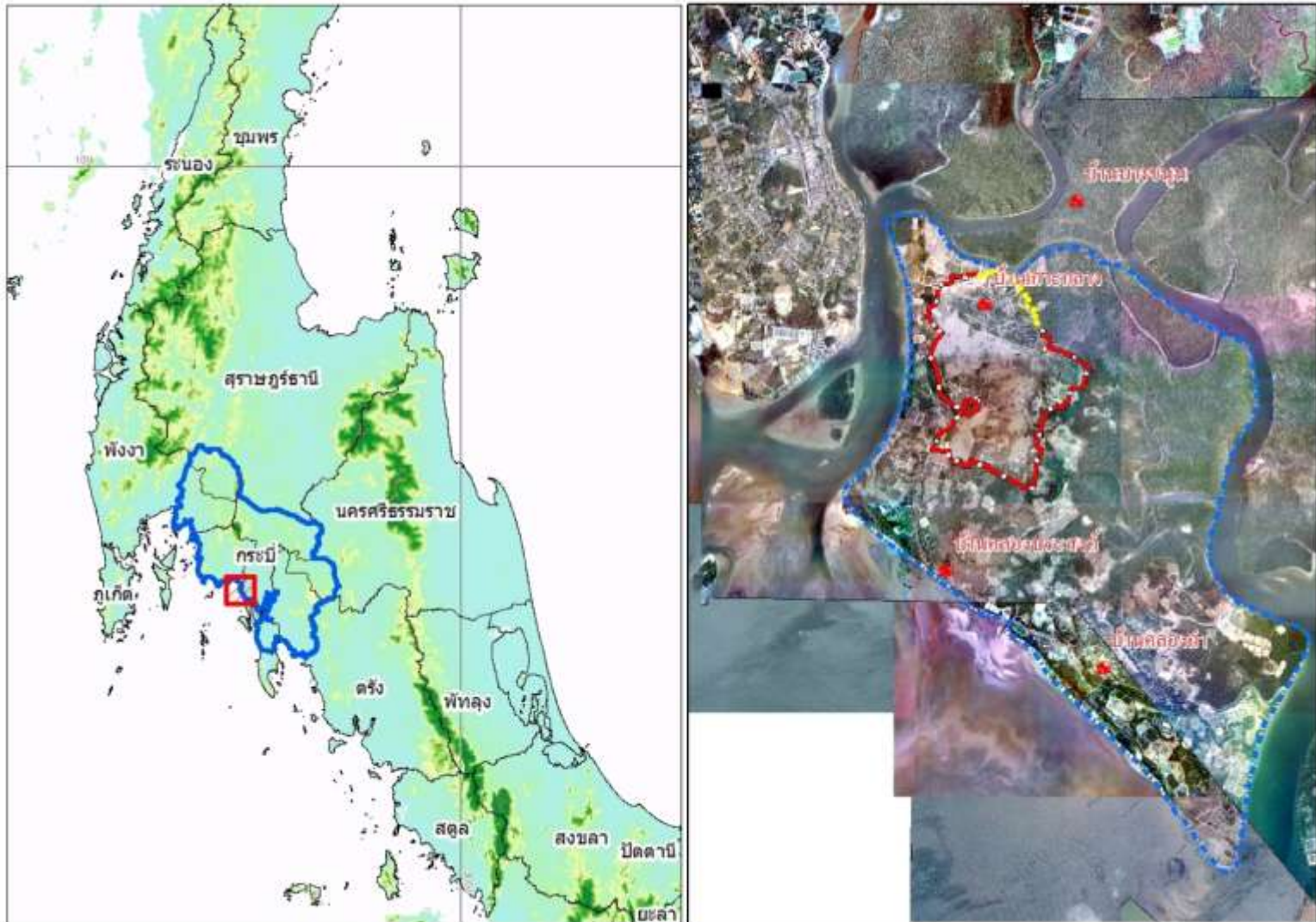


Economic Evaluation of Response
Options to Sea Level Rise and Sea
Level Extremes for Coastal Agriculture
Community
Ban Ko Klang, Muang Krabi

Anond Snidvongs
Southeast Asia START Regional Center

Study Area



Rice Fields and harvesting in 2009



Current Saltwater Intrusion



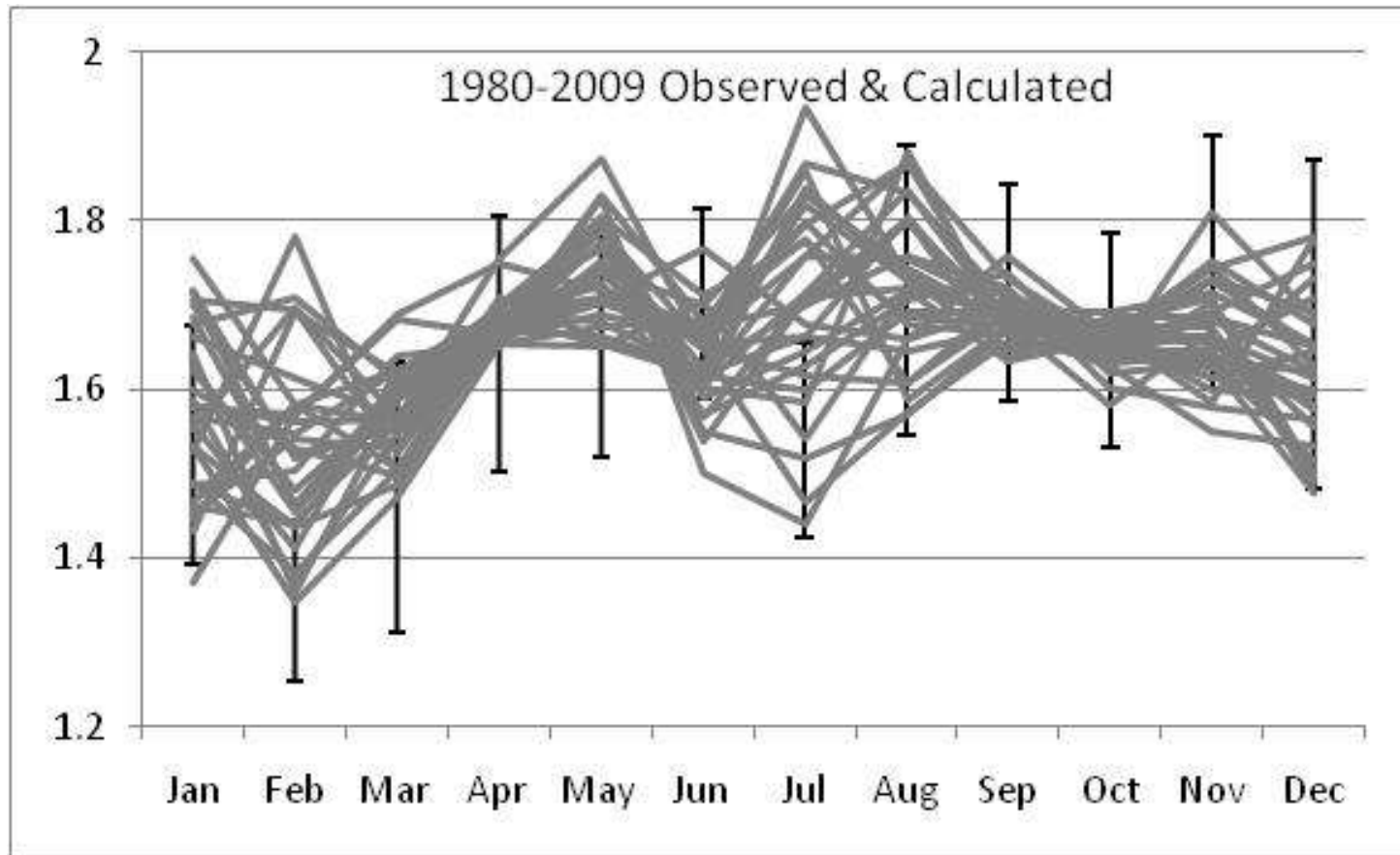
Proposed Dyke (6.7 km)



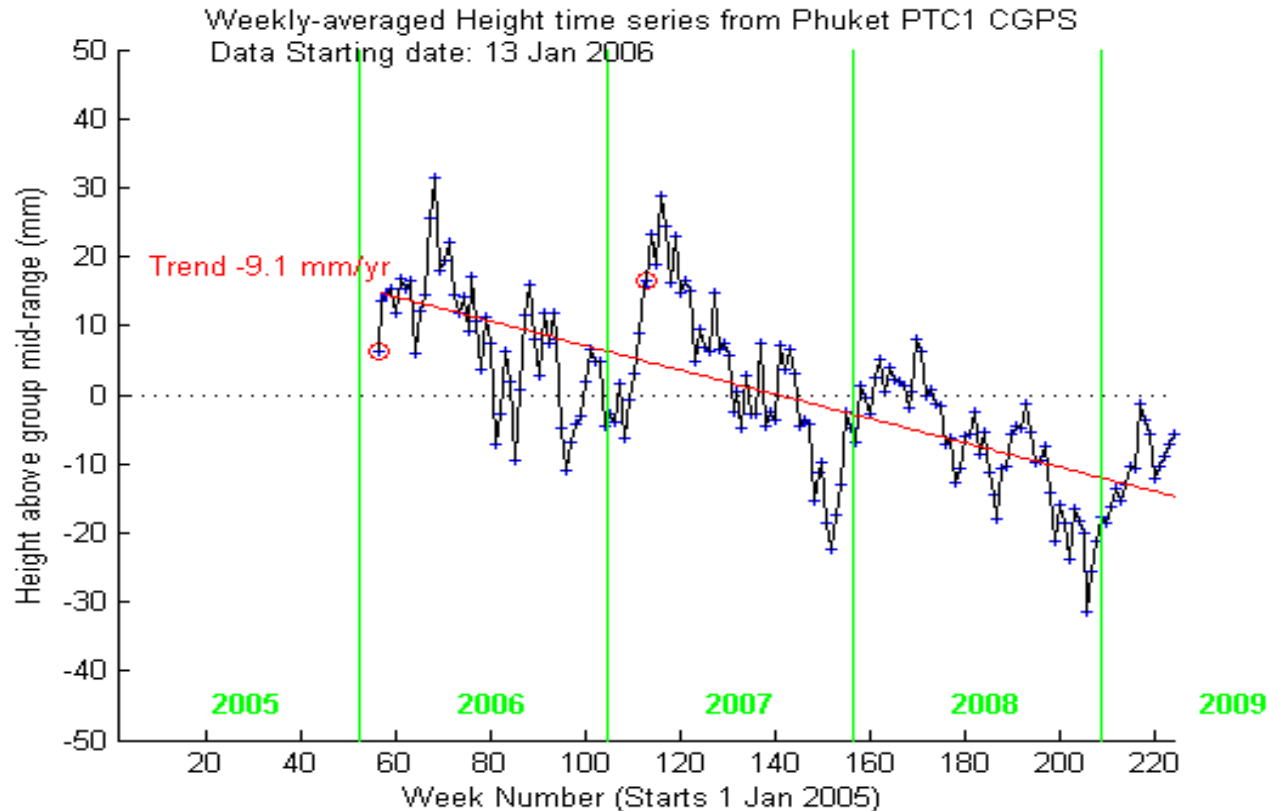
Dyke Construction in 2009-2010



Monthly Highest High Water (HHW) levels calculated from PRECIS A2 wind stresses and observed HHW (mean \pm 1S.D. for baseline period (1980-2009))



Land subsidence at Phuket from very high reposition GPS permanent station



From Itthi (2009)

Vertical Displacement Corrections

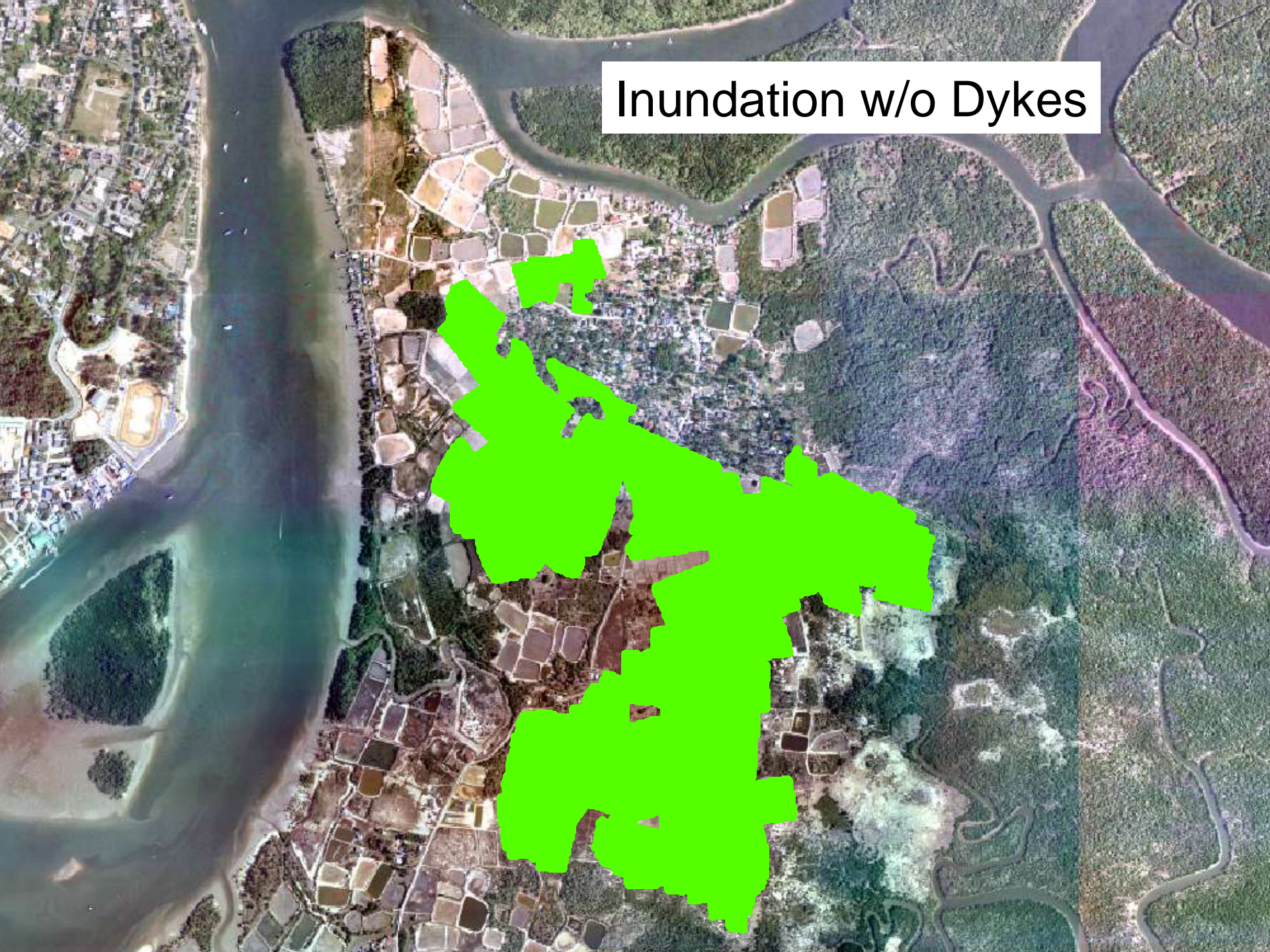
Period	Mid Year	Sea Level Rise relative to baseline (m)	Land subsidence correction (m)
1980-2009	1995	0	0
2010-2039	2025	+0.14	+0.27
2040-2069	2055	+0.40	+0.54
2070-2099	2085	+0.78	+0.81

Mean and Variability of High Water Levels Corrected for Eustatic SLR, Monsoon Driven Wind Stress, and Land Subsidence

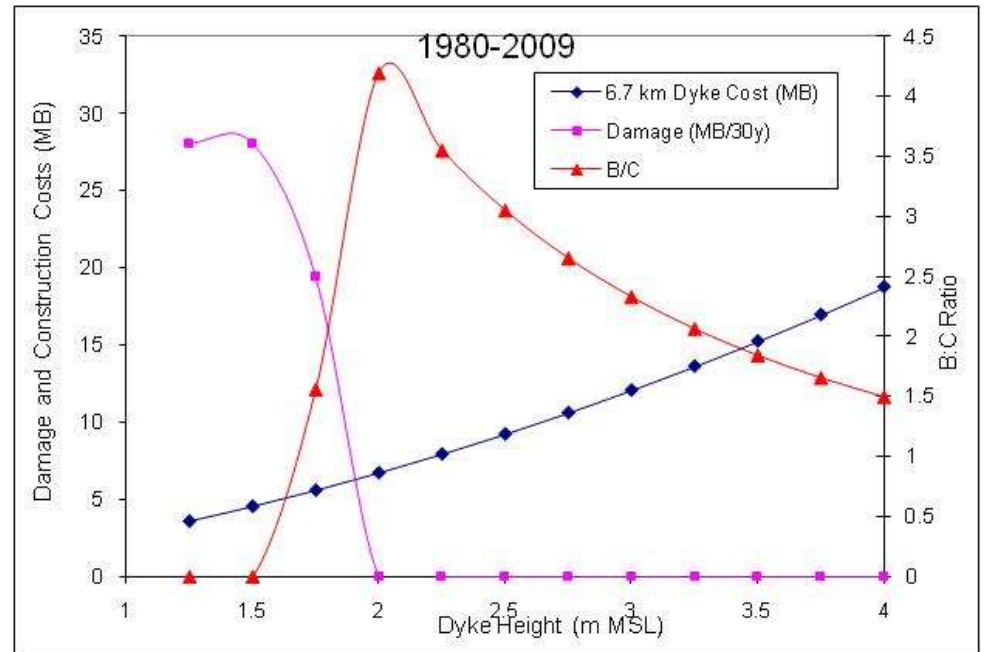
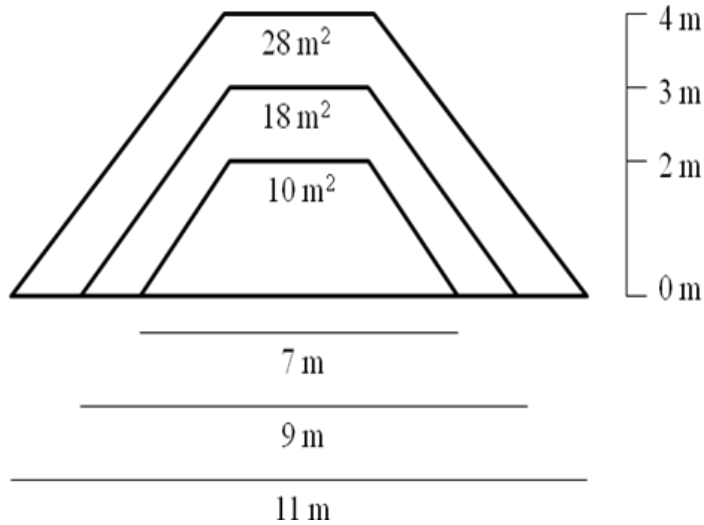
Period	MHW (m MSL)	HHW (m MSL)	LHW (m MSL)	SD	CV (%)
1980- 2009	1.65	1.94	1.35	0.097	5.9
2010- 2039	1.79	2.22	1.13	0.105	5.9
2040- 2069	2.05	2.31	1.79	0.089	4.3
2070- 2099	2.41	2.59	2.09	0.088	3.6

Baseline Height above MSL _o	Rice Field (Rai)	Flood frequency (per 30y)			
		1980-2009	2010-2039	2040-2069	2070-2099
<1.50	56.7	30	30	30	30
<1.75	166.0	13	30	30	30
<2.00	382.9	0	30	30	30
<2.25	498.4	0	6	30	30
<2.50	569.8	0	0	30	30
<2.75	600.0	0	0	3	30
<3.00	608.4	0	0	0	30
<3.25	613.1	0	0	0	27
<3.50	615.3	0	0	0	0
<3.75	616.6	0	0	0	0
<4.00	617.0	0	0	0	0

Inundation w/o Dykes



Response Option I: Defense



Maximize profit

Maximum Benefit:Cost for Dyke Options

	1980-2009		2010-2039		2040-2069		2070-2099	
Dyke	No	Yes	No	Yes	No	Yes	No	Yes
Height (m MSL _o)	0	2.00	0	2.50	0	2.75	0	3.50
Construction Cost (MB)	0	6.7	0	9.2	0	10.6	0	15.2
Rice Yield (MB/30y)	140.4	168.4	58.9	168.4	13.7	152.2	3.0	168.4
Rice Damage (MB/30y)	28.1	0	109.6	0	154.7	16.2	165.4	0
Benefit:Cost	0	4.19	0	11.90	0	13.07	0	10.85

Response Option II: Dyke and Compensation

Dyke Height (m MSL _o)	Construction Cost (MB)	Compensation for Rice Damage (MB/30y)			
		1980-2009	2010-2039	2040-2069	2070-2099
1.25	3.6	28.1	109.6	154.7	165.4
1.50	4.5	28.1	109.6	154.7	165.4
1.75	5.6	19.4	109.6	154.7	165.4
2.00	6.7	0	109.6	154.7	165.4
2.25	7.9	0	26.9	154.7	165.4
2.50	9.2	0	0	154.7	165.4
2.75	10.6	0	0	16.2	165.4
3.00	12.1	0	0	0	165.4
3.25	13.6	0	0	0	149.0
3.50	15.2	0	0	0	0

Response Option III: Adaptation

Mud Crab Raising



	1980- 2009	2010- 2039	2040- 2069	2070- 2099
Upper limit of crab zone (reference to current contour line above MSL)	2.00	2.50	2.75	3.25
Crab zone area (Rai)	166	498	570	442
Pond construction cost (MB)	9.7	26.8	21.5	9.7
Crab profit (MB/30y)	29.9	89.7	102.6	79.6
Rice area remain (Rai)	458	125	54	15
Compensation (MB/30y)	0	0	0.8	1.1
Benefit:Cost	3.09	3.35	4.74	8.10

Comparison between Dyke and Crab Options

