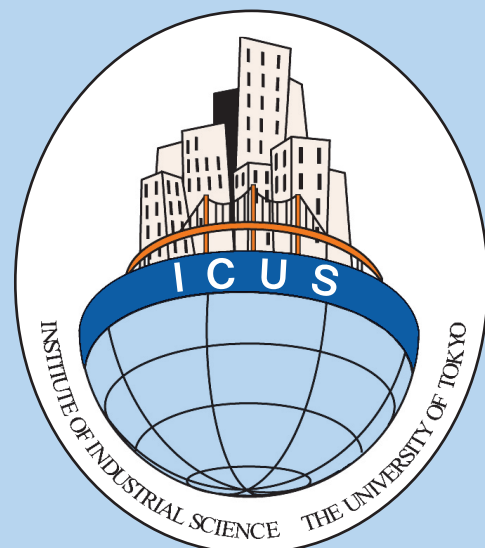


***ICUS REPORT 2010-08***



***INTERNATIONAL CENTER FOR  
URBAN SAFETY ENGINEERING***

***INSTITUTE OF INDUSTRIAL SCIENCE  
THE UNIVERSITY OF TOKYO***

# **Forefront and Challenges of Water Resources Management in Southeast Asia**

**Edited by**

**Akiyuki Kawasaki  
ICUS, IIS, The University of Tokyo, Japan**

# **Forefront and Challenges of Water Resources Management in Southeast Asia**

29 January 2011  
Novotel Bangkok Fenix Ploenchit Hotel,  
Bangkok, Thailand

## **Organized by**

Regional Network Office for Urban Safety (RNUS),  
School of Engineering and Technology,  
Asian Institute of Technology

International Center for Urban Safety Engineering (ICUS),  
Institute of Industrial Science (IIS), The University of Tokyo

Chula Unisearch, Chulalongkorn University

*Edited by*

*Dr. Akiyuki Kawasaki*



# ***Forefront and Challenges of Water Resources Management in Southeast Asia***

**January 2011**

## **PREFACE**

Due to rapid and dynamic changes in economy, society and the environment in the context of globalization and localization, Southeast Asia faces many new challenges and opportunities such as political democratization, administrative decentralization and improved governance, regional economic cooperation, trans-boundary resource management and sustainable development, infectious diseases prevention, and disaster preparedness and response. Among these many critical issues, consideration of the water resources management is drastically increasing in the region due to record flooding and draughts in recent years – especially in the Lower Mekong River basin.

To raise public awareness of these issues, a half-day symposium, "Forefront and Challenges of Water Resources Management in Southeast Asia," was held at the Novotel Bangkok Fenix Ploenchit, Bangkok, Thailand, on January 29, 2011. This symposium was co-organized by the International Center for Urban Safety Engineering (ICUS), Institute of Industrial Science (IIS), the University of Tokyo; the Regional Network Office for Urban Safety (RNUS), Asian Institute of Technology (AIT); and Chula Unisearch, Chulalongkorn University.

The objectives of this symposium were:

- To understand critical environmental and disaster problems in Southeast Asia
- To share and exchange knowledge, information and opinions among geospatial researchers, practitioners, and decision-makers.
- To discuss forefront and challenges of geospatial technologies for solving problems

In this symposium, we invited six distinguished Thai and American speakers in the field of water resources management from both the academic field and government. Overall, the symposium was completed successfully, with interesting, informative and exciting presentations and lively questions and discussions. We also obtained many positive evaluations through the questionnaire sheets answered by the participants. We hope this symposium contributed to promoting information exchange, mutual communication and understanding and research collaboration among universities, institutes, and private sectors in Southeast Asia.

Akiyuki KAWASAKI

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## Table of Contents

	<i>Page</i>
<b>Mekong sub-regional framework: opportunities and challenges</b> <i>Ms. Nitivadee Manitkul</i>	1
<b>Vulnerability assessment of freshwater resources in the Mekong River basin</b> <i>Assoc. Prof. Mukand Singh Babel</i>	13
<b>Water resources management in MRC &amp; Thailand's perspectives on MRC's role</b> <i>Mr. Chaiporn Siripornpibul</i>	41
<b>Integrating provincial/community water planning with provincial development plan by area based information system</b> <i>Assoc. Prof. Sucharit Koontanakulvong</i>	65
<b>Who's river is it anyhow? Some issues regarding transboundary development on the Mekong River basin</b> <i>Prof. Peter Rogers</i>	89
<b>Challenges to Benefit sharing in the Mekong River basin</b> <i>Prof. Suzanne P. Ogden</i>	105
<b>Panel discussion</b> <i>6 presenters chaired by Dr. Akiyuki Kawasaki</i>	

# SYMPOSIUM SUMMARY

January 29th, 2011

The International Center for Urban Safety Engineering (ICUS), the University of Tokyo, and the Regional Network Office for Urban Safety (RNUS), AIT organized a seminar titled “**Forefront and Challenging of Water Resources Management in Southeast Asia**” at Novotel Bangkok Fenix Ploenchit Hotel (Room Ruam Rudee Ballroom) on January 29, 2011.

The seminar was held in half-day with six distinguished speakers. The seminar was inaugurated and welcome by Dr. Akiyuki Kawasaki, Regional Network Office for Urban Safety (RNUS).

The speakers consists of Ms. Nitivadee Manitkul (Director, Division of Economic Relations and Cooperation, Department of International Economic Affairs, Ministry of Foreign Affairs); Assoc. Prof. Mukand Singh Babel (School of Engineering and Technology, Asian Institute of Technology); Assoc. Prof. Sucharit Koontanakulvong (Faculty of Engineering, Chulalongkorn University); Mr. Chaiporn Siripornpibul (Deputy Director General, Department of Water Resources, Ministry of Natural Resources and Environment); Prof. Peter Rogers (School of Engineering and Applied Sciences, Harvard University, USA); and Prof. Suzanne. P. Ogden (Department of Political Science, Northeastern University, USA).

Among about 150 participants, 92 audiences retuned the questionnaire sheet to the secretariat, and their replies were as follows:

The list of the organizations in which total 114 audiences attended the seminar:

Organization	Number of audience
<i>University</i>	<i>80</i>
AIT	54
Srinakharinwirot University	7
Kasetsart University	4
Chiangmai University	3
King Mongkut’s Institute of Technology	3
Mahanakorn University	3
Mahidol University	3

Burapha University	1
Kasem Bundit University	1
Thasin University	1
<b><i>Thai Government</i></b>	<b><i>40</i></b>
Royal Irrigation Department	21
Department of Water resources	5
Department of Drainage and Sewerage	4
Metropolitan Waterworks Authority	2
National Disaster Warning Center	2
Bureau of Royal Rainmaking and Agricultural Aviation	1
Department of Groundwater Resources	1
Hydrographic Department	1
Pollution Control Department	1
Public Works Department	1
Thai Meteorological Department	1
<b><i>Private sector</i></b>	<b><i>25</i></b>
GTM Corporation Ltd	5
Information Construction Co., Ltd (iCONS)	4
Sun Yu Consultants Ltd. (Thailand) Co., Ltd.	4
Panya Consultant Co., Ltd	4
CMS Engineering & Management	2
ASDECON Corporation Co., ltd	1
Black & Veatch (Thailand)	1
Consultants of Technology	1
N-Power Co., Ltd	1
Progress Technology Consultants Co., Ltd	1
Regional Center for Geo-informatics and Space	1

Technology, Northeast Thailand	
<b><i>International or foreign organization</i></b>	<b><i>3</i></b>
Japan Society for the Promotion of Science (JSPS)	1
Remote Sensing Technology Center of Japan (RESTEC)	1
Thai National Mekong Committee Secretariat	1

**Additional desired seminar topics:**

***Mekong Framework***

- Mekong sub regional framework
- Challenge & Benefit and Opportunities
- IWRM of Mekong River basin
- Seepage analysis and erosion study around Mekong river
- Proper water management for community development
- Construction of Dam along the Mekong river and its impacts
- Water quality of Mekong River Basin
- Natural condition of basin
- Practical solve in Mekong River
- Discrete impact on ecology in Mekong river
- Impact of CC & adaptation measure in local level in Mekong river community
- Water situation due to industry, economic etc.

***Urban Infrastructure***

- Planning & Development of Urban infrastructure system
- Integration research for urban area
- Urbanization impacts at the Basin of R.B.

***Water management***

- Innovation for water management for reduce scarcity in dry period
- Allocation water for agriculture sector in developing countries
- Water management approach in different geographic locations
- Gender studies & water resource management
- Water supply issue due to climate change
- Public participation situation in water management

***Technique***

- Various techniques of scientific & engineering analysis of the basin
- Sediment assessment & pollution in Mekong River Basin using GIS Technique
- Remote sensing & GIS applications on water resource
- Technique for waste water treatment and reuse

***Climate***

- The impact of climate change on water resource management in SEA
- Ecological change & water resource management in SEA
- Climate change in water resource in LMR Basin
- Effect of building dam due to climate change

***Other***

- Previous research papers and modeling works
- Conservation practical applied research on watershed area
- Sustainable development
- Hydropower projects / Dam versus biodiversity protection
- SEA and Dam projects

**Comments:**

***Time management***

- Speakers should keep their time frame of presentation
- Time duration is short
- Some speaker is go so fast

***Venue***

- Air condition is too cool in seminar hall
- Convenient for public transportation
- Venue & Speaker are preferable
- Not appropriate for parking

***Contents***

- The seats are too fit & too close
- Lecture setting is preferable (seat with desk)

***Other***

- Overall it was a nice arrangement
- Overall the event was very well-organized
- Nice information for further study
- The symposium should place in morning
- Less photo taking during presentation period
- The symposium should announce earlier

**Location & Setting**

- The start time was convenient:  
Strongly Agree (36)      Agree (45)  
Disagree (9)      Strongly Disagree (2)
- The duration was appropriate:  
Strongly Agree (25)      Agree (32)  
Disagree (10)      Strongly Disagree (-)
- The location was convenient:  
Strongly Agree (46)      Agree (41)  
Disagree (3)      Strongly Disagree (2)
- The facilities was appropriate:

Strongly Agree (42)  
Disagree (6)

Agree (42)  
Strongly Disagree (1)

***Which do you prefer to attend the seminar?***

- Week day (21)
- Week end (Sat or Sun) (50)
- Any day is OK (21)

***What is your occupation?***

- Research, Faculty (10)
- Governmental Officer (25)
- Working at private sector (9)
- Student (47)







*Registration*



*Registration*



*Opening ceremony (Dr. Akiyuki Kawasaki)*



*Welcome participant*



*Ms. Nitivadee Nanitkul*



*Assoc. Prof. Mukand Singh Babel*



*Mr. Chaiporn Siripornpibul*



*Prof. Sucharit Koontanakulvong*



*Prof. Peter Rogers*



*Prof. Suzanne P. Ogden*



*Panel discussion*



*Participants*



*Question and discussion*

*Mekong sub-regional framework:  
opportunities and challenges*

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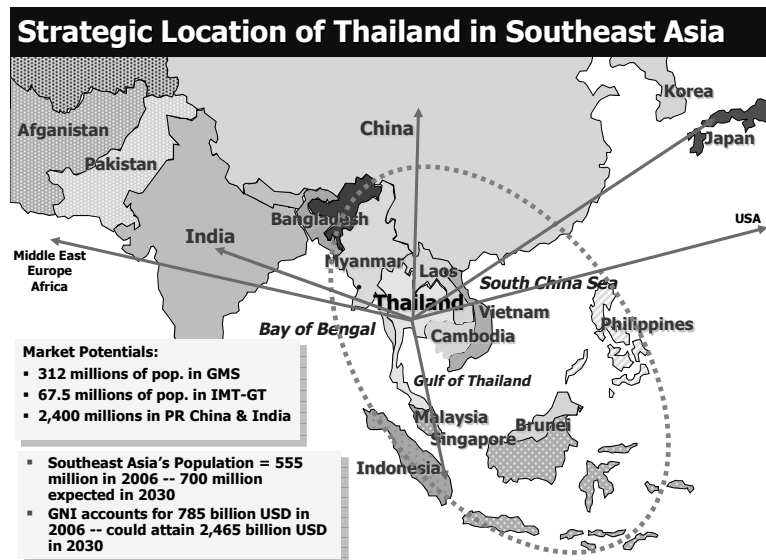
*Ms. Nitivadee Manitkul*

# **MEKONG SUB-REGIONAL FRAMEWORK: OPPORTUNITIES AND CHALLENGES**

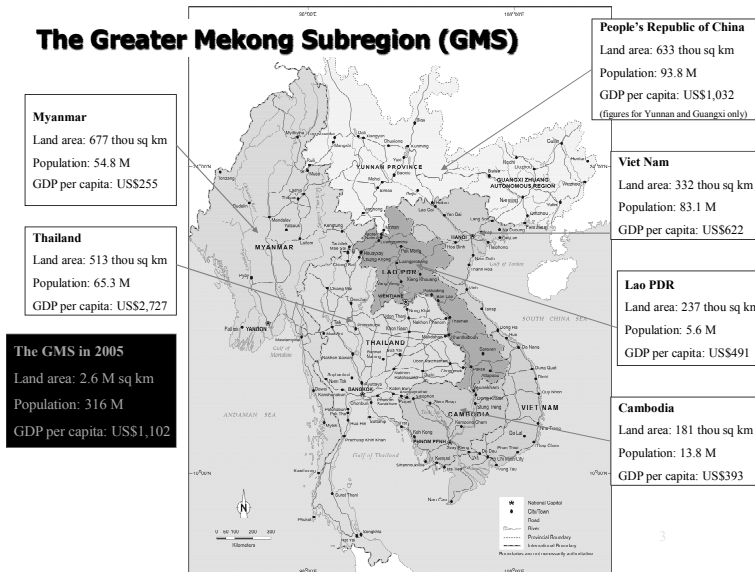
Nitivadee Manitkul  
Director, Division of Economic Relations and Cooperation,  
Department of International Economic Affairs,  
Ministry of Foreign Affairs  
nitivadeem@hotmail.com

## **Mekong Sub-regional Frameworks: Opportunities & Challenges**

Nitivadee Manitkul  
Director of  
Economic Relations and Cooperation  
Ministry of Foreign Affairs  
29 January 2011

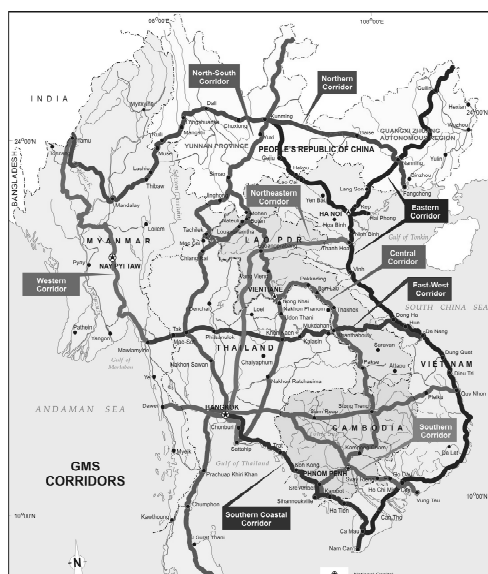






## Changes in the Region's Landscape

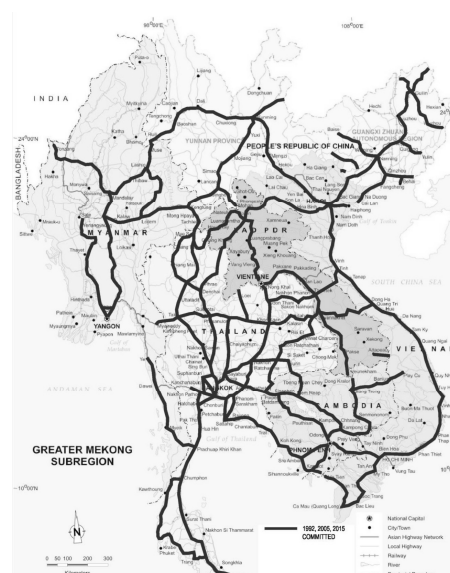
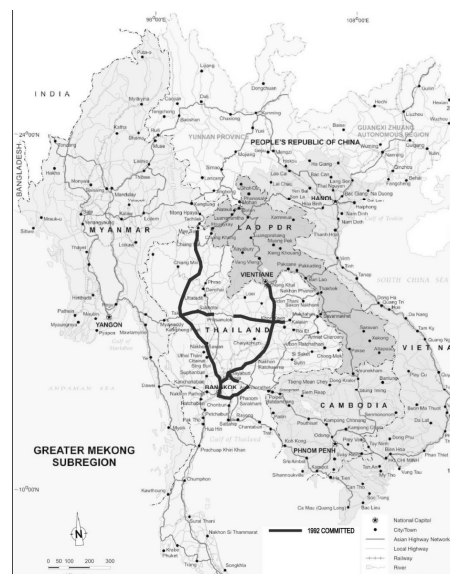
- Moving to Economic Integration: AEC
  - Increase intra-trade/investment; less reliance on external trade; develop value-chains; enhance competitiveness
- Emerging of Sub-region frameworks: GMS, ACMECS, IMT-GT, BIMSTEC, Mekong-Japan, US-Lower Mekong, Mekong-Korea
  - narrow development gap; create income and growth; increase infrastructure connectivity, promote border trade and investment



## GMS Connectivity

### Road Transport Network

1992

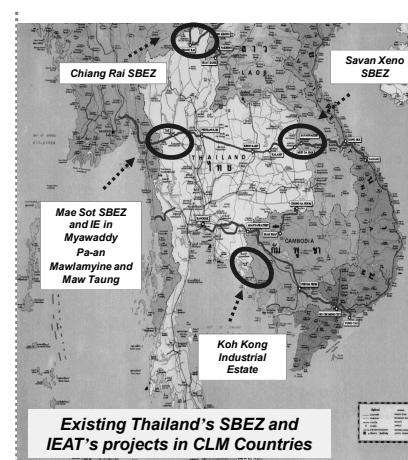


## Industrial Estate and Economic Zone under ACMECS

### Thailand's Border Economic Zone

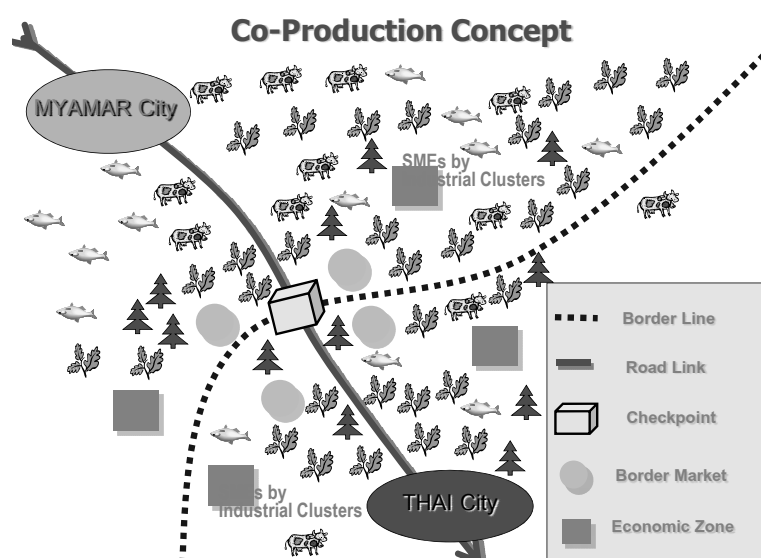
1. Tak SBEZ
2. Chiang Rai SBEZ

Thailand provide  
assistance to Myanmar  
LaoPDR and Cambodia



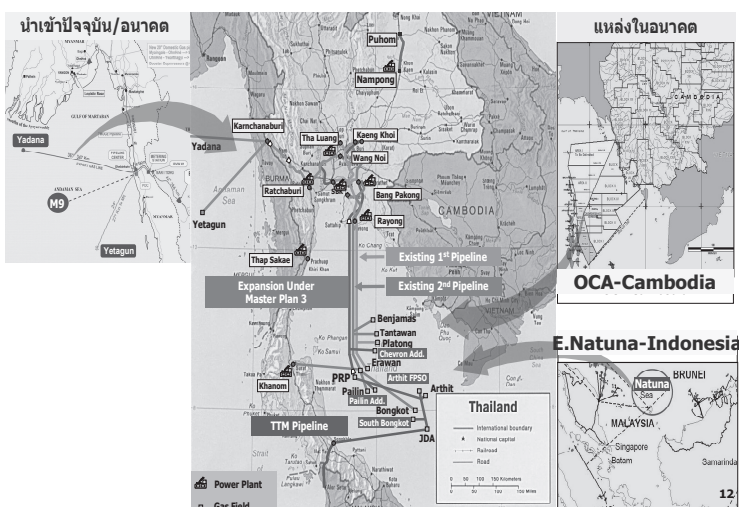
## Other Attempts to Support ACMECS

<b>Agriculture</b>	Facilitation of Import & MOU of Contract Farming; R&D on field crops, livestock, SPS Tech Transfer
<b>Single VISA</b>	Thailand and Cambodia as a Pilot Project; Details had finalized, will signed MOU in 2007
<b>Trading</b>	<b>OSS at 10 Checkpoints in THA; Study of Wholesales Market &amp; Distribution Centers in Cambodia; Providing AISP for CLMV products</b>
<b>Use of Local Currencies</b>	BOT's Study finished. Implementing pilot projects at Commercial Banks at Thai-Lao borders.
<b>Energy Security</b>	Regional Power Grids, Alternatives Energy i.e. Biofuels, Biomass, Hydropower
<b>Capacity Building</b>	Scholarship provided by Thailand and VN for Vocational Trainings and Other Areas
<b>Community</b>	Implementing Sister Cities; Coordination Mechanisms Established at the Local Level ACMECS Business Council at Local Level





## แหล่งก๊าซธรรมชาติ ที่มีศักยภาพอยู่ในประเทศเพื่อนบ้านของไทย



## Movement of Workers

- Economic driven demands & Social impacts
- Migrant workers in Thailand 1,544,902 from 2008-2009 (210,745 registered workers and 1,334,157 illegal migrants)
- Illegal migrants: mostly unskilled labours in labour-intensive industries

Thank You



## Transcript

As Khun Aki introduced me, I work for the Ministry of Foreign Affairs, and actually, when I see most of the audience, I think they come from the engineering sector. That is very, very far from the sectors the Ministry of Foreign Affairs is working on.

Anyway, I am pleased to share some of the information and some views, including comments for the water resource management in Southeast Asia.

Actually, my presentation will be more on a broader scope, and I will catch on what happens in the Mekong Subregion. When we talk about water management, most people talking about Mekong River [know] that it is the main river in Southeast Asia and it crosses through many countries and some might worry about the situation of the Mekong river but some might see the opportunities also. So my presentation will be on a broader scope, trying to draw your attention to see the opportunities and also the challenges that the countries in the Mekong Subregion and the people in this subregion will face within the next twenty years, because don't forget that we are part of the ASEAN community and what happens in the ASEAN community will apply to Mekong countries also.

OK, let me show you this map. The Mekong countries comprise Myanmar, Thailand, Laos, Cambodia, Vietnam and also China, especially the southern part of China with the two provinces Guangxi and Yunnan situated along the upper northern Mekong river. I will show you some potentials that are based on figures and information from some organizations like ADB. They mention that the future Southeast Asian population is expected to reach nearly 700 million by 2020, so that is a huge market in this area when you see that the potential for the GNI account will be nearly 2.500 Billion USD in 2020. So that's a big market and that's why right now we try to promote and influence the intra-trade among ourselves rather than relying on other regions because we can go together and rely on each other.

This is a map where you can see the area, the land (?), the whole population, GDP. This picture is not really up-to-date but we can see the potential existing in these Mekong subregion countries.

OK, this is what happens in this region right now. I just mentioned that in ASEAN, right now we are moving to economic integration in what is called the ASEAN economic community. As a result, in this ASEAN economic community, we will encourage, as I mentioned, the intra-trade and investment between the countries in this region and also raise (?) reliance on external trade and develop one [value] chain and enhance competitiveness. And because of this, this idea, this objective you have seen that during the last two years when the economy had a problem at the global level, we have raised the growth impact on our economy (?), better than ten

years ago because of our exports which especially Thailand still relies on as nearly [fifty percent] of our GDP growth is due to export. So that's why we should not rely [only] on [certain] countries. And from the economic crisis in 1997 on, we have tried to diversify markets. The Southeast Asian market is also one of our targets. And what we see occurring right now is two major powers in Asia arising, two countries we call emerging powers right now though one of them we wouldn't consider emerging any more as it is already at the level of the United States in terms of economy, which is China. The other one is India. So Southeast Asia, particularly the Mekong area has both powers, India and China [as neighbors]. So we would like [to be] the link between these two countries so we can act as servers [offering] opportunities for people who would like to engage in the market.

Just yesterday, I read in the new Economist about the trade from south China to the Mekong countries to the south, and many of you may have read in Thai newspapers also that China is heading south with trading. Now, China has already signed an MoU on trade building with Laos. Now it is already negotiating with Thailand and we are preparing to submit this to parliament for approval of the framework for trade building between China and Thailand. That is also an opportunity, not only for construction but also for trade and investment and this can use mechanisms like transportation to increase trade and investment.

What has happened in the subregion which is very phenomenal, has never happened before and makes me so busy right now is the emergence of subregional frameworks. Many of you may have heard about the Greater Mekong Subregion which has been established almost twenty years ago which comprises two provinces of China, Yunnan and Guangxi [Guangzhou], Myanmar, Thailand, Laos, Cambodia and Vietnam. These six countries' joint objective is to narrow the development gap and to build up the economy to create income and growth by increased infrastructure connectivity. Connectivity has been an issue in ASEAN as well since Thailand pushed better connectivity during the summits of the last two years. And that's a aim for ASEAN and that's why we put more emphasis on connectivity because we think that when we have more like hardware connectivity to each nation, this will connect people and the economy and minds and souls of people to [induce] integration towards a single economy like in Europe in the future. But right now, we still are at the beginning of the development of a single economy like Europe.

Apart from GMS, around ten years ago, the Thai government initiated ACMECS which stands for "Ayeyawady - Chao Phraya - Mekong Economic Cooperation Strategy", which is another framework [not including] China. Thailand plays a small role in this. Some of the practical issues you may have heard [concern] contract farming which means that some investors request and plan certain agricultural production in our neighboring countries. The idea behind is to allow them to sustain themselves by creating income and building up knowledge how to grow produce on their own. This is almost an inland scenario, because the produce we invest into contract farming in our neighboring countries will

help poor areas but at the same time, it will come back to Thailand as raw material for more value-added products like seeds which can be used as animal feed we can export to the world market. But at present, the contract farming idea was accused as a victim, well, I may call it victim because we have measures for contract farming (?). Because when we have projects by the fund-making parts to repay for the funds and to keep it for what is “Kho gann jamm namm” in Thai, some of the produce from our neighboring countries has been trafficked to Thailand as a reserve for [speculation with] an expected price increase. So that is why this project has been accused as a victim for the results of the management in our countries (?).

But anyway, there is another project which is very popular. And what else is there? I will talk about ACMECS later.

The third one is IMT-GT which stands for Indonesia-Malaysia-Thailand-Growth-Triangle between the three countries to the southern side of Thailand.

BIMSTEC is interesting because it is one of the forums linking Southeast Asia and South Asia with seven [member] countries, five of them in South Asia, which are India, Bangladesh, Bhutan, Nepal, Sri-Lanka. And the other two are Myanmar and Thailand. Here we see the huge potential of South Asia, especially India that can [provide] both raw materials and a market. This framework has been established nearly ten years ago. We just had a ministerial meeting. We already had two summits for BIMSTEC and a ministerial meeting in [opaque] last week and we are going to have a summit in Myanmar this year.

Concerning ACMECS, as mentioned, and contract farming, we just had a summit in Phnom Penh. If you can recall that the Thai Prime Minister visited Phnom Penh in November last year, this was to attend the ACMECS summit.

The next are the Mekong-Japan and US-Lower Mekong- and Mekong-Korea [frameworks]. The Mekong-Japan [framework] was established just two years ago by the initiative of the Japanese government. So we see why they established the stand-alone frameworks. Usually, Japan and the US contribute quite a lot in the Greater Mekong Subregion frameworks or GMS through ADB, but now they come into this region [establishing] stand alone forums. So this means something why they come here and why they [set up] stand alone forums. So this means quite more geopolitical and economic competition.

For the Mekong-Japan [framework], we had two summits already. The first one in Tokyo. At that time, the media payed attention because the Prime Minister went there amid the conflict between Thailand and Cambodia and the media payed attention not to the summit but to the relation between Thailand and Cambodia. The second [summit] was held in Hanoi last year. We are going to have this one again back to the [unclear] ASEAN summit.

Concerning the US-Lower Mekong [framework], it was just [set up] at the level of Foreign Minister meeting when Madam Clinton came to the ASEAN meeting and launched the idea of an engagement in the Mekong [area], especially in the Lower Mekong [region].

This forum admitted only four countries in the Mekong [area], without China and Myanmar.

Getting back to the Japan-Mekong [framework], [it includes] five countries of ACMECS: Myanmar, Thailand, Laos, Cambodia and Vietnam, without China, so there is Japan [together] with five countries. While the US -Lower [Mekong framework] includes four countries, without China and Myanmar.

So you see the significance and the symbolism of each forum, and Thailand is member of both.

Concerning Korea, we haven't got a forum yet but we are going to have it this year because the initiative was endorsed during the ASEAN Korea Summit last year where Korea approached us to [set up] a senior official and a foreign ministerial meeting. We see also that Korea plays quite a great role in this subregion both in terms of infrastructure and software science (?) which means for the customs, for the facilitation of cross-border trade, something like that.

So all these forums share quite the same objectives that I put on the slide: narrow the development gap, create income and growth, increase infrastructure connectivity, promote [trans-] border trade and investment.

This picture {slide5} looks quite familiar to some people who work for the Mekong region because [it depicts] the idea we call the GMS corridor: to construct roads connecting the six Mekong countries which ADB launched in 1992 when it looked still like [shown on] this slide {slide 6} but this {slide 5} is what we expect for 2015.

This is the North-South Corridor, [depicted by] the red line. This road called R3 East, some of you may have traveled from Chiang Rai to Chiang Khong, west side (?), then you go on to Kunming by this road, [passing] Boten and Mohan, some of you may be familiar with this road. It's a one day trip but one you start at 6 o'clock in the morning and end maybe close to midnight. That's a one-day trip.

So far, the road is pretty good but there are some things we have to invest in like rest areas and some activities we have to promote at this road. There's some missing link over here across the Mekong river which right now, Thailand and China are building what we call the Mekong Bridge Number 4, of course [connecting] Chiang Khong – Hoay Sai in Chiang Rai and Laos. And if the missing link is finished this road leads down from China on this route to the sea here and some time [later] maybe to – here, but we have to talk more about this.

The other one we call R3 West, which passes Myanmar and causes still some problems for getting back to this route but some goods from China also pass this route. But maybe one day we will use the one route to go up and on the next day the other one to get back. It is not finalized yet for passage.

But concerning this route, the bridge is expected to be finished within the next two years so we can go by road.

What will be next? Not only the road but we also plan to build a railway along this route. That's in the plan of GMS.

Now, this is R3, and here we have this one, road number 9 we call the East-West Economic Corridor from Tak province passing Phitsanulok and then ends up at Mukdahan, crossing the Mekong to Savannakhet. We have the bridge over there some of you may have visited. This is the bridge we call the Second Bridge built by Japan [opaque]. This one is mainly used for transportation of goods and maybe also for tourism because over here is what we call the historic cities of Dompha and Damnan (?) which are very famous. But we have to promote also more economic activities along this route.

The third one is more interesting right now and many people are talking about this now because this one will [connect to] Dawei port or Thawai port as we call it in Thai. That's why it is much more important right now. Dawei port is more important right now because we have to find some deep sea port that may substitute another deep sea port we have in the eastern part of Thailand. Although the government tries to encourage some deep sea port along the Andaman in the south of Thailand, the depth of the water is not equivalent to what Dawei port offers. And we also have to manage the misunderstanding of the local people so right now, one of the companies given the concession to build Dawei port is [opaque] and the government quite supports the construction of Dawei port because there will be heavy industry [situated] behind the port which can become a substitute for Maptaphut and also Laem Chabang. And if we can use Dawei port the ships don't have to go down to Malacca [Strait] and we see the opportunity right now that ships can go either to Laem Chabang and [freight carriers] can then use Thai corridors while on the way to South Asia and Europe, ships don't have to go down to Malacca. That's the big opportunity.

(OK, I'll skip this one.) The next slide deals about ACMECS. As I mentioned before, apart from ASEAN connectivity, the idea is to narrow the gaps and to create incomes, for Thailand especially [important considering we] have neighbors with wide development gaps. So some ideas have been brought up to build special economic zones or activities along the corridors or along the borders. [Referring to] Thailand, in the past, we had ideas to build up Tak and Chiang Rai special economic zones but right now, what the government has just approved is to build Tak Economic Zone because



we [decided to] realize the special economic zone in Tak first as in Chiang Rai, there are still some problems among the stakeholders.

The idea behind is that if we can [establish] the Chiang Rai Economic Zone, [this would benefit] Mae Sot [situated at the border to Myanmar] opposite Myodee (?), Myanmar, and Kho Khom. But Koh Khom is seen as inviable at the moment because there is still a lack of facilities, especially energy facilities, there is just one gas agent so if you would invest in the economic zone without any facilities then this wouldn't be very good for your future industry. So that's the concern.

But we push forward for the Maesot Economic Zone and we may realize some proliferation through this zone and use it to promote trade between Thailand and Myanmar and also to other nations. OK, that's the idea behind ACMECS I mentioned, also [concerning] agriculture where we try to apply contract farming.

The Single Tourist Visa is also interesting as we try to promote tourism in this area and the single visa zone is like Schengen for third countries. If you apply for a visa, supposed you are French and you have only a Thai embassy in Paris but no Cambodian embassy, you can apply for a Thai visa with the permission of entering Cambodia. But you [will still] have to pay a fee at the border because this [agreement] does not deal with fees but just with the representation of third parties in this area and right now, it's already implemented between Thailand and Cambodia. And Laos and Vietnam (maybe as the last one) will join in the future. Laos expressed key interest in joining Thailand and Cambodia in the meantime.

And [concerning] the local currency [regulation] that is already in place between Thailand and Laos along the borders [allowing you] to use Kip instead of Baht or Dollars that are also accepted to facilitate trade then it is clear that the idea behind is to have manageable power grids and also alternative energies. [We are] talking about security and community also (?).

OK, that's the idea of co-production and contract farming that I mentioned: you invest in agriculture along the border and import to Thailand or export to third countries by using what we call GSP.

And this slide [shows the] Mekong-Japan framework I mentioned before. These are some pictures, first from the summit and the third is from the prime minister meeting.

This one deals about water resource management in GMS. Even some countries like Vietnam come to attend the GMS water management forum but so far China rejects to discuss this in the GMS forum. But in the Mekong-Japan forum, Japan proposed two anchors, one concerns infrastructure, and the other one the "Green Mekong". In the Green Mekong initiative, we are talking about reforestation, water management, urban management and something like this.

Another idea behind is that the Japanese can come to cooperate to help in something like dolphin conservation in the Mekong river.

And this slide shows you some pictures related to energy [explaining] why Thailand still relies on her neighboring countries.

Actually, the idea behind the subregion is to let the people in our neighborings countries earn their own income, have their jobs but sometimes [some] have to migrate to Thailand and this are the data that show the number of countries' migrants coming to Thailand. That's also a social problem that we have to tackle, these [are] also challenges that we have to tackle. Because of the social situation in Thailand [there are fears] among Thais that labor from neighboring countries would replace them but we also have to get to tackle the submissions.

OK, that's all I'd like to say but I am happy to answer any issues that maybe I spent too little time on. Thank you very much



*Vulnerability assessment of freshwater resources  
in the Mekong River basin*

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*Assoc. Prof. Mukand Singh Babel*

# ***VULNERABILITY ASSESSMENT OF FRESHWATER RESOURCES IN THE MEKONG RIVER BASIN***

Mukand Singh Babel  
School of Engineering and Technology,  
Asian Institute of Technology  
msbabel@ait.ac.th

## Vulnerability Assessment of Freshwater Resources in the Mekong River Basin

*Mukand S. Babel (msbabel@ait.asia)  
Water Engineering and Management  
Asian Institute of Technology (AIT)  
Thailand*

## Outline

- Project background
- Water issues in Mekong
- Method development
- Assessment results for Mekong
- Conclusions and recommendations



## Project background



## Vulnerability Assessment of Freshwater Resources in Asia UNEP, AIT and Peking University (PKU)

Development of **methodological guidelines**

Application in selected **trans-boundary river basins** in Asia



**Asian Institute of Technology (AIT)**  
South Asia: Ganges-Brahmaputra-Meghna,  
Helmand and Indus  
South East Asia: Mekong

**PKU and Mongolia Water Institute**  
Northeast Asia: Huanghe, Chang Jiang,  
Song-Liao, Tuul and Orkhon



## Water issues



## Mekong river basin



- Lifeblood of about 65 million people
- High Pop. Density - arable land wise
  - Lao PDR (465/km<sup>2</sup>)
  - Viet Nam (395/km<sup>2</sup>)
- 75% of the population - dependent on agriculture and fisheries
- Development coming fast...
  - Rapid development associated with globalization
  - Greater Mekong Sub-region Project
  - Bilateral assistance to power projects

## Mekong: Waters at the crossroads



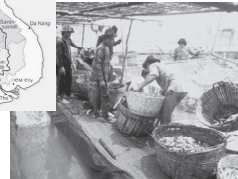
Manwan dam, China



Rice harvesting in Mekong Delta, Viet Nam



Cruise boat, Thailand

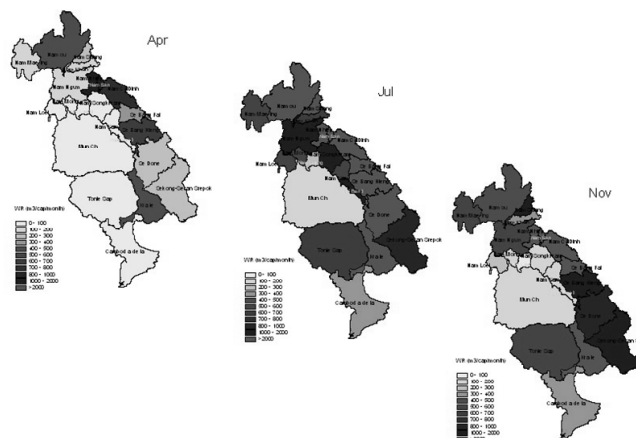


Fishing, Tonle Sap, Cambodia

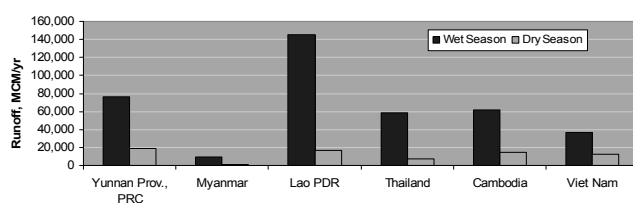
## Water resources availability

- Assessed in 23 hydrological units
- Estimated based on annual runoff factors
- Runoff factors of the sub-basins were used to generate monthly runoff in each sub-basin
- Annual per capita water resources availability > Asian average of 4,900m<sup>3</sup>/person/yr
- Varies in space and time
  - >80% of available water generated in monsoon

## Per capita water availability

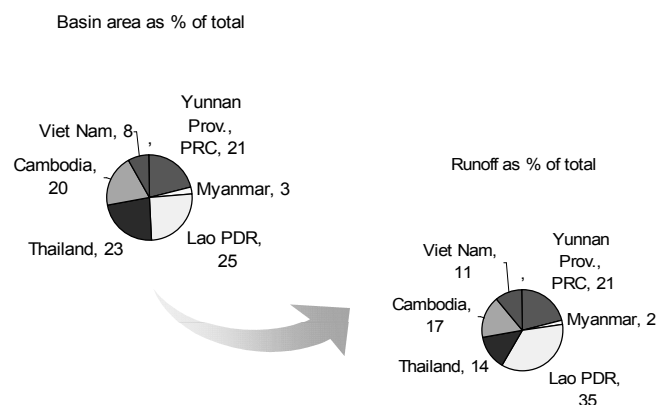


## Runoff: dry vs. wet season

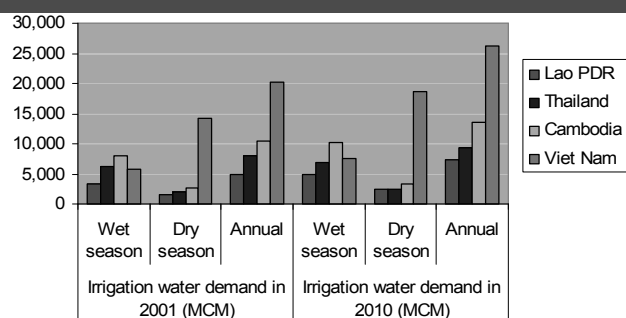


Dry season water availability restricts use in Mun Chi sub-basin of Thailand and Mekong Delta and Central highland sub-basins of Viet Nam

## Runoff: country contribution



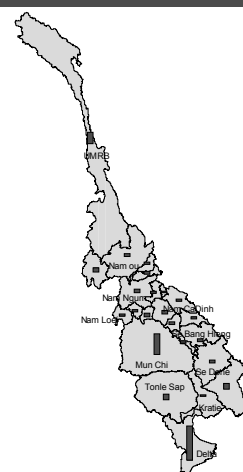
## Irrigation development and use



- Over-dependence on Irrigated Agriculture
- Mekong Delta - 40% of the agricultural production in Viet Nam
- Significant opportunity costs to irrigation expansion are likely

## Domestic and industrial water use

- Estimated based on population data and criteria for the capita consumption
  - Lao PDR, Thailand, Cambodia, Vietnam, Yunnan - Demand per capita - 64, 115, 64, 67, 64 (litres/day)
- Demand will be highest in Thai and Viet Nam sub-basins



## Sedimentation and the ecosystem

- The Mekong River and floodplain, sustains a rich flora and fauna
- Annual sediment load at Pakse = 187 million tons = ½ that at Chiang Saen
- Rate of sedimentation of Tonle Sap = 0.08 mm per year (slow to silt the lake)
- Colossal dams in the upper Mekong will trap more sediments -> lowering of the fertility of Mekong waters



## Water pollution

- Hydropower stations – danger of release of anoxic bottom waters from reservoirs; reduction in temperature in water
- Industrial pollution – rapid development in Yunnan (e.g. paper mills)
- Urbanization – 2 large urban areas (Vientiane in Lao PDR, and Phnom Penh in Cambodia) are of concern
- Delta region – acidification, salinity and organic pollution
- Nam Chi and Nam Mun tributaries (Khorat Plateau) - mineralization (deposits of rock salt-halite ) and high organic matter (intensive agriculture) is a concern

## Hydropower Generation

- Rush to exploit huge hydropower potential (about 8.4% of the feasible hydropower potential exploited currently)
  - China: power to Guangdong Province/ eastern seaboard and development of impoverished Southwest
  - Laos: aspirations to be the "battery" of Southeast Asia
  - Other Lower Mekong countries also plan to fully exploit tributaries
- Planned development may impact
  - River flow volume and timing
  - Water quality deterioration and loss of biodiversity



A section of the controversial Theun-Hinboun Dam



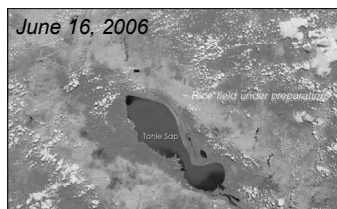
Nam Ngum dam in Laos

## Maintenance of wetlands and floodplain ecosystems

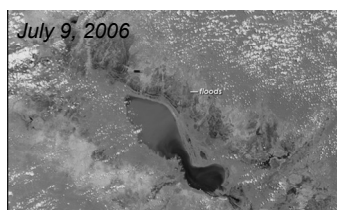
- Lower reaches of the Mekong floodplain - flood will linger longer
- Oxygen concentrations will decrease during the rising flood - harmful for the fish
- Decreased sediment concentration and sedimentation may affect adversely productivity of the wetlands and floodplain system



## Flooding



Flooding in the Mekong Delta is mainly caused by storm precipitation in the upstream catchment, shortly after the onset of the summer monsoon



Flooding around the Tonle Sap Lake in Cambodia (Jul 2006)

## Transboundary water management

- Mekong River Commission (MRC) 1995
- In June 2006, MRC countries agreed to implement key 1995 goals:
  - Acceptable dry season flows
  - Acceptable flow into Tonle Sap
  - Prevention of peak flood flow greater than normal levels
- China and Myanmar have declined to join MRC but hold observer status.





## Key questions



- Is Mekong water resources vulnerable?
- If yes, what contributes to vulnerability?
- How would vulnerability change along space and time?

## Assessment Method

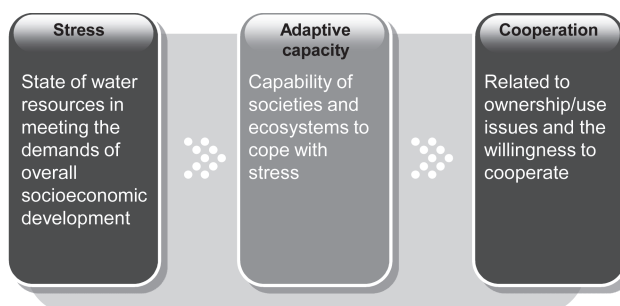
## What is vulnerability?



Desert water – Israeli children learn to reuse early

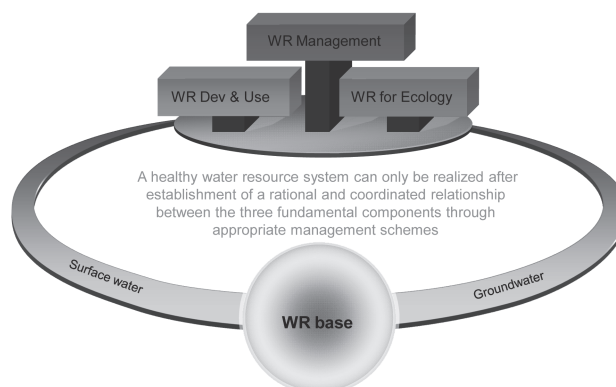
- Characteristics of water resources system's weakness and flaws to maintain its functionality in the face of socioeconomic and environmental changes

## What contributes to vulnerability?

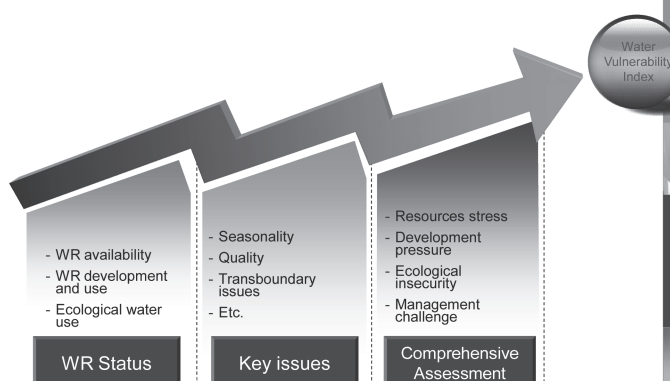


## Conceptual framework

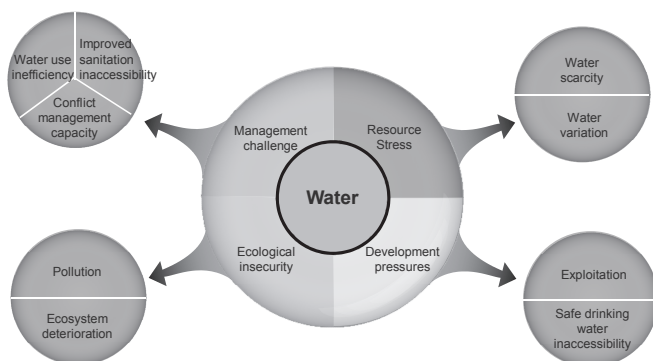
How would vulnerability change under different conditions?



## Steps (DPSIR)



## Indicators



## Resource stress

### Water scarcity parameter

- Expressed by per capita water resource of a region in comparison to the generally agreed minimum level of per capita water resources (1,700m<sup>3</sup>/person)

$$\begin{cases} RS_s = \frac{1700 - R}{1700} & (R \leq 1700) \\ RS_s = 0 & (R > 1700) \end{cases}$$

- $RS_s$  – Water scarcity parameter
- $R$  – Per capita water resource, m<sup>3</sup>/person

### Water variation parameter

- The variation of the water resources can be expressed by the coefficient of variation (CV) of precipitation over the last 50 years

$$\begin{cases} RS_v = cv / 0.30 & (cv < 0.30) \\ RS_v = 1 & (cv \geq 0.30) \end{cases}$$

- $CV = 0.30$  is taken as the threshold for vulnerability

## Development pressures

### Exploitation parameter

- Percentage of water supply to the total water resources used to demonstrate basin's inability for a healthy renewable process

$$DP_e = \frac{WR_s}{WR}$$

- $DP_e$  – Water resources exploitation parameter
- $WR_s$  – Total water supply (capacity)
- $WR$  – Total water resource

### Safe drinking water inaccessibility parameter

$$DP_d = \frac{P_d}{P}$$

- $DP_d$  – Safe drinking water inaccessibility parameter
- $P_d$  – Population without access to improved water sources for drinking
- $P$  – total population

## Ecological health

### Pollution parameter

- WR vulnerability in terms of pollution assessed - ratio between total untreated wastewater discharge and total water resources
- 15% is used as the threshold
 
$$\begin{cases} EH_p = \frac{WW}{WR} & (WW < 0.15 \cdot WR) \\ EH_p = 1 & (WW \geq 0.15 \cdot WR) \end{cases}$$
- $EH_p$  – Water pollution parameter
- $WW$  – Total wastewater discharge ( $m^3$ )
- $WR$  – Total water resource ( $m^3$ )

### Ecosystem deterioration parameter

- Loss of vegetation may change the hydrological regime
- Land area without vegetation coverage (forests and wetlands),  $A_d$  is taken as the indicator

$$EH_e = \frac{A_d}{A}$$

- $EH_e$  – Ecosystem deterioration parameter
- $A_d$  – Basin area without vegetation
- $A$  – Total basin area

## Management capacity

### Water use inefficiency parameter

- GDP value from one cubic meter of water
- Inefficiency of a management system can be demonstrated through the gap between water use efficiency between a basin and defined world average
 
$$\begin{cases} MC_e = \frac{WE_{wm} - WE}{WE_{wm}} & (WE_{wm} > WE) \\ MC_e = 0 & (WE_{wm} \leq WE) \end{cases}$$
- $MC_e$  – Water use inefficiency parameter
- $WE$  – GDP value produced from one cubic meter water
- $WE_{wm}$  – Mean WE of selected countries

### Improved sanitation inaccessibility parameter

- Accessibility to improved sanitation is used as a typical parameter to measure the management capacity to meet the livelihood needs

$$MC_s = \frac{P_s}{P}$$

- $MC_s$  – Improved sanitation inaccessibility parameter
- $P_s$  – Population without access to improved sanitation
- $P$  – Total population

## Management capacity

### Conflict management capacity parameter

Category of inability	Description	Scoring Criteria		
		0.0	0.125	0.25
Institutional inability	Transboundary institutional arrangement for coordinated water resources management	Solid institutional arrangement	Loose institutional arrangement	No institution existing
Agreement inability	Writing/signed policy/agreement for water resources management	concrete/detailed agreement	General agreement only	No agreement
Communication inability	Routine communication mechanism for water resources management (annual conferences etc.)	Communications at policy and operational levels	Communication only at policy level or operational level	No communication mechanism
Implementation inability	Water resources management cooperation actions	Effective implementation of river basin-wide projects/programs	With joint project/program, but poor management	No joint project/program

## Vulnerability Index calculation

Parameter	Resource stress		Development pressure		Ecological insecurity		Management challenge		
	RSs	RSv	DPs	DPd	EHp	EHe	MCE	MCs	MCc
Calculated	0.68	0.34	0.65	0.25	0.45	0.52	0.99	0.25	0.4
Weight for parameter	0.5	0.5	0.5	0.5	0.5	0.5	0.33	0.33	0.33
Weighted	0.34	0.17	0.32	0.12	0.22	0.26	0.33	0.08	0.13
Component total	0.51		0.45		0.48		0.54		
Weight for component	0.25		0.25		0.25		0.25		
Weighted	0.12		0.11		0.12		0.11		
Vulnerability index	0.47								

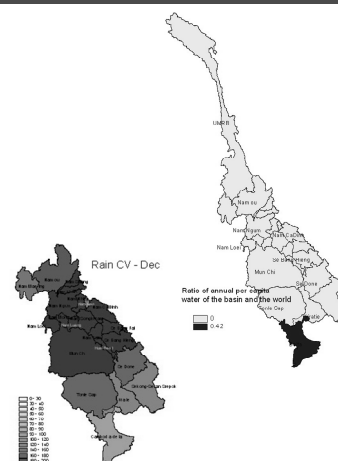
## Vulnerability Index interpretation guide

Vulnerability Index	Interpretation
Low (0.0 - 0.2)	Healthy basin No serious policy change is needed Careful examination of the VI structure needed
Moderate (0.2 - 0.4)	Basin is generally in a good condition toward realization of sustainable water resource management Policy focus - the identified challenges and constraints of the river basin
High (0.4 - 0.7)	High priority to policy formulation to mitigate the high pressures A longer term strategic development plan needed
Severe (0.7 - 1.0)	Restoration of the river basin's water resource management will need high commitment from both government and general public. It will be a long process for the restoration, and an integrated plan should be made at basin level with involvement from international, national and local level agencies.

## Assessment results

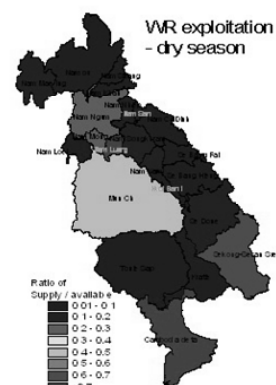
## Water resources base

- No water scarcity (annual per capita water > 1,700 m<sup>3</sup>/person/year)
- Large average monthly precipitation variation during Nov-Mar (CV>1) in the middle part



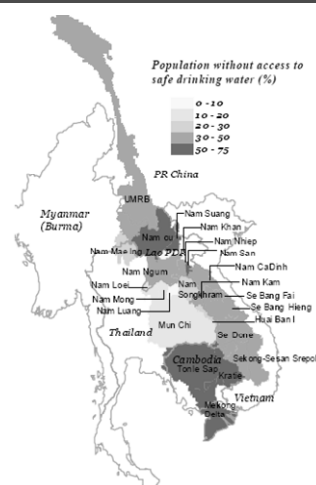
## Water resource exploitation

- % of water supply (agricultural, domestic and industrial sectors) to the total available water resources
- Annual scale < 40%
- Dry season > 40% in Mun Chi, Mekong Delta, Sekong-Sesan-Srepok sub-basins



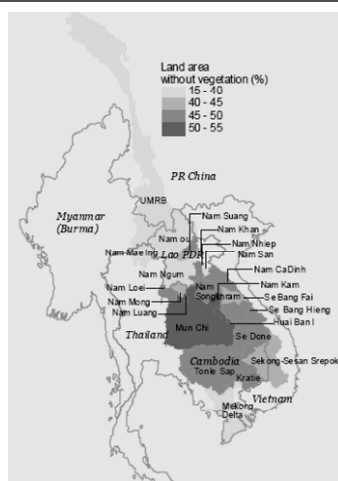
## Access to safe drinking water

- On a sub-basin scale, there are six sub-basins (population 20% of MRB) where more than 50% of the population lacks safe drinking water access.
- 38% of the population in the LMRB is without access to safe drinking water.



## Ecosystem deterioration

- **LAO PDR**
  - Only 4.5% commercially valuable forest left
- **CAMBODIA**
  - Forest loss 250,000 ha/year (1.4% of total)
- **THAILAND**
  - 13% forest cover; decreased 69% in 30 years
- **VIETNAM**
  - 30% forest cover lost in past 30 years

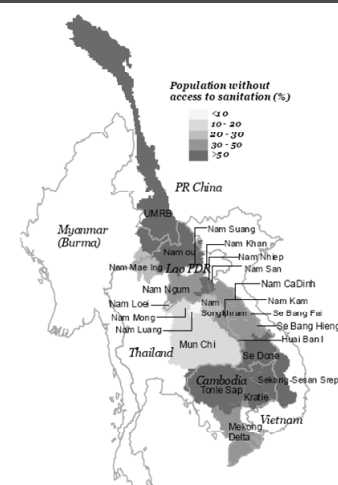


## Water use efficiency

- GDP value produced from one cubic meter water use in all sub-basins is low (US\$ 2.4)
  - Less than one third of the world average (US\$ 8.6)
  - Only 6% of the average of world's four largest economies (US, Japan, Germany and China)
  - Approx. 10% of the average of world's top five food producing countries (China, USA, Mexico, Brazil, France)

## Improved sanitation accessibility

- In Lao PDR, Cambodia and Vietnam, 41-72% of population lacks access
- On a sub-basin scale, the largest number of people (72%) lacking access to improved sanitation facilities is in the Nam San sub-basin in Lao PDR



## Conflict management capacity

- Hydro-politically unique transboundary water basin
- Enjoys long-standing comprehensive river basin management organization
- MRC - Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin include Helsinki rules and UN Convention on the Law of the Non-navigational Uses of International Watercourses
- Greater Mekong Sub-region (GMS) - power trade agreement, promotion of regional tourism, trade and transport
- Moderately vulnerable

## Vulnerability Index

Sub-basin	RS	DP	ES	MC	VI
Tonle Sap	0.22	0.36	0.24	0.65	0.37
Nam Khan	0.25	0.29	0.20	0.67	0.36
Sekong-Sesan Srepok	0.14	0.41	0.22	0.65	0.35
Kratie	0.15	0.32	0.23	0.71	0.35
Mekong delta	0.23	0.43	0.13	0.59	0.34
Nam Suang	0.21	0.36	0.17	0.62	0.34
Nam San	0.12	0.27	0.25	0.71	0.34
Se Done	0.16	0.26	0.23	0.70	0.34
Nam Kam	0.22	0.26	0.26	0.60	0.33
Nam Nhiep	0.19	0.22	0.24	0.64	0.32
UMRB	0.13	0.24	0.23	0.67	0.32
Nam Ou	0.18	0.28	0.17	0.63	0.31

VI: Vulnerability index  
 RS: Resource stresses  
 DP: Development pressures  
 ES: Ecological insecurities  
 MC: Management challenges

Color guide

Low
Moderate
High
Severe

## Vulnerability Index

Sub-basin	RS	DP	ES	MC	VI
Se Bang Hieng	0.21	0.19	0.23	0.63	0.31
Se Bang Fai	0.21	0.19	0.21	0.64	0.31
Nam Ngum	0.18	0.23	0.20	0.60	0.30
Nam Ca Dinh	0.17	0.16	0.24	0.59	0.29
Nam Mae Ing	0.20	0.22	0.20	0.52	0.28
Mun Chi	0.20	0.20	0.26	0.47	0.28
Nam Loie	0.23	0.13	0.24	0.48	0.27
Nam Luang	0.29	0.09	0.25	0.43	0.27
Huai Ban I	0.24	0.13	0.26	0.41	0.26
Nam Mong	0.24	0.10	0.22	0.47	0.26
Nam Songkhram	0.16	0.13	0.23	0.46	0.24
<b>Mekong River Basin</b>	<b>0.15</b>	<b>0.25</b>	<b>0.22</b>	<b>0.60</b>	<b>0.31</b>

VI: Vulnerability index  
 RS: Resource stresses  
 DP: Development pressures  
 ES: Ecological insecurities  
 MC: Management challenges

Color guide

Low
Moderate
High
Severe



## Conclusions and Recommendations

### Conclusions

- Overall vulnerability index of the MRB is 0.31 - good condition toward realization of sustainable water resources management
- No water shortages or open conflicts
- Challenges - development pressure and poverty ...
- Per capita water availability in the Mun Chi is lowest
- Tonle Sap, Nam Khan and Sekong-Sesan Srepok are the most vulnerable sub-basins

### Conclusions

- Vulnerability is most related to lack of management capacity..
  - Reflects poor economic situation and low GDP production from the use of water
- To a lesser extent development pressure...
  - Reflects lack of access to safe drinking water
  - More than 50% of the population lack safe drinking water access in six sub-basins

## Recommendations

- Given the contrasting scenario of rich water availability in volumetric terms and lack of water services provision, challenge is to strike a balance between resources exploitation and maintenance of ecological health
- Resources exploitation through massive infrastructure development coupled to industrialization should be envisaged with caution
- Equitable utilization between upstream and downstream co-riparian countries including environmental flow requirement holds the key

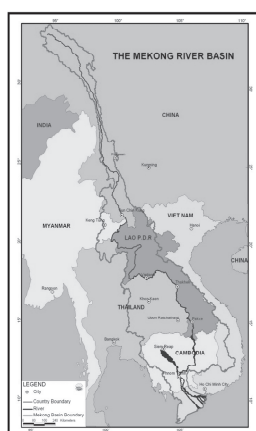
Report can be downloaded:

[www.roap.unep.org/publications/sea\\_water\\_report.pdf](http://www.roap.unep.org/publications/sea_water_report.pdf)

Thank you for your kind attention

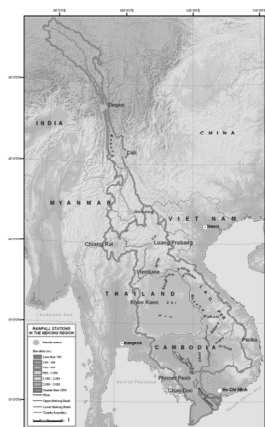
msbabel@ait.asia

## The Mekong basin



Country or Province	Area (km <sup>2</sup> )	Basin		Population		
		% of country or province	% of MRB	total (10 <sup>6</sup> )	% of country or province	% of MRB
Yunnan Prov., PRC	165,000	38	21	9.6	25	15
Myanmar	24,000	4	3	0.9	2	<1
Lao PDR	202,000	97	25	4.9	94	8
Thailand	184,000	36	23	23.1	37	35
Cambodia	155,000	86	20	9.8	80	15
Viet Nam	65,000	20	8	16.9	22	26
Mekong River Basin	795,000		100	65.2		100

## Physiography



- **Lancang River Basin (China)**
  - Parts of Qinghai province, Tibet Autonomous region, Yunnan province in China
- **Northern Highlands**
  - Parts of Yunnan Prov. Lao PDR, Myanmar and Thailand
- **Korat-Sakon Plateau**
  - parts of northern Thailand and southern Lao PDR
- **Eastern Highlands**
  - parts of Lao PDR and Viet Nam
- **Southern Uplands (parts of Cambodia)**
- **Lowlands**
  - parts of Cambodia, Lao PDR and Viet Nam including the Mekong Delta and its associated coastal area

## Lancang River Basin



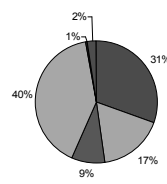
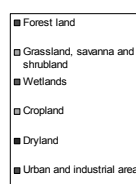
- Steep narrow gorges
- Elevation from 6,740-317m
- Fall ratio reaches 4.5%
- Middle reach – erosion prone
- Lower reach – low altitude area

## Climate

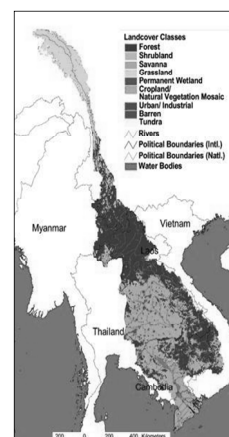
Cool/Cold			Hot/Dry		Wet					Cool/Cold	
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
NE Monsoon			Transition		SW Monsoon					NE Monsoon	

- **UMRB**
  - Annual mean precipitation > 1,000mm
  - South - tropical and subtropical monsoons
  - North - temperate monsoons
- **LMRB**
  - Tropical monsoon (wet and dry)
  - Annual mean precipitation 2000–4000mm

## Land Use

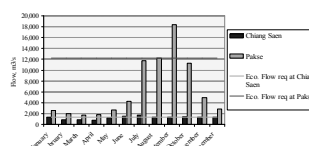
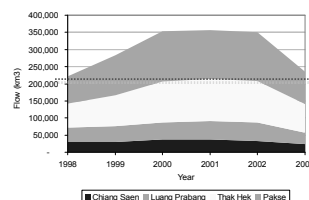


- Croplands and forests - major land use
- Shifting cultivation is practiced on hill slopes and wet rice farming in valley flats



Source: World Resources Institute, 2003

## Ecological water requirement



- to some extent arbitrary
- flow volume (1998-2003) at Chiang Saen and other main tributaries compared with flow volume at a downstream location - Pakse
- monthly and yearly wetted perimeter-discharge relationship Chiang Saen and Pakse studied
- dry monthly flow requirement at Pakse is approximately six times less than the yearly ecological flow requirement

## Transcript

Thank you very much, Dr. Kawasaki, and a very good afternoon to everyone. Thanks to Professor Kawasaki again for briefing the audience about myself. I've worked with the Asian Institute of Technology for the last twelve years or so, and before that I was in a consulting company in Bangkok for about seven or eight years, and before that I was teaching in India. So that's the summary of my 25 years of occupational and academic experience.

I was in Bonn, Germany, last month when Dr. Kawasaki asked me to speak on this particular symposium and I said OK, I'm coming back and we will talk about this, what should be the topic of the presentation. And his suggestion was that something related to Mekong because we'll have a variety of presentations around Mekong.

### Slide 1

So I thought of presenting this which is a study which AIT was involved in about two years ago. I'll give you a brief of this project which we did for UNEP.

### Slide 2

So this will be my outline: Go to brief in the water issues which many of you might be aware of. We developed a method of assessing the vulnerability of freshwater resources. The whole idea of development of this method was that the governments can use it. So the specific motivation was not to make it too academic. Where you do not have data and you do not have [unclear] - so the whole idea was to make it as simple as possible. But it MUST try to cover the aspects of vulnerability. So this was the objective and it took us about a year to come up with this methodology [opaque].

Then I will give you brief results of the assessment of vulnerability in the Mekong [area] and then some conclusions and recommendations.

### Slide 3

So, the project background goes like this: This was an initiative of UNEP, the United Nations Environment Programme, to develop this vulnerability assessment methodology and [its] application on two continents: Africa and Asia.

### Slide 4

For Asia, AIT and Peking University of China were involved heavily with UNEP in coming up with this. So there were two parts, development of these methodological guidelines as I said, and another one is the application in a trans-boundary river basin. So this was the given task.

**Slide 5**

AIT was responsible for South Asia and Southeast Asia. In South Asia, we looked into three trans-boundary river basins, and in Southeast Asia, originally, we wanted to look into two but finally, we considered only Mekong as one place.

**Slide 6**

In Northeast Asia where Peking University was working with Mongolia Water Institute, again five to six international river basins were studied.

**Slide 7**

So going into the Mekong water issues, as also mentioned earlier by Miss Nitivadee, Mekong is an important river basin especially for the Southeast Asian region. There are about 60 to 65 million people relying on it. You will know more about it later on as we go along.

The population as such is not that high considering the whole area. But looking into the arable land, then, as we can see, the population density is quite high. Development is coming very fast, we will see that also as we go along. A lot of bilateral projects, a lot of GMS projects which were mentioned earlier – a lot of development projects which are taking place and are going to bring a lot of development in the region.

**Slide 8**

As such, water is a common [good] for all of the six countries, but then, these six countries are at different levels of development and their needs are different.

**Slide 9**

The issue of water availability, if we look into very simple, so our approach was to divide this whole basin into 23 sub basins and we applied a very simple hydrological model.

You see that the annual per capita water availability is much higher than the Asian average of about 5,000 cubic meters per person per year. And there is, as in most other river basins, 80 percent of the water is in the monsoon season of four to five months.

**Slide 10 and 11**

Our study looked into on monthly basis - these are the detailed results which I would not cover here – but again, as I said, the majority of water availability is in the wet season, and dry season issues are very important, especially in some of the river basins like Mun and Chi in Thailand, and the Mekong delta in Vietnam.

**Slide 12**

This particular slide, probably known to many of you here, shows how the basin area is distributed among six countries and at the same time put in the contribution.

Interesting to note here is that about 25 percent in area, except baseline [?] area, [lie] in Laos but contribute about 35 percent of the flows.

**Slide 13**

Irrigation development - food security issues are important. Again, the demand for irrigation in the dry season is huge and is going to develop further and there are estimates that this demand will grow by 50 percent within the next nine or ten years or so - and a lot of over-dependence on irrigated agriculture. The importance is very well known, the way the rice production in the Vietnam delta is contributing to the production and the exports.

**Slide 14**

Domestic and industrial water use is not that much. We again used a very simple estimation approach. But some of the basins again in Thailand and Vietnam because of the industrial development and the population pressure - the demands are quite high, as far as - not much, but has been reported with respect to ecosystems and sedimentation which is very, very important for maintaining the flood plains and low-lying column, the wetlands, quite important, one of them is very well known to us, it's the Tonlesap Lake in Cambodia.

**Slide 15**

What will happen with the development with respect to hydro-power which is going to take place or is taking place in China and this is not too far - is it going to affect with respect to sedimentation? Because it is very important to maintain our wetlands and ecosystems.

**Slide 16**

Water pollution - because of this hydro-power development, impact on pollution with respect to temperatures, with respect to dissolved oxygen in the water, industrial pollution is not to that extent but still industries are coming up, urbanization is taking place at a faster rate. There are estimates that 50 percent of the population of the Mekong basin live in urban areas in another 20, 30 years, so urbanization is very much linked to pollution.

Apart from this we have this mineralization problem, especially in Mun and Chi river basins and also very high organic matter [levels] because of the extensive and intensive agriculture.

**Slide 17**

Hydro-power generation, as was also mentioned, renewable energy, hydro-power renewed interest, [e.g.] in Cambodia, and Laos would like to be the battery of power, going in a big way, China upstream. These are some of the plans. I don't have figures here to explain but there are a huge number of hydro-power plants going to come, even in the main stream and in these tributaries, especially in Laos.

What is the effect going to be in terms of river run-offs? - The design, the sediments, how the water quality is going to deteriorate because of these?

**Slide 18**

We have already seen these wetlands - I just mentioned the wetlands and the management of flood plains because of the so called decreased sediment concentration and the sedimentation will affect this productivity of these wetlands.

**Slide 19**

Flooding is a very, very common issue in the Mekong [area].

**Slide 20**

Trans-boundary water management - as we are also aware of the establishment of the MRC. The cooperation among these countries goes back as far as 1957. But then, in 1995, the MRC was established. The whole idea is for the sustainable development of the water and related resources in the basin.

**Slide 21**

So the key issues which we had are like this: are the Mekong water resources vulnerable? If yes, what contributes to this vulnerability? And then, how does vulnerability change with space and time? So these were the three questions.

**Slides 22 and 23**

So as I mentioned that we developed, this assessment method, this is the definition we used from the perspective of vulnerability of freshwater resources: we read it like characteristics of water resource systems, weaknesses and flaws to maintain its functionality in the face of socio-economic and environmental change. That's the basis.

**Slide 24**

Now we use: What can contribute to vulnerability? Three measures are points here. One is the stress, adapting capacity, and the cooperation. Stress relates to the pressure on the resources and the demand of the overall socio-economic development.

As far as adaptive capacity is concerned we are looking into two aspects: the capacity of the society and the capacity of the system itself. And cooperation is related to ownership, use issues and willingness to cooperate.

Several examples were mentioned by the speaker before me how the countries can come together and cooperate on. She mentioned both rail network and road network. But water can play a measurable role to bring the countries together.



### Slide 25

Our conceptual framework: We had three main components: One is the resource base, the development and use of water resources for sustainable development, and the water resources required to maintain our ecosystems, to maintain our ecology, nature, and on top of it we have water resource management. So that's the basis.

### Slide 26

The approach which we followed is based on a value-analytical framework or VBSIR and this is the way we [unclear] to. This is an indicator-based approach we followed.

So we started with water resources status, identified what are the main key issues, this was done as I said on a sub-basin level, we divided the whole basin into 23 sub-basins. And then we went into vulnerability comprehensive assessment, into four major components.

### Slide 27

And these are the four components: One is looked into resource stress, second one is on development pressures, third one is on ecological insecurities, and the fourth one is on management challenges. And we had started, that's what I remember, we started with 50 indicators, we trimmed them down to about nine, which are listed here. With respect to water space, there are two indicators, then we have two indicators related to development pressures – I will give you more details about this in a minute or so.

So these are some of the questions. I will probably not take them up in detail but resource scarcity and water availability are the two indicators we use with respect to resource stress. And we used some threshold values for these two parameters.

We have two indicators or parameters related to development pressures, one is related to: what is the status of exploitation? And another one is related to: what is the safe-drinking-water-inaccessibility? With respect to ecological health, again, the idea was to use only two indicators or parameters. One is related to pollution, the other is related to ecosystem deterioration level in the sub-basin.

Management capacities - and I said that we used three different parameters, one related to efficient we are with respect to water use, and we related it with the respect to how much you produce in terms of GDP per cubic meter of water, and we compared it with some top food producing countries and we tried to see how the Mekong [region and its] sub-basins are performing in terms of efficiency of water use. Another indicator related to management capacity is the improved sanitation inaccessibility parameter. How and why we have linked it with respect to management is with respect to: How much investment is required? Why are we not doing well with respect to sanitation? The third indicator was related to: how do we manage our complex?

And the details here I will skip to the benefit of time.

**Slide 33**

We developed this VI indicator or Vulnerability Index which considers these four components, nine parameters, and we can give them weights, based on some criteria and we can try to assess each of these sub-basins in how they are performing in four aspects of vulnerability.

**Slide 34**

The interpretation of these was done like this: So we tried to develop these parameters and indicators and the index in a way we would reach a level of zero to one. Between zero and 0.2 we say that the particular basin or sub-basin is healthy, no serious policy change is required at a particular time – this may change based on time [frame] – and similarly, the meanings of these VI values have been given here. I will quickly take the resources of Mekong: We found that as such, Mekong is having plentiful water – no water scarcity.

**Slide 35/36**

Now, this is at the stage of sub-basin level. But we know: at many places during a particular time of the year, still we face water shortages.

Then, [there is] a large variation of monthly precipitation, especially during November and March which is quite expected.

**Slide 37**

With respect to exploitation, percentage of water supply for agricultural, domestic and industrial sectors is less than 40 percent on an annual basis. But during dry season, it is more than 40 percent of what is available, especially in Mun-Chi river basin, Mekong-Delta and Triple-S Basin in Vietnam and Cambodia.

**Slide 38**

Access to safe drinking water: On a sub-basin scale, there are six sub-basins where more than 50 percent of the population is lacking safe drinking water. And 38 percent of the population are without access to safe drinking water as a whole, in the lower Mekong basin.

**Slide 39**

Ecosystem deterioration: We had a lot of difficulties in assessing this. Finally, we reached to this [result] that in different countries, let me take the examples of Vietnam and Thailand, 30 percent of forest cover have decreased from 69 percent over the last 30 years or so.

**Slide 40**

GDP value: Interesting results came out of this study: This basin is producing 2.4 Dollars per cubic meter of water. In comparison, this is only six percent of the top four largest economies, the US, Japan, Germany and China. But if you compare it with the five top food producing countries – China, US, Mexico, Brazil and France – then it is about ten percent. So 24

Dollars per cubic meter of water is produced in these five countries on average. And the basin is producing only 2.4 [dollars].

**Slide 41**

Improved sanitation: Mostly support between 41 and 42 percent, only one sub-basin is lacking more than 70 percent, more than 70 percent of the population lacking sanitation.

**Slide 42**

Conflict management: MRC, with respect to the agreement on cooperation for a sustainable development of the Mekong river basin, based on the Helsinki Rules and the UN convention, we will listen more on this later on.

**Slide 43/44**

These are the summary results for all 23 sub-basins sub-basins, they are chronologically put with respect to which sub-basins are having high vulnerability.

**Slide 45/46**

Now to conclude, I have two and a half minutes conclusions, (I am following it – perfectly...): Overall, our conclusion says that the vulnerability index for the whole Lower Mekong river basin is about 0.31. That means, the basin as a whole is a good condition toward realization of sustainable water resources management – at this stage. We need some strategies: What will happen under climate change conditions? What will happen in the future with the population growing? These results are not shown here.

No water shortages, no open conflicts, challenges are there, development pressures are there, and poverty is a big issue. Per capita water availability in the Mun-Chi [basin] is the lowest because rainfall is low, and Tonlesap, Nam Khan and Triple-S are the most vulnerable sub-basins out of 23.

**Slide 47**

Vulnerability we found most related to lack of management capacities and, to a lesser extent, because of development pressures.

**Slide 48**

Some of our recommendations are that given the contrast scenario of rich water availability in volumetric terms and the lack of water services – we have a lot of water and still there are 50 to 60 percent of the population not having access to safe drinking water [the question is:] Where is the problem?

The challenge is to strike a balance between resources exploitation and maintenance of ecosystems.

Resource exploitation through massive infrastructure development coupled with industrialization should be envisaged with caution.

And equitable utilization between upstream and downstream which is very, very crucial and difficult to achieve, including environmental flow requirements.

These reports are available, it's a kind of report. And also for South Asia where researches are quite interesting, for example in Indus river basin, in India and Pakistan where water use is more than 90 percent [of available sources] and [the level of] pollution is very high. For those of you [who want] to read the report which is separate for South Asia, and this is for Southeast Asia.

Thank you very much. If you would like to reach me: [msbabel@ait.asia](mailto:msbabel@ait.asia)



*Water resources management in MRC &  
Thailand's perspectives on MRC's role*

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*Mr. Chaiporn Siripornpibul*

# ***WATER RESOURCES MANAGEMENT IN MRC & THAILAND'S PERSPECTIVES ON MRC'S ROLE***

Chaiporn Siripornpibul  
Deputy Director General,  
Department of Water Resources,  
Ministry of Natural Resources and Environment



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## **WATER RESOURCES MANAGEMENT IN The Mekong River Commission(MRC) and Thailand , country perspective on MRC's role**

Thai National Mekong Committee Secretariat, Department of Water Resources,  
Ministry of Natural Resources and Environment,  
29 January 2011



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### **Contents**

#### **I. General Information of the Lower Mekong Basin (LMB)**

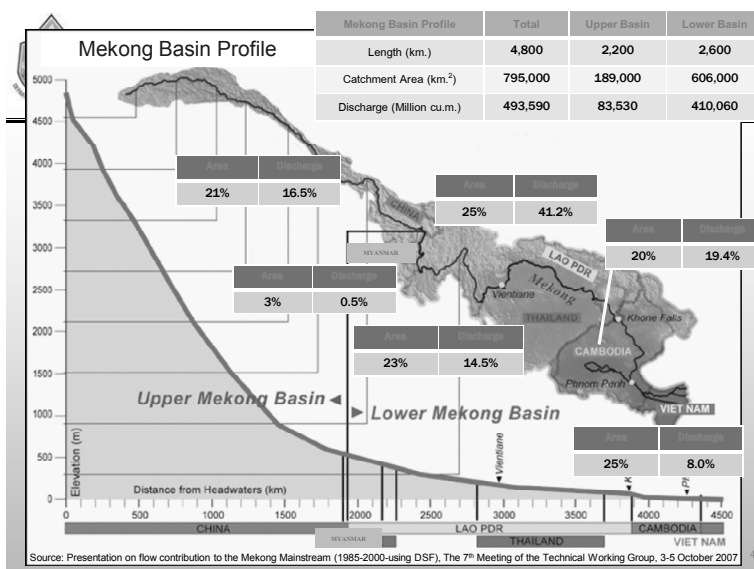
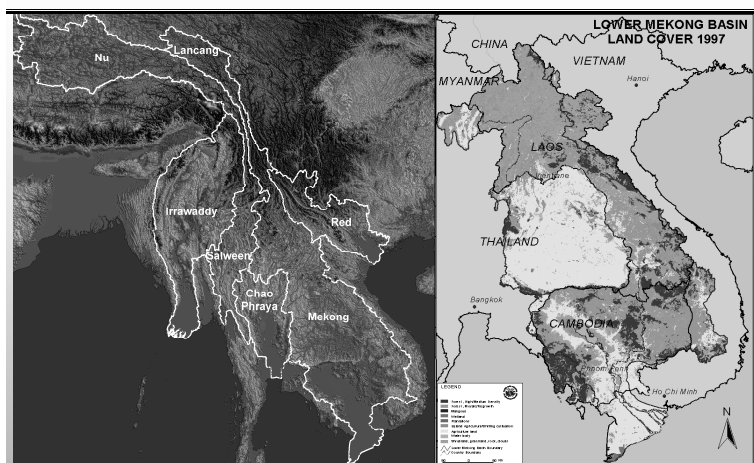
- ❖ Physical Characteristic
- ❖ History of Corporation
- ❖ 1995 Agreement
- ❖ Organizational Structure of MRC
- ❖ MRC Strategic plan and work programme
- ❖ MRC's Budget

#### **II. Thailand, Country perspective**



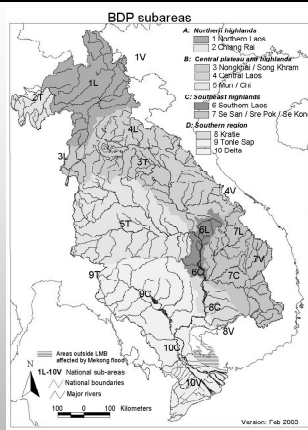
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General information: Lower Mekong Basin, LMB

- ❖ LMB area 795,000 sq.km.
- ❖ Population ~80 million persons
- ❖ Water Quantity ~475,000 million cubic meter/year
- ❖ Aquatic production 1.5 – 2 million ton/year : 15% come from cultivation.
- ❖ Hydropower (developed)~ 3,500 MW , Total capacity ~30,000 MW





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## Mekong River Basin Data in Thailand



❖ Sub-area 2T (Chiang Rai)	
❖ basin area	18,859 square km.
❖ population	1.8 million
❖ water quantity	6,559 million cubic meter/year
❖ Sub-area 3T (Nong Khai/ Songkram)	
❖ basin area	46,460 square km.
❖ population	6.1 million
❖ water quantity	26,475 million cubic meter/year
❖ Sub-area 5T (Mun / Chi)	
❖ basin area	119,177 square km.
❖ population	16.4 million
❖ water quantity	30,744 million cubic meter/year



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## The History of Cooperation and Development

- 1957 (B.E.2500) Mekong Committee for Coordination of Investigations of the Lower Mekong Basin
  - 1975 (B.E.2518) The Joint Declaration of Principles for Utilization of the Water in LMB
  - 1978 (B.E.2521) The Declaration Concerning the Interim Committee for Coordination of Investigations of LMB
  - 1995 (B.E.2538) Mekong River Commission: MRC “The Cooperation for the Sustainable Development of the Mekong River Basin”
- ↓
- “THE 1995 MEKONG AGREEMENT”**



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## Role of MRC

The 1995 Mekong Agreement outlines the legal mandate for the MRC to be the institutional framework of the regional cooperation for sustainable development of the Mekong basin.

Due to the strong interdependency of different users and countries within the Mekong River Basin, the role of the MRC as a promoter and coordinator of sustainable development of the Mekong’s water and related resources is extremely important.

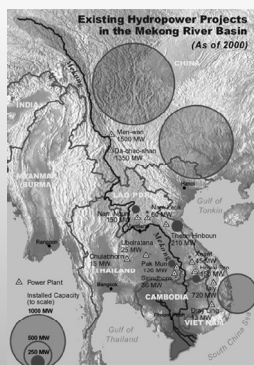


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#### Agreement on the Cooperation - Reaffirming



- ❖ Reasonable and equitable sharing of water
- ❖ Most beneficial use of Mekong River
- ❖ Poverty reduction
- ❖ Ecological Balance
- ❖ Member state settle annual contributions

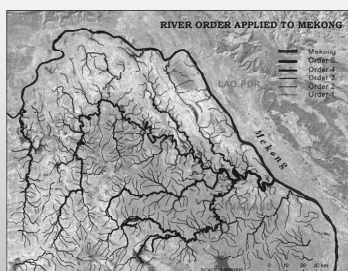


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#### Agreement on the Cooperation - Opportunity



- ❖ Water Use from Mekong River without significant impact on other riparian countries.
- ❖ Country's Economic Development with riparian countries as partnership.
- ❖ Poverty Reduction at national and regional level.
- ❖ Conservation of Natural resources and ecological system for sustainable use.

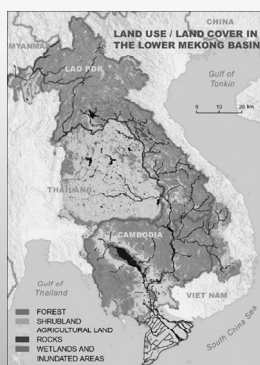


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#### Agreement on the Cooperation - Realizing



- ❖ Development tools for Riparian country
- ❖ Information exchange and sharing
- ❖ Monitoring and Assessment of Regional Environmental Situation



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## MRC Rules of Procedures for Utilization of Water in the Lower Mekong Basin

1. Procedure for Data and Information Exchange and Sharing(PDIES)
2. Procedures for Notification, Prior Consultation and Agreement(PNPCA)
3. Procedure for Water Use Monitoring(PWUM)
4. Procedures for Maintain Flow on Main Steam(PMFM)
5. Procedures for Water Quality(PWQ)



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## MRC Permanent Bodies

MRC consists of 3 permanent bodies:

- **Council:** one member from each participating riparian State at Ministerial and Cabinet level ( no less than Vice Minister level)
- **Joint Committee:** one member from each participating riparian State at no less than Head of Department level
- **MRC Secretariat:** shall render technical and administrative service to the Council and the Joint Committee, and shall be under the supervision of the Joint Committee

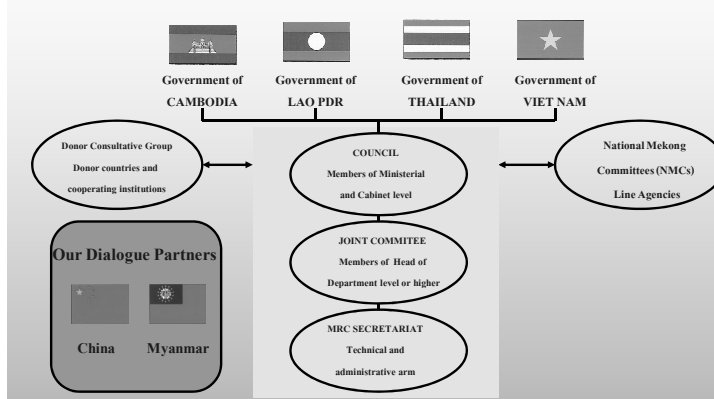


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## ORGANISATION OF THE MRC



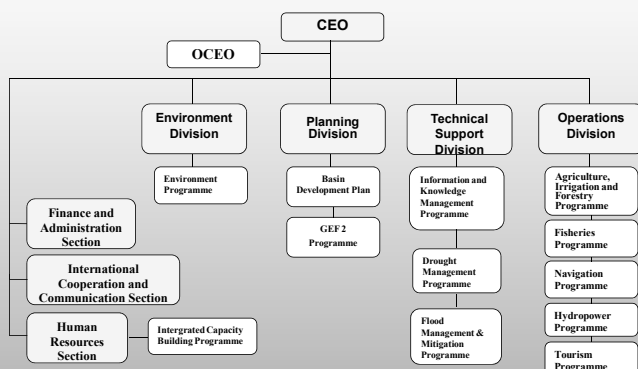


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### Organisation of the MRC Secretariat

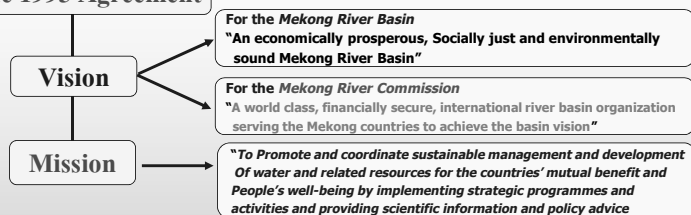


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### The 1995 Agreement



1995-2000

Focus on the projects

1999-2003

MRC's First Strategic Plan

2001-2005

MRC Strategic Plan 2001-2005

2006-2010

MRC Strategic Plan 2006-2010

From Project to  
Programme



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### MRC Programmes

for Strategic plan 2001-2005

CORE Programme

(4)

Basin Development Plan (BDP)

Water Utilization Programme (WUP)

Environment Programme (EP)

Flood Management and Mitigation Programme (FMMP)

Sector Programme

(4)

Navigation Programme (NAP)

Fishery Programme (FP)

Agriculture, Irrigation and Forestry Programme (AIFP)

Hydropower Programme (HP)

Support Programme

(2)

Integrated Capacity Building Programme(ICBP)

Decision Support and Information Management Programme

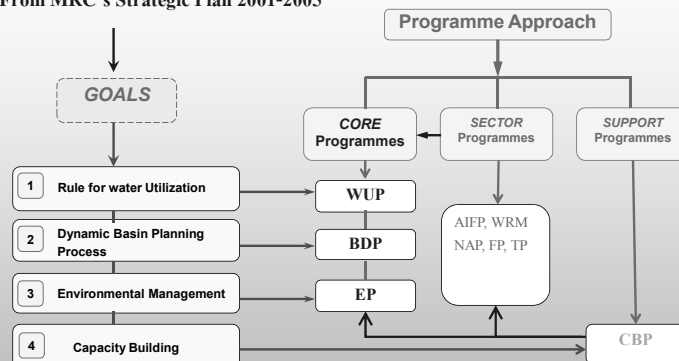


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From MRC's Strategic Plan 2001-2005



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## MRC Strategic Plan for 2006-2010

### Goals

**Goal 1:** To promote, support coordinate, sustainable and pro-poor development

**Goal 2:** To enhance effective regional cooperation

**Goal 3:** To strengthen basin-wide environmental monitoring and impact assessment

**Goal 4:** To strengthen the Integrated Water Resources Management capacity and Knowledge Base of the MRC bodies, NMCs and line agencies and stakeholders



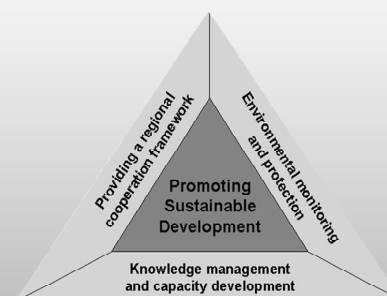
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## MRC's Strategic Plan 2006-2010

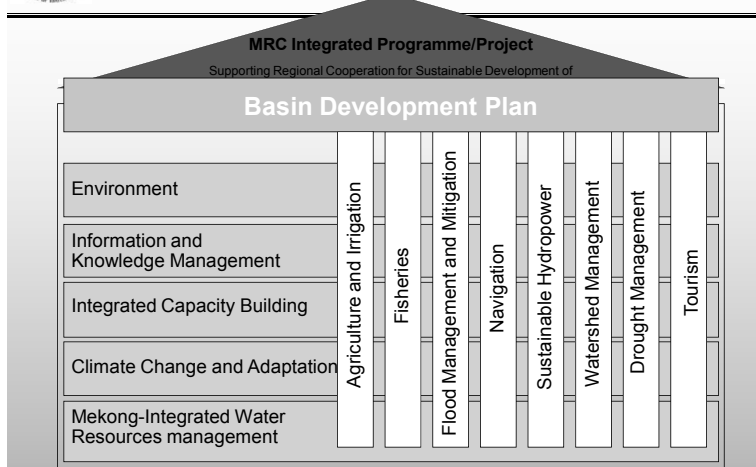
Framework for the Promotion of Sustainable Development of the Mekong River Basin





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### MRC's Strategic Plan 2006-2010

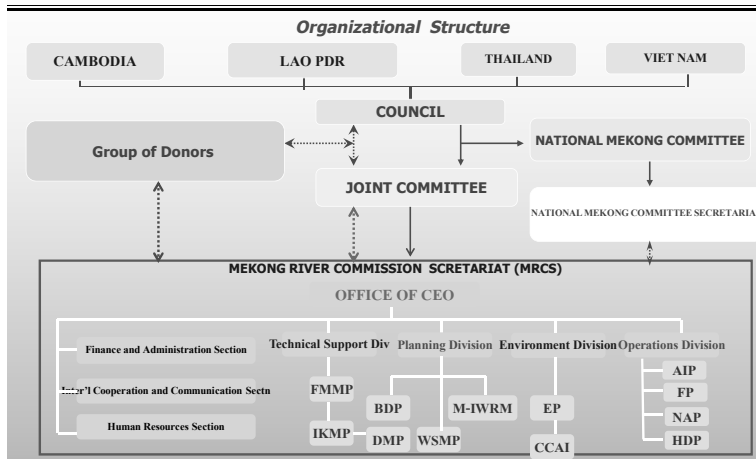
#### MRC Programmes (All programmes are equally important)

- Basin Development Plan, BDP
- Environment, EP
- Mekong Integrated Water Resources Management, M-IWRM
- Flood Management and Mitigation, FMMP
- Information and Knowledge Management, IKMP
- Integrated Capacity Building, ICBP
- Drought Management, DP
- Agriculture, Irrigation and Forestry, AIFP
- Navigation, NAP
- Initiative on Sustainable Hydropower, ISH
- Fisheries, FP
- Tourism, TP



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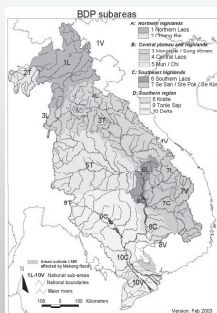


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## Basin Development Plan (BDP)



- BDP is an Integrated Water Resources Management and Development Plan
- Using the principles of Integrated Water Resources Management (IWRM)
- Aims to achieve a balance between socio-economic development and environmental concerns



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## Environment Programme (EP)



- ❖ Environmental Monitoring
- ❖ Environmental Decision Support
- ❖ People and Aquatic Ecosystem
- ❖ Environmental Knowledge
- ❖ Environmental Flow Management
- ❖ Climate Change and Adaptation Initiative(CCAI)



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### Water Utilization Programme : WUP

Currently, WUP have been changed to M-IWRM(Mekong Integrated Water Resources Management Project)

The project supporting the Legal Framework mainly on ;

- ❖ Procedure for data and Information Exchange and Sharing, PDIES
- ❖ Procedures for Water Uses Monitoring, PWUM
- ❖ Procedures for Notification, Prior Consultation and Agreement, PNPCA
- ❖ Procedures for Maintenance of Flows on the Mainstream, PMFM
- ❖ Procedures for Water Quality, PWQ





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#### Flood Mitigation and Management Programme : FMMP

- ❖ Establishment of a Regional Flood Centre
- ❖ Structural Measures and Flood Proofing
- ❖ Enhance cooperation in address Tran -boundary Flood Issues
- ❖ Flood Emergency Management
- ❖ Land Management



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#### Navigation Programme: NAP

- ❖ Socio-economic Analysis and Regional Transport Planning
- ❖ Legal Framework for Cross-Border Navigation
- ❖ Traffic Safety and Environmental Sustainability
- ❖ Information, Promotion and Coordination
- ❖ Institutional development



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#### Agriculture, Irrigation and Forestry: AIFP

- I. Watershed Management
  - MRC-GTZ watershed management
- II. Irrigation and Agriculture
  - ❖ Demonstration of multi-fucntionality of Paddy fields
  - ❖ Improvement of Irrigation Efficiency on Paddy field



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Fisheries Programme:FP



- ❖ Fisheries Ecology , Valuation and Mitigation
- ❖ Fisheries Management and Governance
- ❖ Aquaculture of indigenous Mekong fish species



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Hydropower Programme: HP

Currently, MRC implementing this activity under the Initiation on Sustainable Hydropower Project (ISH)

- ❖ Technical input to PNPCA process
- ❖ Capacity Building and Knowledge Base Support
- ❖ Regional Planning Support; SEA and Macro economic studies
- ❖ Sustainable Assessment and Financing



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Integrated Capacity Building Programme: ICBP



- ❖ General IWRM Competencies; Junior Riparian Professional Programme(JRP)
- ❖ Organizational Development Competencies
- ❖ Gender Mainstreaming in Water Resources Management
- ❖ Capacity Building Integration and Sustainability



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### **Information and Knowledge Management Programme (IKMP)**

- **IKMP provides a common information data base and communication platform for all MRC programmes.**
- **Data Exchange and Sharing**
- **etc.**



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### ***Drought Management Programme (DMP)***

- ❖ **DMP will address the problem of drought in the Lower Mekong Basin; its impacts upon agriculture and water resources and what management plans and mitigation policies might be put in place.**
- ❖ **Possibly merge with the FMMP on next phase**



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### **Tourism Programme (TP)**

- ❖ **TP aims to promote tourism within the Mekong River Basin in a balanced manner, which also ensures necessary protection of the environment against adverse effect of tourism.**
- ❖ **Currently, still have no fund and under the discussion in MRC on integration of the activities relating to the TP to other existing programmes.**







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## Financial contribution from riparian countries

Year				
	(0.18)	(0.18)	(0.34)	(0.30)
2001	195,000	195,000	195,000	195,000
2002	205,000	205,000	209,960	208,200
2003	215,000	215,000	227,972	224,093
2003	225,673	225,673	248,132	241,881
2004	237,414	237,414	270,309	261,449
2005	250,328	250,328	294,703	282,973
2006	264,534	264,534	321,536	306,649
2007	280,160	280,160	351,053	332,694
:				
2009	316,258	316,258	419,236	392,856
Summary budget 2009 :		Riparian governments	1,444,608	US
		Development Partners	21,538,387	US
		Total	22,982,995	US

## MRC's BUDGET

I. Contribution from riparian countries (approx. 5 to 10 %)

II. From Donors (approx. 90 to 95 %)



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# THAILAND,

## Country Perspective



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## Country Perspective

Lesson learnt from MRC (Regional Water cooperation/Implementation)

❖ Played too many emphasized on the creation and implementation of Rules/Procedures for utilization of water in the LMB.

❖ Difficult to implement&gt;&gt;&gt;&gt;&gt;.

- River Basin boundary Participation mean that countries boundary less participation.....HOW?
- Without (with little) incentives or with very few win-win situations
- ....etc

❖ Some kind of win-win situations/activities need to be made.....etc.



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### Country Perspective (cont.)

- ❖ There are many Rules/Regulations under MRC Programme, especially rules for Water Utilization. These regulations hinder cooperation as each NMC tries to protect its own interest. THUS>>
- 1. Cooperation rather than regulation is necessary to drive the implementation of the MRB (Mekong River Basin).
- 2. The cooperation should be created and strengthened into trust and harmony atmosphere towards a win-win solution.
- 3. It is suggested that one of many way to enhance cooperation in the region is to promote joint projects (both structural and non-structural projects) aimed to raise the regional economy and well being of people.



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### Country Perspective (cont.)

- 4. The local wisdom and culture should be harmonized with the scientific knowledge in an appropriated way also need to be put into practice for the promotion of the pro-poor development and food security matter.
- 5. It is envisaged that MRC shall integrate all the programmes together in order to assess its status. The basin development programme should be more focused. Some redundant activities should be deleted. Sub-basin of Mekong needs to prepared basin plan by employing IWRM process.



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### Country Perspective (cont.)

- 6. Simulation modeling of various scenarios should tell the positive and negative impacts of each country. Water uses scenario should cover wet and dry seasons. Water diversion scenario and scenario with ecological demand could be additional scenario that should be further studied. Trade-off between development and environment is to be decided.
- 7. Institutional arrangement, one benchmark of the IWRM, is to be adapted to changes and should be flexible to cope with local and national needs.



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### Country Perspective (cont.)

8. IWRM of the MRB would not be successful unless IWRM in each member country is also successful. Experience in institutional arrangement with particular emphasis on river basin committee could be share among riparian countries.
9. Technical assistance is required in certain areas such as multiple criteria analysis, institutional arrangement integrating functional and area approach, etc.



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### Country Perspective (cont.)

10. MRC should strengthen the public relation programme and disseminate fruitful results to the public.
11. Member countries should promote the sense of ownership. They should play more leading role in the management of development partner/donor's funding. Local consultants would be useful and lower the expenses.



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### Country Perspective (cont.)

12. China and Myanmar should be involved in the MRC through GMS with a particular emphasis on navigation, hydropower and flood and drought management. Common interest is to be identified.
13. Enhancement with the others regional initiatives (e.g. GMS, ACMECS, ASEAN, etc.) need to be made effectively for the promotion of Win-Win solution, Trade-off, and also Benefit Sharing concept.



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### Country Perspective (cont.)

14. The North and Northeastern people of Thailand expect that MRC could contribute to mitigate drought and flood in the region. Moreover, the information regarding the effect of Water Level on Mekong main stream have been changing abnormally, especially, as a result of Upper part main stream developing (e.g. China dams, and other mainstream dams etc.) They could play a more active role had their expectation be met.



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Thank you very much  
for your kind attention

## Transcript

Good afternoon everybody.

Before I start my presentation I'd like to tell you that this picture is a special thing that I want to present you even not by accident because, you know, for the past two weeks I was in China when I was informed by my colleague that I was assigned to give a special lecture in this forum for Minister Suwit Khunkitti who was supposed to be here today so I am only an alternative.

For the question and answer part, I will ask my colleagues to come and help.

### Slide 1

I will start my presentation on the topic “*water resource management in the Mekong River Commission and Thailand's country perspective on MRC's role*”.

### Slide 2

I'll send you into the main topic. The first one is the general function of the Mekong basin, the other one is Thailand's country perspective.

### Slide 3

As you can see here, the Mekong river basin flows from the south of China down to the main part of Southeast Asia: From China and parts of Myanmar [down to] Thailand, Laos, Cambodia and Vietnam.

### Slide 4

The water way of the Mekong River is about 4,800 km long and covers almost 800,000 square kilometers of catchment area. There are about 490,000 million cubic meters of discharge. If we look into detail, we can separate this region into two parts: the Upper Mekong situated in Southern China and some part of Myanmar, and the main area along the Lower Mekong in the MRC member countries namely, Thailand, Laos, Cambodia and Vietnam.

The maximum discharge of approximately 41 percent comes from Laos, 14 percent from Thailand, 19 percent from Cambodia and 8 percent from Vietnam.

Comparing the Upper and the Lower Mekong, we can see that the Upper Mekong contributes only approximately 16 percent of the total discharge of the MRB.

### Slide 6

Concerning Thailand, the Northern and Northeast regions that are part of the Mekong river basin have three river [sub] basins: 2T is the Kok and Ing river basin in the Northern part, 3T – Nongkhai and Songkram in the



northern part of the Northeast and 5T – Mun-Chi is a wetland in the remaining river basin in the northeastern part of Thailand.

#### **Slide 7**

From the historical background of cooperation and development in the Mekong area, [let's shortly] talk about the beginning of the history: From 1957, we had the Mekong Committee for Coordination and Investigation of the Lower Mekong Basin. After that, we had the Joint Declaration of Principles for Utilization of Water in the LMB in 1975. This year, there were many changes in Indochina when some political [systems] changed with the invasion (4.55) of the communism. Then, in 1978, we had the Declaration Concerning the Interim Committee for Coordination of Investigation of the LMB. And finally, we formed the Mekong River Commission in 1995, thereafter, also in 1995, the Mekong Agreement.

#### **Slide 8**

The main function of the MRC is the cooperation for sustainable development in the Mekong river basin. The main role of the MRC is to be the institutional framework of the regional cooperation for sustainable development of the Mekong basin. The role of the MRC would be [that of a] promoter and coordinator of sustainable development of Mekong's water and related resources.

#### **Slide 9**

We have three main topics in the Agreement on Cooperation. The first one is the reaffirmation concerning *“reasonable and equitable sharing of water, most beneficial use of the Mekong river, poverty reduction (6.24), ecological balance etc.”*.

#### **Slide 10**

The second is *“opportunities”*. Here, it means that (6.28) we should have good objectives for *“water use of the Mekong river without significant impact on other riparian countries”*, so this is more a theoretical thing but impractical, which means that at this time, (6.52) there are still many processes to follow.

The others are *“countries' economic development with riparian countries in partnership”* and *“poverty reduction at national and regional level”*. This is really considered one of the most important topic.

The last one is *“conservation of natural resources and the ecological system for sustainable use.”*

#### **Slide 11**

The third topic deals with *“development tools for riparian countries, information exchange and sharing, monitoring and assessment of the regional environmental situation”*.

**Slide 12**

We have many (6.37) rules for Water utilization under the MRC [regulation]. The first one is the “*procedure for data and information exchange and sharing, PDIES*”, and we did this part long time ago. The second one is “*PNPCA*”, “*procedure for notification, prior consultation and agreement*”.

The third one is “*procedure for water use monitoring, PWUM*”.

The fourth is “*procedures for maintaining flow on the main stream*”.

The fifth and last is “*procedure for water quality, PWQ*” which was just approved by the MRC council meeting on 26 Jan 2011. The last country to agree on this issue was Vietnam – in the last minute of the signing day on 26th.

**Slide 13**

Concerning the bodies of the MRC, there are three levels. The first one is the Council level, [at the] ministerial and cabinet level.

The second one is the Joint Committee. In this, the level of the representatives from riparian countries (9.33) should be no lesser than the head of department. For Thailand, this is the Permanent Secretary of the Ministry of Natural Resources and Environment.

Then we have the MRC Secretariat working in two offices in Vientiane and Phnom Penh.

**Slide 14**

Under the organization of the MRC, we have four member countries and we have two dialog [partner] countries, China and Myanmar. Now Myanmar has shown the intention by supposing (10.19) to become a new member and this is in process. The Department of Water Resources of Thailand has also tried to have some more cooperation with China’s Ministry of Water Resources. The last two weeks, I spent there and we started talking about opportunities to share something like information and also the capacity building in technical issues. So we should start from there as we cannot go directly to the point we want.

**Slide 16**

Since 1995, we have an agreement in the MRC setting up two visions, one is a vision for the Mekong river basin and another one is a vision for the Mekong River Commission (11.45). Under the visions, in the early years, we tried a project approach but then we changed from the project base to a program base as this is more flexible and offers a broader area to be considered [for cooperation opportunities].

### Slide 17

We have three programs. The first one is the Core Program, the second is the Sectoral Program and the third is the Supportive Program during the implementation period of MRC strategic plan 2001-2005.

For example, the Core Program is the Basin Development Plan, [containing the] Water Utilization Program which was finished in 2008; and we will continue with another form of the M-IWRM project.(12.47)

We have an Environment Program or EP, and a Flood Management and Mitigation Program (12.54). This one, FMMP, also was approved for the new phase from 2011 to 2015 during the last MRC council meeting in Ho Chi Minh [City].

Concerning the Sectoral Program, we have a navigation program, fishery program, agriculture, irrigation and forestry and hydro-power program. The Hydro-power program is one of the most serious programs for the MRC members. If anything happens in any country, (13.37) especially in the upper part of the basin, this may affect the water quantity and water quality downstream in the lower part [of the basin] (13.45).

Further, concerning the Support Program, we have the ICBP – Integrated Capacity Building Program and Decision Support and Information Management Program, this last one still was not set up during the MRC strategic plan 2001-2005.

### Slide 18 skipped

### Slide 19

This is the last MRC strategic (14.04) plan [for] 2006-2010, we have some goals like this: to promote, support, and coordinate sustainable and pro-poor development, something like that.

### Slide 20

Under the MRC Strategic Plan 2006 – 2010, Promoting Sustainable Development, we have three main subjects. The first one is “*environmental monitoring and protection*”, another one is “*providing a regional cooperation framework*”, and the third one is “*knowledge management and capacity development*”.

### Slide 21

Under the MRC Development Program, we have the five main cross cutting programs; namely, first: Environment, second: Information and Knowledge Management, third: Integrated Capacity Building, forth: Climate Change and Adaptation (13.11) and fifth: Mekong-Integrated Water Resource Management. We can use these program functions to support many activities or programs like agriculture and irrigation (13.25), fisheries, navigation etc.

**Slides 22/23 skipped****Slide 24**

To give an example of some plan, like Basin Development, we have the Integrated Water Resources Management and Development Plan, using the principle of integrated water resources management (IWRM); the aim is to achieve a balance between socio-economic development and environmental concerns. When we talk about water only, it is not good for us (16.11) because we have to think of many more aspects such as social, economic, livelihood of people, development too. So we need to think in all directions.

**Slide 25**

Referring to the Environmental Program, we have many activities for monitoring, the decision support system, environmental knowledge, flow management and CCAI. The last one was also approved by the last MRC Council meeting.

**Slide 26**

Water Utilization Program: Finally (16.54), the WUP has been changed to M-IWRM

**Slide 27**

For the Flood Mitigation and Management Program, we established a Regional Flood Centre; we have structural measures and flood proofing, and enhance cooperation to address trans-boundary flood issues, flood emergency management and land management, too.

**Slide 28**

Navigation is also one of the important programs. The challenge is how to deal with China because China has many navigation activities to send goods to Lower Mekong countries (18.05). If we use this issue carefully, I think we can get benefits for the MRC or the riparian countries downstream in terms of cooperation with China.

**Slide 29**

For the Agriculture, Irrigation and Forestry [programs], we need watershed management; we have built irrigation and agriculture [projects] for the “*demonstration of the multi-functionality of the paddy fields*”, and the “Improvement of irrigation efficiency on paddy fields”, because this area produces some of the best rice varieties for global consumption.

**Slide 30**

Concerning fisheries which are important for Thailand as well as in general, we can say water is life. The Mekong river flows through several riparian countries, so fishery (19.28) is one of the important issue to be considered. We need to take good care of the ecology, procuring valuation and mitigation. Sometimes when there is big flood or drought with related [issues], fisheries are affected.

### **Slide 31**

Coming to hydro-power: this issue, as I said before, is the most critical topic in this region, because whenever any country needs to construct dams, these may cause effects to countries downstream. So we really need to clear the details about procedures and the [required] dialog. The dialog about the agenda should be held at all levels. And under the MRC, [here] we have one really important [procedure] called PNPCA: the Procedures for Notification, Prior Consultation and Agreement.

When Laos wants to construct a sustainable hydropower project, all of the four countries have to organize public hearings or at least public consultations. In Thailand, we organized the first public hearing in Chiang Khong District. It looked very serious for Thai people [living] along the Mekong river, so it is really a good forum for local people to voice their comments or questions. These comments or questions, we will keep on record and report to the Lao government through the MRC. Another public hearing is in process and we will organize another in Nakhon Phanom.

Vietnam has done [her hearings] in the lower part of the delta, they also got a really strong response from their people but we still need more from Cambodia and Laos. You can see this process (22.35). I think when any country wants to construct some structure around the mainstream or even at a tributary they should consider this issue very carefully. So in this [respect], we have to assess both sustainability and financing because all riparian countries are not rich, so a very big project demanding a lot of budget or financing needs a good source of funding from other countries, from rich countries or even some big companies.

(I will skip some slides because I have only two minutes left...)

### **Slide 33-35**

We have the Information and Knowledge Management Program, and the Drought Management Program, now we combine flood and drought [programs] for a more effective management [including] also the Tourism Program. This is one of the most important programs for our riparian countries.

(I skip this one.)

### **Slide 37/38**

Now [looking at the] Thai perspective: We have learned a lot from the past. We think that in the past we paid too much attention on the evaluation and implementation of rules and procedures for the utilization of the water in the Lower Mekong Basin. We should not emphasize only on water. We have to think about the ecology and other aspects of sustainable development and sometimes we need to build a Win-Win policy in the discussion.

**Slide 39**

Other rules and regulations under the MRC Program, especially rules for water utilization, [may even] hinder cooperation as each national member country tries to protect their own interest so this is a big point. We should have more [focus] on cooperation than on regulation to drive the implementation of the MRC.

We also wish to [highlight the] suggestion that one of many ways to enhance cooperation in the region is to promote joint projects because under joint projects or joint activities, we can learn [to know] each other [better] and we can exchange information.

**Slide 40**

We join through local wisdom and culture which should also be harmonized with scientific knowledge in an appropriate way.

**Slide 41**

We did some simulation modeling for various scenarios, both wet and dry seasons.

The institutional arrangement which is one benchmark of IWRM should be adapted [accordingly].

**Slide 42**

IWRM in the MRB will not be successful unless IWRM in each member country is [implemented] successfully. The last bullet of this slide, number nine: technical assistance is required in certain areas such as multiple criteria analysis, institutional arrangement integrating functional and area approach.

**Slide 43**

MRC should strengthen the public relations program and disseminate fruitful results to the public.

Member countries should promote the sense of ownership. I mean the ownership of the MRC map of each country.

**Slide 44**

China and Myanmar should be involved in the MRC through another forum like GMS, and enhanced by other regional activities such as ACMECS, ASEAN etc. In recent years, we are not working alone any more because there are other agencies at international or global level which can look after us.

**Slide 45**

So for the wellbeing of the Mekong River Basin, especially for the MRC countries, we should share our information and instill more transparency at all levels. In this case, also [involving] China and Myanmar (28.50).

Now, we have a better situation concerning the [relations] of [member] countries to the Chinese government. As in the past, China did not release any information related to the flows to the MRC. Last year, we received information on the flow in the dry season for the first time. So we should celebrate and we hope that we can progress further with this.

Concerning flooding, in the past, people in Thailand expected that the MRC could contribute to mitigating drought and flood in the region, [especially by more] information regarding the effects of abnormally changing water levels in the Mekong mainstream as a [possible] result of the upper main stream development.

In this respect, the MRC has [set up] a monitoring system and we also release information to the public through our website. You can search the website of the MRC for this. We have information on water levels in daily charge which [at the moment] shows that now we have a lower water level in Luang Prabang in Laos but in Chiang Saen of Thailand the water level is still in good condition. Therefore, if any country proposes building a dam in its territory, we need to consider it on the basis of sustainable development.

Thank you very much for your attention

*Integrating provincial/community water planning  
with provincial development plan  
by area based information system*

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*Prof. Sucharit Koontanakulvong*





# **INTEGRATING PROVINCIAL/COMMUNITY WATER PLANNING WITH PROVINCIAL DEVELOPMENT PLAN BY AREA BASED INFORMATION SYSTEM**

Sucharit Koontanakulvong  
Faculty of Engineering  
Chulalongkorn University  
Sucharit.K@chula.ac.th

## **Integrating Provincial/ Community Water Planning with Provincial Development Plan by area based information system**

Sucharit Koontanakulvong  
Faculty of Engineering, Chulalongkorn University

**"Forefront and Challenging of  
Water Resources Management in Southeast Asia"**

Bangkok, Thailand, Jan 29, 11

## **Abstract**

RNUS Seminar 2011 on

**"Forefront and Challenging of Water Resources Management  
in Southeast Asia"**

Bangkok, Thailand, January 29, 2011

**On the topic of**

**Integrating Provincial/Community Water Planning with Provincial Development Plan by area  
based information system**

**by**

**Sucharit Koontanakulvong  
Faculty of Engineering, Chulalongkorn University  
Bangkok, Thailand.**

Abstract

Up to now, water resources planning mainly use the concept of IWRM process to integrate various components related to water planning and management, e.g., river basin management project etc. However, the area socio- economical development planning is usually based on administrative unit, e.g., country, region, province, district and the planning will comprise of physical, economic, social and environmental aspects. The integration of both water basin and administrative unit then becomes an issue for planners to combine both area aspect and element aspect into smooth planning process.

Thailand had classified her country area into 25 basin area and in the last ten years, the study of basin master plan had been conducted to investigate the physical conditions, water demand and supply, potential water development projects in the basin in the last ten years. In 2008, the Provincial Development Plan Act had been enacted and forced each Province to conduct the development plan

## Abstract

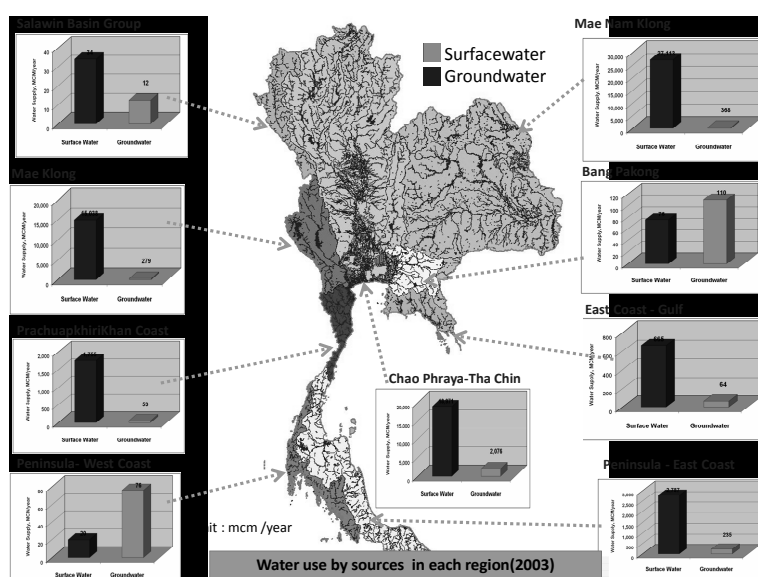
within her province or group of provinces as a rolling basis of next 4 years to control budget spending in the province. This master plan has to pass through community hearing process before it can be approved. The intention of this provincial development is to link the national plan down to provincial group or provincial plan and also to community plan. The planning element will include economical, social, resources, security and administrative works. Water planning is then included in the resources aspects (water supply, environment (water quality), disaster (flood and drought)).

In our research project, the development of provincial water planning system aimed to develop area based information system and tools to help province/community integrating water planning with provincial/community socio-economical development plan. The project comprised of three elements, i.e., research, information system development and dissemination. The research work is to survey water use, to conduct water supply survey and to estimate water demand due to the socio-economical development plan and find appropriate measures and plan to cope with provincial development objective and goals of both provincial and community level. The system comprised of necessary planning information in the mapping system to be used for planning, discussion and public hearings. The dissemination included local university staff training, provincial staff training with series of workshops to build up the core team for provincial planning execution. The project also included the survey of community plan and local staff training in order to be able to use the system developed to incorporate with provincial water plan.

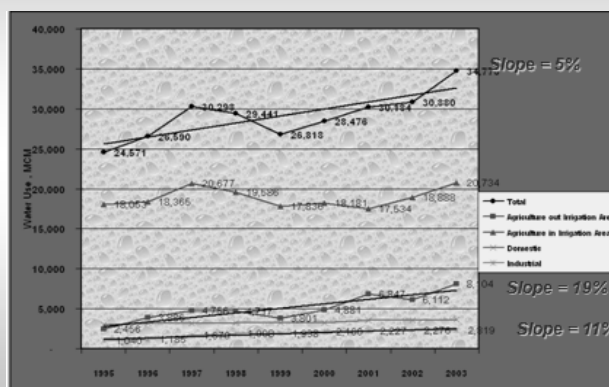
The presentation will describe how the project and information system were developed and showed samples of dissemination process and content used for capacity building of both provincial and community level. Lessons learned from the project execution of both provincial and community level are summarized as knowledge sharing which will hopefully be beneficial to other southeast asia countries.

## Presentation items

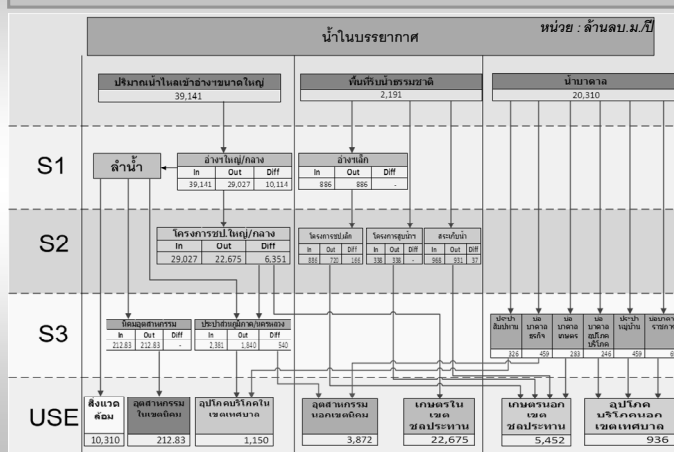
- Background information
- Laws concerned
- Research project concept
- Implementations
- Lessons learned



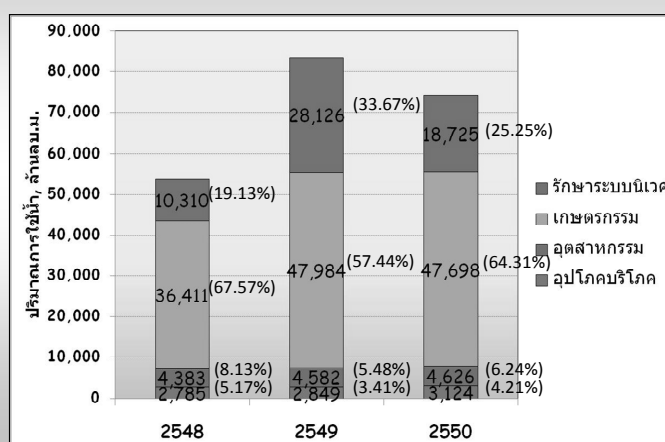
## Water use in 1995-2003



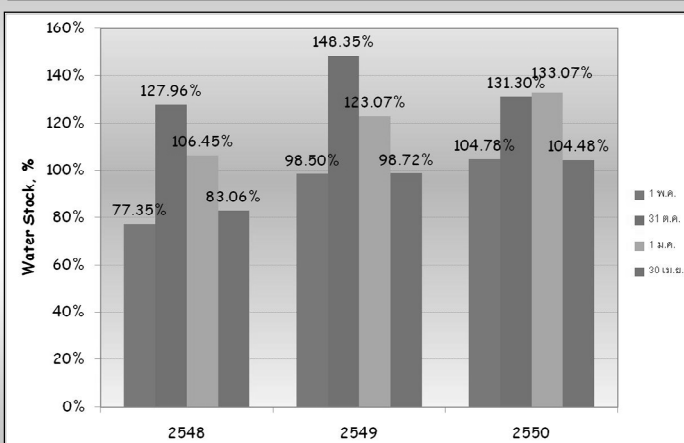
## Thai Water Balance



## Water Use in Thailand

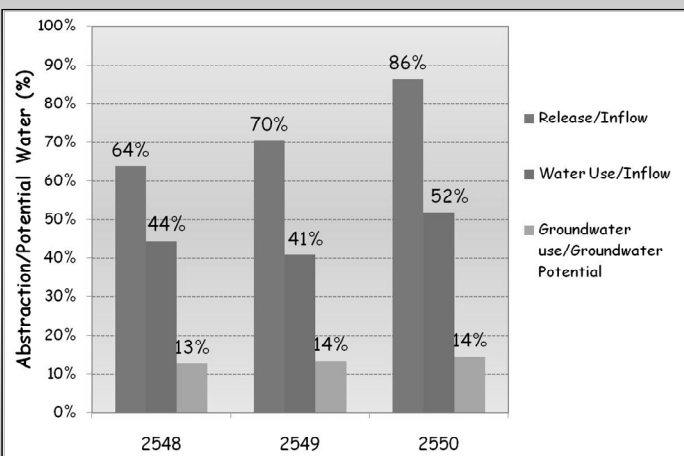


## Water Stock\*

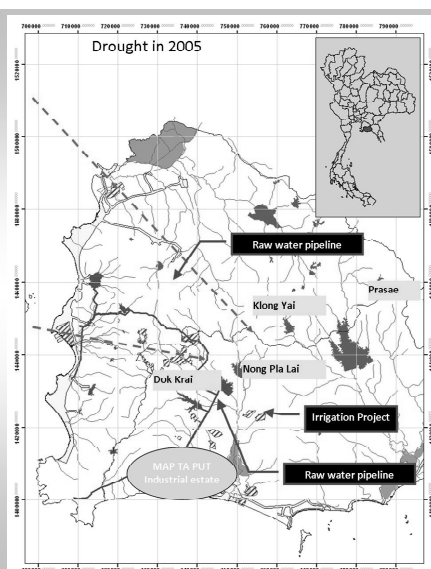
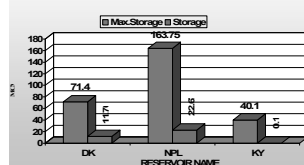


Remarks : data only from large scaled reservoir

## Abstraction/Potential Water (%)



Remarks: data from large scaled reservoir only

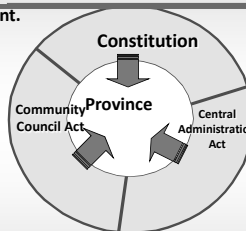


## Laws & Water Resources Planning

- National Water Resources Committee
- National Water Vision (2000)
- Major Basin Plan Study  
(list of proposed WR development projects)
- Shift from supply mgt to demand mgt  
(GW fee, water supply fee review, 3 R concept etc.)
- Provincial Development Plan Act (2008)

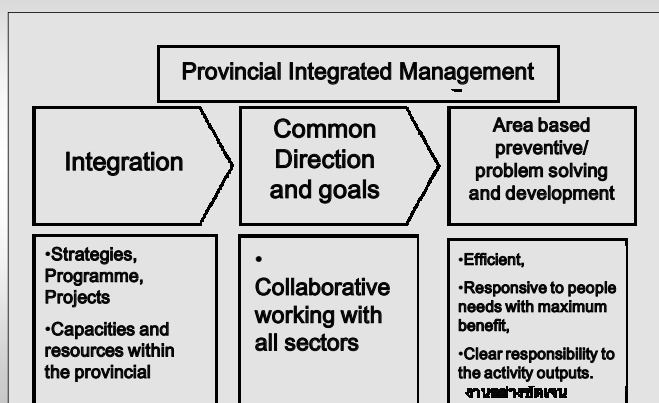
## Laws concerned

- A.66 community has a right to conserve and rehabilitate culture, local knowledge and natural resources and environment.
- A.78 support province to have plan and development budget for benefits of people in the area.
- A2 7 / 1 propose development directions to Governor and Provincial Council to Provincial Development Plan consideration
- A 27/2 recommend to Governor, local council and concerned agencies about public services and development of economic, social, quality of life and environment
- Central Adm. Act (1991, modified 2007) A52 Province can ask for budget according to the procedure set by the Act.
- A 53/1 Province must set plan accordance with National Development Plan and local demand. To set the plan, Governor must set the meeting with concerned agencies, local councils, civil society and private sectors.

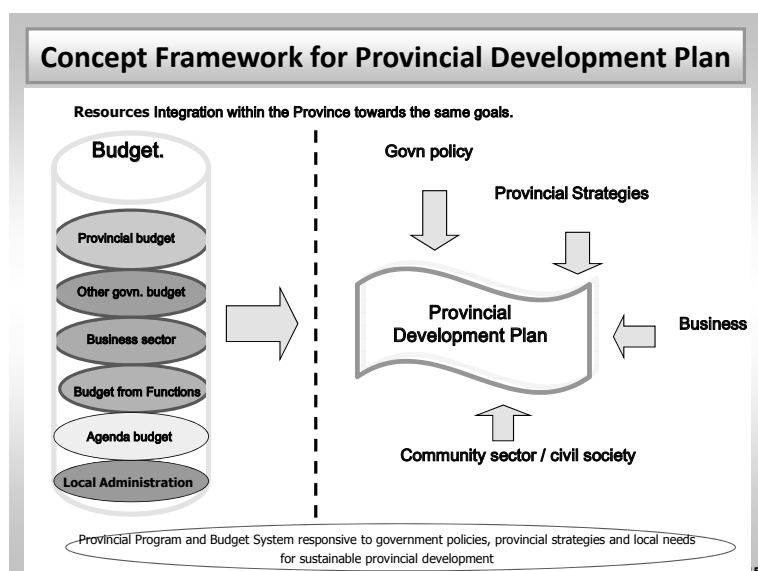


## Background of the provincial development plan

- Provincial Integrated Management Concept



14



## Nature of problem

- **Water Management Issue**  
(multidiscipline/multilevel/space/time)
- **Multidiscipline**  
( Natural resources, Economics, environment, social )
- **Decentralized Issue**  
(authority boundary, decision process, stakeholder involvement, resources available)
- **New Technology**  
(ICT, database, mapping, integration)

## Issues to be considered

- **National Planning and Water resources availability**
- **Water resources management in macro and micro scale**
- **Technology development and its role especially IT/GIS/MIS technology**
- **Capacity building**
- **Decision system and conflict management**

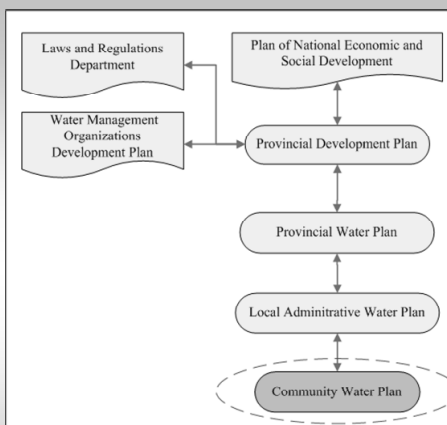
## Research concept

- Objectives
  - Research : planning process, information needed
  - Infor : integration, ICT application
  - Dissem : university network, provincial, community capacity building
- Scope
  - Three years
  - In six provinces (Rayong, Nakornpathom, Samutsonkran, Nakornsrihammarat, Patalung, Nan)

In the past, Provincial Develop Plan made by Provincial Strategy Unit may be not included water plan.

In the improvement of planning process, Provincial Develop Plan includes water plans (as shown in the Figure). Community Water Plan becomes an important part in the Provincial Water Plan because local area can drive Provincial Strategy.

Community Water Plan is set from the basic local information area based and useful for the national budget formulation and the plan will be continuously developed.



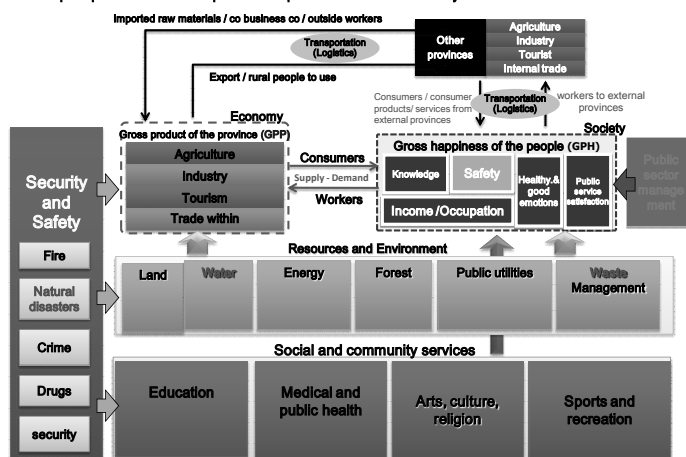
Community Plan is linked with Provincial Development Plan



Water Resources System Research Unit, Department of Water Resources Engineering, Faculty of Engineering, Chulalongkorn University, Thailand

## Provincial Development Objectives in each aspects

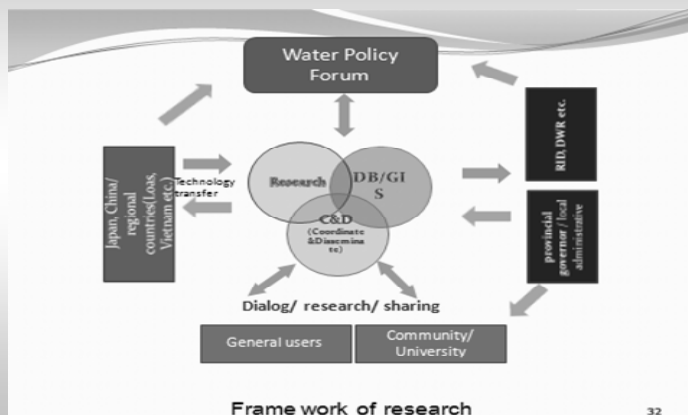
- Develop the province in various aspects in comprehensive and consistent ways



20



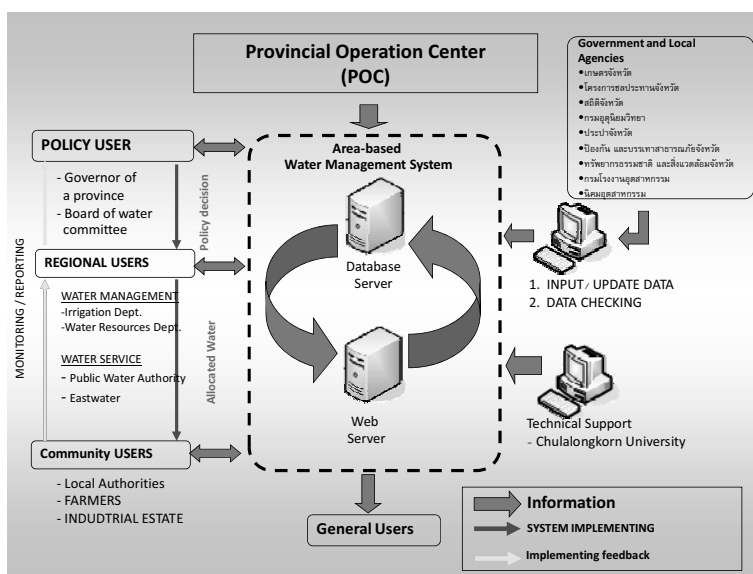
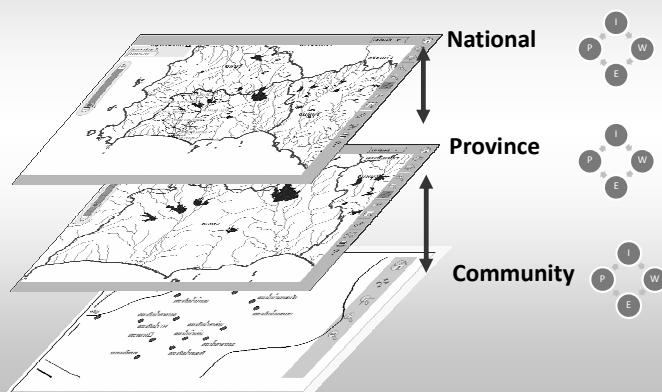
## Research Link



32

## 2 Concept

### Water Information System ( for Warning/ Emergency/ Planning operation)



## Tools used

- GIS/MIS information (web based if possible)
- Mapping training from field survey
- Workshops
- Governor's working group setup
- Water Policy forum
- Network meetings

## Implementations

- Web based system setup
- Network meetings
- Governor working group meeting
- Community working group meeting
- Water Forum meeting

## Website Sample

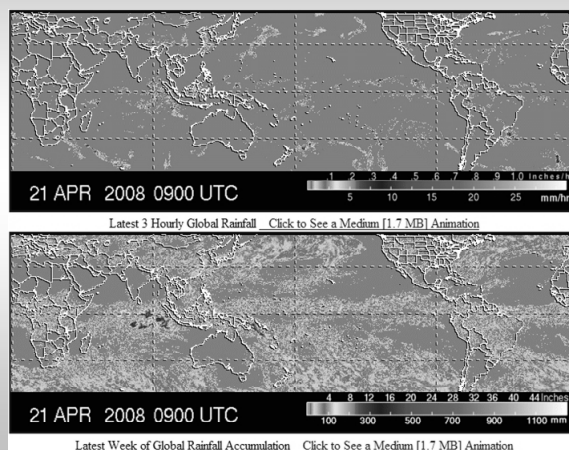


### Warning Sample

### Map Sample



## Rainfall data provision hourly & 7 Day Rainfall



30

## Meeting and workshop

Meeting with Governor



Meeting with network university-1



Meeting with network university-2



Meeting with network university -3)



## Data Meeting with Local Administrative Authority



Collected data were presented and verified with local communities in small group meetings.

## Capacity building-1

- Local lecturer

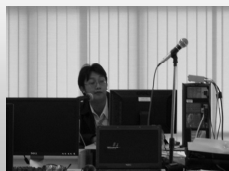
Irrigation Unit



PWA



Local Admin



## Capacity Building-2



Local communities

Meeting results :

- Cooperation in updating data and testing system



- Cooperation in training local authority

## Workshop with community

Community Plan: show the development of water supply project, channel excavation



### Water forum 23-03-10 (RID)



### Water forum 24-03-10 (DWR)



### Lessons learned

- Mapping technology help planning process for better planning and prevent duplication
- Planning workshops bring more understanding and collaboration among users and functions
- Integration of information for multilevel development planning is necessary, though more effort is needed.
- Capacity building is a key success factor.

## Acknowledgement

### Thanks to

- participating administrative units (in Rayong, Nakorn Pathom, Samutsongkram, Nokornsrithamarat, Pattalung Province)
- Royal Irrigation Department officers
- Provincial Water Authority officers
- Rayong Provincial Authority
- etc.

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under the research unit funded by Chulalongkorn University

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- สุจิตต์ คุณธนกุลวงศ์ 2553 สภาพภูมิอากาศเปลี่ยนแปลงของไทยและผลกระทบต่อด้านน้ำ
- (ISBN 978-616-551-249-7) หนังสือวิชาการ ตุลาคม
- สภาพัฒนาเศรษฐกิจและสังคมแห่งชาติ(2553) รายงานการจัดทำบัญชีประชาชาติที่คิดรวมต้นทุนด้านทรัพยากรธรรมชาติและสิ่งแวดล้อม รายงานฉบับสมบูรณ์

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## CURRICULUM VITAE

**Name** : SUCHARIT KOONTANAKULVONG  
**Date of Birth** : December 6, 1955  
**Nationality** : Thai  
**Position Appointment** :  
 - Associate Professor at Faculty of Engineering  
 Chulalongkorn University  
 - Executive Director of Technology Promotion (Thai-Japan)  
 Association  
 - TISI's Technical Committee No. 898 member (ISO9000)  
 - Water Resources System Research Unit Head  
**Education** :  
 1978 - Bachelor Degree in Chemical Engineering, Faculty  
 of Engineering, Kyoto University, Kyoto, Japan.  
 1980 - Master Degree in Agricultural Engineering (in Civil  
 Engineering), Faculty of Agriculture, Kyoto  
 University, Kyoto, Japan.  
 1983 - Doctoral Degree in Agricultural Engineering (in Civil  
 Engineering), Lab. of Water Use Engineering, Faculty of  
 Agriculture, Kyoto University, Japan.

## CURRICULUM VITAE

**Employment** :  
 1979-1980 - Special Lecturer of Shiga Agricultural College,  
 Shiga Prefecture, Japan.  
 Apr.-Dec 1983 - Research Fellow at Water Use Eng. Lab., Department  
 of Agricultural Engineering, Faculty of Agriculture,  
 Kyoto University.  
 1984- 1986 - Lecturer at Department Of Civil Engineering,  
 Faculty of Engineering, Chulalongkorn University  
 1986- 1996 - Assistant Professor at Department of Civil Engineering, CU  
 1989-1995 - Deputy Director of Chula Unisearch  
 (Administration/ Business Development)  
 1996- Present - Associate Professor at Department of Water Resources  
 Engineering, Chulalongkorn University  
 1996-1998 - EIT's ISO9000 Committee Chairman  
 2000-2006 - Associate Dean

## CURRICULUM VITAE

**Major experiences in Research**  
 1990-1993 - Joint Research on Siltation Mechanism of Chao Phraya River  
 Mouth with Osaka University funded by Japanese Nikkeiren  
 and Chulalongkorn University  
 1994 - Research on Numerical Modelling of Current-wave  
 Field at River Mouth funded by Asahi Glass Foundation  
 1995 - Research on Wave Hindcasting Methods for Lower  
 Siam Gulf funded by Faculty Research Fund  
 1996-1997 - Kamphaengphet Groundwater Rehabilitation Study funded by  
 Department of Public Works  
 1999 - Research on The possibility of Kra Channel  
 Dredging – Physical Aspect - funded by Royal Thai government  
 2000-2002 - Groundwater Potential and Demand Study for GW  
 Management in the Northern Part of Lower Central  
 Plain funded by the Thailand Research Fund  
 2003- 2004 - Groundwater Monitoring in the north of Lower Central Plain  
 and the development of Groundwater Data Linkage System  
 2004-2005 - The Assessment of Pasak Jolasid Dam Project (Effectiveness of  
 Surface Water Management and Impacts on Groundwater)  
 2007-2008 - Project Manager and Researcher, Area-based Water  
 Resources Management System Development Along With  
 Decision Support System and Social Process in Rayong  
 Area, funded by Thai Research Fund.  
Province  
 2007 - Consultant, National Trans-boundary Flood Issues Expert for  
 Thailand, Mekong River Commission.  
 2007 - An Evaluation of Flood Management and Alleviation Project in  
 the Central Region of Thailand during 2006, funded by Royal Irrigation  
 Department.



## CURRICULUM VITAE

### Major experiences in Research

- |           |   |  |
|-----------|---|--|
| 2007      | - | The Risk Assessment of the Contamination in Groundwater Resource in Klangdong District Pakchong, Nakornrachasima Province, funded by Department of Groundwater Resource. |
| 2007-2008 | - | Assessment of Impacts on Enforcement of Laws on Establishment of Groundwater Conservation Fees in the Critical Zone of Bangkok Metropolis                                |
| 2007-2009 | - | Impact of Global Climate Change on Monthly Precipitation and Stream Flow in Thailand, Water Management in the Eastern Region   |
| 2008-2009 | - | Analysis of Land Subsidence in Bangkok Metropolitan and its Vicinity Area  |
| 2008-2009 | - | The Master Plan for Groundwater Resources and Environment Development and Conservation (2009 – 2012)   |
| 2008-2009 | - | Water Resources Management Scheme by Implementing an Area-based Water Resources Information System together with Social Participatory Process in Rayong Province         |
| 2009-2010 | - | Research Center on Web based Provincial Water Planning System for Water Research Security  |
| 2010      | - | Impact of Climate Change on Irrigation System and Adaptation Measures  |
| 2010-2011 | - | Comparative Studies on Development Strategies to adapt for the Nature Disasters due to Climatic Change in Thailand   |

## Transcript

Thank you very much. It is a pleasure for me to present our research project in this seminar.

### Slide 4

I think that my presentation will have two parts, i.e., the first part is about water resource planning in Thailand, and the second part is related to the provincial and also community based water planning. So we developed the process for better planning by some research project at the moment. So we try to inform you what we did.

### Slide 5

So this is the data of water use in the year 2003. We had done a survey to gather water use information. We used the wording of “water use” for our definition when we tried to find out the ultimate use of water at user base. Normally in Thailand, we are talking only about water supply. So water use, we consider mainly from the demand side. So we had to gather data from the operation side and made a survey of the demand side about how much water is used, even from the provincial water works, the unit we kept that in and the exact numbers for each area and each user type in the year 2003. We also gathered the distribution [data] and tried to divide throughout the country [based] on how much water was used at that time and also from what sources. So I think you may see the main water use in Thailand is in the Chaophraya Basin and also in the Mun and Chi Basins which are the main water users of Thailand. So this is the general data that we analyzed in the year 2003.

### Slide 6

After that [we estimated] also the trend of the water use and we can see that during 1995 to 2003, there was a growth. So in the previous time, normally, in Thailand water use grew on average about by two to three percent. But when the economy grows faster it can be up to five percent. So the main player now is irrigation in the non irrigation area and the industrial use also grows quite fast with about 19 percent and 11 percent respectively which is above the average of the country. So these are the newcomers. Normally, the main water use has been for irrigation in [traditional] irrigation areas but now these two users are coming up with a very high speed. So these are some remarks we mentioned in 2003.

I already mentioned that this study may not be directly linked to the MRC but some experiences here can be applied to the water planning in the MRC in the future.

### Slide 7

Last year, for the first time we made a so called water account for Thailand which linked water supply and water use in the years 2005, in 2006 and 2007. We gathered information from various organizations, analyzed and estimated the amounts of water used. From the data, you can see that the

main water user is the irrigation sector, i.e., 20,000 million cubic meters per year are used for irrigation in [established] irrigation areas, and 5,000 cubic meters are used in the non irrigation area. The increase of water use in irrigation areas is attributed to the rise of paddies. Farmers now are growing more in the non irrigation areas. So the use of water in non irrigation areas grew quite fast.

The next part is about the domestic use which comprises the use within municipal areas, outside the municipal areas, after that, we can summarize the total.

So we have these use data, now we link them with the supply. The supply includes large scale, medium scale and small scale and also groundwater. So we are trying to link this and make a water balance. And we can see that the water inflow into the big dams is 39 billion [cubic meters] annually so when we look at the release, it is about 29,000 million annually so there is some difference, this is called the efficiency of conveyance.

So this is tier one or called supply one in the structure. So we go down into the irrigation area, this is tier 2. And after the irrigation project, we go down to the service providers like municipal water works.

So this is the way that we divided the supply into three tiers of use and balanced this again and again within the 25 sub-basins. Now we tried to [balance the] distribution of supply and use in each province. So we made a water balance for each province too.

### Slide 8

So with this data, we concluded that in the year 2005, 2006 and 2007 which were a drought year, a flood year and a normal year respectively– from this data you can notice that in Thailand the water yield [greatly] depends on the rainy season in each year.

And [here] you can see the domestic use. The domestic use grows say 100 million to 200 million [cubic meters] each year.

While this is [the figure] for industry: industry [demand] also grows by about one - to 200 million cubic meters per year.

This shows the irrigation, agricultural use: this will fluctuate with the water year.

And this stands for the environmental [use] which means the downstream release through Bang Phrakong and the Chaophraya river mouths. This depends on the rainy season of each year.

So from these data, we also concluded on the areas we try to set the water stock – water stock means the water volume in big reservoirs in the beginning of the rainy season and at the end of the rainy season, in the beginning of the dry season and at the end of the dry season – so in this, we tried to set some guidelines with these numbers, this here is in May, so at the beginning of the rainy season. Here we have 77 percent of the water

compared to the available capacity. So in a dry year we have 77 %, in a flood year we have 98 %, so we can use this as a basic kind of indicator for warnings to stop the water. And if we link to the demand side, we can see the amount of water available at that time at the end of the rainy season while this is the beginning of the dry season. So we have about 106 percent in the dam. This refers to the available capacity. So this is for a flood year. This is for a normal year - 130 percent. So this figure [shows the amount] at the end of the dry season, so there is some carry-over water from this to the next year.

So these are the status of water that we compared [derived] from the capacities of the dams.

This is another picture, in which we compare the release of the water to the inflow. Like in the year 2005, we released about 65 percent of the water compared to the inflow of the previous year which was a drought year. The figure of 70 percent is that of a flood year and 86 percent is for a normal year.

#### **Slide 9**

This picture shows the compensation water to the farmers affected from flood damage. So it is evident from the release data that even in a normal year, more water is released to compensate for the damage of a previous flood.

#### **Slide 10**

These are some pictures that we produced [to show] the percentages comparing release and inflow, use and inflow, and groundwater use compared with the potential. So we can notice that now we are using about 13, 14 percent of the groundwater of the potential we have. This potential is based on the DGR mapping estimating figures for each basin.

This summarized data we can use as a base for a guideline for managing the water as a whole.

#### **Slide 11**

Now this picture shows some kind of national figures. When we come to the actual condition like in 2005 – we had a problem on the Eastern Seaboard – we can see that we have a certain dam. But in this year, the rainfall was very low. So the reservoir ran very dry. And there was a lot of social conflict at that time between the communities and also the functions of the communities because of the water allocation issue. So even though in the Eastern Seaboard in general, the annual rainfall is quite high, about 1800 millimeter – when a drought year comes social problem arise in that area. So this is one of the issues that come along with the [water use].

#### **Slide 12**

The general [inflation] index sometimes cannot cover prices in certain issues [especially] when problems of a country occur in a special way, in a two-directional way or in an extreme way. So here comes also [into question:] how to manage water?

The second issue is some change in Thailand so we have a certain law concerning water resource management like Water Resource Committee, National Water Vision, we have some studies on the basin land, then we have a list of 25 water basins, how much water we have [based on] many workshops that we conducted. There are now some shifts on the supply side to the demand side, especially for the groundwater we have a fee for now. So we have tried to control not only the supply side, we tried to expedite some economic tools to manage this demand side too.

### Slide 13

And then since the year two thousand-something, we have a new constitution. And the new constitution also authorizes certain authority to the community. The community has some right to preserve their own natural resources. So this means a big change to Thai water management. So now, there is a law called the Provincial Development Plan Act, in 2008, [whereas] up to now, all the budget was controlled by the function or [the respective] department of the central government. But since 2008, each province is what we call a budget unit. So each province has become a department. So each province can have their own budget. Starting from a certain [minimum] percentage, by constitution, they will have up to twenty percent of the national budget within a certain period of time. At present this is about 15 %. So this is a kind of decentralization scheme of the central government.

So now, in each province, the constitution provides that each community has the right to conserve its own culture, local knowledge, and also natural resources.

And this is what the rural people use to sue the central government in terms of the Eastern Seaboard issue because we have now the law that when the authority of the local committee or even the local men how much they have... so we don't have that, so the court decided that the community [authorized] in that article can sue even the central government if the central government behaves not in a good manner or without any rules.

The second one is article 28: each province having a plan and having their own budget ... so this a kind of regional or even provincial structure to [secure] their own authority and also moneys. So this is a big change and this also affects the water management at the community level. The other [provision] is [for] a kind of committee that [says] if the authority doesn't act, the central administration has to support that also.

So now this is the kind of change since 2008. And the [advantage on the one hand] is also critical [on the other] that now each central government has to adapt itself to fit into the new circumstances.

### Slide 15

So this is the rule that each province will have some indicators [to match]. So indicators mean they have their own strategy, their budget, some provinces also [have to prepare for] this kind of structure of seeking their

own budget. Concerning the budget, there is the provincial budget, [contributions] from other government [departments] or even from functions and also business sectors and even agenda budgets. And there is a rule concerning the local administration units in the Thai national rules providing a ten percent tax pay back to each local administration. So this kind of budget system is variable so now the government also enacted putting the control over this budget into the wider provincial plan. So again, each community or even local administration is forced to [prepare] a four years community plan. So in community workshops they gather [their demands] and submit them back to the province. So this is a kind of new scheme that means a change to Thailand.

#### **Slide 16**

So coming back to the water management issues, even now they are very complex ones because water is linked to many other disciplines: linked to economics, linked to environment, linked to social issues.

Another level is the community level. [Be it on] provincial level, sub-basin level and basin level, nation level, so space and time [matters]. So this is a kind of a complex.

So now the decentralization issue: How [can] the local authority manage the water? Because up to now, many issues have been controlled by central government functions. So how can they adapt? But the law forces them to decentralize, so it's an issue how the local authorities will adjust to these circumstances. ...

Besides, they have to consider resources, economics, environment and social [aspects]...

Authority boundary: now we have the problem that we have so many jobs that nobody knows whose job is this, there's some gray zone, so this is some process issue.

So in another research study we try to raise awareness and try to make use of some new technology that can help the local authority to plan their own resources.

#### **Slide 17**

So depending on planning issue, we have [related] water resources [issues]. Up to a certain extent, we have to manage both macro and micro, very small, on village [scale]. There is some technology development, we have IT/ GIS/MIS. We need to focus on capacity building, we mentioned about decision support system and conflict...

So we set a three years plan and this was funded by the Thailand Research Fund to explore how to design the planning process and link with the central government and also the local community.

We suggested to use an information technology system to help speeding up the process. So we set up an information system with ICT

application. Moreover, we don't do [everything] by ourselves, we have a university network of about five universities linked there. So each university will check one province ... in each area.

Thus we have provincial communities [represented], and so we have selected about three to five local authorities to join the panel so that we can test the system design and see whether and how they can make use of this three years' project. We are [present] in Rayong, Nakhon Pathom and Samut Prakarn, Nakhon Ratsima, Patalung and Nan.

#### **Slide 19**

So this is the system, by law. We need to have this provincial development plan. So this depends on many sectors. The government right now has to control about 40 disciplines within the provinces. A lot of things that happen, the government has to control. So when we talk about water, how can it be integrated into this kind of big issue? So they [installed] a lower administration water plan [including] their own budget. Now some local authorities have about two million Baht per year. But some maybe a billion Baht per year. So there are big gaps between local administrations/authorities because both have ten percent of the tax to [be given] back to them. So if they have a big factory or so they have a lot of tax...

So now, we try to produce a sample community plan and integrate it into the provincial [level]. And this integrates at the national level in the NESDB's National economic-social plan also.

#### **Slide 20**

So this is a scheme that under the province depends on tax. There is a resources base, a social base, so each governor has to plan. There are now three main areas, one is the economy, so this concerns the GDP; after GDP there is the GPP: each province has its own revenue or output [?]

Second, there are security and safety issues ... in Thailand, like fire, natural disaster, crime, drugs, security... and now [talking] about social [issues]: we're probably [going to] use a Gross Happiness Index in Thailand, the GHI.

So in this relationship, we are now producing some links as Dr. Babel said: producing one ton of rice, how much water we use? If we going to use the unit of one province one million Baht, how much water we use? Or even in tourism, OK.

So now, this is what we plan for the next two years: we try to link the relationship [of a given] GDP and the estimated water demand.

Again, [under] the resource [aspect] this [represents] drought and flood. So we try to set some index for each province to keep control of, and match with, upstream [conditions], possibly up to a 90 percentile figure.

OK, concerning social [aspects] and water supply: water supply has two categories: municipal areas and rural areas. [Concerning] Water supply ratio



or toilet sanitation, we are now to set some criteria: the number of villages in each province having good, safe water [compared to those with] non safe water.

We have certain data from NESDB, the national survey. So we are now gathering these and then try to make a security index record for each province [to identify] how a certain index can define the security level of each province as A or B or C or D.

Breaking down to the local authority [level], a similar index can also set certain criteria.

#### **Slide 21**

So [according to] the research plan we have to link with the local authorities, so each year, we have some policy forum in March on the [World] Water Day.

#### **Slide 24?**

So this is the way we use GIS to link with the national, province and community [levels]. We set [up] some system [...] at the central [level] but each province can [receive] technical support because the system is web-based and we use public software.

We use the GMS base and we provide mapping training to the provincial officers and also the local authorities. We have the governor set a working team group comprising over 30 members from all departments.

#### **Slide 25**

With this system, we teach our network [members] how to use it. We talk to the governors [about the] policies of each province and link all data both central and local. We work with the committee as a working group. And then each year we have a water forum to summarize the things done.

#### **Slide 26/27**

This is an example for a website (*in Thai*) that we initiated.

#### **Slide 29**

And then each province builds up its own water data. So they can link supply and demand.

Then they have the data of each source and supply. They have some certain status of the size of water deficit, or domestic use, or industrial use or agricultural use...

#### **Slide 30**

Again, we try to link up some data to make a warning system. You know, to input and to make use of satellite data for water warnings, now we are under research. So by linking to “JAXA” where you make use of satellite data, we have some provincial [level] water warning system.



Slides 31ff

So these are some samples with the governor, with the university network, with the local authorities, ...

And we also try to [include] people like irrigation people, also as directorate lecturers from the provincial water authorities, and we train the local lecturers, so now we have at least five to ten [persons] in each province who can [work as] lecturers, only using the [set-up] system, to [instruct] the other local authorities.

So this is a meeting. This training we try to use as one set, in a community plan. Now they [are] training mapping so they know what is the existing plan, what is the future plan, for the next four years, where water constructions [are planned], how [big the] water deficit is, the water demand-supply ratio in their own area.

So this is the way we try to express [how to do something the] other way so they will decide to develop water supply units or make excavations [for] some channels. So this is the way we train communities to plan [for] themselves.

So each year we have some meeting. Last year, we had a meeting with RID, and we also asked for more technical support from the RID staff to help in the communities. We have the Water Policy Forum, we have the “Water Day”, so that all committees [taking part get to] know each other.

### **Slide 36**

So this is the thing we have learned to build [during the] last three years - now we have another two years for the research. So we hope that new technology can [be introduced] and made use of and help communities to plan in a better way with certain data. We have the training workshops, we display the information on multi-levels so that the authority and police can use it.

We found that capacity building of the personnel is a key issue to make this process sustainable.

### **Slide 37**

So we thank the many units in each area that we approached and also for the funding by the Thailand Research Fund.

So we hope that this kind of experience can be utilized in other regions, and by the MRC also.

Thank you

*Who's river is it anyhow?*  
*Some issues regarding transboundary development*  
*on the Mekong River basin*

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*Prof. Peter Rogers*

# **WHO'S RIVER IS IT ANYHOW? SOME ISSUES REGARDING TRANSBOUNDARY DEVELOPMENT ON THE MEKONG RIVER BASIN**

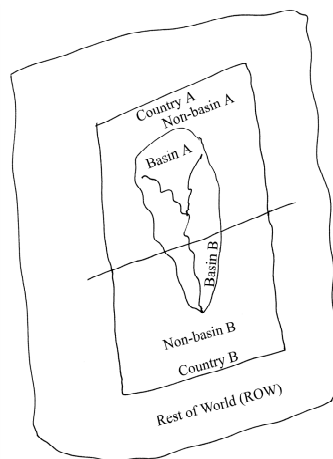
Peter Rogers  
School of Engineering and Applied Sciences,  
Harvard University  
rogers@seas.harvard.edu

## **Who's river is it anyhow? Some reflections on trans-boundary development on the Mekong River Basin**

Peter Rogers  
Harvard University

### **“Forefront and Challenging of Water Resources Management in Southeast Asia”**

Novotel Bangkok Fenix Ploenchit  
(Ruam Rudee Ballroom, 9<sup>th</sup> Floor)  
Saturday 29 January 2011



1. Upstream basin population - riparian
2. Upstream basin population - non-riparian
3. Downstream basin population - riparian
4. Downstream basin population - non-riparian
5. Upstream country - non-basin
6. Downstream country - non-basin
7. Rest of world or region

Common property resource --- Seven institutions for trading water

## Which are the affected populations

- Within the river basin
  - Within national boundaries
    - Riparian communities
    - Non-riparians
- Outside of the river basin
  - Within national boundaries
  - Outside of national boundaries
    - Regional
    - Global

## Who are the Relevant Stakeholders for the Mekong?

- National governments (Cambodia, China, Laos, Thailand, Vietnam)
- River riparians (in each country)
- River basin agencies (MRC)
- Local NGOs
- Supra national agencies (UN)
- Regional Treaty Organizations (ASEAN)
- Informal regional associations (GMS)
- IFIs (ADB, WB, bilaterals)
- Private investors
- Global NGOs (WWF, IUCN, IRN, etc)

## Who Should Make Decisions About Water Rights?

- The government?
  - National governments
  - Provinces or states
  - County or local
- The basin entities?
  - River basin agencies
    - National
    - Transboundary
- Others?
  - Transboundary polity
  - Global or regional

## Water and Benefits Trading across boundaries

- Within the river basin (water quantity and quality)
  - Among countries
  - Among provinces
  - Among water users
- Outside of the basin (economic, social, political)
  - Among regions
  - Among nations
  - Among provinces
  - Among water users
- Linkages (trade and transit; GMS)

SOBR,  
2010

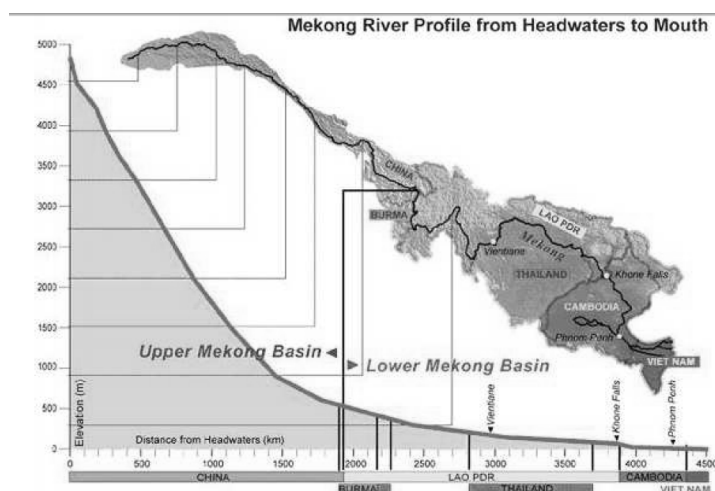
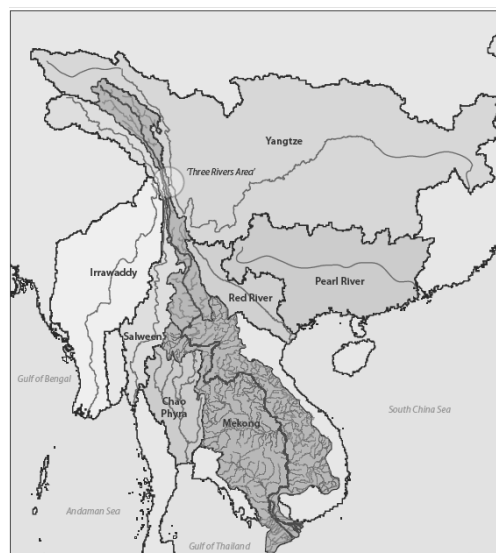


Figure 1.1 Mekong River Basin and longitudinal profile of the Mekong River (MRC, 2005)

## Factoids for the Mekong Basin

- is the second most bio-diverse river in the world after the Amazon, and supports the world's largest fresh water capture fishery of about 2.3 million tons per year.
- The LMB population in 2007 was estimated at 60 million, with about 90% of the populations of Cambodia (13 million), 97% of the population of Lao PDR (5.2 million), 39% of the population of Thailand (23 million), and 20% of the population of Viet Nam (17 million in the Delta and 3 million in the Central Highlands) living within the basin.
- average annual withdrawals for agricultural, industrial and other consumptive uses in the LMB are about 60 billion m<sup>3</sup>, or 12% of the Mekong's average annual discharge

## Why has Mekong River Basin not seen more development? Historical Context

- 19<sup>th</sup> century to 1954: French Colonialism
- 1954-1975: Independence—and war
- 1979-1991: Vietnam occupies Cambodia,
- China, Laos, Vietnam undertake economic liberalization, 1980s
- 1997-98: Asian financial crisis

## Geopolitical Context of Mekong Basin

- National vs regional interests
- Resources need to be shared
  - Laos: 35% of total flow of Mekong  
26% of basin area. Both = largest.
  - Myanmar: 2% of flow  
2% of basin. Both = smallest.
- China is upstream riparian, but
  - China: only 17% of total flow

## Political Context of Mekong Basin

- Laos, Vietnam, Myanmar and China
  - ally against Western states' demands concerning human rights and democratization;
  - share political objective of regime stability;
  - benefit from China's aid and investment.
- Laos and VN pursue Chinese development model of "economic liberalization under Communist Party control."
- 1997-98 eco/financial crisis results in Western donors (ADB, World Bank) and investors retreat from Mekong. Replaced by "private-sector hydropower developers, primarily from Thailand, Vietnam, China, Malaysia, and Russia.
- Thailand's dominance in Mekong Basin (currency, culture, products) resented. Suspicious of motives.

## 1995 Mekong Agreement

*"the full potential of sustainable benefits to all riparian countries and the prevention of wasteful use of Mekong River Basin waters"*

- Protection of the environment and ecological balance;
- Sovereign equality and territorial integrity;
- Reasonable and equitable utilization;
- Maintenance of flows on the mainstream;
- Prevention and cessation of harmful effects;
- State responsibility for damages;
- Freedom of navigation; and
- Response to emergency situations

## Competing Visions for the Mekong River Basin

- Development vs. maintaining biodiversity
  - Should Laos and Cambodia maintain biodiversity, and poverty, for sake of the rest of the world that has ignored biodiversity in order to develop?
- Development vs. maintaining livelihoods as they are now
  - Massive numbers of people have, however, already left the basin, get non-farm work. So, already, basin has changed in terms of "livelihood values."

## Basin Development

- **Upper Mekong.** China is completing its hydropower cascade; the Manwan, Dachaoshan, Jinghong and Xiaowan dams are currently operational and the Nuozhadu Dam to be completed in 2014. The Xiaowan and the Nuozhadu dams, have 9,800 and 12,400 million m<sup>3</sup> of active storage
- **Lower Mekong Basin – Development.** 26 hydropower projects (>10 megawatt) are under construction on tributaries, creating, together with the dams in China, 36 billion m<sup>3</sup> of additional active storage.

## Planned Dam Development

- Over the next 20 years, 12 mainstream projects and 30 tributary dams, mostly in Lao PDR are planned. All mainstream dams are classified as 'run-of-river', with limited storage capacity and regulation potential. Many tributary dams include significant reservoirs, adding 21 billion m<sup>3</sup> of storage. Including 10 dams across the river channel (8 in Lao PDR, two of which are on the Lao-Thailand mainstream and 2 in Cambodia), 1 partial damming (Don Sahong) and 1 diversion project (Thakho) in Lao PDR.

## Planned Irrigation and Fisheries

- There are plans to increase dry season irrigation by 50% (from 1.2 to 1.8 million hectares) in the next 20 years, with Lao PDR planning to expand irrigation from about 100,000 to over 300,000 hectares
- LMB countries also plan to further develop aquaculture and improve fisheries management, navigation, flood management and tourism. Aquaculture growth is forecasted to double to 4 million tonnes in the next 20 years.



## **Some Impressions**

### **Common (Mis) Perceptions**

- The MRC is a strong institution with planning and regulatory authority
- The dams will provide most of the electricity demanded in the basin over the next two decades-never more than 10%
- The dams will provide major downstream flood control benefits-not enough storage
- The dams will greatly enhance water transport-low flow will still control

### **(Mis) Perceptions, cont.**

- The dams will enable huge irrigation developments-improvement of low flows, but not enough storage
- The dams will mitigate the consequences of climate change-unclear ppt patterns
- The dams will improve municipal and industrial water supplies-yes
- The dams will seriously damage the capture fisheries-yes

## **Questions to be Asked of Proponents**

- ” How much damage does the capture of sediment behind a dam cause in loss of nutrients for fish and agriculture and erosion and flood damages?”
- Relative risk assessment is very important. Should we focus on future risks like climate change at the expense of current and maybe smaller risks? Remember that risk is defined as the probability of an event multiplied by its economic consequences.

## **Simple Analysis of Benefit Sharing**

- Rough estimates of the annual revenues from electricity sales for Laos for building the Xayaburi Dam could amount to US\$800 million. This is based upon a capital cost of \$3.9 billion spread over a 25 year concession. The type of questions to ask with regard to this number is, “does this exceed the losses due to reduction of fish capture downstream due to the dam?”

## **An Analysis of Benefit Sharing in the 3S Basin (Sesan, Sre Pok, and Sekong) (The only tributary with cross national border flows)**

Jiangrong He, “A Game Theory Approach to Transboundary Impacts of Hydropower development in the Mekong: Case of the 3S Basin,” Honors thesis, Dept. of Applied Math, Harvard University, April 1, 2010.

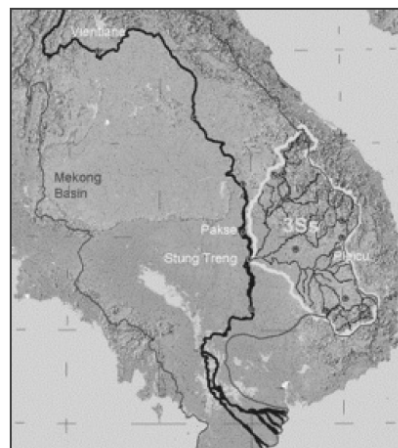


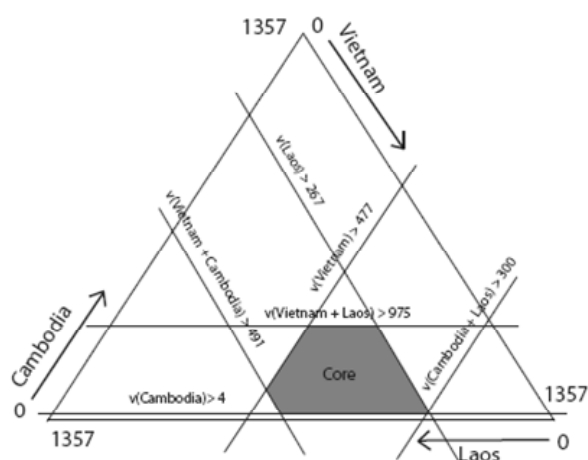
Figure 4.4.1 The Sesan, Sre Pok, Sekong (3-S) tributary system.

Source: ADB Regional Technical Assistance (3Ss study) <http://reta.3sbasin.org/>

## How to apply Reasonable and Equitable Sharing

- Model the benefits accruing to each riparian if they act to develop their water resources independent of others,  $IX(i)$
- Model benefits accruing to each country and each possible coalition of countries under assumed levels of cooperation,  $CX(i)$
- If each country can do as least as well as it could do acting alone, then  $CX(i) - IX(i)$  is measure of the incentive to collaborate

Figure 5: Graphical representation of the core of the three-player game



## Transcript

I can see am not being able to compete with the coffee break. So welcome back to the coffee break. I think you all get it... I want to thank the organizers of this conference for inviting me to speak here. That's with some trepidation as I am speaking to a room full of experts on the Mekong River basin. And I am an expert dating from December 23<sup>rd</sup> 2010 when I set out for a 2000 km trip around the Mekong. I feel as if I have seen every square inch of it though I haven't. I feel the bumps still on my backside from riding on Jeeps on dirt roads in various places. But anyhow, I want to thanks the organizers for putting me on the firing line here for this presentation.

I must say I am tremendously impressed by what we've seen on this trip. The quality of the human resources involved in planning and management of the Mekong, in all the countries we visited, has been really truly impressive. And certainly, the Mekong River Basin Commission – from the very flashy headquarters in Vientiane and Phnom Penh, down to little things in interior areas in northeastern Thailand/ northeast Cambodia which is very worth to mention, the staff there were very high quality. I really enjoyed this couple of weeks. And it's really impressive, having such people involved in developing the Mekong basin.

I just wanted to mention that the support for our and my activity, and for Prof. Suzanne Odgen and Professor Kawasaki was supported by a small Spanish quasi governmental organization called Casa Asia, They paid for our travel, both the luxury travel and the non luxury travel.

### Slide 2

I wanted to talk about “Whose river is it anyhow?” I spent a lot of time during my life thinking about river basin development and trans-boundary issues. And you know, it's a general issue about rivers: whom do they belong to? Well, it's not at all clear that we know who a river belongs to, and this is a schematic slide laid out in this sketch. We can see that there is a little river basin shown in the sketch and it's divided up into sub-basins and divided into countries and divided up into non-basin areas and basin areas. The question is: Does the river belong to the upstream basin population who are riparians, upstream basin population who are non-riparians, people who live in the river basin but not on the river, downstream basin population who are riparians, downstream basin population who are non-riparians? Does it belong to the upstream country in the non-basin areas or the downstream country in the non-basin area? Or does it belong to the rest of the world? And I think this is an interesting issue because when we deal with large international river basins like the Mekong there is certainly something to be said about the role of the rest of the world in its development.

### Slide 3

Which are the affected populations? - within the river basin, within national boundaries, outside the river basin within the national boundaries and outside the national boundaries? This depends on which river basin we are

dealing with. For instance, in the Nile, there are ten countries involved, at the Mekong river just six countries involved and at Ganges, there are four countries involved. So this depends on where you are located in the geography of the system itself.

**Slide 4**

Who are the relevant stakeholders? So when you have decided who owns the river then you can decide who are the stakeholders in the active actions? The national governments of Cambodia, China, Laos, Thailand and Vietnam, river riparians, river basin agencies, local NGOs, supra national agencies, regional treaty organizations, informal regional associations like GMS, that we shall talk about, international financial organizations (Asian Development Bank, World Bank, bilaterals), private investors, global NGOs etc.

But even within the country, you have a conflict between stakeholders and government agencies, you have the energy ministry, the land and water ministries, the interior ministry, the irrigation ministry, the forestry and fishery agencies, all of which have different perceptions and different views of how the river basin should be developed. And [when] we make the decisions, again the same issue: should the government – like the national government – should the provincial governments, basin entities or river basin agencies, or others who have a trans-boundary institution make the decisions?...

**Slide 9**

What about trading the river benefits across the boundaries, for instance? Within the river basin, water quantity and water quality – it's generally assumed it's very easy to trade water within the river basin and that's where many of the discussions of the past were focused on.

Now we going to shift the focus on outside the river basin economic and social and political benefits and trading across boundaries.

So it's not at all clear how much is said about doing these things, but there are lots of unresolved questions involved in the decision of who the stakeholders are and who should the stakeholders be etc.

**Slide 10**

So this is the space schematic of the Mekong basin and the various countries. We've seen this several times today.

**Slide 11**

This is a graphic which I really like because it gives you some sense of the importance of hydro-power in the Mekong basin. We are talking about a river basin that goes from close to 8,000 meters above sea level down to sea level and then creates, a tremendous opportunity for generating hydro-electric power - which is being developed.

### **Slide 13**

Why has the Mekong river basin not seen more development? Well, the historical context is important: From the 19<sup>th</sup> century to 1954, it was a colony of France, there was a war for independence from 1954 till 1975, there was another war between Vietnam and Cambodia till 1991, then around about that time, China, Laos and Vietnam undertook economic liberalization, and then, the Asian financial crisis, all of these things are seen as reasons for non development in the basin.

### **Slide 14**

The geopolitical context of the Mekong basin – national, regional interests, resources need to be shared; Laos has 35 percent of the total flow of the Mekong, 26 percent of the basin (again, as we saw this before), China is upstream everyone of the basin and it has 17 percent of the total flow – very important.

### **Slide 15**

The political context is very important. One of the things that I have learned in many years of dealing with water resources is that it's always a political subject, not a technical subject. As technicians for a long time assumed that they knew what to do about water exactly. Every time they try it's actually a political decision. Quite right the issue is extremely political. So the political context is very important.

### **Slide 22**

In 1995, the Mekong Agreement is very important for the basin. I like the idea that “the full potential of sustainable development benefits to all riparian countries and the prevention of wasteful use of the Greater Mekong River Basin waters” is the guiding principle of the Mekong in 1995. And I think it's the sustainable benefits which are important to think about. And we'll come back to this later.

### **Slide 17**

Competing visions for the Mekong river basin – development versus maintaining biodiversity: should Laos and Cambodia maintain the biodiversity and poverty for the sake of the rest of the world that has ignored biodiversity in order to develop? - And that's an interesting question. I come from a country which was recently supporting a framework for hydro and environmental impact of the hydro-power development in Mekong. And it's a very nice USAID report in turn for the MRC, and it's very elaborate and beautifully done. let me tell you, if we had enforced that in the United States 50 years ago we wouldn't have most of the hydro projects that we actually have developed quite successfully. In terms, what we see is there is some pressure on the rest of the world to say no loss of biodiversity due to development. This pressures countries to maintain biodiversity, at the expense of development. I think this is an important issue is one of the main choices; development versus maintaining livelihoods as they now are – so should be more people within the basin

maintained as subsistence farmers and fishers? or should they be allowed to develop the resources as they deem fit? Who should make the choice?

### **Slide 20**

In the previous presentations that discussed the development of the basin. There are plans to increase dry season irrigation by 50 percent, and the Lower Mekong Basin countries plan to further develop their agriculture, fisheries, flood management and tourism... Agriculture growth is forecast to develop to four million tonnes in the next twenty years. These are just some of the grandiose plans that we see proposed for the Basin.  
(I think we skip over some...)

These are some impressions from my recent trip (and I think I've lost some of the slides...) That's no big loss because we can use the time better to have a discussion. Let me review some impressions of my trip, based on thousands of kilometers traveling around the basin. There are some common perceptions or common mis-perceptions about the Mekong River Basin:

The first one is the Mekong River Commission is a strong institution with planning and regulatory authority. Viewed from the outside, that is viewed from the rest of the world who see the Mekong River Commission as a wonderful institution started a long time ago; a powerful committee, developing funds, helping countries to do lots and lots of tremendously interesting and good studies on the basin. But when you get down to the final point of making plans and regulatory authority it actually turns out to be more like a talking show. People can get together and meet and discuss things but the MRC has very limited powers. In fact, with the serious main stem project coming up for decision now, basically, it's up to the commissioners, the four members countries, to assess the project and to decide whether it goes ahead for construction or whether they intend to stop it now. Unfortunately the institution is particularly weak in this type of issue.

Another common mis-perception is: dams will be providing most of the electricity in the basin over the next two decades. It's less than ten percent now, and the electric demand, the increasing demand for electricity is probably more than eight percent per annum. I can't give you the exact figures out from my head but I know, seven percent per annum doubles in ten years. That's the rule of Seven. Figure that out in ten years time, when the current 30,000 Megawatts of power demand in the Mekong doubles to 60,000 Megawatts, and in another twenty years double to 120,000 Megawatts. However the total hydro development capacity in the basin. is less than ten percent of this figure. Even when every hydro site is developed in the basin, there won't be enough electricity and we have to go to other resources. And that's one of the interesting issues and that's what we see: that there is plenty of substitution possibility for electrical energy; there is thermal, there is biomass, there is solar, there is wind, all of these things which are more expensive than hydro now, fossil fuels already as they're expensive, the hydro, but some day, in ten or 15 years, they will be actually



quite competitive and, they will have totally different environmental consequences due to the development.

“The dams will provide major drought and flood control benefits” – well, again, when we look at the size of the Mekong river and when we look at the size and the magnitude of the flood flows, the wet season flows, then there's no way the dams would work as proposed. There would be some small regulation but there isn't enough capacity of storage in these dams to make a lot of difference to flood control management.

“Dams will greatly enhance water transport”, I think the locals will still control what's going on in the Mekong and I think that the dream that they had in the nineteenth century, river traffic going from the ocean all the way up to China will not happen – will never happen. But there will be parts of the river which will work fairly well. And some of the benefits of the Chinese developments might actually help on this because of the increase of the low flow as they're generating electricity from the cascades. So the dams' flow will have marginal, but positive, impacts on navigation.

“Dams will enable huge irrigation developments”, including low flows increase from the Chinese dams, will help, but again, if you want to have your transportation, you want to keep the water in the river and you don't want to take it out of the river. So the actual amount of the proposed irrigation probably cannot be done on low-flows on the Mekong and there is not enough storage in the dams to give you that second and third crop.

It's true that one of the things which is not widely discussed in any of the reports that I have seen is the possibility of large groundwater developments in the region, and certainly, the potential for groundwater recharge in monsoon is then another part of the story which looks attractive. Maybe you can get a large irrigation development but not through the diversions from the Mekong..

“The dams will mitigate the consequences of climate change” – again, this is an interesting question. It is not at all clear that that will happen. The MRC has sponsored some very interesting studies on climate change, but the results are very ambivalent: precipitation going up in some regions, the precipitation going down in other regions, may well be that the precipitation in rainy areas will be higher than further down the basins, so it's very unclear if the dams will make very much difference to the impacts of climate change.

“Dams will improve municipal and industrial water supplies” – yes, that's true, in fact, that's a positive aspect of an investment strategy. There will be an improvement.

“The dams will seriously damage the capture of fisheries” – yes, that is true.



The other mis-perception of the reviews was that the Chinese dams are already causing problems. For example, that the drought was caused by China, last year; that the Chinese have cut off the supply of water etc. In reality, it is highly unlikely that Chinese dams have very much to do with the water shortages last year. Chinese dams are on balance probably very positive in maintaining the low flows downstream.

These are some of the mis-perceptions that we see.

When we're dealing with specific types of projects you might start to have questions like: how much damage is the capture of sediment behind the dam because of loss of nutrients for fish and agriculture? Erosion and flood damages? And I put those together because we don't know the answers to those questions. Those are all very, very difficult. We haven't done adequate studies on sediment impacts and other adequate data to address erosion and flood damages related to the sediment. These are extremely complex issues one should bear in mind.

For example, Albert Einstein's son, Heinz-Peter, spent his whole life studying sediment transport in rivers and thought he was going to find an equivalent "e" equals "mc-squared", like his father did. He never got any general theory from his studies - very carefully done with all of them involving some fudge factors to make them work... So there is no general theory on sediment movement in actual natural rivers. It is very difficult and unfortunately that's one of the major issues in the Mekong basin:

Then the issue of relative risk assessment - very important: Should we focus on future risks like climate change at the expense of current maybe smaller risks? Remember the risk is defined by probability and then multiplied by the consequences and discounted over time so if the climate effects are going to be seen in hundred years' time they will be major effects if the worst projections come about. We still have to discount them in present value terms and you have to compare that with dealing with loss of livelihoods in the river basin by not acting in the present.

So for example: This is an example given to me the other day by somebody in USAID. We talked about electricity sales following the building of the Xayaburi dam. The revenue is about 800 million Dollars a year – which is a lot of money for a small country like Laos. And this is based on a capital cost of 3.9 billion Dollars for a 25 year concession. The type of question to ask with regard to these numbers: does this exceed the losses due to the reduction of fish capture downstream due to the dam? found answer. Certainly 800 million Dollars sounds like a lot of money when going to the electric power sector, but what about the effects on livelihoods of individuals downstream? For people living on capture fisheries the economic damages could well be significantly higher than 800 million. So this is the type of questions one should be asking in these ecosystem type of issues.

We did some... Prof. Kawasaki did some studies on benefit sharing on the Three-S basin which is the only trans-boundary tributary in the whole

Mekong basin, which is interesting: there are six countries in the overall basin and there is only that small three river basin, three river basin of those three rivers, actually trans-boundary between Cambodia, Laos and Vietnam.

#### **Slide 29**

The question asked by Kawasaki was: what are the benefits of sharing and cooperating? And this basin is the major contributor to flow in the Mekong. So this is an example of a simple game theory application which we set. Can people be better off by cooperating than acting by themselves? And this is the coalition analysis between Vietnam, Cambodia and Laos. And the blue area says that that's an area which there is possibility that everybody can be better off when they agree to cooperate. And so this is an example and we're hoping to do this in the six nation river basin but after this recent trip, I'm less enthusiastic about game theory than I was when I set out for this trip. You know it's easy for professors to think you can get a nice simple theory, apply it and get an answer which will look very nice. This answer looks very nice by the way and we were lucky that it worked out in this particular case. But I don't see how we can actually do that on overall six nations plus the factor that we had a very good database on the three aspects in the three extensively studied basins...

My own major overall impression is that the issue of sustainable development has not been pursued adequately by the MRC. I think the pressure to go for hydro-power at the expense of everything else, looks to me like a short-sighted approach. And I hate it to join the chorus of people who say we shouldn't build any dams because I remember I started up like saying if the US had followed the USAID's approach – we wouldn't have built any of our own dams. Actually we see, we are quite happy with the dams we have – on the Colorado in the Grand Canyon the Hoover Dam is one of the most amazing mid-century constructions and it is still functioning. So certainly I don't want to be joining the chorus that say we shouldn't build dams but I think because the MRC and the countries to ask some serious questions about the sustainability in the hydro developments, I think dams with diversion for other purposes of integrated planning would be better than what we're seeing right now.. By building the dams with the focus on hydro may preclude the possibilities of other types of investments in the future.

Thank you.

*Challenges to Benefit sharing  
in the Mekong River basin*

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*Prof. Suzanne P. Ogden*

# ***CHALLENGES TO BENEFIT SHARING IN THE MEKONG RIVER BASIN***

Suzanne P. Ogden  
Department of Political Science,  
Northeastern University  
s.ogden@neu.edu

## **Challenges to Benefit Sharing in the Mekong River Basin**

Suzanne Ogden, Professor  
Northeastern University  
Boston, Massachusetts, USA  
Research Associate  
Fairbank Center for Chinese Studies  
Harvard University, Cambridge, Ma. USA

**Conference on “Forefront and  
Challenges of Water Resource  
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29 January 2011  
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Unisearch of Chulalongkorn University, and  
International Center for Urban Safety Engineering,

### **#1 Challenge**

**Conflicting viewpoints and objectives among the MRB states, among the ministries within a state, within the Mekong River Commission (MRC), within the donor community, and among all these and the investors in the MRB.**

### **#2 Challenge:**

**The consequences of building a dam are complicated and cannot be known in advance of building it.**

### **# 3 Challenge**

**Finding the real reasons for problems with flow of water and sediment in the Mekong River rather than blaming Chinese dams.**

#### **#4 Challenge**

**National government ministries are unwilling to release data to the other members of the Mekong River Basin (or to the MRC) that would make rational, scientific analysis possible.**

#### **#5 Challenge**

**Lack baseline data, so is hard to calculate what the costs and benefits of building dams and expanding irrigation have been, and what they might be in the future.**

#### **#6 Challenge**

**A focus on hydropower to the exclusion of a focus on water for irrigation. Neglect of ground water as a resource for greater water availability.**

**#7 Challenge**

**A focus on Energy Security to  
exclusion of focus on Food Security.**

**#8 Challenge**

**Energy Investors other Investors,  
and NGOs/INGOs Driving the  
Agenda in the MRB**

**#9 Challenge**

**Protect the livelihoods of farmers  
and fishers without locking them  
into subsistence livelihoods.**

**#10 Challenge**

**A Focus on Climate Change rather than immediate consequences of building dams.**

**#11 Challenge**

**Expanding the pie and building greater benefits so have more to share. A non-zero sum approach to the MRB is more likely to result in agreements, security (national, food, water) because all countries will feel that they will gain.**

**#12 Challenge**

**Building Stronger Governance of the MRB by Strengthening the Institutional Infrastructure**



## Transcript

Thank you very much, Aki, and everyone who at this point of the conference acknowledges the tremendous effort Prof. Kawasaki has put in organizing this conference. It's a wonderful chance to share information and knowledge about the Mekong and the perspectives on it.

Today, my topic is the challenges to benefit sharing. As the Chinese might say, every problem, presents both a challenge and an opportunity. The benefit sharing of the resources of the Mekong river basin should be approached on a very rational, scientific calculation of those interests because, after all, we are dealing with science here. We're dealing with hydrology, we're dealing with ecology, we're dealing with scientifically knowable data in many respects. And yet, the field trip which we took over the Mekong river basin through the last five weeks suggested there are many challenges to the scientific calculation for sharing benefits.

Some of these challenges are political; some are related to data and knowledge about the complexity of the river basin and its environment and hydrology.

Some relate to the institutional framework, such as the MRC and the other institutions that are involved in developing the Mekong.

Some are about the priorities that have been set by the MRC's states, the institutions, their investors, and their donors.

So the problems are the challenges that have been put forth by the various officials, the donors and the academics, and the villagers, the fishers that we met on this field study. What I am presenting here are less our own assessments based on our own research than simply summarizing our overall impression of the key challenges based on these interviews.

### Slide 3

The first challenge is that there are conflicting viewpoints and objectives among the Mekong river basin states, among the ministries within the states, within the Mekong River Commission, within the donor community and among all these and the investors. There are a very large number of different opinions, conflicting opinions on what is the best thing to do in the Mekong river basin.

One of the problems is that there are really enough facts to go round for anybody to pick the facts that are most beneficial to their own perspective.

But perhaps the overriding problem is that the large stakeholders such as construction companies, commercial fisheries and real estate developers and governments and politicians have a huge stake in the development of the Mekong river basin. Even within organizations and within countries, there are a variety of viewpoints, for example, there is no agreement among a state's own ministries, there are concerns with matters related to the Mekong river basin's environment, the natural resources of water and the economic development. National decision makers don't make decisions

based on environmental impact assessments because ministries of the environment tend to be weak compared to the ministers that are involved in energy, water and construction. The more these ministries build the better because the ministry gets more power because it has more dollars involved, larger budgets, and so building dams is very much in the interest of these ministries and ministries get really nothing from protecting fish, communities or livelihoods or the environment. That is, speaking for the poor gives no power to ministries.

This is simply a matter of real politics. There is little agreement among the various stakeholders, moreover, within a state, such as construction companies and the public, the NGOs and the international government organizations and the affected communities. Those stakeholders that benefit the most, for example from the dams, such as urban communities that want more electricity and control of flooding are not the stakeholders who have to pay the cost of development. For example the [residents of] areas that are flooded by reservoirs lose their homes and livelihoods or suffer from the environmental damage are not those who are benefiting from the construction of dams.

Cambodia is, for example, thinking of building dams. But there is too much opposition from international non governmental organizations. Their concerns are about the need to resettle the people if these dams are built and the costs to the environment. Some have suggested that Cambodia should build nuclear plants instead of hydro. But Cambodia does not have the human capacity to deal with nuclear plants.

Another example is building nuclear power plants instead of dams in Thailand. This is simply unacceptable to the Thai public.

And a third area where there are substantial disagreements is on many issues of water allocation and development among the national actors in the Mekong river basin itself, among the four members of the Lower Mekong River Basin.

#### **Slide 4**

The second challenge is: The consequences of building a dam are complicated and cannot be perfectly known in advance of building them.

There is no way you can build a dam for an experiment to see what its consequences will be. For every dam that's built, there is a different hydrology, a different ecology involved, with different consequences. And nobody really knows what the impact will be. They can only basically make an assessment based on what other dams have done in other similar kinds of regions.

Water projects, dams, development, climate change, ecological changes, deforestation, all of these things are going on at the same time and they're interacting so that whether it is the dam itself or some other factor that is causing the problem is not entirely clear. For example, one of the

people of the MRC told us, 50 percent of the deforestation has occurred since 1960 but seems to have no effect on the hydrology of the Mekong. This is perhaps because water retention of the forests has been replaced by water retention of the rice paddies. But it is not entirely clear why this major deforestation has had no impact on the hydrology of the Mekong.

Another example is that the Mekong river is eroding very rapidly – even without dams – because of the sharp incline of the Mekong river, so we cannot necessarily blame dams for the increased transport of sediment that is causing the erosion.

#### **Slide 5**

The third challenge: “Finding the real reasons for problems with the flow of water and sediment in the Mekong rather than blaming Chinese dams”

Blaming China without real data means that apart from everything else, countries are not addressing the real issues of their own role in the damages and cost to their own country. They try blaming somebody else such as the Chinese. They are not confronting the reality and what needs to be done.

Apart from everything else, upstream dams ensure dry season flow for lower dams so Chinese dams are going to be critical if other countries lower down the Mekong want to build their own dams, such as Vietnam. Vietnam has been basically the last country to accept the possibility that the Chinese dams are actually beneficial to themselves.

So the Chinese storage dam (Xiaowan Dam) which is still not yet full, hopefully will provide a higher flow in the dry season. This will also be helpful for navigation, which requires minimal flows to continue throughout the year.

So, hydro-power dams, by default, create benefits to downstream countries. Why? Because they spread the supply of water more evenly throughout the year, meaning less flooding, less of drought and more navigation.

A specific example of a country that blames China but is really itself in part to blame, perhaps fully, is Cambodia. Cambodia itself has built dams on its tributaries that have decreased the water for wild capture fishing. Now Cambodia wants to build a dam on the Mekong main stream because it needs electricity. Last year when it was particularly hot in Cambodia, and people all rushed out to buy air conditioners, the demand for electricity caused major blackouts in Phnom Penh. So the government decided to build three new dams to generate electricity. And where did they choose to build them? Two of them were being built on the outskirts of what are called protected forest areas. So some of these countries are doing much of the damage to themselves but choose to blame someone else.

**Slide 6**

The fourth challenge is that “national government ministries are unwilling to release data to the other members of the Mekong River Commission (or to the MRC) that would make rational, scientific analysis possible.”

- It's not easy to build trust and exchange data. National governments are reluctant to give the data. In the case of China and other countries throughout the world including Singapore and India, but if sticking to the Mekong river basin, Vietnam and China, basically all are claiming secrecy for national security purposes. What they're really worried about is if they give information to the MRC and the MRC allows other countries to see this information, that it may be used against them or to their disadvantage, that it would be used in a way they won't be able to do what they want to do in terms of building dams.

**Slide 7**

Another challenge is the “lack of baseline data, so it is hard to calculate what the costs and benefits of building dams and expanding irrigation have been, and what they might be in the future.”

So we lack baseline data on flow, and we also lack standards for the baseline data, which is different for each country in terms of what information is collected. There's still no standardization of the data, and there is a lack of agreement on how much water is used by each country. So for example, the way to manage the Mekong is by managing the tributary flow. But the problem is there's not yet a known baseline flow. So the MRC is now trying to establish that, but it's difficult because they can't agree on the standard of the baseline. One of the problems in the MRC is that the MRC only applies to the Lower Mekong at this point, just four members at the Lower Mekong, not China or Myanmar. And China only gives information about its wet season. Last year, it did release information until October but then stopped. And they're hoping that next year, China will be willing to release more.

**Slide 8**

The sixth challenge is the focus on hydro-power to the exclusion of a focus on dams providing water for irrigation and food security.

There's a neglect of groundwater as a resource for greater water availability. This neglected groundwater and the focus on food security is a topic which Prof. Rogers briefly mentioned. As you know, electricity can be generated from resources other than hydro but water has no alternative sources than precipitation. But in Thailand, we were told, people don't even allow a study to estimate nuclear power as a substitute for hydro-power. Thailand has plans to build two small nuclear plants that are ready to go but they cannot be built because of public relations issues and because of the fear of the Thai public of a nuclear accident. So the Thai public seems less afraid of pollution from coal plants, and only wants to have dams built in Laos, not in Thailand, for its own electricity.

### Slide 9

Another challenge, very much similar, the focus on energy security in the Mekong river basin to the exclusion of the focus on food security – fisheries and navigation:

One of the problems here is that evaluating the benefits is very difficult. It's easy to evaluate the value of electricity but fisheries are more difficult: Do you evaluate fisheries on the value of nutrition or from the perspective of the market price of fish? 2.1 million tons of fish are captured in the Mekong each year which is about the same amount which is consumed in the United States each year. So the Mekong produces the largest number of fish in the world and if it builds dams the consequences on this substantial source of the world's fish will be significant. 500,000 tons from wild capture fisheries, it is estimated, will be lost from the building of the Sabori Dam alone. So when six dams are built on the main stem of the Mekong in the Lao People's Republic, the losses of fish will be even larger.

Aquaculture is a substitute for wild capture fishing that is used in Vietnam; but unlike in Vietnam, aquaculture in Laos will cost 3 or 4 times as much as wild capture fishery. In part because aquaculture requires feeding fish with fish feed. So the real cost of the dam should be the replacement cost of *fish protein* for all the poor people of Laos and Cambodia who depend on wild fish as their only source of protein. But when they decided to build the Sabori Dam, they had not considered this replacement cost of protein. Instead, they determined the cost of building the dam in terms of its impact by determining the price of the fish at the point of sale. And then, (even) the loss of fish is mostly a Cambodian, Ton Le Sap concern, Vietnam has already moved to almost exclusively aquaculture. There's almost no wild capture fishery left in the Mekong delta.

And one of the final problems with this is that when a dam is built and the electricity that is generated is sold to Thailand – we were told that around twenty percent of the profits from that sale will go to Laos – and this will come in the form of royalties and taxes the government will get from the sale of electricity, but that twenty percent that they get in Laos will not be turned over to the people who have lost their protein source from wild capture fisheries. So the people who sustain the costs are quite different from those who get the benefits from building the hydro-power dam.

### Slide 11

Number 9 – This challenge is the pressure on the national governments to develop now and not to defer building dams. Governments are, for political reasons, for reasons of social stability as well, unwilling to wait until important studies have been completed to obtain adequate data for making decisions. Because, after all, if we look at it from the perspective of a national government, these studies have been going on for decades, one after the other. And what we knew fifty years ago is much less than we know now; and maybe ten years from now, we will know something else, so they can't wait forever for the definitive study to be laid.

Nevertheless, there is a concern that dams are being built when other things could be done instead. And one of the possibilities for generating electricity in Laos without so many costs is the possibility of developing hydro-kinetic turbines.

Hydro-kinetic turbines can be put in a river by a poor country like Laos without having to be beholden to banks, say Thai or Chinese banks, to build the dam for them. So if they were to use hydro-kinetic turbines, they could sell electricity to their own people. They would not have to sell it to another country and suffer all the externalities of doing so. I mentioned before that Laos will get about twenty percent of the proceeds of royalties and taxes from selling hydropower to Thailand, but they simultaneously lose an equal amount in the value of their wild capture fisheries that are lost because of the large dams. Let's say: what they put in hydro-kinetic turbines - they do not produce nearly as much electricity but they will certainly produce enough for Laos' need so Laos could have electrification, they could have their fish and fish protein, and they would not have any impact on the environment. But that requires waiting to develop until some other study comes along.

**Slide 11 (#9)**

Another very important challenge is – the challenge of protecting livelihoods of farmers and fishers without locking them into subsistence livelihoods:

This is one of the most important things we learned about or thought about when we were around on this trip: It's interesting that NGOs and INGOs are very concerned about protecting communities and livelihoods that are actually subsistence livelihoods, for the benefit of diversity, for the benefit of communities, particularly minority groups in various countries within the Mekong river basin. But when we talked to these groups (and other studies also indicate), most of them said they did not feel that they wanted development to stop. What they wanted was for development to provide alternatives to their present livelihood. They don't want to have their children locked into subsistence fishing and farming. And they are very pro-development. Now this may vary from community to community but fact is that not every person living a life along the Mekong dependent on wild capture fishery is particularly interested in keeping that kind of livelihood for their children.

**Slide 12 (#10)**

A focus on climate change rather than on the immediate consequences of building dams is another issue in the Mekong River Basin.

The basic problem is that the consequences of building dams are right now, within the next ten years, whereas the focus on climate change is further down the line. Countries downstream should be very concerned about the consequences of the dams being built rather than worrying about

climate change, especially since we're really not entirely sure of what the impact will be.

What can be done about all this?

**Slide 13 (#11)**

I think that one of the biggest challenges is to expand the pie and build greater benefits so there is more to share. This is certainly the impression ESCAP (United Nations) had. The most important thing to do [is] to look at having a non-zero-game approach, looking at all winning together (or all losing because of lack of cooperation). To the MRB, it is important that you can build cooperation at the lowest level and expand the pie to have ever larger benefits. And the creation of the Greater Mekong Subregion, which has thus far focused on building infrastructure (roads, railroads, shipping, tourism, etc within the GMS) has done just this. The ADB has foresight in creating the concept of the GMS: building an infrastructure for the Mekong river basin has contributed greatly to expanding the benefits for everybody in the Mekong river basin.

**Slide 14 (#12)**

And a final challenge: building stronger governance by the MRB by strengthening its institutional infrastructure.

Right now, the MRB is not the strongest of institutions. And with repatriation, there's a challenge to the MRB to take control of its own institutions through the Mekong River Commission [by] having their own people from the region take over this institution and strengthen it.

Thank you very much.

## *PANEL DISCUSSION*

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## **PANEL DISCUSSION**

**Dr. Kawasaki:** Prof. Rogers, please briefly explain the characteristics of Mekong river basin compared to other international rivers.

**Prof. Rogers:** I think one of the important things to remember is the Mekong is not unique in the sense that it's the only river basin in the world which has trouble from development because of the international dimensions. I think [there are] a lot of other river basins – 261 river basins worldwide across boundaries between at least two countries. I think about maybe 50 percent of the world's population live in river basins which are shared among countries. So we see this is not a unique problem of the Mekong, it's very much the state of the world situation. Unfortunately, there is no international borders formalized in these United Nations treaties and they're non ratified on these international trans-boundary rivers. It is interesting that it took fourteen years of negotiations for this text to be approved by the General Assembly for signatures, and I think they got something like 50, 60 countries who pushed it for signatures and never got the 35 signatures to actually ratify it. And the countries who ratified it, are all downstream countries. Countries who refused to ratify were all upstream countries. So we have... My own country, the United States, did not ratify the treaty, even though the United States is very instrumental in getting the drafting done on the treaty. So they have... national sovereignty comes to play when you start to give up... so Bangladesh has pushed hardest in the United Nations trying to get a treaty approved, it is not successful I think it's, you know the... more or less contentious but it doesn't have I think there are some very, very good examples of trans-boundary border issues that work very well and the border can be used actually to help cooperation about an intercourse conflict. And I think that Canada and the United States, two large countries with thousands of miles of common border where hundreds of streams and rivers go across boundaries, and over hundred years ago, an international joint commission was set up between Canada and the United States, and basically, we've had hundred and something years of agreement of the rivers, so there is only one case where there is a serious problem and that happened during World War One when the United States insisted that they kept the flow of the Iv??? river and used it for armaments production. You know the Canadians were hoping to use the electricity, this was only once in a 120 years.

On the other hand, it is an institution which is extremely powerful and I think we are not likely to see any of this institution anywhere in the world and it's set up with around four commissioners: two commissioners from the US and two from Canada, and they make the decisions by consensus. They make the decision and then that becomes law in both Canada and the United States. What you see: we have four individuals that can commit to very large nations to actually be in a unique situation. I don't think it's possible

now, it would be impossible for the United States to have the United States enter into a treaty with another country at that type of binding resolutions. We can see the difference between rivers on the southern border between Mexico and the United States where there have been not quite so happy relationships and lots of trouble on that border. And a lot of it stems from the fact of water as it is in the United States, as it is in India and many other countries, is that a provincial or a state subject is not controlled by the federal government. So the water in... the seven states in Colorado river basin actually own the water and they have a contract which is approved by the federal government but they basically split up the water of the river basin. But unfortunately, the river actually then runs into another country, Mexico, and the federal government wanted to have a treaty to give Mexico some water and total of the basin states said, go ahead, that's fine, where are you going to get the water from? - Because the water belongs to us. There is no federal water in the United States. And so, actually, what happened was the federal government tried to make water by desalinating unusable water [opaque] which is a very sorry tale and has never been fully resolved. And I've been working for quite some years, my first paper was on the hinges about the Brahmaputra river basin in 1966 and [opaque] going back and forth and it was about game theory looking at the resolution of a conflict. Of the eastern board countries of the [unclear] Pakistan, East Pakistan and India. And that was an interesting example back in 1966. Those days, we were much more hopeful about being able to get negotiating settlements. But since then, [opaque] resources the conflict by Nepal, Bangladesh and India. India is, like China in this particular setting, India is a big player, India just not wanted to sign a treaty to give sovereignty to anybody else. Endless arguments back and forth. And India – if I would be an adviser to the Indian government, I would give them exactly the advice that they were using which is: don't join an international conference. The basin made bilateral treaties, so India has actually bilateral treaties with Nepal, Bhutan and Bangladesh, but there's no treaty which has all of these countries together because game theory tells us that if you have two players you can't have a coalition whereas with three players, you have a coalition. With four players, you get an even bigger coalition, and then you can get yourself into serious trouble if you sign such a treaty. So the theory and the behavior of a big country like India is [opaque] and congruent. We see the same with China in this basin. There is very little incentive for Chinese to bring anything other than to be nice to your neighbors. That's exactly what they're doing, they will make the decisions.

The Tigris/Euphrates is another river I have worked on. That is a river which runs out of Turkey into Iraq and into Syria and a little bit into the Iran.

The Turks have wonderful costumes - they built storages at least twice the capacity, twice the flow of the rivers, how much .. they have built - no definition of an international river – an international river is a river that runs along boundaries between two countries in this area. If the river is the boundary between the two countries, then you have to share the water equally. But the Tigris and Euphrates are Turkish rivers because they flow across the border, not along the boundary. So you can do anything you like

as long as it's yours. And then it goes to your neighbors they can do what ever they want. These are the types of issues you get into with international river basins.

The Ganges/Brahmaputra is something I have worked on for a long time. Ten thirty tonight I had a conference call from Rupert (?), the World Bank yet again is doing another study on the Ganges. He is from Brooklyn University, where they are trying to devise ways structuring cooperation between participants and riparians. Let me tell you that the Mekong basin might also have big advantages in terms of institutions. We actually have an institution, a high-tuned institution which is eventually [unclear] There is no international institution dealing with [opaque] They may be 25 to 30 years behind Mekong. These are the sorts of issues we are thinking about when we talk about development of the Mekong.

**Dr. Kawasaki:** Thank you, Professor Rogers. And now we will open our questionnaire from the floor. Please join, your comments are also welcome. And discuss with the speakers. Yes, Dr. Sucharit, please.

**Dr. Sucharit:** I think, a river, mentioning... there are two points. One is like in the Chaopraya river, which has also a conflict between the upstream, middle stream and downstream so even in one country there are certain conflicts, so how to manage? This also why the development of the quality of life, that why more use of the water, both quantity and quality-wise. There are also another approach in some engaged area which have good community relationship so they have a sharing culture between the upstream side and the downstream side. So I think even in one country, there need to be approach from ... This non-zero side approach that the function of central government need to have a better planning to have a better benefit together in each area.

The second one is a kind of social relationship within so that we have the own sharing so benefit of the national should come down to so that they can have certain measure. So these are I think the lesson that we need in the country that something now I think what the central government have non-zero some approach and community based, they have cultural sharing, the sharing between the community and central government. These are two or three [unclear] we need to study more so that for the better government in the sharing, this can [unclear] in that have some better for the conflict in the social in the future. So these kind of things need more research.

**Dr. Kawasaki:** Thank you, Prof. Sucharit. - Upstream and downstream – a very big issue, so even in Thailand is that an issue, so I think Dr. Babel, you studied for long years about Mekong, so how are there any changes about the upstream and downstream issue in the Mekong [area]? Any change from twenty years ago or ten years ago? Development or any...?

**Dr. Babel:** OK, I would like to raise some other point of discussion since Prof. Rogers is here ... let's get something from him – he has got fifty years of experience. I raise a point maybe of interest. I would like to know, based

on your experiences: is there any study which clearly defines the benefits of those dams which were constructed about thirty – forty - fifty years ago? If those dams would have not been there, what would have been the situation? That means that plenty of benefits which we have seen from these dams, I would like to know - I am not aware of such comprehensive strategy which says that if Bhumipol dam for example would have not been there, what would have been the situation in terms of development?

**Prof. Rogers:** One of my best supporters, she asked a good question and pointed out something now... I think that one of the issues Professor Aki pointed at, it's very hard to know what the consequences of building a dam are going to be. We pretend we know, we look around and see what's happening in other places but we don't have very many experiments in building a dam and taking it down, however, in the United States recently, over the past ten years, we have taken down about eighty dams, some smaller and some larger ones, and actually, we have a sense of what will happen to the environment when a dam is being taken down. The experiences so far have not been very encouraging. In fact, they will be in taking the dam down will never get back to where you were beforehand because the river has changed so much due to the morphologies forth and back due to the dam itself so it's hard to imagine [opaque]. Now in terms of the consequences of dams, one of the important studies I know of, was studied in 1966 on the river flowing from the US into Canada, the Columbia river, and that study was done by the Resources for the Future, and it's a very interesting study because this was in 1966 and we were all very enthusiastic, in 1966, the year I wrote my paper on Ganges we were very enthusiastic in analysis and developed a lot of methodology and things like that... Professor Howe I think wrote the report. He looked at the Colombia River Treaty which the United States signed with Canada on the river, and the argument: the [unclear] engineers and the Environment Canada designed the system together, it was in the best methodology of the time, very, very carefully done, and in the last minute, in British Columbia the Socialist Party was elected and they objected to the treaty. So it had to be treated??? by provinces and the states. And so they objected the treaty. They objected to the treaty because the treaty involved the US constructing dams inside British Columbia and actually running the dams. So the British Columbia government said no. We will build the dams and we will sell the electricity to the United States. So with lots of back and forth in nineteen years, the Corps. engineers advised the President of the United States not to sign the treaty because they said it was not up to the optimum Even the Cops. engineers talked about that this was not an optimum. This was not an optimal solution so they didn't sign it because the Canadians would get more benefits than the United States.

So anyhow, at that time, this is the benefit, the linkage issue, how to link water to things [which] are sided to water sector likely in the Greater Mekong Sub-basin.

And then that time NATO was considering a new fighter plane. And there were two competing offers: one of them was the US Phantom jet, and

the other was the Canadian Star Fighter. Now the Canadian Star Fighter was much better flying allrounder than the Phantom. The point is that who ever won the competition about the sale, NATO, every NATO country would have to buy the airplanes that won this competition. And the United States being the biggest player in NATO, insisted that the Phantom jet be the one to be chosen. The Canadians were very unhappy. So the president said to his advisers, [he said] “the Canadians are very unhappy with my decision, isn't there something we can give them?” One simply quite gaffed in the back and said “yes, we have this treaty” Even if it is a lousy treaty but you should give it to the Canadians, that they'll feel better. So since 1963, Kennedy signed the treaty, the treaty was approved by the senate... and of course, it's interesting to see what happened to the treaty. The treaty has still... in fact, the hydro-power was under-priced, the Canadians forced themselves to supply electricity at three cents a kilowatt-hour for thirty years, and that ended up the debate over dams in Canada. And of course, what happened at that time in the mid-sixties, huge inflation in construction costs, so it's like the Canadians were stuck having to build dams, very expensive, and to sell electricity at ridiculous prices. And the treaty is up for renegotiation right now. And of course, what has happened since then, and this is one of the cautionary tales about this whole thing, that nobody was worried about salmon in 1963, now, the salmon fishery is one of the critical issues on the renegotiation on the treaty. What is happening to the salmon now is it has almost disappeared from this river. Is it because of the dams? Is it because of climate change? Is it because of ocean fishing? Are other people involved? So now we're in the middle of a big wrestling match on the consequences of the salmon fisheries, consequences these dams having, five or six dams. And this is an example I think, how things change. So if you agree to a treaty right now and it gives something right now, thirty years time, remember these are long terms for investment, thirty years time.

**Prof. Ogden:** I had the impression that your question was really: What would have happened had we not built the dams? The Hoover Dam, the Tennessee Valley Authority, would we have had development in the United States? I think that's the thrust of your question, wasn't it? - Professor Rogers, that was the question.

**Prof. Rogers:** I think I had a good answer for another question... When I was a student, I visited the [?] dam in northern?? Tennessee, probably the first dam built in the Tennessee valley, that was in 1963 I think, the dam had been built in 1936/7 and the turbines have run continuously from that point on, until they were stopped once in the [unclear] period. Basically, once you have built a well-built hydro-dam and it's functioning and well-maintained, it will run for ever. Assuming sediment problems etc. etc, and the TVA, then this is the experience of this one dam which was like having your own printing press to produce money – once you built it it just ran for ever. I'm not saying this would happen in the Mekong. Certainly, this is one of the reasons why hydro projects are so attractive. You make a clever investment and then you have one guy who, well, can put some work in observation, and the operation maintenance is very low.



**Dr. Kawasaki:** Thank you. So any other question?

A member of the audience: My name is Chaipapasophon from Chiangmai University. I want to ask maybe Professor Babel that last year they have a low for during the dry season of the Mekong River, and a lot of media blame because of the Chinese building the dam. I just want to ask if that is true or not.

**Dr. Babel:** So last year, a lot of news in the newspaper and there was a counter-report also [which] came from China, and China says that is not [opaque] You see we need to consider the climate variability, and it is important that we cannot just say that because of climate change or because of the dams which have been constructed upstream. We need to look at the common stream, and based on one year's flows in the river, I don't think we should be able to conclude anything at all. We have been having climate variability for centuries. And that could have been because of the low flows, low dry years which have been observed in all states.

As far as... There are many other issues here. It's not just because of the development which has been taking place, diversion which has been seen in other parts of the MRC. So in my view, I would say that rather having a perception based on only one year of information will not lead to any conclusions.

**Prof. Rogers:** I have a rider to it and a comment: We did visit China and we spoke to a professor in Kunming who was head of the trans-border institute of China. And we discussed this particular issue and we said, well, they have daily data from fifty to hundred years of – I've forgotten the number – of the stream flows in that area, and the hydrology and rainfall, and he said “we sent a senior government official who told the Mekong River Commission not to worry because all data showed we are not responsible.” And I said, well that's nice to send a senior government official but wouldn't it be nice if the scientific community could see the data you have that we could arrive at the same conclusion? And we would feel a lot better about it, if we can see there is a computer disc some of the data is standing on. And the Chinese were only willing to share when they wouldn't be criticized. This is a perfect example of what Professor Odgen was talking about in terms of information sharing. Without information sharing, there is no trust.

**Dr. Kawasaki:** Thank you. So Mr. Chaiporn, so I would like to know what your department thinks about this?

**Mr. Chaiporn:** Thank you. So I will add up for what about your answer. From the fact, there are many monitoring stations in the Mekong river, both in the mainstream and tributaries. That I said before during my presentation that this time, the percentage of the discharge of the whole Mekong river basin coming from China is only 17 percent and the rest depends on the Laos with 40 percent, and just today, you can look at the MRC website, at the Chiangsai??? station, you can see the average water level is quite normal, higher than average, but in Luangprabang, it's very low because there was not much rainfall in that area.

I just come back from China. I've been there twice in December. Last year, the southwest of China was confronted with the most serious drought in decades, so the solution is that Prime Minister Wuchita (?) called hydrogeologists from our countries, more than ten thousand hydrogeologists, together with the equipment to survey groundwater during the ..., so they could solve the problem in five months. So in this case, somebody already mentioned the drinking water [issue] in this region, so concerning the Mekong, or MRC committee, we propose that... - in the past, we didn't talk about the groundwater but in the near future, we will form this activity. And the next, in the FU, one sub of the UATS will come to discuss with us about this.

And for Thailand, for example in the rural area, many small waterworks or village waterworks depend on the groundwater, more than 70 percent. So considering Thailand and our neighboring countries, I think we a bit more advanced in this technology. So we already have some contracts with our neighboring countries like Cambodia, Laos. We help them with surveys and planning for the groundwater development. So we hope we can do more. And we already [work] in the Department of Groundwater Resources also... OK, there is international credit course on groundwater development already two years. So, we will continue the technique to do this. So this refers to groundwater, I think we should pay more attention from now because during the dry period when you have no water, no surface water, you should pay more attention to groundwater development. This is my idea.

And can I get up another thing? - For MRC, this is the international institutionalization, but you can see that all of MRC member countries are very poor countries – low education, low economic strength, so if you want to fully adopt international standards, you will fail, the country cannot perform in the international discipline but we should keep [trying], to emphasize e.g. capacity building and to seek help from the developed country. Only five percent of the budget of the MRC, only five percent or something, but not more than ten percent are from the riparian countries. The other 90 to 95 percent are from the north, northern countries like Denmark, Australia, US, Japan, Germany. So in this case, when the donors give us money, so they want to have [some rights] to follow up closely some issues that we have to follow, including the environmental aspect, and many, many sustainability issues, as we always say. But then another thing is what we should do and we can we will do now is for instance to keep monitoring the data like flow data, water quantity, water quality, also other related things as a baseline. For Thailand, we have about 48 water limitations (?) along the Mekong. So we should help [our neighbors] to install some monitoring stations for every [area]... in this case, for a long, long time, so through longterm [observation] we can get really good data as a base form. So later, if we have a conflict with China or some other country, we can use this data for our dequotation (?) or some discussion.



**Dr. Kawasaki:** Thank you, Mr. Chaiporn. So China is a very big brother. We have to think, its very important to think about China, so please, Ms. Nitivadee.

**Ms. Nitivadee:** Yes, I would like to add from the China aspect to the [discussion]: if there is any effect on drought or flood in the Mekong region, we cannot find any definite answer for this. But we put first that we have seen China more cooperative since last year when we had the summit, the ASEAN Summit in Thailand, and this is the first time that, maybe because of some - you know - political push, so China sent the level of the deputy prime minister to the summit and what they promised is that in MRC, China is not a member country, just an observer, and the status observer means no commitment to any MRC regulation, right? - Yes, OK, and we have seen the progress is that the deputy prime minister of China came to that meeting and they promised to exchange data information on the level of water with the MRC that is what we think is a big progress with China. I don't know whether that is, you know, maybe because of some push or not but that is where we see some progress.

Member of the audience: I am [opaque]. I am a student at AIT, I have a question for Professor Suzanne: Do you think MRC will consider all the challenges you put up? Do you think money or development weight will be a trouble on environmental effect? Do you trust in the MRC IIT? Do you think they will consider also the environmental effect?

**Prof. Ogden:** Thank you for the question. Actually, I didn't necessarily think that all of these challenges or problems were ones that were necessarily coming from the MRC itself, I mean the fact that there are different groups within a country that don't agree with each other, or ministries fight with each other about the Mekong, there's not much the MRC can necessarily do about that. And one of the problems the MRC has is that it is really, as someone said, sort of a talk shop. One of the most important things that they've done in terms of bringing real water security to the area is to make sure that conflict is avoided. So they have been very important so far in preventing conflicts over the water within the Mekong river basin. But they're really... just two things to say, one is that in a sense, they don't have the power to do many things because it is the national governments that will make the final decision. But the MRC would like very much to strengthen, to have each of the four Lower Mekong River Basin Committees strengthened so that they can represent their governments. In other words, when they make a decision, when they are looking at things within the MRC that these, let's say Vietnam's national committee within the MRC, that it can speak for the government, - as it is right now, it cannot speak for the government, it just can make suggestions that then the national government makes a decision for - political reasons or what ever. But the other thing the MRC is doing is, as you probably know, by next year, all the people in the MRC who are not riparians will be replaced. So all the people from the developed world who are now controlling the MRC will be replaced and many people there ... two perspectives are... but the one I'd like to mention is that many people feel it will be very positive for the MRC

because they know for example that as it is right now the riparians, that is the Vietnamese, the Thai, the Laotians and the Cambodians, they don't even eat lunch with the non-riparian staff. It is the people from outside of this region who have controlled the MRC and that is not very empowering to the members from these countries to be in an organization that is really being controlled by people from Europe, from Japan and from other countries. So that can be a very positive development that as of next year, everybody in the MRC, including the Chief Executive Officer, will be from this area. Now one of the problems that has been mentioned is that there is a different capacity in terms of providing personnel to replace these people from outside, the people who were there, the technical people especially, were highly trained people from the outside who were brought in. But Thailand, of course, has very talented people who could then go to the MRC. The problem is that the Thais don't want to go to the MRC because they can make a lot more money in the private sector here and because if they leave Thailand and go to the MRC, if they leave a ministry, which is, by the way, where all the talent really is here for the Mekong river basin, - it's in the ministries – if they leave that, sort of they feel they might be interrupting their careers and those positions only last for six years and then they must leave the MRC. So Thailand doesn't necessarily - in a sense, they dominate the riparian staff right now – but they could be stronger if they worked for all these skips except that they have, you know, other choices or places to go with their talent and everything. Vietnam and Laos, you know they're socialist countries and they assign people to it. Vietnam is becoming much stronger, but those people, their technical staff can only stay for three years and then they bring them back to Vietnam. And the salaries for the non-Thai people in the Mekong River Committee appear quite competitive for a Laotian or Cambodian or Vietnamese but for a Thai person, they are not too appealing. But what that means is that the Thai, the Laotians, the Cambodians, the Vietnamese are more likely to quickly build their staff, their capabilities. And I think having them take over, having the people from the Mekong river basin, from the Mekong River Commission will possibly be a very positive development.

**Dr. Kawasaki:** So thank you all for your cooperation. I think this symposium has been completed successfully with interesting, informative and exciting six presentations, with a lively panel discussion. So we would like to express our sincere gratitude for those who kindly bought it and contributed to the success of this symposium by giving a big hand.



# QUESTION AND ANSWER

## Q&A Dr. Babel

Q: My name is Duangchan Singkran from the Pollution Control Department. I just finished a new building the main report on the Lower Mekong Basin for my department and I think we submitted that to the Water Resources Department just yesterday.

So my question: Like... I would like to ask your opinion about the... how you think about the - I will focus on the Lower Mekong Basin that's involved with four countries like Lao, Thai, Cambodia and Vietnam, we draw like the scenario in the next 50 years, and how to manage the water conflict like for use among four countries and you say that it seems like is no problem about the water scarcity in the whole river basin. But I think for the Lower Mekong Basin, we still have that problem. So I would like you to like express your opinion about this. Thank you very much.

A: I think we are pushing this very [much], as I said in my presentation that when we consider the scarcity with respect to sub-basin level on an annual time scale, then we do not have the criteria which was used - of 1,700 cubic meter per person per year, we have that lot of water. Now when it comes to – on a spacial scale, on a smaller scale, local scale, and time – if we look into dry season, there are problems. So that is very clear. So our intention here is to see how the sub-basins perform at the annual basis. Then, we applied the same approach in some of these small basins, sub-sub-basins in Nepal. A lot of what was done after the last two years on this approach. And we have even published journal papers on it. So the idea is that when you go on a smaller scale, spatial scale, the problems are still there. Now this gives a direction of what renovations are required, in which area we need to look at, so this is a comprehensive assessment which can identify at basin level what is happening. And the whole idea was that in [task? - unclear] only what [basias?? - unclear], what is important, what is, like we said here, the main important problem: it's management capacities and cooperation developments.

I hope I answered your question.

Q: Yes, but I think like the part of the problem is not just focused on the specific area but we should look at the perspective of the ... I mean the whole picture of the Mekong Basin. I like the like that.. for like the particularly in Thailand last year, like the in the dry season, we have the very dry, like the is a big drought in the northeastern part province of Thailand, we have severely discussed that because that a lot of dams were constructed in the Upper Mekong region that may have a lot of impacts to the Lower Mekong Basin...

A: Very clear. I fully agree with what you have said. But we also look into one of the strategies we are now involved in. There are eight post-docs

working in different aspects of this in Mekong. And to our initial vulnerability research says that probably storage of water upstream might not affect downstream to that great extent which we assumed. But I will have more clearer answers in the next one year or so.

### **Q&A Dr.. Sucharit**

Q: I am Vevien Chang and I am doing my research about the agenda?? on the water I stayed in Kanchanaburi province in the village for three months and I would like to ask you specifically about the community. Your study now is trying to do the community plan is linking with the provincial development plan. I want to know your community is specifically which level – village, Tambon or “Or.Bor.Tor”? - Thank you.

A: So, the way the budget unit is at Or.Bor.Tor or local administrative unit; by law, within Or.Bor.Tor or local administration, we need to have a community workshop, we have to go ask each village [to clear] what they want. So now the Aor.Baor.Taor has two functions: one function is area-based, within the village; the other function is occupation area [related] like rice paddy or prik/ chilly (?). So this [is what the] local community has to gather in information [by] coming together. Up to now, because we have a mapping system, they have a lot of papers of requests. So now we map up the information into the mapping and add some calculations, so they can constellate better which [requests to promote], also if the supply side is sufficient or not, and we are copying [this] now at many lower administration units.

### **Q&A Prof. Roger**

Q: I am from the Pollution Control Department, my name is Brantan Singkhram. I just ask one question for the first part of this. First, I would like to say that I totally agree with Professor Rogers, with most of your impressions, point of view. I agree that. I think that in Southeast Asia Country, we do have a lot of dams already built and going to be built. Like for example in Laos, now, when I was young, I see like the Nam Nueng?? 1, like the first Nam Nueng?? dam – Nam Nueng?? is the name of the dam – now, I am not sure is the Nam Nueng 11 or 12, and that's, you know, not only fishery, not only fish resources that we think that is maybe lost but like forestry resources, too. Like once that you have to build the dam like ... for example in Laos, ten years I went to... at that time I was a reporter so I went to interview the president of Laos, and we saw a lot of the - you know – the logs, like the big logs, after cutting down the tree, under the water and most of them like they cannot be get out under the water because low technology. And Thailand is one of the country that – you know – buy the electricity from the Laos. So that happened. So and I don't think that the dam is the final solution for many things in this Southeast Asian country. And it maybe the big problem in the future for the Mekong River Basin, so I am very glad that you raised these topics for MRC to reconsider as is especially the [point

of] the draft for the main report that I just submitted to the Department of Water Resources. - Thank you very much.

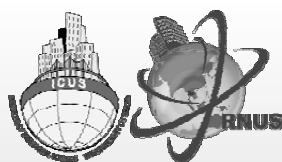
A: Thank you for the comments. You are some sort of the audience I have all the time. I love that being approved...

Q: Thank you, Mr. Peter Rogers, I come from Royal Irrigation Department, Guysip?? I am engineer. Today is very much organized but is policy with development in MRC. 50 years ago is very long term for approve than in four??? I told you one question: Ask about opportunity to be create new dam along way inside MRC?...

A: I think you did probably flood a lot of people out. Please remember there's a lot of dams and very flat river basin areas so we don't have any good dam sites to store a large quantity of water. And then my understanding of the topology, topography of the basin is that there are no good sites for storing large quantities of water. We don't have something like a swamp, we don't have something like the Colorado River in [opaque] or even the Three-Gorges in China. So the building double-size of the dams on the main stream is going to flood out a lot of people and take up a lot of very valuable agricultural land in (murmuring). I don't see the possibility of doubling the storage capacity.

# *APPENDIX I: BROCHURE*

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RNUS Seminar 2011

# Forefront and Challenges of Water Resources Management in Southeast Asia

**13:00 – 17:30, Saturday, 29<sup>th</sup> January, 2011**

**@ Novotel Bangkok Fenix Ploenchit - Ruam Rudee Ballroom, 9th Floor**

## Organizers

*Regional Network Office for Urban Safety (RNUS), School of Engineering and Technology (SET), Asian Institute of Technology; International Center for Urban Safety Engineering (ICUS), Institute of Industrial Science (IIS), The University of Tokyo; and Chula Unisearch, Chulalongkorn University*

## Presentations

### **Ms. Nitivadee Manitkul**

*(Director, Division of Economic Relations and Cooperation,  
Department of International Economic Affairs, Ministry of Foreign Affairs of Thailand)*

### **Mekong subregional framework: opportunities and challenges**

### **Assoc. Prof. Mukand Singh Babel**

*(School of Engineering and Technology, Asian Institute of Technology)*

### **Vulnerability assessment of freshwater resources to environmental change in a case of the Mekong River basin**

### **Assoc. Prof. Sucharit Koontanakulvong**

*(Faculty of Engineering, Chulalongkorn University)*

### **Integrating provincial/community water planning with provincial development plan by area based information system**

### **Mr. Chaiporn Siripornpibul**

*(Deputy Director General, Department of Water Resources,  
Ministry of Natural Resources and Environment of Thailand)*

### **Water resources management in MRC & Thailand's perspectives**

### **Prof. Peter Rogers**

*(School of Engineering and Applied Sciences, Harvard University, USA)*

### **Who's river is it anyhow? Some issues regarding transboundary development on the Mekong River basin**

### **Prof. Suzanne P. Ogden**

*(Department of Political Science, Northeastern University, USA)*

### **Benefit sharing in the Mekong River basin**

### **Panel discussion by 6 presenters chaired by**

### **Dr. Akiyuki Kawasaki**

*(Project Assoc. Prof., ICUS, IIS, The University of Tokyo /  
Visiting Faculty, RNUS, SET, Asian Institute of Technology)*



**Admission to this event is FREE, but we would appreciate it if attendees register by email or fax by 26<sup>th</sup> Jan**

Contact: **Regional Network Office for Urban Safety (RNUS)**, School of Engineering and Technology,  
Asian Institute of Technology (AIT), P.O. Box 4, Klong Luang, Pathumthani 12120, Thailand

Tel: (+66-2) 524-6418 Fax: (+66-2) 524-5565 E-mail: [rnus@ait.ac.th](mailto:rnus@ait.ac.th) URL: <http://www.set.ait.ac.th/rnus>



## *APPENDIX II: SYMPOSIUM PROGRAM*

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# PROGRAM OVERVIEW

## “Forefront and Challenging of Water Resources Management in Southeast Asia”

**Venue:** Novotel Bangkok Fenix Ploenchit (Ruam Rudee Ballroom, 9<sup>th</sup> Floor)

**Date:** 29 January 2011 (Saturday)

MC: Akiyuki Kawasaki, *Visiting Faculty of AIT and Project Assoc. Prof. of ICUS, IIT, Univ. of Tokyo.*

Time	Topic	Speaker
12.30-13.00	Registration	
13.00-13.05	Opening remarks	
13.05-13.35	Mekong sub-regional framework: opportunities and challenges	Ms. Nitivadee Manitkul (MOFA)
13.35-14.05	Vulnerability assessment of freshwater resources to environmental change in a case of the Mekong River basin	Assoc. Prof. Mukand Singh Babel (AIT)
14.05-14.35	Water resources management in MRC & Thailand's perspectives on MRC's role	Mr. Chaiporn Siripornpibul (MONRE)
14.35-15.05	Integrating provincial/community water planning with provincial development plan by area based information system	Prof. Sucharit Koontanakulvong (Chulalongkorn University)
	Coffee break	
15.30-16.00	Who's river is it anyhow? Some issues regarding transboundary development on the Mekong River basin	Prof. Peter Rogers (Harvard Univ.)
16.00-16.30	Challenges to Benefit Sharing in the Mekong River Basin	Prof. Suzanne P. Ogden (Northeastern University)
16.35-17.20	Panel discussion	6 presenters chaired by Dr. Akiyuki Kawasaki (AIT/UT)
17.20-17.30	Closing remarks	

## *APPENDIX III: BIOGRAPHY*

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Nitivadee Manitkul

**Affiliation:**

Director of Economic Relations and Cooperation,  
Department of International Economic Affairs,  
Ministry of Foreign Affairs of Thailand

**Education and professional training:**

- M.A. (International Relations) International University of Japan & Carleton University, Canada
- Certificate of International Trade Training Forum of International Trade Training-FITT, Canada
- Certificate of the Art of Negotiating Course The Negotiation Institute, Inc, USA
- Certificate of the Executive Course for Diplomat Devawongse Varopakarn Institute of Foreign Affairs, Thailand
- Certificate of the Executive Course for the Government Officials, Office of the Civil Service Commission, Thailand

**Professional appointment:**

- Third Secretary, Division of Economic Relations and Cooperation, Department of Economic Affairs
- Second Secretary (Economics) , Royal Thai Embassy, Ottawa
- First Secretary, Division of Europe I, Department of European Affairs
- First Secretary, Division of Cultural Relations, Department of Information
- Counselor, Division of Pacific Affairs (Thailand-Australia FTA), Department of America and South Pacific Affairs
- Counselor, Thailand-US FTA Negotiation Unit, Department of America and South Pacific Affairs
- Acting Director, Latin America Division, Department of America and South Pacific Affairs

Mukand Singh Babel

**Affiliation:**

Associate Professor and Field Coordinator, Water Engineering and Management (WEM) Field of Study, School of Engineering and Technology, Asian Institution of Technology



**Educational Background:**

- D. Eng. (Water Resources Engineering), Asian Institute of Technology, 1993
- M. Eng. (Soil and Water Engineering), Asian Institute of Technology, 1983
- B. Eng. (with honors) (Agricultural Engineering), Rajasthan Agricultural University, Udaipur, India, 1981

**Research interests:**

Dr. Babel specializes in hydrologic and water resources modeling as applied to integrated water resources management. His interest areas are very much diverse and include watershed modeling and management; water resources allocation and management; water resources and socio-economic development; water supply system and management; and climate change on hydrology and water resources. Research related to groundwater resources management and drought analysis, forecasting and management are also of interest

**Mr. CHAIPORN SIRIPORNPIBUL**

**Affiliation:**

Deputy Director General,  
Department of Water Resources, Ministry of Natural Resources and Environment



**Brief Career:**

- 2010- Recent Deputy Director general,  
Department of Water Resources, Ministry of Natural Resources and Environment.
- 2007 – 2010 Director of the Bureau of Groundwater Conservation and restoration,  
Department of Groundwater Resources, Ministry of Natural Resources and Environment.
- 2002 – 2007 Director of the Bureau of Groundwater Assessment & Balance,  
Department of Groundwater Resources, Ministry of Natural Resources and Environment
- 1979 - 1980 Deep Well Drilling and Development Division, Public Works Department,  
as a Senior Hydrogeologist, chief of Hydrogeological Survey Section.

**Education:**

- 2003-2005 MPA (Master Degree of Public Administration), Sripatum University, Thailand
- 1974-1978 B.Sc. (Geology), Chiang Mai University, Thailand
- 1991 Post Graduate Diploma in Seismology, International Institute of Seismology and Earthquake Engineering(IISEE), Tsukuba, Japan

**Awards:**

- 2005 Good Performance Award, the Achievement of Anti-draught Award from  
the Project of the Groundwater Investigation and Development in Chonburi and Rayong Province.
- 2004 “Royal Initial of The Queen Sirikit of Thailand ” for the project of Groundwater  
Investigation and Development for Bhuping Palace, Chiang Mai Province
- 1994 “Merit Award(Good Man of Ministry of Interior)” by Ministry of Interior, Thailand.

**Membership:**

Geological Society of Thailand (GST),The Thai Astronomical Society,Thai Hydrogeology Association(HAT)

**Selected Publications:**

- Dancing Salt Theory : The Method of the Study of the Occurrence of Salt water and saline soil in Northeastern Region of Thailand, Technical Meeting held by Ministry of Environment and Natural Resources, BITEC, Bangkok, 14-16 September 2009
- Limestone Caves: Occurrence, Development & Conservation, Special lecture for Geological Science Students, Mahidol University, Saiyoke Campus, 11 February 2009

Sucharit Koontanakulvong

**Affiliation:**

Head of Research Unit,  
Water Resources System Research Unit,  
Department of Water Resources Engineering,  
Faculty of Engineering, Chulalongkorn University



**Education:**

Ph.D. (Water Use Eng.) Kyoto Univ. Japan 1983  
M.A. (Water Use Eng.) Kyoto Univ. Japan 1980  
B. Eng. (Chemical Eng.) Kyoto Univ. Japan 1978

Peter P. Rogers

**Affiliation:**

Gordon McKay Professor of Environmental Engineering,  
School of Engineering and Applied Sciences,  
Harvard University, USA.



**Research interests:**

B.Engineering, 1958, University of Liverpool

M.S., 1961, Engineering, Northwestern University

Ph.D., 1966, Engineering, Harvard University

**Research interests:**

- Conflict resolution in international river basins.
- Improved methods for managing natural resources and the environment, with emphasis on the use of analytic optimizing methods to incorporate both the natural phenomena and the engineering controls.
- Impacts of global change on water resources, and the development of indices of environmental quality and sustainable development.
- Interaction of land use planning and central management.

Prof. Rogers has carried out extensive field and model studies on population, water and energy resources, and environmental problems in Costa Rica, Pakistan, India, China, the Philippines, Bangladesh and, to a lesser extent, in 25 other countries. His most recent work has focused on sustainable development with an emphasis on large cities in Asia.

He is a member of the American Academy of Environmental Engineering and the Third World Academy of Science, and is the recipient of the Maass-White Visiting Scholarship, and Guggenheim and Twentieth Century Fellowships.



Suzanne P. Ogden

**Affiliation:**

Professor, Department of Political Science,  
Northeastern University, USA



**Areas of Study:**

Comparative Politics, Chinese Politics, Democratization and Development in China;  
International Relations, US-China Relations, US Policy Towards Asia

**Selected Professional Activities:**

- Research Associate, Fairbank Center for East Asian Research, Harvard University, 1974-present
- Visiting Fellow, Wolfson College, Cambridge University, England, 1995-1997; 2010
- Visiting Scholar, East Asian Research Institute, National University of Singapore, 2011
- Visiting Scholar, Faculty of Oriental Studies, Cambridge University, 1995-96, 1997
- Fulbright Lecturer, Foreign Affairs College, Chinese Foreign Ministry, Beijing, 1996-97
- Editorial Board, *Journal of Contemporary China*
- Evaluator, National Science Foundation
- Evaluator, American Council of Learned Societies
- Evaluator for CGIAR Challenge Program on Water and Food, CGIAR (Consultative Group on International Agricultural Research)
- Founding Board of Directors, Greater China Business Council of New England
- Roundtable discussant, "Roundtable: Democracy, Sooner or Later?" China in the Red, Frontline, PBS
- International Monitor for national elections in El Salvador, 1994
- Member of:
  - National Committee on U.S.-China Relations
  - New England China Seminar (Harvard)
- Grants:
  - CASA ASIA, 2010-2011. For study of shared benefits in the Mekong River Basin

Akiyuki Kawasaki, Dr. (Eng.)

**Affiliation:**

- Project Associate Professor, International Center for Urban Safety Engineering (ICUS), Institute of Industrial Sciences (IIS), The University of Tokyo (UT)
- Visiting Faculty, Water Engineering Management, and Coordinator, Regional Network Office for Urban Safety, School of Engineering and Technology, Asian Institute of Technology



**Brief Career:**

After getting his doctoral degree and working at Yokohama National University, Dr. Kawasaki conducted research at UT, United Nations University, and at Harvard University.

Dr. Kawasaki has over 13 years of experience utilizing GIS for multidisciplinary environmental research while developing systematic approaches for integrating a wide range of data models, data formats, and research methodologies into a common GIS computing environment. Using GIS as the main tool, he has been conducting research on both disaster management, such as landslide and earthquake response, and environmental management, such as an integrated approach to evaluate the potential impact of precipitation and land-use change on stream flow. His current main study area is the Mekong River basin.

***INTERNATIONAL CENTER FOR URBAN SAFETY ENGINEERING***

*Institute of Industrial Science, The University of Tokyo*

*4-6-1 Komaba, Meguro-ku,*

*Tokyo 153-8505, Japan*

*<http://icus.iis.u-tokyo.ac.jp>*

*E-mail: [icus@iis.u-tokyo.ac.jp](mailto:icus@iis.u-tokyo.ac.jp)*

*Tel: (+81-3)5452-6472*

*Fax: (+81-3)5452-6476*