



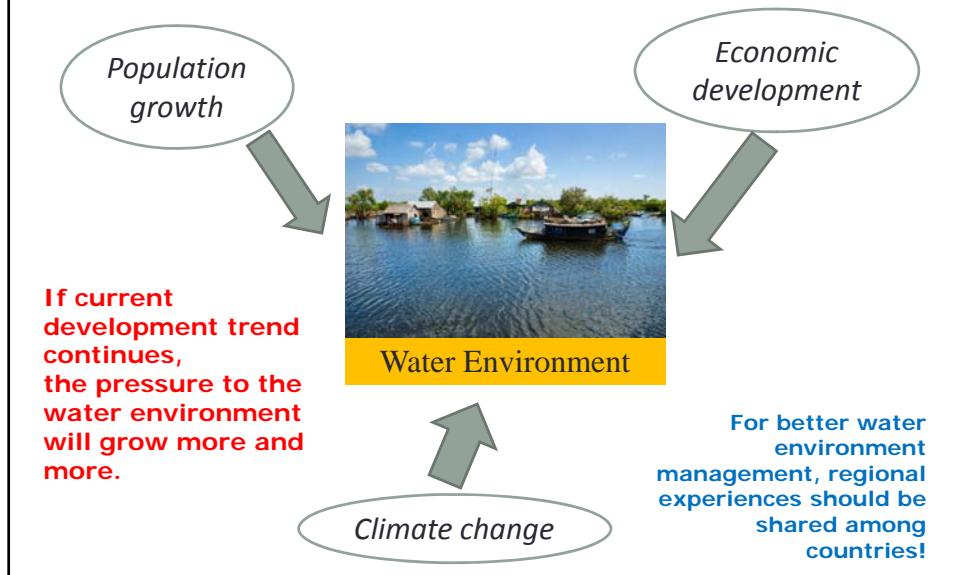
***The State of Water Environment and
its Management in Asian Countries
- from the experience of WEPA***

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27 August 2012, Colombo, Sri Lanka

Today's Presentation

- Water Environment Partnership in Asia (WEPA)
- Glimpse of water quality problems
- The state of water quality monitoring and issues
- Our commitments: Future actions of WEPA

Threats to the water environment



Water Environment Partnership in Asia (WEPA)

- A regional partnership program launched in 2004 by the Ministry of the Environment, Japan;
- Aiming for **sustainable water environment** in the region through **knowledge-sharing** and **capacity development**
- **13 member countries** in Asia (as of 1st March 2012)
- **Sri Lanka** became a member of WEPA since 2009.
- CEA is the focal point of Sri Lanka.



Knowledge-sharing and Capacity Development through WEPA Activities

- WEPA Database as an information platform (policy, technology, NGO activities)
- Annual meeting
- WEPA workshops & symposiums
- WEPA dialogue
- **Sharing good practices and experiences accumulated in Asian region**



WEPA action focuses

1st phase (2004-2008)

Establishment of Network and Knowledge Base Development

2nd phase (2009-2013)

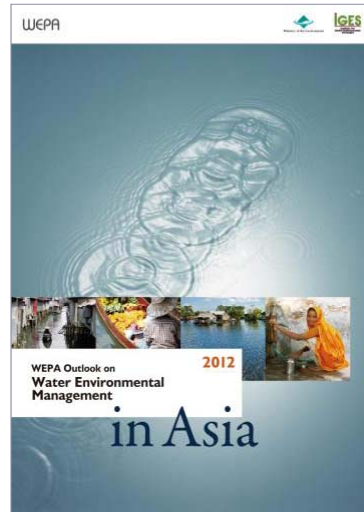
Knowledge Sharing for Solutions (WEPA 2nd phase)

- **2009-11**
 - *Review of Water Environmental Management*
 - *Starting with Two Fields of Topics*
 - *Domestic Wastewater Treatment*
 - *Climate Change and Water Environment*
 - *Identification of **Specific Issues** to be discussed*
- **2012-13**
 - *Experiences Sharing and Knowledge Sharing among Member Countries through **Solution***
 - Findings by:
 - *Workshops, Bilateral meetings, Annual meetings etc.*
 - *Development of Twinning Programs for Capacity Empowerment etc.*



WEPA publication:
WEPA Outlook on Water Environmental Management

- Published every three year (at the timing of World Water Forum)
- Featuring the state of water quality and recent development of water environmental management in partner countries, including Sri Lanka.
- Serving as an archive of water environment and its management in the region.



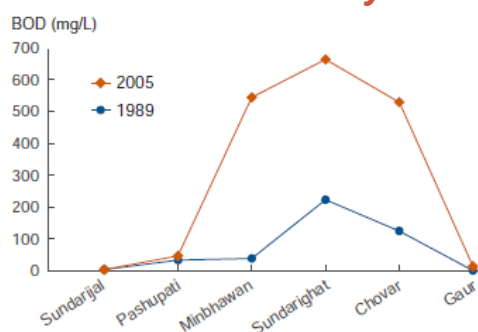
State of water quality in WEPA countries

Specific quality problems identified in the WEPA countries

- ◆ High concentration of COD
- ◆ Eutrophication (water quality degradation in enclosed water bodies)
- ◆ Non-point source pollution
- ◆ Pollution by toxic materials (heavy metal and chemicals)
- ◆ Groundwater quality problems
- ◆ Coastal water quality degradation

- ◆ Increasing pressure from untreated domestic wastewater especially in urban areas

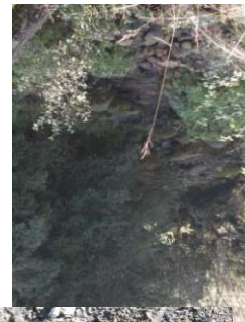
Glimpse of water quality problems State of Water Quality in Nepal



BOD in 5 sites from the headwaters to downstream along the Bagmati River, Nepal.

Water quality in downstream is heavily deteriorated by untreated wastewater.

(WEPA Outlook 2012)



Glimpse of water quality problems

State of Water Quality in Thailand -



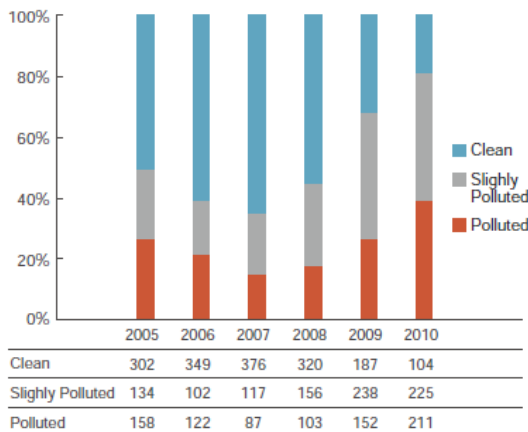
State of river water quality in Thailand (by Water Index)

- ✓ Serious water pollution mainly caused by industrial wastewater has been improved, but water quality has been slightly deteriorated in recent years.
- ✓ **Untreated or insufficiently treated domestic wastewater** is the main contributor to water pollution.

(WEPA Outlook 2012)

Glimpse of water quality problems

State of Water Quality in Malaysia and Thailand



State of river water quality in Malaysia (by BOD sub-index)

- ✓ *Serious water pollution has been improved, but water quality has been slightly deteriorated in recent years.*
- ✓ *Insufficiently treated wastewater from industries is considered to be a reason of the recent deterioration.*
- ✓ *Malaysian government tried to encourage self-regulation by industries, in addition to traditional command and control approach.*

(WEPA Outlook 2012)

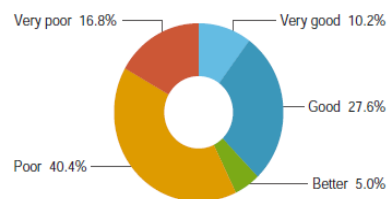
Glimpse of water quality problems

State of Water Quality in China

Type of water bodies	Number of water bodies	Grade					
		I	II	III	IV	V	>V
Three lakes	3	0	0	0	0	1	2
Large freshwater lakes	9	0	0	3	0	3	3
Urban lakes	5	0	0	0	2	1	2
Large reservoirs	9	0	1	5	4	6	10
Total	26	0	1	5	4	6	10
Percentage in 2010	(26)	0	3.8	19.2	15.4	23.1	38.5
Percentage in 2005	(27)	0	7	21	11	18	43

Note: Three lakes refer to Taihu Lake, Dianchi Lake and Chaohu Lake
(Source: 2010 data from MEP 2011a; 2005 data from SEPA 2009)

(above) Monitoring results of major lakes – nearly 40% of lakes is below category V, heavily polluted.



(left) Groundwater monitoring results --- Untreated wastewater from industries and households as well as agricultural activities contributed to groundwater pollution.

Common Challenges :

Some of the Issues identified by WEPA Partner Countries

- 1. Legislation and Organization: Detailed systems and capacity development required in order to implement a legislative framework**
 - Identification of proper paths for a new form of development, leap frog approaches
- 2. Ensuring implementation of proper monitoring and data management**
 - Adequate settings of water quality standards/effluent standards
- 3. Coordination among relevant water organizations and regulations**
 - Partnership among NGOs, GOs and various stakeholders, Cooperation between member countries, etc.
- 4. Water quality management at the basin level**
 - Integrated management, upstream/downstream relations, diversified stakeholders, multiphase problems, long range optimization, etc.

Water quality monitoring-
Measures to ensure implementation and compliance

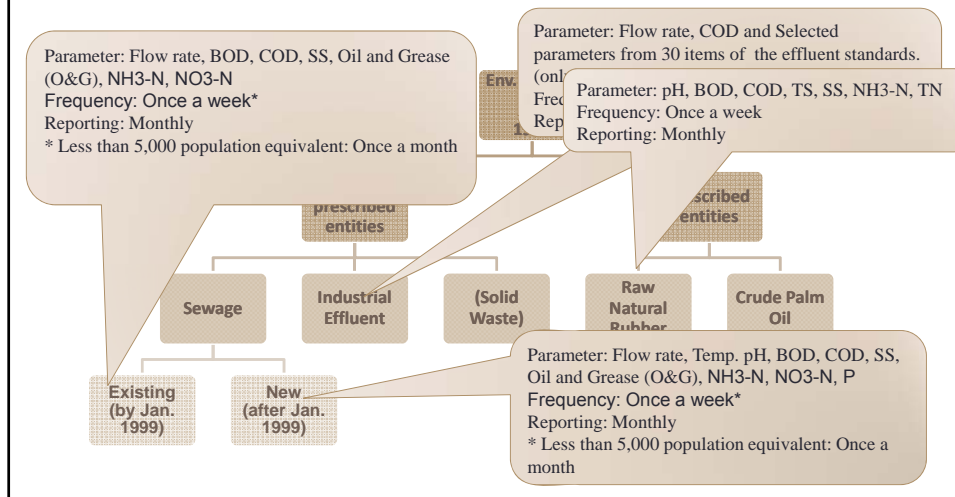
Water quality monitoring – providing a basis for water environmental management

- Ambient water quality monitoring
 - Providing basic information for planning and evaluation
 - Important, but challenge is technical and financial capacity
 - Issues
 - how to monitor water quality in technical and financial capacity?
 - strategic monitoring that incorporates climate concerns (e.g. data for prediction)
- Effluent (wastewater) monitoring
 - Providing essential data for enforcement
 - Could be used for pre-cautional actions or immediate actions against pollution (e.g. accidents)
 - Effluent standards – all WEPA partner countries* have effluent standards
 - Those who discharge effluents should monitor their effluents and report the status to the authorities. → but not implemented always.

** No national standards, but standards are set by Yangon Special City in Myanmar.*

Wastewater monitoring in Malaysia

- Effluent should be monitored by the owner or occupier of a premises by their expenses.
- Basic structure of wastewater management and monitoring requirement
- “Self-regulation” by industries is promoted by government.



Water quality monitoring Efforts made by the partner countries

- Monitoring and reporting
 - Korea: centralized effluent monitoring (using IT)
 - Malaysia, Thailand: on-line reporting system of effluent monitoring results by businesses
 - Japan: both centralized and distributed monitoring and operation systems depending on the size of plants
- Inspections and penalties
 - Penalties of non-compliance of effluent monitoring and recording are strengthened in the past 5 years: Indonesia, Japan and Viet Nam
 - Before penal actions, corrective actions by industries are encouraged by the government in most countries.
- Not only monitoring, but recording and reporting is also important.

Reality of Effluent Monitoring

- **Effluent from industries are not always monitored properly though effluent monitoring is mandated by laws and regulations in almost all countries.**
 - **Difficulties:**
 - in setting effluent standards (*too high value to comply with, too complex*)
 - in identification of industries to be covered (*weak enforcement of registration system*)
 - in awareness of industries (*no incentive to monitor effluents*)
 - in financial arrangements by industries (*no/less investment for monitoring, no temporary support from public sectors*)
 - in submission of monitoring reports (*submission to different authorities, scattering data among different organizations*)
- It is important to identify where the stems of problem exists.

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To promote compliance of industries...

Indonesia: PROPER PROKASHI

Color-ranking environmental performance of industries (gold, green, blue =compliance), red and black (non-compliance)) and disclosure of the results to mass-media.

Viet Nam: Targeted Approach

A plan for “thoroughly handling” establishments that cause serious environmental pollution (The Prime Minister’s Decision No. 64/2003) + Financial assistance for relocation with the Environmental Revolving Fund and the Development Assistance Fund

Malaysia: Performance Monitoring of IETS

Setting technical guideline “daily walk through inspection” of industrial effluent treatment systems (to achieve regulatory compliance by improving performance of treatment systems). Government provide training for officials to do monitoring.

Thailand: Self-help among Industries

An industrial association provide opportunities to help a member company to comply with effluent standards – mutual help among industries

Water quality monitoring in Japan

- Why and how to monitor?
- How to improve water management system?
- How to comply with effluent standards?
 - Equality?
 - Feasibility?

Environmental Water Quality Standards for Rivers

category	water use	standards				
		pH	BOD	SS	DO	CG
AA	Water supply class 1 ; conservation of natural environment, and uses listed in A-E	6.5-8.5	1	25	7.5	50
A	Water supply class 2 ; fishery, class I; bathing and uses listed in B-E	6.5-8.5	2	25	7.5	1,000
B	Water supply class 3 ; fishery, class 2, and uses listed in C-E	6.5-8.5	3	25	5	5,000
C	Fishery class 3 ; industrial water, class I, and uses listed in D-E	6.5-8.5	5	50	5	-
D	Industrial water class 2 ; agricultural water; and uses listed in E	6.0- 8.5	8	100	2	-
E	Industrial water class 3 ; conservation of living environment	6.0-8.5	10	*	2	-

**no floating matters like garbage*

Water Quality Monitoring: Satisfy with EQS?

- Parameters on health
 - more than 1 /month, ca. 4 /day
 - more than 1 day: for all the parameters
 - other days: necessary parameters based on the condition of water pollution and wastewater discharge

- Parameters on living environment
 - points for EQS, important points on water use: more than 1 /month, ca. 4 /day
 - points with little variation in water quality like upstream and offshore may be reduced
 - points with large diurnal variation: 13 /day with 2 hours interval, at least 2 /year

Water Quality Monitoring in Japanese Waters: 2010

Human Health

Number of	river	lakes	estuary	total
Water area	-	-	-	-
Sampling points	4,030	395	1,100	5,525
samples	175,018	17,516	31,611	224,145

BOD/COD

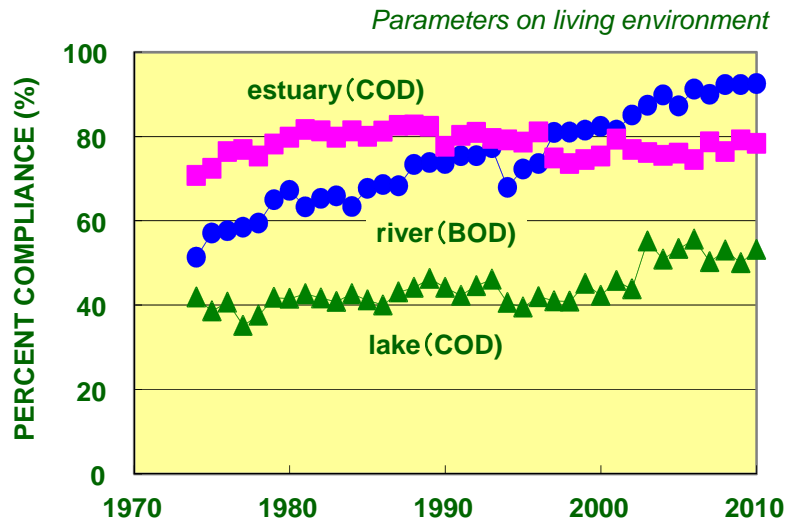
Living Environment

Number of	river	lakes	estuary	total
Water area	2,561	186	590	3,337
Sampling points	4,587	458	2,062	7,107
samples	238,173	37,467	94,016	369,656

T-N/T-P

Number of	river	lakes	estuary	total
Water area	-	117	152	269
Sampling points	-	320	1014	1,334
samples	-	5,857	16,966	22,823

PERCENT COMPLIANCE FOR WAETR QUALITY STANDARDS



Water Quality Standards for Lakes and Reservoirs: T-N, T-P

Category	water use	Standards	
		T-N	T-P
I	Conservation of natural environment, and uses listed in IV	0.1	0.005
II	Water supply classes-I, 2 and 3 (except for special types), fishery class 1, bathing; and uses listed in III-V	0.2	0.01
III	Water supply class-3 (special types), and uses listed in IV-V	0.4	0.03
IV	Fishery class 2, and uses listed in V	0.6	0.05
V	Fishery class 3, industrial water; agricultural water; conservation of living environment	1.0	0.1

NATIONAL MINIMUM EFFLUENT QUALITY STANDARDS

- Regulate all the effluent discharges into public water bodies from the specified facilities (ca. 600 industries).
- Uniform and national minimum criteria for effluent quality
- Parameters
 - Human health : all facilities
 - Living environment : daily discharge > 50 m³
 - Local (prefecture) ordinance

NATIONAL MINIMUM EFFLUENT QUALITY STANDARDS

parameters	standard values
pH	5.8-8.6
BOD, COD	160 (daily average = 120)
SS	200 (daily average = 150)
n-hexane extract	5.0 (mineral oil), 30 (animal fat and vegetable oil)
phenols	5.0
copper	3.0
zinc	5.0
dissolved Fe, Mn	10.0, 10.0
chromium	2.0
fluorine	15
number of C.G.	3,000 (ml ⁻¹ daily average)
nitrogen	120 (daily average = 60)
phosphorus	16 (daily average = 8)

(mg l⁻¹ or less)

MORE STRINGENT STANDARDS

- Local (prefecture) ordinance
 - if the national standards are not enough to satisfy with the environmental water quality standards for a specific water body
- All the prefecture governments have put local standards in force

More Stringent Standards by Shiga Prefectural Governments : T-N, T-P

industry	Daily volume of discharge (m ³)	operating		new	
		T-N	T-P	T-N	T-P
Food (except for box lunch production)	10 - 30	40	8	30	2
	30 - 50	25	4	20	2
	50 - 1,000	20	3	12	1.5
	1,000 -	15	2	10	1
textile	10 - 30	40	6	30	2
	30 - 50	15	2	12	1.2
	50 - 1,000	12	1.5	8	0.8
	1,000 -	10	1	8	0.5
Other production	10 - 30	40	2	20	2
	30 - 50	15	1.5	12	1
	50 - 1,000	12	1.2	8	0.6
	1,000 -	8	0.8	8	0.5
Night soil treatment	10 -	20	2	10	1
Jokaso	10 -	20	5	20	5
Sewage treatment plant	10 - 3,000	20	1	20	0.5
	3,000 -	20	1	15	0.5

EFFLUENT STANDARD FOR N,P

- National Minimum Standard
 - T-N: 120 mg/l (daily max.), 60 mg/l (daily ave.)
 - T-P: 16 mg/l (daily max.), 8 mg/l (daily ave.)
 - daily discharge > 50 m³
 - closed waters with high possibility of eutrophication

- Provisional Standard ← best available technology
 - specified industries: N:55, P:39
 - national minimum in 5 years (1993-1998)

PROVISIONAL STANDARDS FOR FOOD INDUSTRIES

	T-N		T-P	
	max.	ave.	max.	ave.
meat processing	140	70	140	70
dairy products	-	-	30	15
other livestock products	140	70	60	30
fish canning, bottling	440	220	100	50
seaweed processing	180	90	60	30
fish ham/sausage	260	130	160	80
fish paste (boiled)	460	230	320	160
frozen fish products	360	180	140	70
frozen fish processing	460	230	320	160
other fish products	380	190	340	170
soy source and amino acids	480	240	-	-
synthetic seasoning	480	240	-	-
beet sugar refinery	260	130	50	25
fresh cake	-	-	60	30
vegetable oil	-	-	100	50
animal oil	180	90	100	50
grain starch	-	-	30	10
potato starch production	500	250	140	70
tufu/tofu derivatives	-	-	30	15
bean jam	-	-	60	30

REVISION OF THE PROVISIONAL STANDARDS

● PROVISIONAL STANDARDS:

● 1993.10-1998.9

● REVISION I : 1998.10-2003.9

● N: 50 INDUSTRIES → 4 INDUSTRIES

2,851 plants → 115 plants

● P: 34 INDUSTRIES → 3 INDUSTRIES

2,512 plants → 117 plants

● REVISION II : 2003.10-2008.9

2nd (2003.10-2008.9) and 3rd (2008.10-2013.9) REVISIONS OF THE PROVISIONAL STANDARDS

● N: 6 INDUSTRIES

● Natural Gas : 200 (180) → 170 (150) → 160 (150) → 160 (150)

● Feedlot : 270 (350) → 260 (200) → 190 (150) → 190 (150)

● Silver Oxide : 560 (370) → 350 (300) → 240 (210) → remove

● Cobalt Oxide: → 1100(880) → 900(750) → 550(300)

● Lead Chromate Paint : → 1,500(1,000) → 1,300 (950) → remove

● Vanadium & Molybdenum Compounds :

26,000 (17,000) → 8,000 (6,000) → 6,000 (5,000) → 5,000(3850)

● P: 2 INDUSTRIES

● Feedlot : 100 (50) → 50 (40) → 30 (24) → 30 (24)

● Phosphorus and Compounds : 640 (280) → 90 (40) → 40 (10) → 40 (10)

Most WEPA partner countries have already set up the basic framework of water environmental management.
(e.g. framework laws/regulations; standard setting; non-compliance measures, etc.)

However, water pollution is still critical problems in many areas, especially urban areas.

How to develop/elaborate implementation scheme should be a key for the improvement of the water environment.

A key point for
2012-2013
WEPA activities

Time for Q & A

