NARLabs 國家實驗研究院
STPI 科技政策研究與資訊中心
Science & Technology Policy Research and Information Center

NARLabs
國家實驗研究院

Designing a Mechanism for Collaborative Governance of Climate Change Adaptation Planning for Water System in Taiwan

H. C. Lin, L. H. Lo, Y. Wu, Albert C. T. Lee
Science & Technology Policy Research and Information Center(STPI),
NARLabs, Taiwan

www.narlabs.org.tw

1

NARLabs

Abstract

- According to the Global Risks Landscape 2015 published by World Economic Forum, water crises and failure of climate-change adaptation are perceived as more likely and impactful than many other risks in the next 10 years. Water security is also deemed as cross-cutting issue for many other related policy domains such as energy, agriculture, infrastructure, biodiversity, disaster risk reduction and health. In Taiwan, increased water risk and growing uncertainty about future conditions has also reported by local scientific research, which may exacerbate existing water security challenges and complicate the adaptation planning of water system.

- This research focuses on designing a mechanism for collaborative governance of climate change adaptation planning for water system in order to form integrated adaptation responses to climate change. Also, a risk-based framework, which was developed by International Risk Governance Council (IRGC), is also integrated into our mechanism to provide a systematic approach for the analysis, assessment and governance of adapting water systems to climate change, in order to enhance the adaptation planning methodology widely used in Taiwan status quo, such as downscaling techniques and traditional risk assessment methodology.

NARLabs

Collaborative Governance

- Many key term may related to collaborative governance (Robert Dobrohoczki, 2008)
  - collaborative management
  - collaborative policy development
  - collaborative funding
  - funding tables
  - shared management
  - participatory strategic planning
  - community development and planning
  - deliberative democracy

3

Review of Recent Theories and Definitions of Collaborative Governance

NARLabs

- Emerson et al. (2012)
  - ✓ the process and structures of public policy decision making and management that engage people constructively across the boundaries of public agencies, levels of government, and/or the public, private and civic sphere to carry out a public purpose that could not otherwise be accomplished.
  - ✓ include both intergovernmental collaborative structures (collaboration among actors on the vertically arranged governance levels) and interagency collaboration structures(actors at the same governance level) collaborating on specific policy issues.
- Ansell and Gash(2008)
  - ✓ An arrangement where one or more public agencies directly engage non-state stakeholders in a collective decision-making process that is formal, consensus-oriented, and deliberative and that aims to make or implement public policy or manage public programs or assets.
  - ✓ Ansell and Gash stresses six important criteria:
    1. the forum is initiated by public agencies or institutions,
    2. participants in the forum include nonstate actors,
    3. participants engage directly in decision making and are not merely 'consulted'by public agencies,
    4. the forum is formally organized and meets collectively,
    5. the forum aims to make decisions by consensus (even if consensus is not achieved in practice), and
    6. the focus of collaboration is on public policy or public management.
- Zadek (2008)
  - ✓ public-private partnerships, essentially collaborative initiatives between state and non-state, commercial and non-profit actors have been born out of their participants' pragmatism ... these initiatives have been founded on participants' views of potential synergies in capacities in leveraging improved outcomes for all concerned.

4

Integrative Framework for Collaborative Governance (Emerson et al. 2012)

NARLabs

- System Context
- Drivers
- The Collaborative Governance Regime
  - Collaborative Dynamics
    - Principled Engagement
    - Shared Motivation
    - Capacity for Joint Action
  - Outputs Collaborative Actions
- Collaborative Outcomes
  - Impacts
  - Adaptation

5

Reasons for Collaboration
(Robert Dobrohoczki, 2008)

NARLabs

- Collaborative governance generally arises in response to three problems
  - jurisdictional entanglements - seek to overcome procedural inefficiencies in the decision making process (lack of efficient procedure)
  - efficiency problems in decision-making - use collaboration to achieve better results than the status quo (lack of results)
  - legitimation crises - use collaboration to alleviate democratic deficits through participatory democracy (lack of legitimation)
- Commonly cited advantages of collaboration
  - Effective and efficient program delivery
  - professional development / capacity building
  - Improving communication
  - Elimination of duplication
  - Increasing use of programs
  - Increasing access and effectiveness of programs
  - Improving public image
  - Better needs assessment
  - Quality of information
  - Increasing available resources.

6

Case-

NARLabs

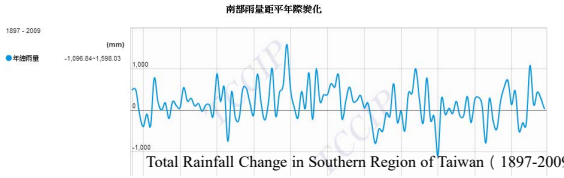
Climate Change Adaptation Planning for Water System in Taiwan

- Future climate change predictions in Taiwan based on scenario A1B in the system developed by IPCC(F. Y. Kuo, 2013; H. H. Hsu et al.,2011)
  - ◆ Temperature trend prediction:
    ↑2-3°C(by the end of 21st century)
  - ◆Precipitation predictions:
    Winter: -3~-22%
    Summer:+2~+26%
  - ◆Typhoons predictions:
    The number of typhoons will decrease.
    Typhoons' intensity and associated extreme rainfall will increase.

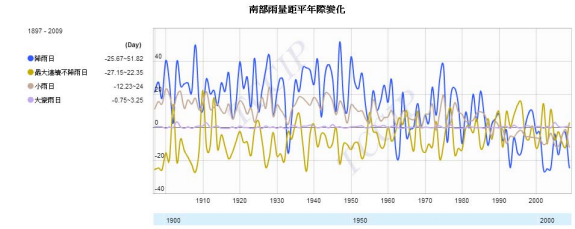
Total Rainfall Change in Southern Region of Taiwan（1897-2009）

NARLabs

- According to the research supported by Water Resource Agency, MOEA, the earliest in five years Taiwan may have to face with the drought risk in the middle and south areas(UDN, 2015a)
- The annual rainfall amount did not change significantly in southern region of Taiwan but the number of raining days showed changes, namely fewer days for raining



Total Rainfall Change in Southern Region of Taiwan（1897-2009）



Source: NCDR

Number of Raining Days in Different Rainfall Intensity in Southern Region of Taiwan（1897-2009）

8

The Planning for Adaptation Framework and Actions have been Started in Taiwan

NARLabs

Definition of Adaptation

Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities （IPCC, 2007）

What is good adaptation ?

- Effective->deal with core problem、public-private collaboration
- Efficiency->integration、synergy（including Mitigation）
- Equality, Legitimacy and Transparency

Current Adaptation Policy Progress in Taiwan

- National Climate Change Adaptation Policy Guideline(2012)
  -Coordinated by Council for Economic Planning and Development(CEPD)
- National Adaptation Action Plan
  -Divided into 8 sectors (such as disasters, water resources etc.)
  -Action Plans for each Sector have been implemented
  (Water Resources: MOEA)
- Local Government Adaptation Planning(2012~)
  – Pilot projects of local action planning (2012)
  – almost all local governments have finished 1st action planning since 2013

9

The Current Planning Process in Water Resource Sector (Central Govt.)

NARLabs

The Planning Process for Water Resource Action Plan(MOEA, 2014)

(1)Status of supply and demand of water resources, and historical analysis and projections of climate change

(2)Adaptation scope and issues identification for water resources

(3)Taiwan hydrology scenario analysis and setting under climate change

(4)Impact assessment on water resources under climate change

(5)Risk assessment of water resources under climate change

(6)Action planning and promotion for water.

10

Impact Assessment for Water Resources under Climate Change (Central Govt.)

NARLabs

- The impact assessment process for identifying the impact of water deficiency under climate change is mainly based on the natural science modelling
  - Water Deficiency-current
  - Water Deficiency under Climate Change Scenario(the most likely A1B scenario)-with no adaptation options
  - Water Deficiency under Climate Change Scenario(the most likely A1B scenario)-with options already listed in current policies
  - Water Deficiency under Climate Change Scenario(the most likely A1B scenario)-based on more adaptation options added or amended for meeting the adaptation objectives

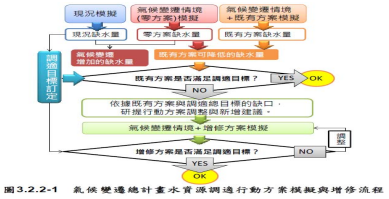


圖3.2.2-1 氣候變遷總計畫水資源調適行動方案模擬與增修流程

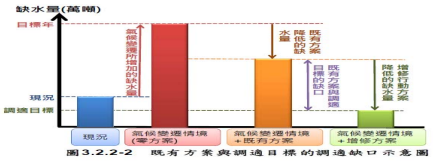


圖3.2.2-2 既有方案與調適目標的調適缺口示意圖

Impact Assessment Process

source：MOEA(2014)

Vulnerability and Risk Assessment of Water Resources under Climate Change (Central Govt.)

NARLabs

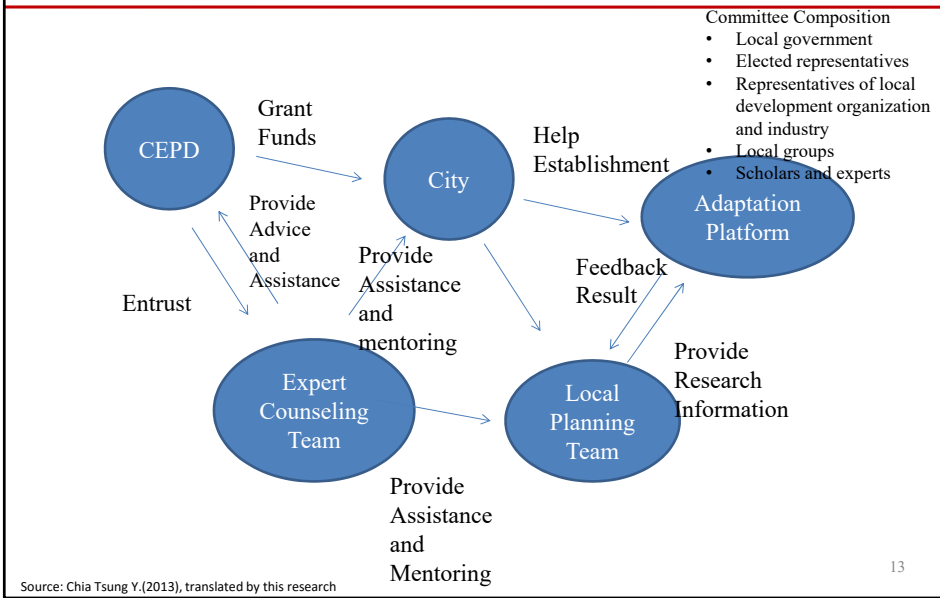
✓ The risk assessment consider the risk matrix widely used in risk assessment process: likelihood and consequence judged by 5 point score

Risk		Likelihood				
		1	2	3	4	5
Consequence	1	1	1	1	1	2
	2	1	2	2	2	3
	3	1	2	2	3	4
	4	1	2	3	4	5
	5	2	3	4	5	5

source：MOEA(2014)

Actor Interactions Suggested by Guideline Made by Expert Counseling Team (Local Govt.)

NARLabs

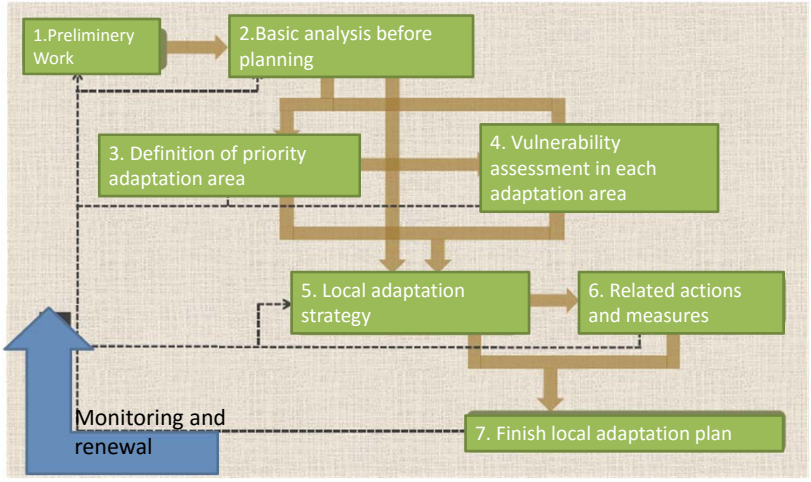


13

Source: Chia Tsung Y.(2013), translated by this research

Local Adaptation Planning Common Process Suggested in Guideline (Local Govt.)

NARLabs

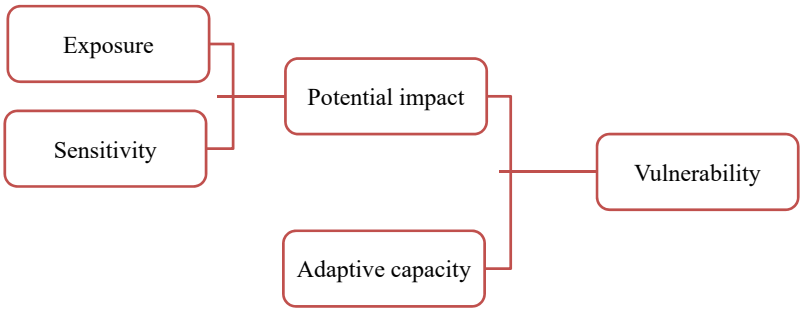


14

Source: Chia Tsung Y.(2013), translated by this research

Vulnerability Assessment Suggested in Guideline (Local Govt.)

NARLabs



Vulnerability		Potential Impact		
		Low	Medium	High
Adaptive Capacity	Low	V3	V4	V5
	Medium	V2	V3	V4
	High	V1	V2	V3

Vulnerability
V5>V4>V3>V2>V1

15

Source: Yeh(2013)，translated by STPI

The Challenge of Climate Change Adaptation Planning for Water System

NARLabs

- The Geographical Scope for Adaptation Planning
  - Natural feature of existing water system : the river basin from upstream to downstream is across the boundary of different local governments
  - Current water system management: water resources allocation has already based on regional area
  - The cost and the benefit of water services are hard to link to just single local government jurisdiction and hence for effectively reducing the climate change risk on water system, the adaptation actions need to be cooperated by multiple adjacent local governments, to response to the impact of climate change in a holistic way
- The Risk Governance Methodology
  - The uncertainty of data and model for climate change projections, impact and vulnerability assessment, and hence needed to be fully communicated to the stakeholders
  - Currently the analysis is mainly based on identifying and estimating hazard and then assessing exposure and vulnerability, as evidence for designing adaptation options, but lack of value related analysis and tradeoff considerations

16

The Challenge of Climate Change Adaptation Planning for Water System

NARLabs

– Adaptation Priority Setting and Decision Making

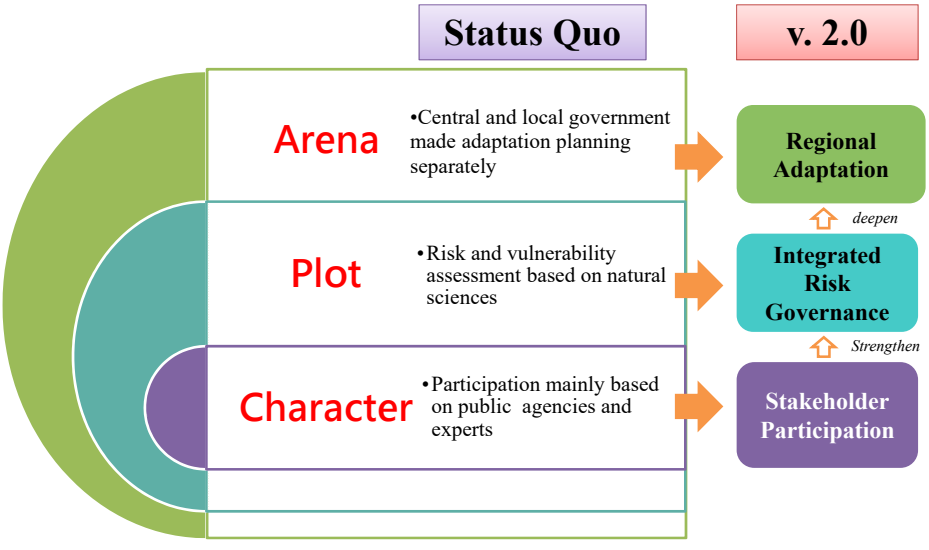
- The planning was usually limited in the public agencies and rely mostly on research results from natural science, however, stakeholders often show differences in adaptation option preference

  Ex: adaptation option preference by interviews in southern region of Taiwan

  – Tainan City： Improve pipeline anti-leakage rate, New Water(mid-term)
  – Companies in Science Park： Low cost running water
  – Water company: Additional spare water treatment plant
  – Department of Irrigation and Engineering, Council of Agriculture: Increase agricultural water resource reallocation fee
  – Southern Region Water Resource Office, Water Resource Agency, Ministry of Economic Affair: Consider multiple options and try to make multi-actor negotiation, options considered including Tseng-Wen reservoir trans-basin water diversion, Kao-Ping artificial lake, agricultural water resource reallocation
  – Local Community: Retention of local ponds
- The challenge for climate change is so high and hence will need collective intelligence of stakeholders and related local knowledge
- The timing for participation for environmental issues always was always in the late stage of policy planning and hence it is hard to reverse any decision that has been planned already, or limited suggestion can be taken into consideration by government, which often resulted in severe conflict or protest

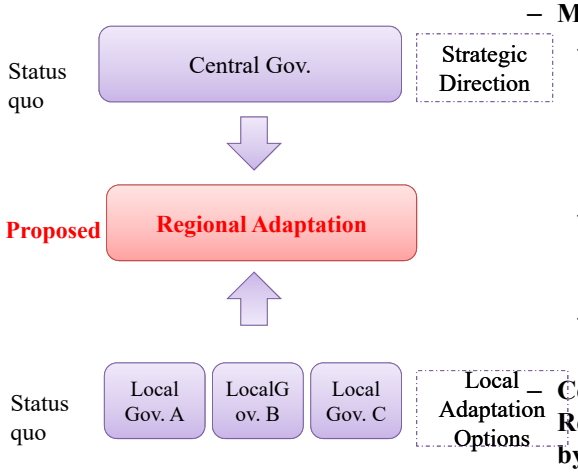
Towards Water Adaptation Planning v. 2.0: Collaborative Governance

NARLabs



A. Arena Evolution

NARLabs



Improvement strategy

- **WG for Regional Adaptation**
- **Member of WG:**
  - ✓ **Local governments in the region of the water system (established regional governance platform can be considered)**
  - ✓ **Regional level management body under central government**
  - ✓ **Key stakeholder representatives(co- selection)**
- **Coordination Mechanism of Regional Adaptation: responsible by CEPD**

19

A. Arena Evolution -Benefit and Challenge

NARLabs

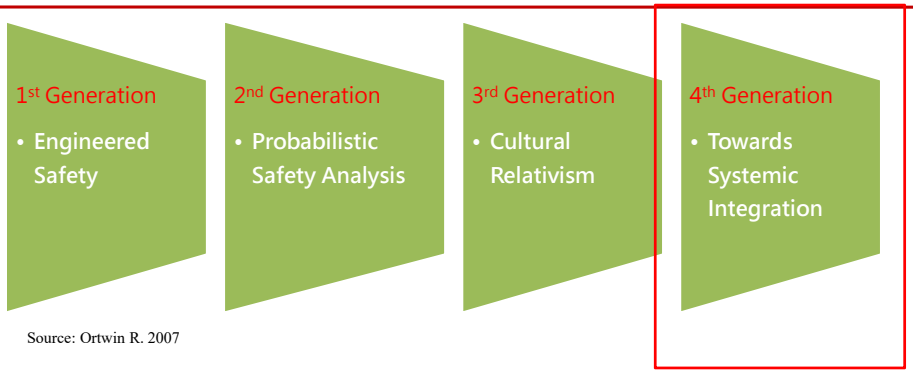
Benefit	Challenge
Enable system consideration, synergy outcome, deal with the core problem but not the symptom, policy mainstreaming, co-learning among local governments	Selfish departmentalism among governments, difference in the awareness of problem urgency, difficulties in co-ordination and integration when the participants expand more widely

In addition to the organization design, incentive or regulatory framework should be well organized.

20

B. Plot Evolution
Evolutions of Risk Research

NARLabs



Source: Ortwin R. 2007

- Integrated Risk Governance Framework Proposed by International Risk Governance Council(IRGC)
  - ✓ Pre-assessment
  - ✓ Risk Appraisal
  - ✓ Risk characterization and evaluation
  - ✓ Risk management
  - ✓ Risk communication

21

B. Plot Evolution

NARLabs

- **Improvement Strategy**
  - Pay more attention to the element of pre-assessment, which focus on reframing the problem and highlight the value conflicts among stakeholders
  - Take concern assessment such as risk perception research and the interdisciplinary analysis of risk for the social and economic impact in "Risk Appraisal" element, to enhance more value based analysis
  - Take risk characterization based on both the result of traditional risk assessment and the concern assessment, to make risk knowledge more integration and for comprehensive the decision basis for risk prioritization and management

B. Plot Evolution -Benefit and Challenge

NARLabs

Benefit	Challenge
• Reframing the problem, the risk scope will not be limited by just existing indicators, convention or general practice • Enhance the considerations on both factual and social-cultural level of risk and make deliberation among different risk research methodology, to make risk tradeoff and comparison more appropriately	• Decision maker and think tank are not familiar with this integrated risk governance framework • Inter-disciplinary cooperation of experts need to be enhanced

- Incentive should be given to promote the research collaboration, data sharing and dialog among interdisciplinary experts under the integrated risk governance framework
- Creation of interdisciplinary program for promotion of the new risk governance framework

C. Character Evolution

NARLabs

- **Seven-step participation ladder(Dulani, 2003)**
  - passive participation
  - participation in information giving
  - participation by consultation
  - participation for material incentives
  - functional participation
  - interactive participation
  - self-mobilization

- **Improvement strategy**
  - Stakeholder mapping and engage them as early as possible
  - Enhance the affected group, industry and citizen to participate and building networks
  - Build the mechanism for stakeholder to engage and dialog in the long run, including create data sharing and knowledge translation mechanism for the participants

24

C. Character Evolution -Benefit and Challenge

NARLabs

Benefit	Challenge
• Providing local knowledge and experience to supplement the expert knowledge • Help to reduce the gap of opinion and hence to increase the opportunity to make consensus among stakeholders • Help the stakeholders to understand their role and importance in adaptation of climate change, enhance promote their partnerships and collaboration with government	• Continuous participation of citizens • Capacity building for participation of stakeholders • The content and dissemination channel should be more comprehensive and diverse • Resource re-allocation according to the participation suggestions

NARLabs

Conclusion

- Water security is also deemed as cross-cutting issue for many other related policy domains such as energy, agriculture, infrastructure, biodiversity, disaster risk reduction and health. In Taiwan, increased water risk and growing uncertainty about future conditions has also reported by local scientific research, which may exacerbate existing water security challenges and complicate the adaptation planning of water system.
- This research focuses on designing a mechanism for collaborative governance of climate change adaptation planning for water system in order to form integrated adaptation responses to climate change. This collaborative governance comprise of :
  - Arena evolution-from central and local government made adaptation planning separately to regional adaptation;
  - Plot evolution-from risk and vulnerability assessment which based on natural sciences to integrated risk governance, which enhance the concern assessment component that is more value sensitive;
  - Character Evolution: from participation mainly based on public agencies and experts to stakeholder participation.

26

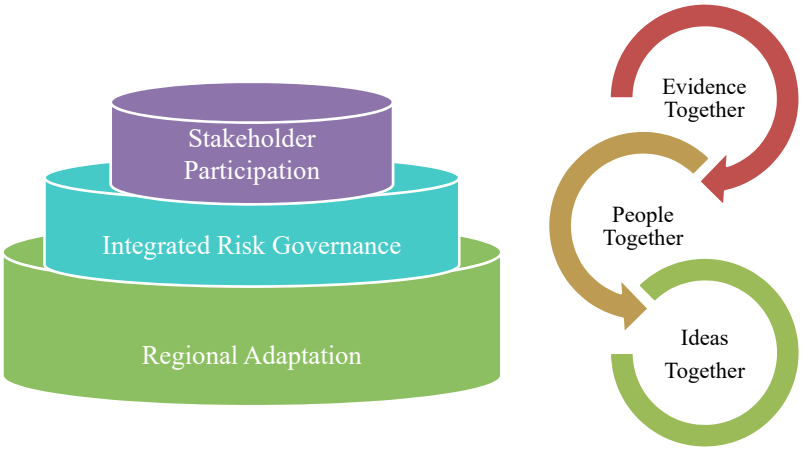
Discussion of Further Research

NARLabs

- This research proposed an improvement concept for adaptation planning in water system by collaborative governance in Taiwan. It is just a prototype designed according to local problem review and related theories identification, and needs to be further adjusted and detail mechanism designed and tested by a specific case.
- Especially, climate change adaptation is highly dependent upon local government political context and resource condition and may needed to adjust accordingly. For example, there are already some regional governance platforms established by adjacent local government in Taiwan for other policy planning or cooperation purposes. However, the current organization and function of these regional governance platforms are not the same, which may diversify the detail mechanisms for the operation of collaborative governance.
- Also, the spirit of sustainability is toward a concept of co-design, co-production and co-delivery with stakeholders, users, researchers, policy maker, policy practitioner, citizens and industry, including from the problem framing, solution proposing prioritization and implementation. Therefore, this collaborative governance prototype also needs to be explained and communicated among stakeholders through some activities when a specific case is chosen, to get more demand driven feedback form stakeholders, to further improve the process legitimacy.

Thank for Your Listening

NARLabs



28

NARLabs

References

[1]Ansell, C., Gash, A., "Collaborative governance in theory and practice", 2008, J. Public Adm. Res. Theory 18, 543e571.

[2]Chia Tsung Y., "Workflow for local climate change adaptation Plan (presentation for local climate change adaptation program of education and training workshop)", 2013.

[3]Dulani, B., "How Participatory is Participation in Social Funds? An Analysis of three case studies from the Malawi Social Action Fund, (MASAF)," 2003, Retrieved from http://www.participatorymethods.org/sites/participatorymethods.org/files/how%20participatory%20is%20participation_dulani.pdf

[4] Emerson, K., Nabatchi, T., Balogh, S., "An integrative framework for collaborative governance", 2012, J. Public Adm. Res. Theory 22, 1e29.

[5]Ettoday news, "Protest against stop irrigation and fallow'policy", 2015, available at http://www.ettoday.net/news/20150101/446296.htm#ixzz3tX8v1xPr

[6]H. H. Hsu et al., "Climate change in Taiwan: scientific report 2011 (Summary)," National Science Council, Taipei, Taiwan, ROC, 67pp, 2011. Available: http://tccip.ncdr.nat.gov.tw/NCDR/Shared_Doc/papers/20130529044217.pdf

[7]International Risk Governance Council , " Risk Governance. Towards an Integrative Approach", Geneva: IRGC, 2005, Retrieved from http://www.irgc.org/irgc/projects/risk_characterisation/_b/contentFiles/IRGC_ WP_No_1_Risk_Governance_(reprinted_version).pdf

[8]IPCC, Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge University Press, Cambridge, UK, 976pp, 2007.

[9]MOEA, "Action Plans for Water Resources Adaptation," 2014, available at http://ws.ndc.gov.tw

[10]OECD, " Water and Climate Change Adaptation," 2013, available at http://www.oecd.org/env/resources/Water%20and%20Climate%20Change%20Adaptation-%20brochure.pdf

[11]OECD, "Water and Innovation for Green Growth," 2015, available at http://www.oecd.org/greengrowth/water-and-green-growth.htm

[12]Ortwin R. ,"Risk Governance: Defining a Better Process for Risk Communication and Stakeholder Participation", 2007, available at www.ortwin-renn.de

[13]Robert Dobrohoczki, "Collaborative governance project - CUISR internship", 2008, Social Economy Workshop, from www.caledoninst.org/

[14]UDN news," earliest in five years Taiwan may have to face with the drought risk in the middle and south areas", 2015a, available at http://udn.com/news/story/7314/1296627-%E6%9C%80%E5%BF%AB5%E5%B9%B4%EF%BC%81%E5%8F%B0%E4%B8%AD%E3%80%81%E5%8D%97%E3%80%81%E9%AB%98%E7%BC%BA%E6%B0%B4%E9%AB%98%E9%A2%A8%E9%9A%AA%E5%8D%80

[15]WEF, " Global Risks 2015 (10th Edition)", available at http://reports.weforum.org/global-risks-2015/

[16]Zadek S., " Collaborative governance: the new multilateralism for the 21st century" 2008, published in Global Development 2.0. Washington DC: Brookings Institute.

29