

“Water and Sustainable Development: Lessons learned from the past for the future”

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Exploring New Approaches for Contemporary Transboundary Water Governance

Saranitet Conference Room, 2nd floor, Main Auditorium, Chulalongkorn University

Monday 29th January, 14:00-17:00

Presentation topics

- Water Management Issues
- Water Security Assessment
- Lessons learned
- SDG, Water Development and risks
- National Strategic Plan
- New knowledge/tools needed
- Remarks

Thailand's Water Management Problems



6 Main Problems

- 1 **Water demand has significantly exceed water supply** due to the exponentially increase of population and the expansion of urbanization while the development of new water storage is limited.
- 2 **The frequency of drought and flood** resulted from climate change is increased, therefore the annually precipitation has been fluctuated.
- 3 **The deterioration of water channels and allocation systems** has caused 50 % loss of irrigated water.
- 4 **Ineffective water use** occurs mostly in Bangkok and vicinity with 400 liters on average/day compared to 122 liters from rural areas.
- 5 **Inefficient water management system** for consumption resulted in high loss in distribution system.
- 6 **Lack of unity in water management at national level** both in terms of law, regulation, and implementation mechanism.

Critical issues for the future of water resource dev.

Enact Water Resource Act

Sustainable Water Management

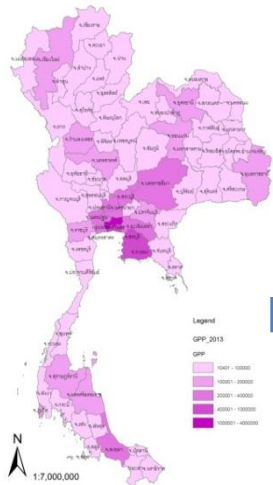
Improve Org. Mgt. and Related Rules, Laws and Regulations

Demand side:

Water for Development

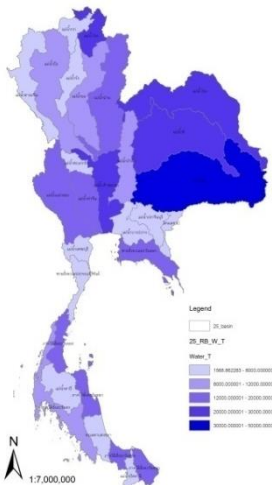
GDP

Provinces



Water use (Basin)

Provinces



Water Stock

อ่างเก็บน้ำ พื้นที่ชลประทาน



Water account

Floods

Drought

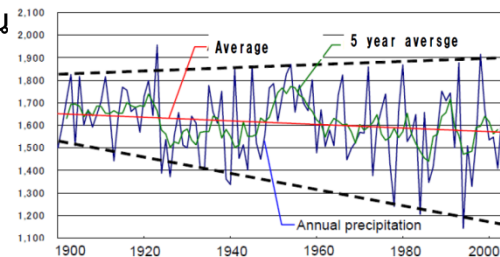
Loss and Damage

Impact to GDP

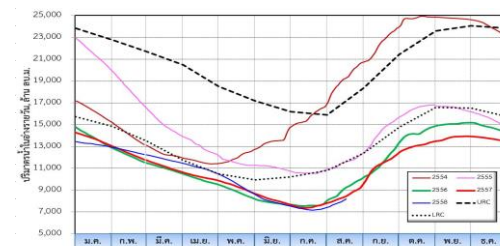
Supply side:

Water, disaster management

Nature : Fluctuations



Human : water management



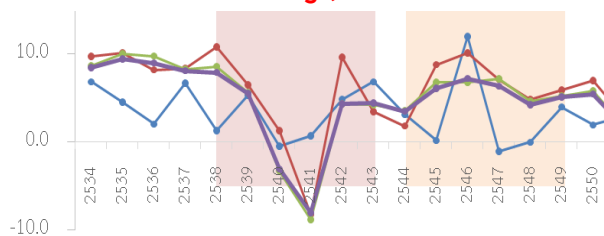
Future drivers

Super cluster

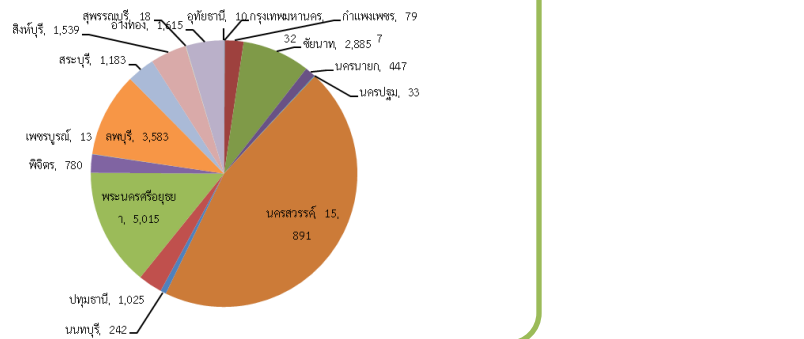
Petro, digital, elect, auto



GDP gr, %



Damage in each province (M baht)



Future budget planning

Demand & supply side

Priority: provincial / super cluster

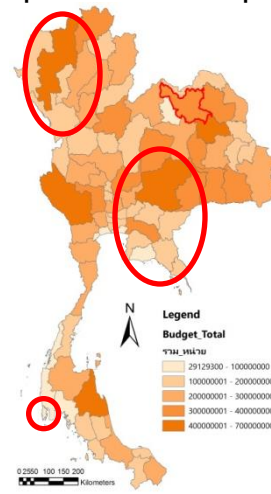


Figure 1: Water Security Framework of Five Interdependent Key Dimensions

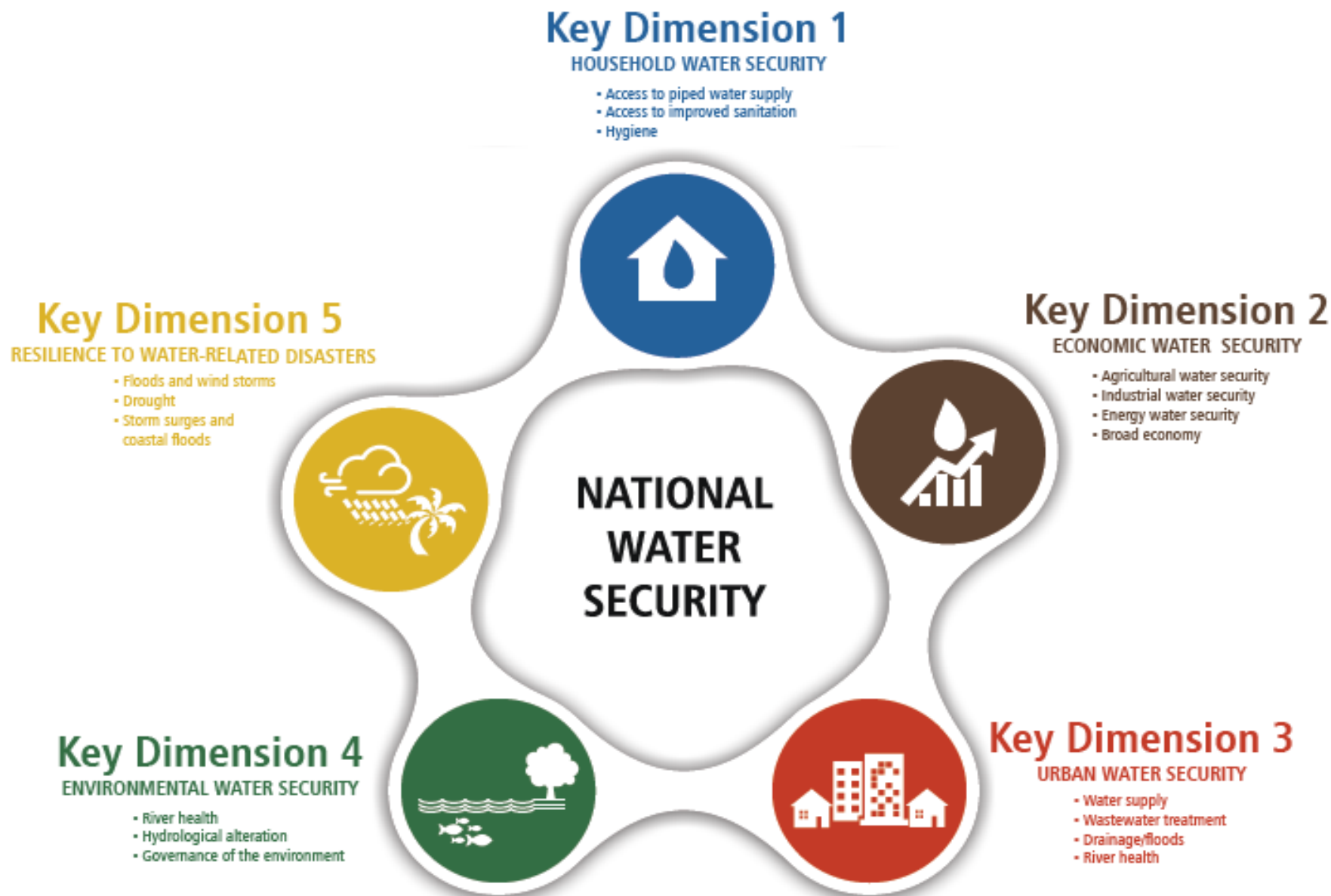


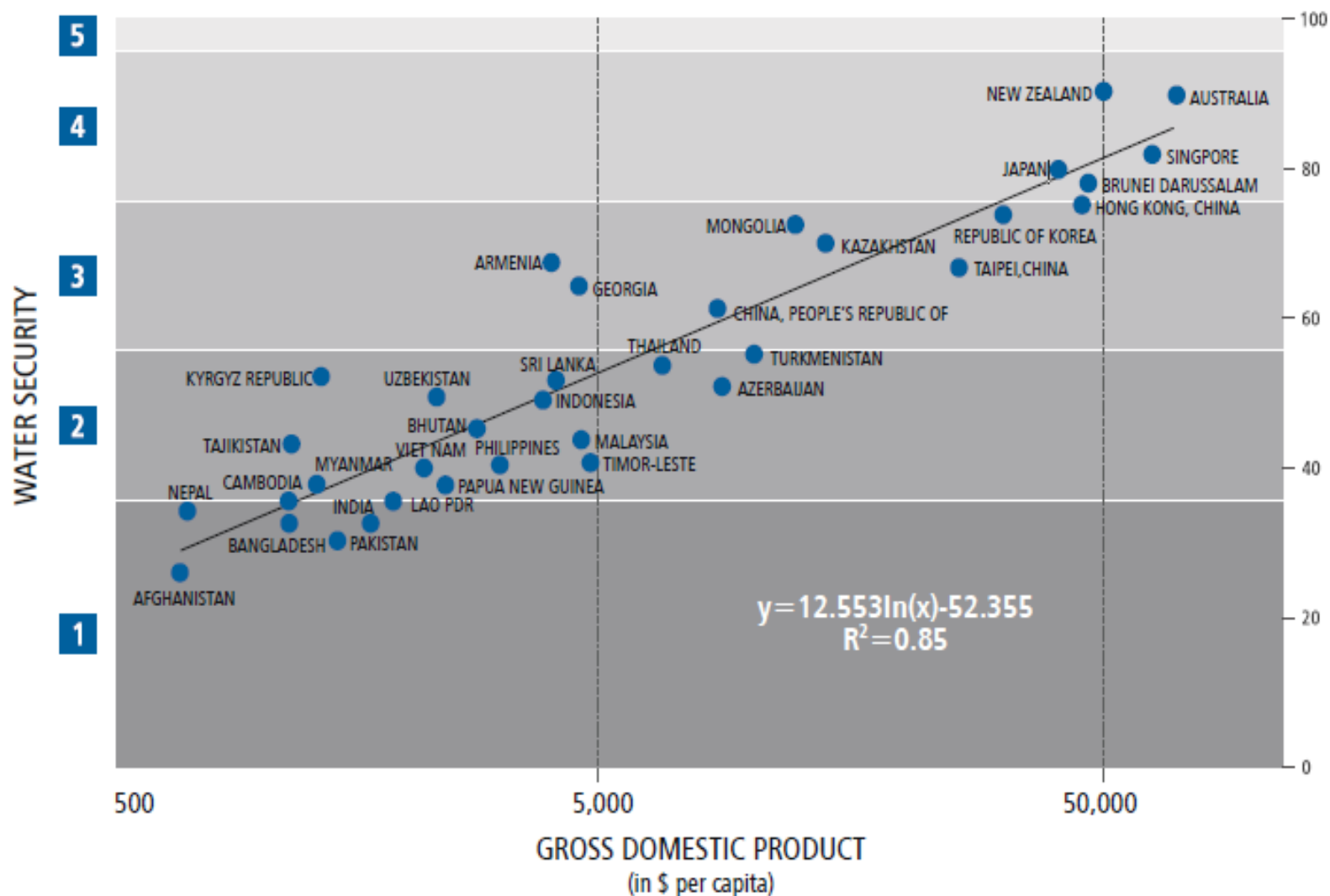
Table A1.2 *continued*

Economy	KD1	KD2	KD3	KD4	KD5	NWS Score	NWS Index
Scale	1–20	1–20	1–20	1–20	1–20	1–100	1–5
Papua New Guinea	4.0	9.6	7.9	13.3	4.7	39.5	2
Philippines	9.3	11.4	5.0	8.0	6.6	40.4	2
Samoa	16.0	8.0	11.3	13.3	5.4	54.0	2
Singapore	20.0	18.3	18.8	14.7	11.3	82.9	4
Solomon Islands	5.3	8.3	8.0	14.7	13.3	49.7	2
Sri Lanka	13.3	12.4	10.0	8.0	7.7	51.4	2
Taipei, China	14.7	14.7	12.5	9.3	16.4	67.6	3
Tajikistan	9.3	9.3	9.0	12.0	4.3	43.8	2
Thailand	13.3	15.7	6.8	8.0	10.6	54.4	2
Timor-Leste	4.0	9.5	7.0	6.7	14.7	41.8	2
Tonga	16.0	5.0	8.8	8.0	5.2	42.9	2
Turkmenistan	12.0	14.4	14.6	8.0	5.1	54.1	2
Tuvalu	16.0	8.0	15.0	16.0	5.3	60.3	3
Uzbekistan	12.0	10.4	12.5	8.0	5.9	48.8	2
Vanuatu	5.3	8.3	9.0	14.7	4.7	42.0	2
Viet Nam	10.7	12.6	5.0	5.3	6.6	40.2	2

KD = key dimension, NWS = National Water Security.

Source: ADB.

Figure 5: Water Security and Gross Domestic Product

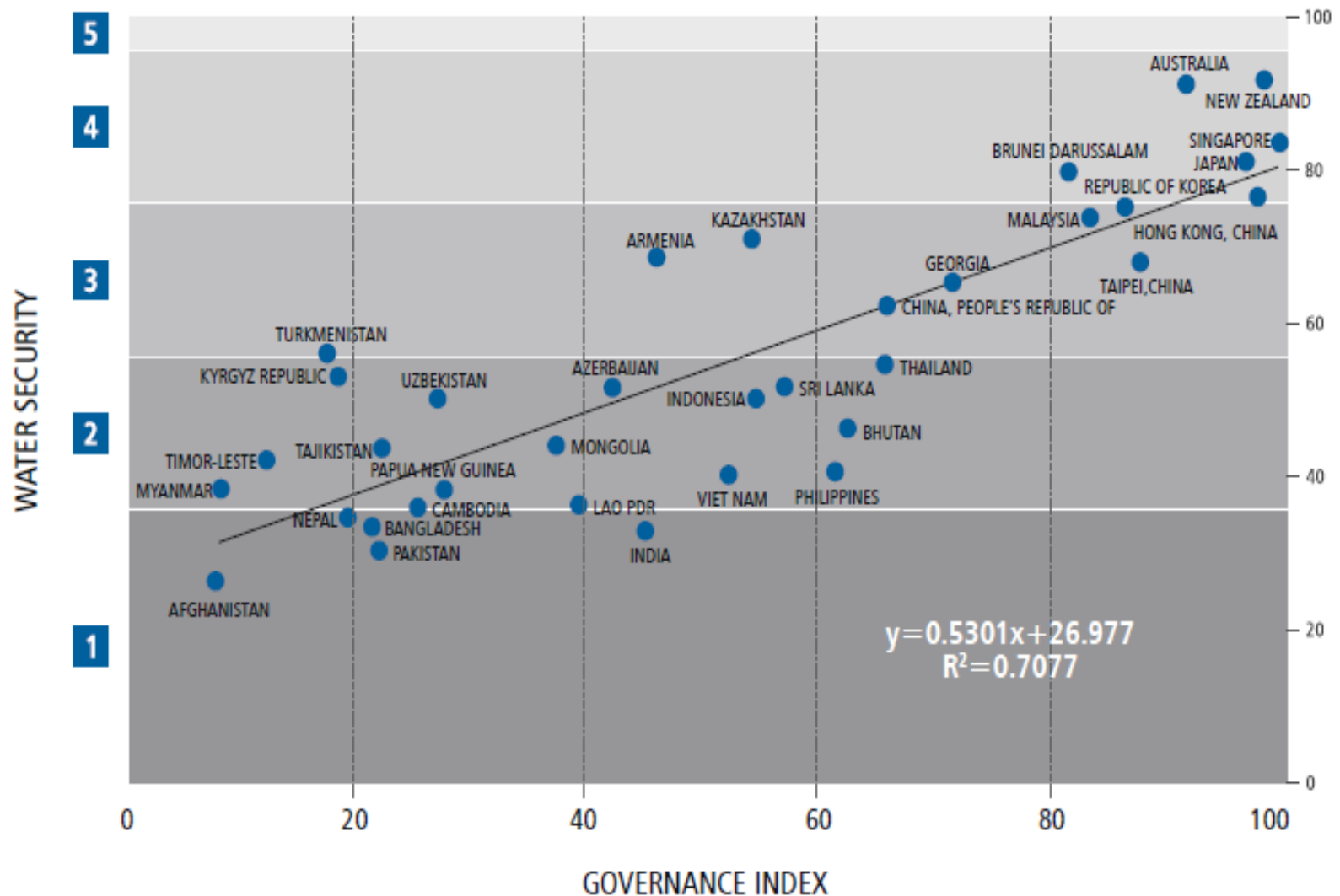


LAO PDR = Lao People's Democratic Republic, R^2 = coefficient of determination.

Note: Excludes small island nations.

Sources: ADB; World Bank. 2014. World Development Indicators, Government Effectiveness, percentile rank data. Accessed 5 January 2016 from <http://wdi.worldbank.org/tables>

Figure 6: Water Security and Governance



LAO PDR = Lao People's Democratic Republic, R^2 = coefficient of determination.

Note: Excludes small island nations.

Sources: ADB; World Bank. 2014. World Development Indicators, Government Effectiveness, percentile rank data. Accessed 5 January 2016 from <http://wdi.worldbank.org/tables>

Table 1 The average world, Asia and ASEAN water use status and the ranking of Thailand's

Items	Elements	World		Asia		ASEAN		Thailand
		average	ranking	average	ranking	average	ranking	
Basic water	1. fresh water renewable (m ³ /capita)	22,167	79	10,854	15	19,205	8	6,382
	2. water supply (m ³ /capita)	84	46	84	9	85	3	98
	3. sanitation water (m ³ /capita)	67	15	70	6	71	2	96
Sufficient water	1. water use per capita (m ³ /capita)	511	12	842	9	531	7	1,391
	2. house holds (m ³ /capita)	84	46	84	9	85	3	98
	3. agricultural water (m ³ /capita)	354	159	712	7	424	1	1,322
Water for development	1.irrigation area (%)	19	49	41	30	18	3	25
	2.industrial water (m ³ /capita)	97	68	60	18	49	4	34
	3.water for energy (%)	31	89	20	23	14	6	4
	4. water for fresh water aquaculture (m ³ /capita)	346,734	4	1,241,323	4	582,458	2	1,385,801
Water disaster	1.flood damage (US\$)	3,543,108	3	8,670,092	2	6,002,888	1	41,051,592
	2.drought damage (US\$)	1,261,531	22	1,896,770	5	239,512	2	424,300
Water for future	1.population growth (%)	1.3	137	1.43	38	1.31	10	0.43
	2.urban population growth (%)	63	147	59	30	59	7	42
	3.water footprint (m ³ /capita)	1,338	7	1,304	2	1,697	2	2,223
Water productivity	1.GDP (10 ⁶ US\$)	343,530	29	445,799	7	151,224	2	318,907
	2.productivity(US\$ / m ³ water)	81	132	41.3	132	117.3	6	3.6
	3.agricultural productivity (US\$ / m ³ water)	392	124	33.8	18	162.5	7	0.32
	4.industrial productivity(US\$ / m ³ water)	169.1	63	69.5	8	121.6	4	51.2

Lessons learned

- Manageable but unsecured
- Low productivity and high loss
- Unsmooth social interactions
- More fluctuated and risks
- Needs careful considerations for future development planning

SUSTAINABLE DEVELOPMENT GOALS 2030 (UN, 2015)



6. Water



8 Econ growth



13 Climate Change

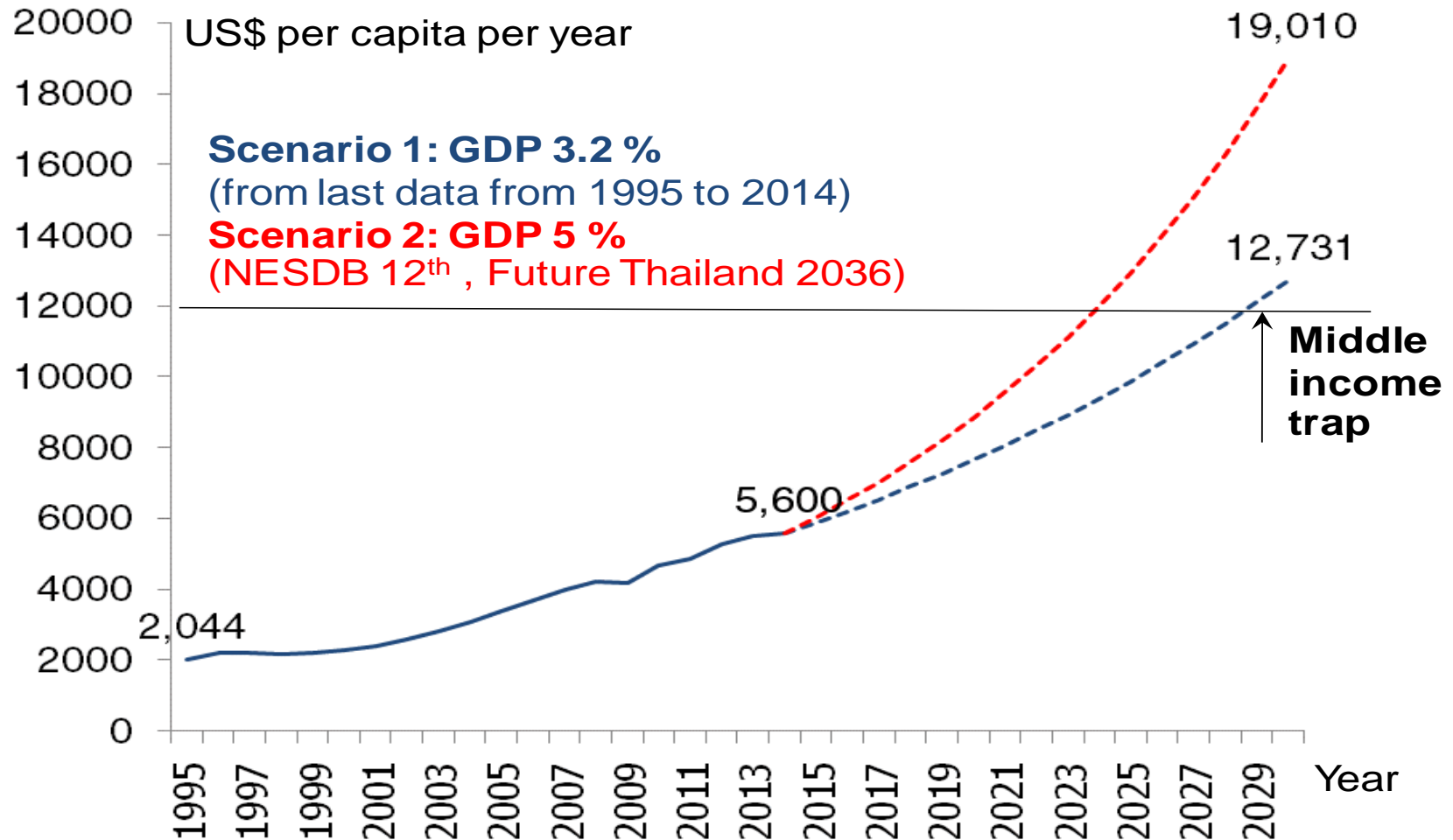
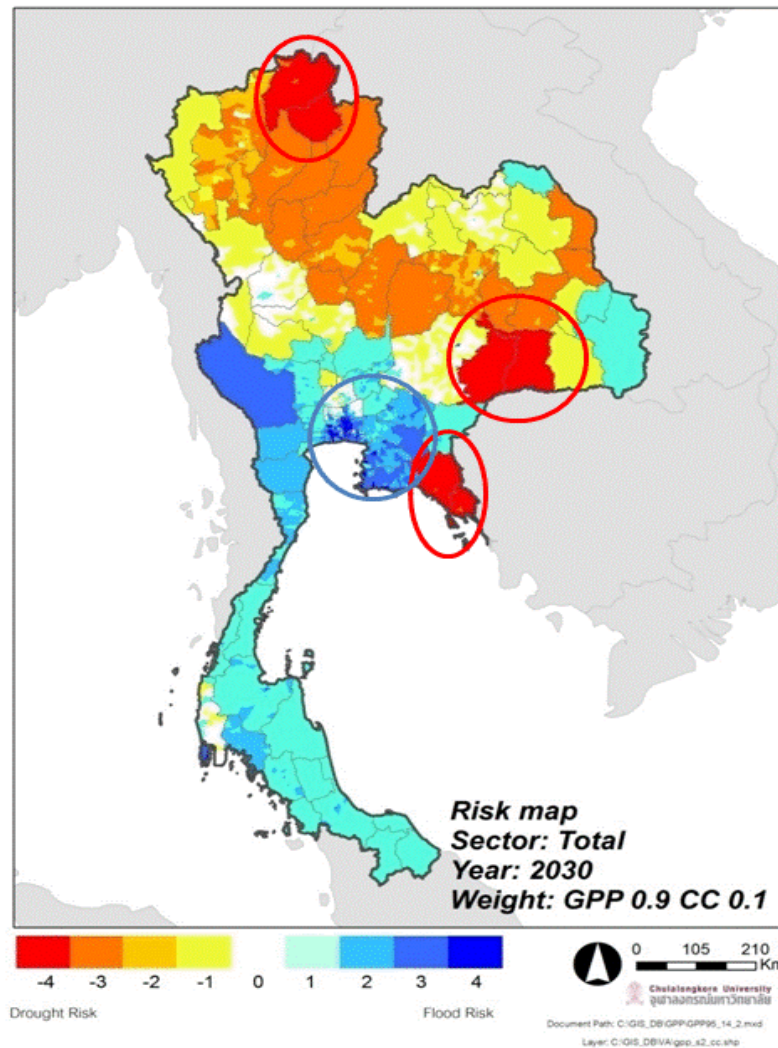


Figure 4-5 GDP per capita in each scenario (NESDB)



Risk management Under future uncertainties

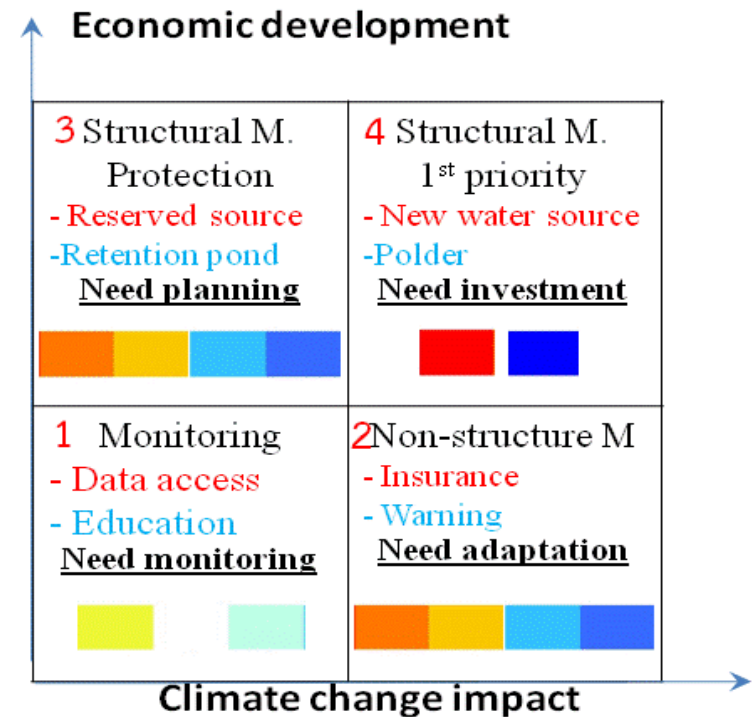


Figure 4-11 Risk management under uncertainty in the future

Future Thailand

หลุดกับดักรายได้ปานกลาง

Loss



GDP gr 3%

ฐานเดิมของการพัฒนา

Mega projects

Flood

Super cluster

Drought

Time

Draft National Strategic Plan (20 years)

- **Security** : Water Security (up to level 4)
(five dimensions: balance, integration, participation)
- **Development** : Water Productivity (10 times as present)
(with combined and innovative developments)
- **Sustainability** : Water Governance
(Economic: growth with quality life and friendly
environment, competitive, (human) capitals)
Environment: carrying capacity, standards
Social : coping capacity, trust, for next generation)

New way, knowledge/tools/networks needed

- Different ways for different development stages
but with same shared visions
- Knowledge
interactions, interconnection, cross disciplines
- Tools
technical, economic, social
- Networks
in country, regional, world

Long term vision (from Mekong Delta Project)



Rural development stages

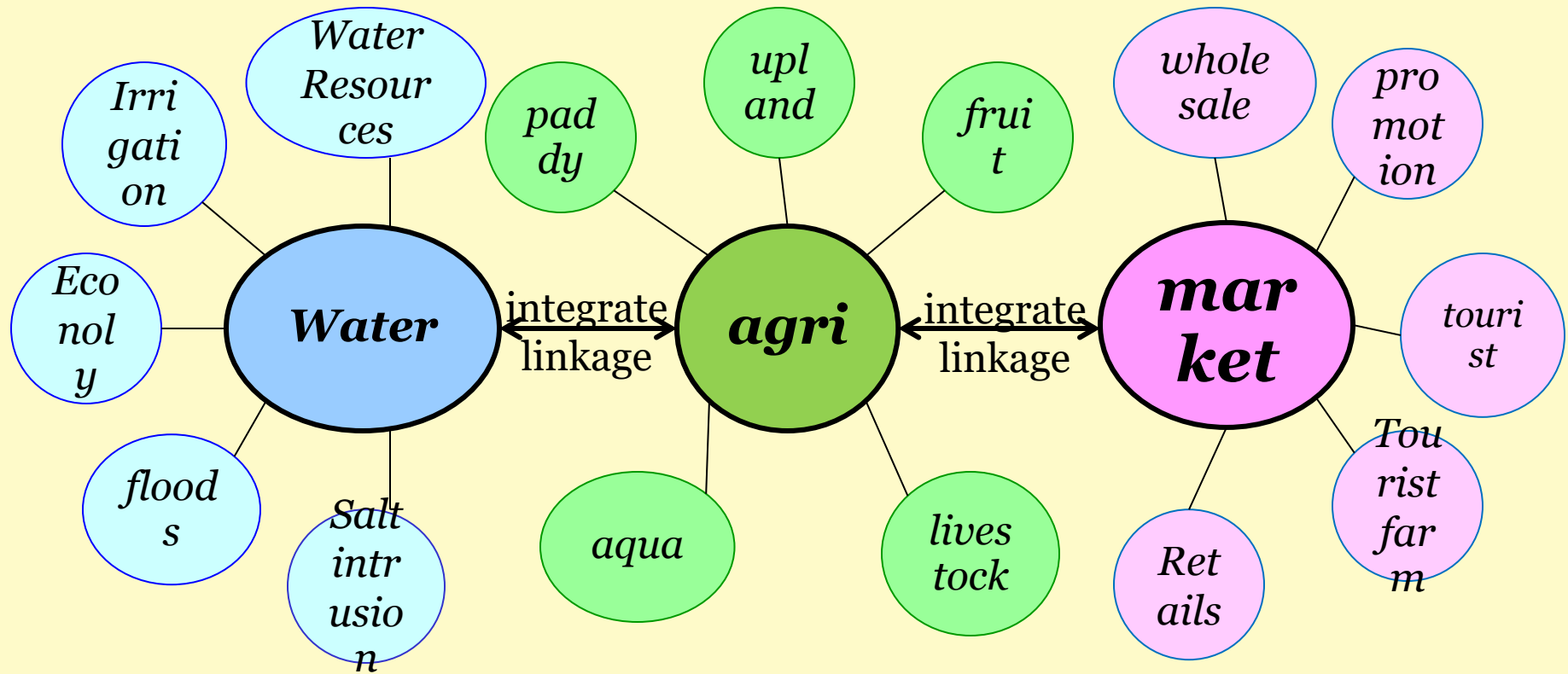
- **Stage 1** agricultures for living
(rural coexisted with urban, water for living)
- **Stage 2** commercialized agriculture
(rural relied on urban and becomes buffer sometime,
water for development)
- **Stage 3** mixed income sources
(rural provides services to urban via good agricultural
product, tourist service, it-joint- marketing, water for services)
- **Stage 4** innovative development model
(rural helps urban via green product and services,
bio based small industries, water for green p/s)

Concept for mixed development model



Concept for water-agriculture-market linkage

The administrative units are unlinked
for Input-output-outcome and impacts



GABA rice product (from water-agriculture to market)

ติดตาม Live สด



สร้างมูลค่า ข้าวพันธุ์พื้นเมืองไทย

"ข้าวสังข์หยด"

สู่การแปรรูป
ที่หลากหลาย

โดย ดร.อนิศรา เพ็ญสุข ตีบแก้ว
ที่ปรึกษาผลิตภัณฑ์จากข้าวสังข์หยด แบรินด์มโนราห์

วันพฤหัสบดี

ที่ 11 ม.ค. 61
เวลา 14.30 น.



LIVE



พิมพ์ค้นหา
dit-บริหารจัดการสินค้าเกษตร

♦ กรรมการค้าภายใน กระทรวงพาณิชย์ ♦

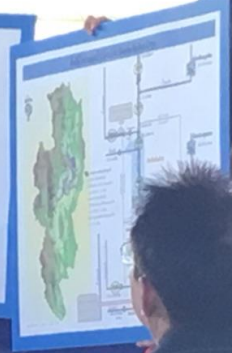


Community Water Planning (Chang, Nan)





การประชุมเชิงปฏิบัติการจากพื้นที่จริง
การพัฒนาระบบข้อมูลและสารสนเทศ ให้เป็นประโยชน์ต่อชุมชนในพื้นที่จริง
ในโครงการพัฒนาระบบข้อมูลและสารสนเทศ
วันที่ ๑๐ มกราคม ๒๕๖๖ เวลา ๐๙.๐๐ - ๑๑.๐๐ น.
ณ ห้องประชุม...
โดย...
...



Water, Energy, Food (WEF) Nexus



‘system efficiency, rather than on the productivity of isolated sectors’

Action Fields

Society

Accelerating access,
integrating the bottom
of the pyramid

Economy

Creating more
with less

Environment

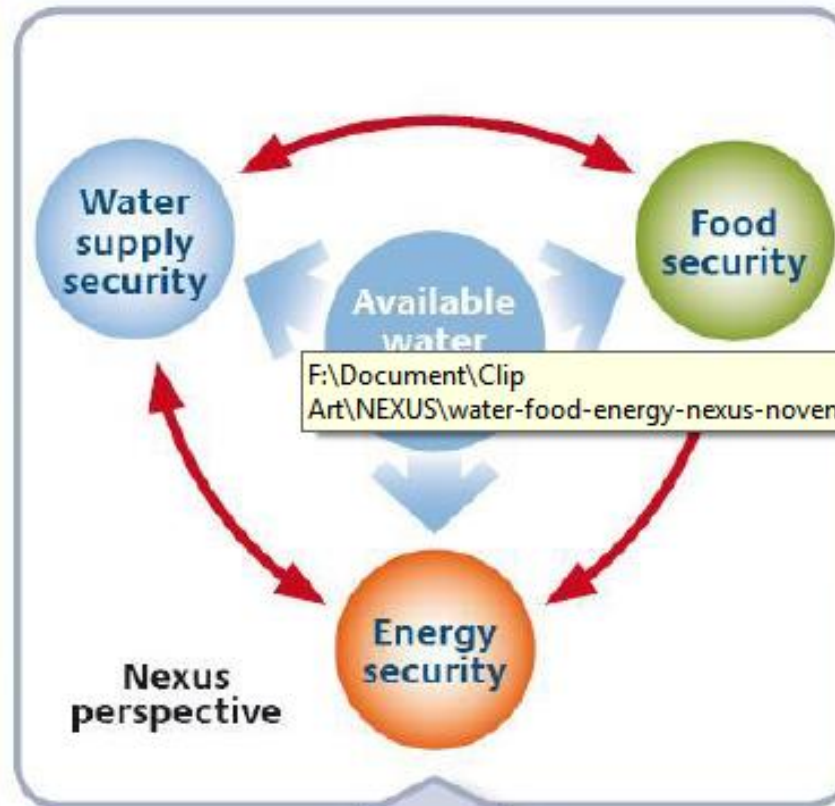
Investing to sustain
ecosystem services

Finance

Governance

Enabling
factors/
incentives

Innovation



To promote:

Water / energy /
food security
for all

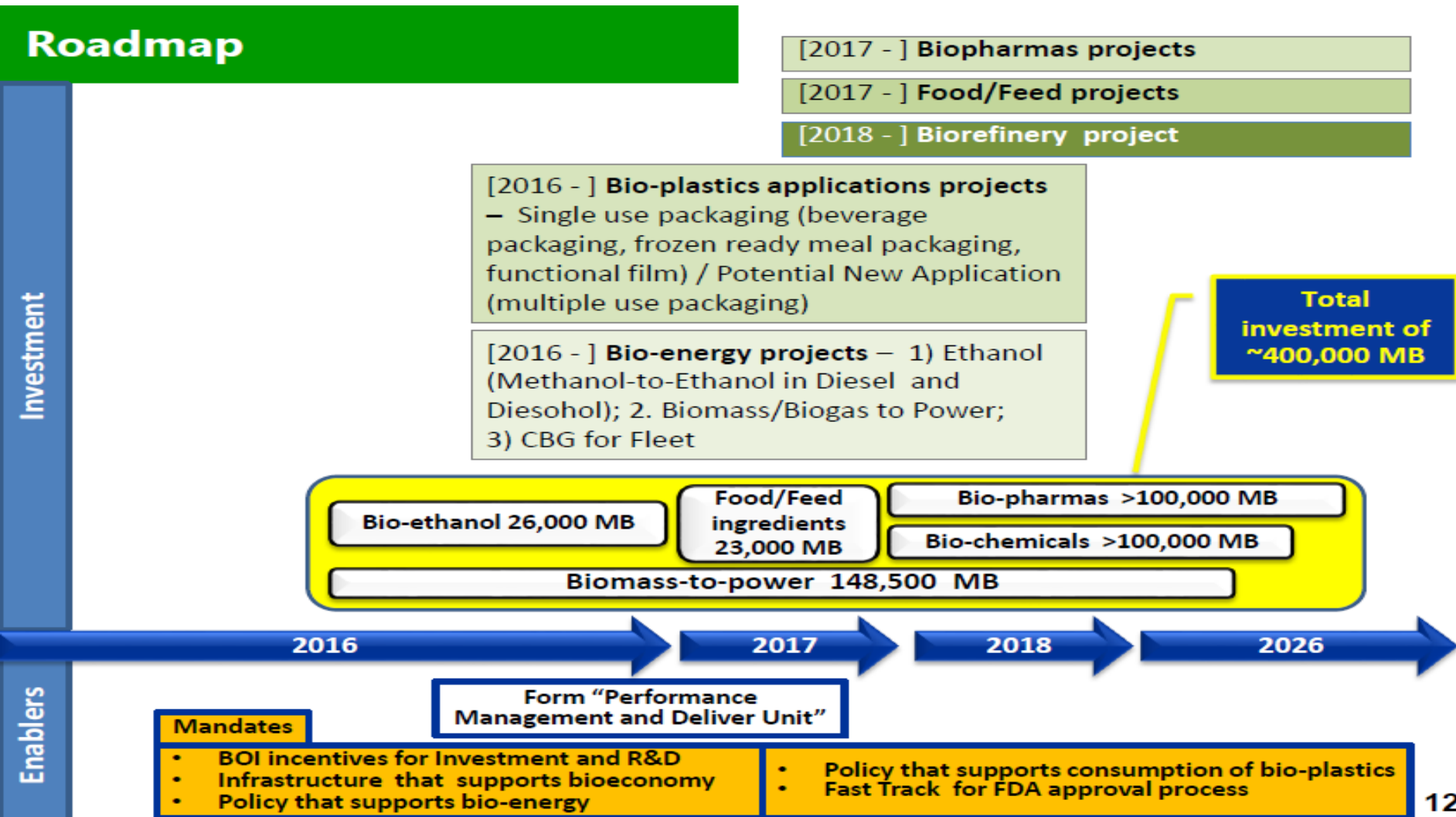
Equitable &
sustainable
growth

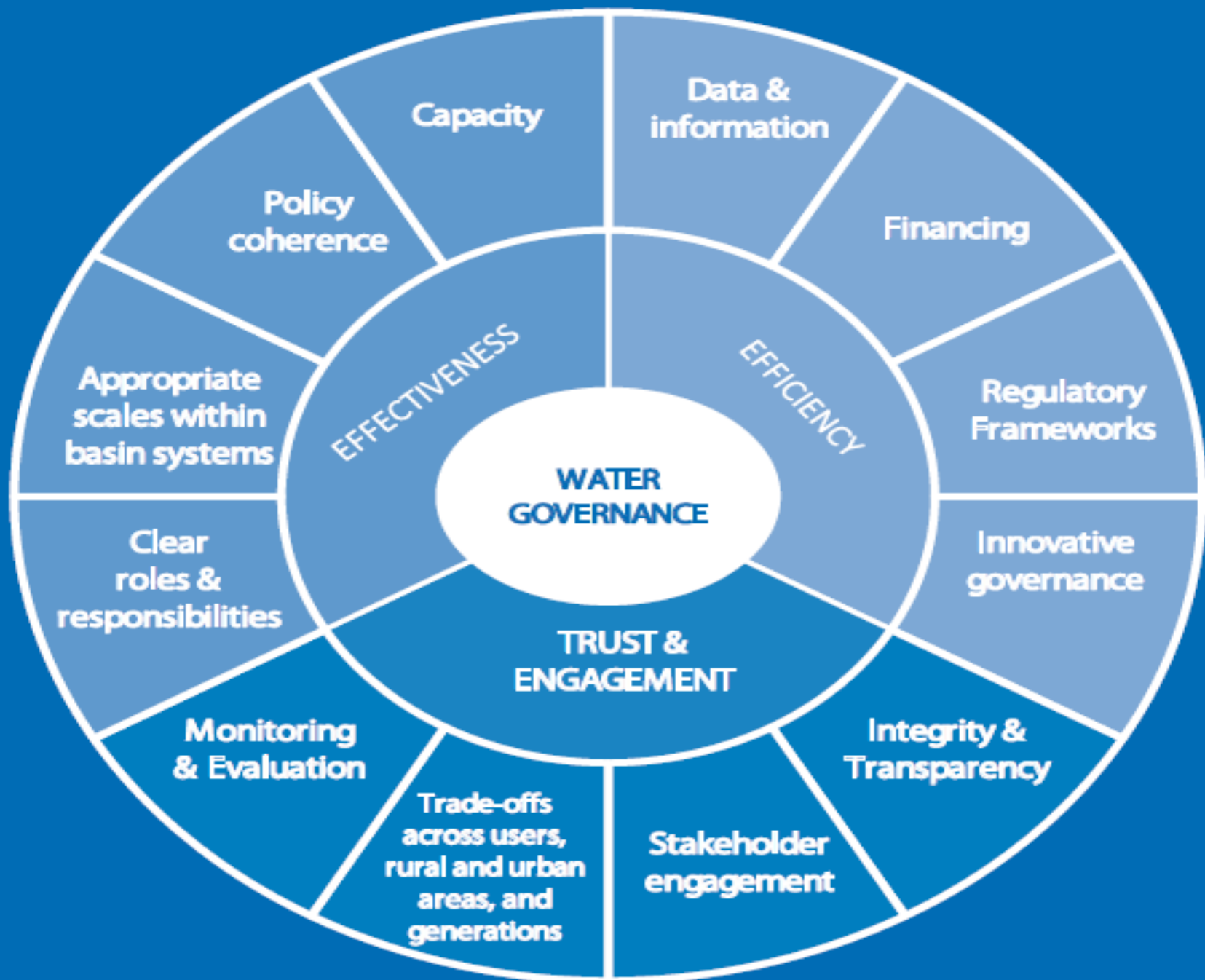
Resilient,
productive
environment

Urbanisation Population growth Climate change
Global trends

Bio-economy

Roadmap





Tools

- Laws and regulation
(national wide, issue base, area base,
international community)
- Budgeting (strategy, function, area, local)
- Incentives for development
- Tax
- Social net

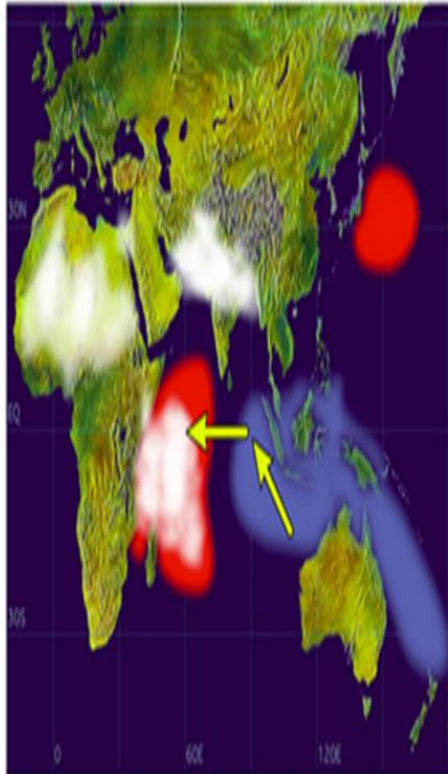
ASEAN Network on WRM/CC



Regional Floods/Drought

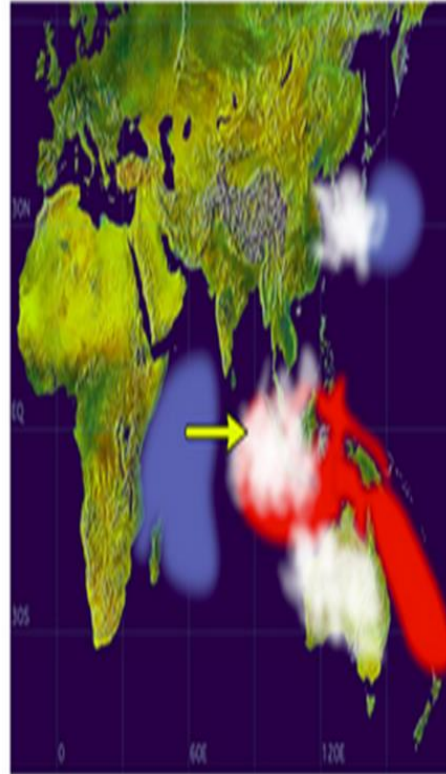
Schematic of a positive IOD event.

Positive Dipole Mode



Schematic of a negative IOD event.

Negative Dipole Mode



Seasonal Forecast

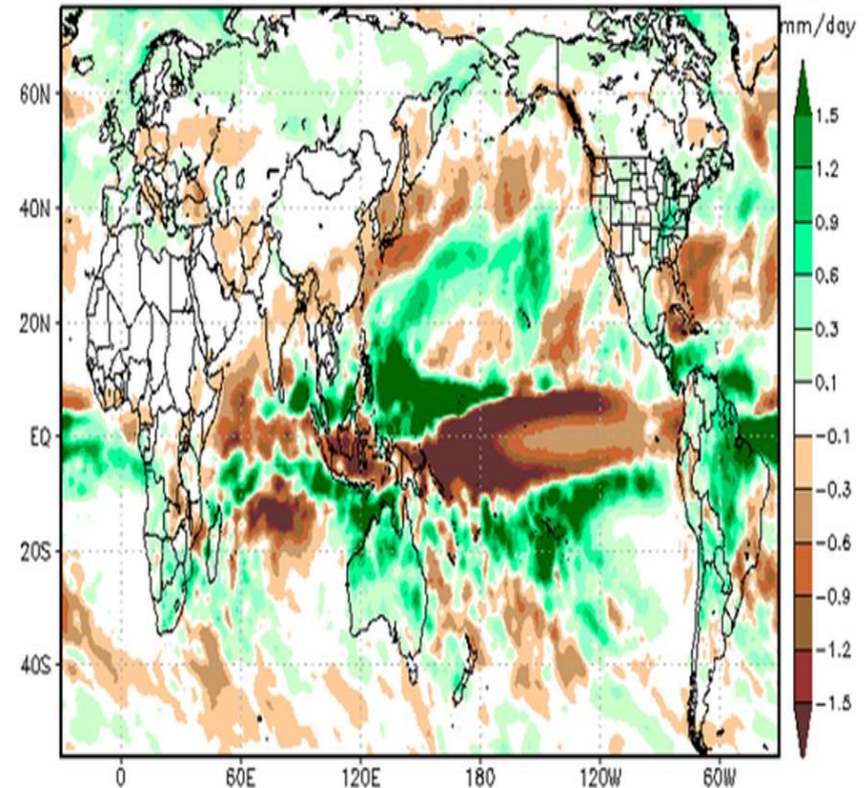
Parameter :

Precipitation Anomaly

December 2016 ▾ : Start Date

Dec-Feb ▾ : Target Season

Predicted DJF2016/2017 tprea from 1dec2016 (9-member)



Satellite Application Training







6

CHULA ENGINEERING
Expectation toward Innovation

The 3rd ASEAN Technical Workshop on
CHRS Remote Sensing Precipitation & Bias Adjustment of
PERSIANN-CCS Estimation for Water and Disaster Management

January 24-26, 2017

Chulalongkorn University and Swissôtel Le Concorde
Bangkok, Thailand

Faculty of Engineering, Chulalongkorn University
www.eng.chula.ac.th

Remarks

- Policy and implementations under uncertain and risk environment
- Flexible and dynamic adaptations
- Mixed ways of development with same visions
- New knowledge/tools needed for different stages especially social trust
- Collaborations of both exchange, catalyst, standardizations, agreement with international bodies.

References

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- NESDB, Draft 20 year National Strategic Plan, Jan 2018.
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