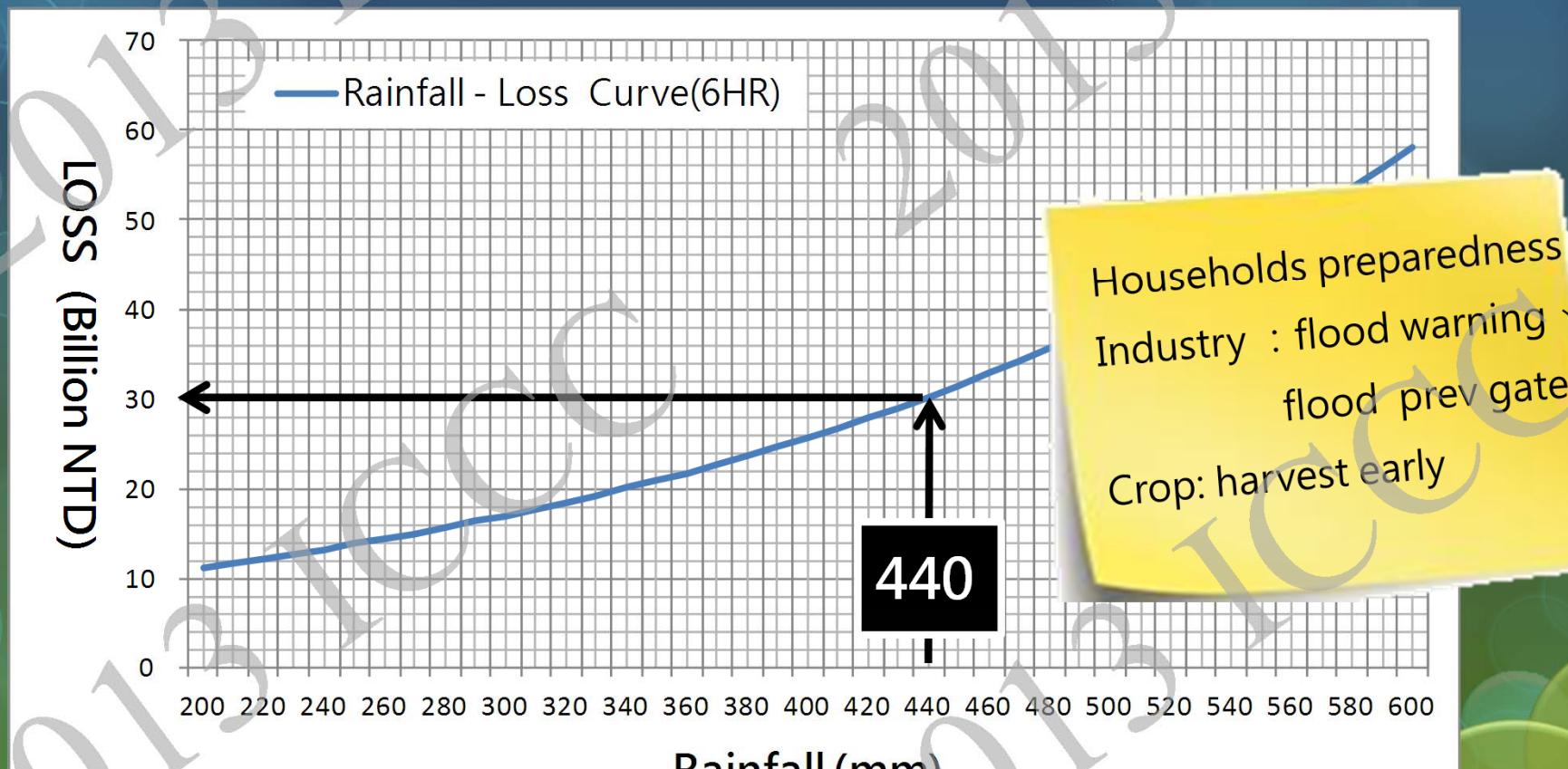
- Max. Hour Runoff

95%

- Industry Loss
- Household Loss
- Crop Loss

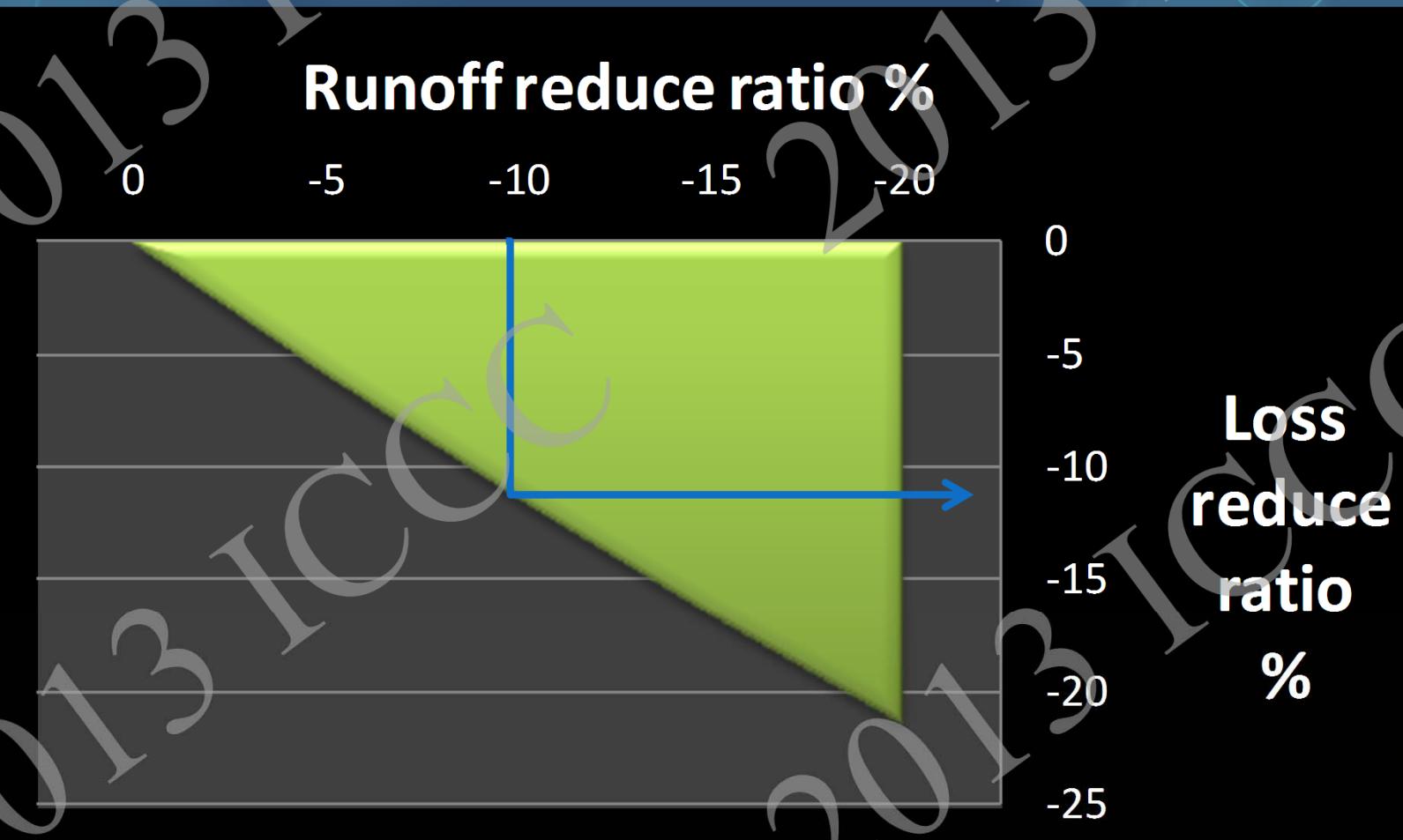
ADAPTATION

Act Early: Loss – Rainfall Curve

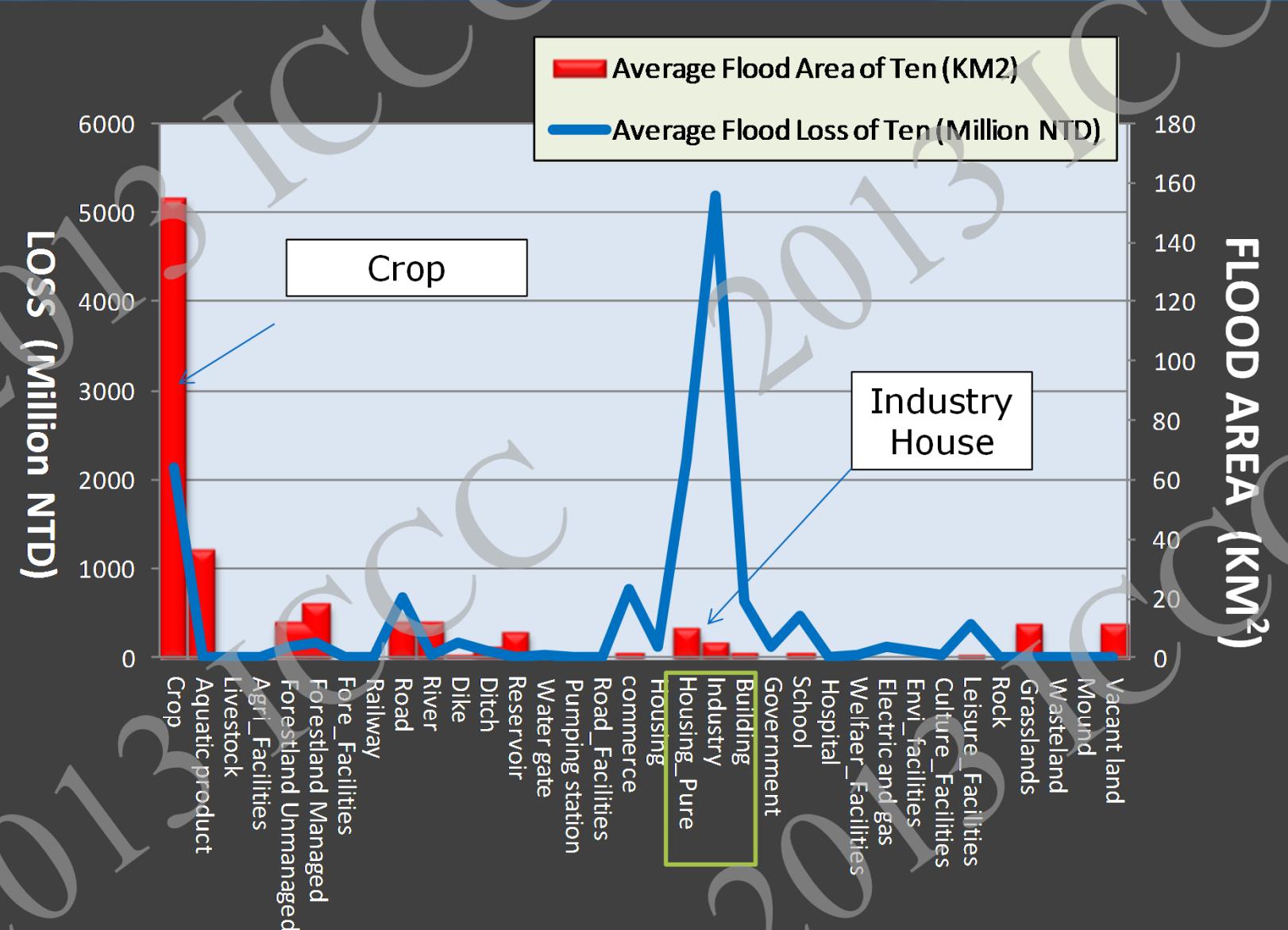


ADAPTATION

Reduce Peak Runoff



ADAPTATION



Thank you for your attention

The end

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