

JUNBA2009

Integrated Management Technologies for Environment in River-Lake Basin

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**Marriott San Francisco Airport
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Kiyoshi Yamada

- Director, Research Center for Lake Biwa Environment, Ritsumeikan University
- Director, Science Museum for Water Environment in Shiga
- Chairman, JSWE Research Committee on Nonpoint Pollutant
- Vice Chairman, IWA Specialist group on Diffuse Pollution

Lake Biwa

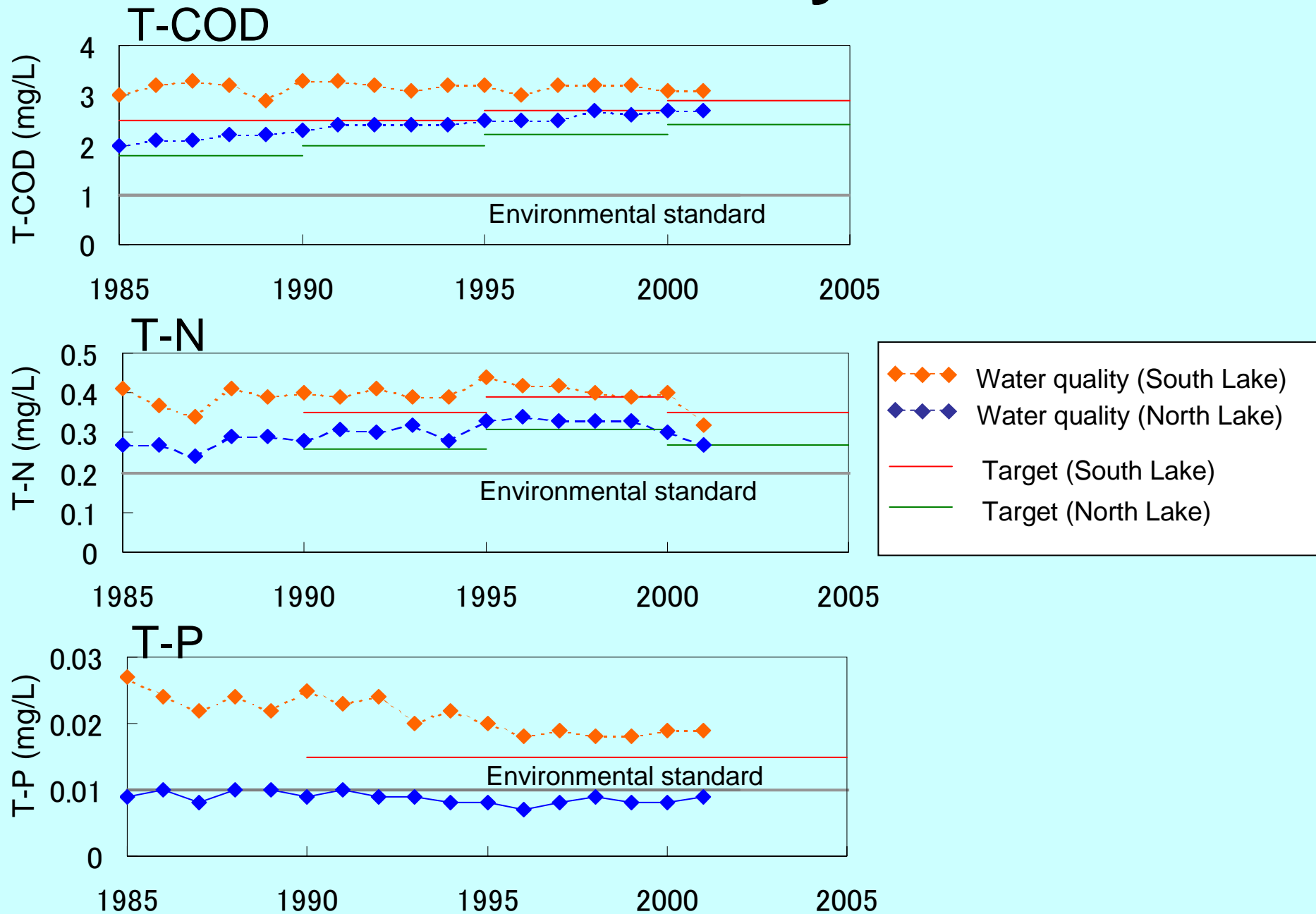


Lake Biwa – Yodo River Basin

Lake Sub-basin	North Lake	South Lake
Surface Area	616 km ²	58 km ²
Drainage Basin Area	3,174 km ²	
Volume	27.3 km ³	0.2 km ³
Maximum Depth	103.6 m	8 m
Average Depth	44 m	3.5 m
Residence Time	5.5 yr	0.04 yr
Population (Shiga)	1.3 million	
Population Density	378 persons/km ²	

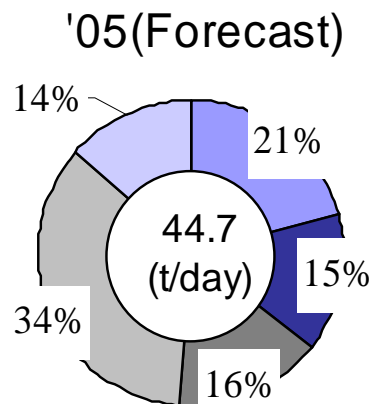
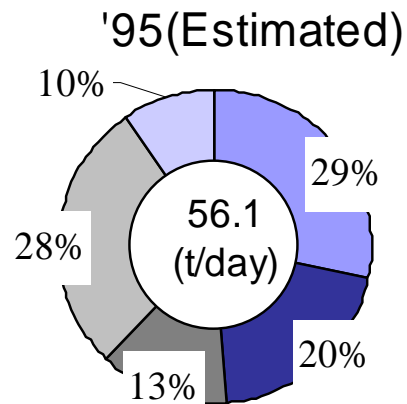


Trends of Water Quality in Lake Biwa

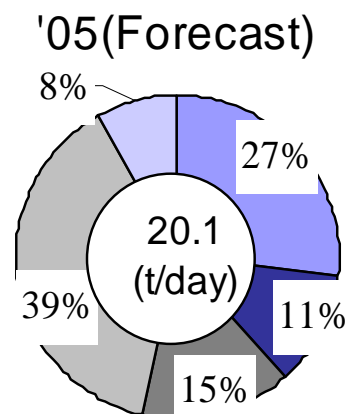
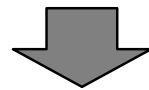
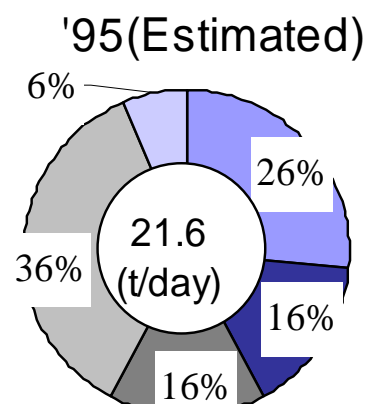


Pollutant Load to Lake Biwa

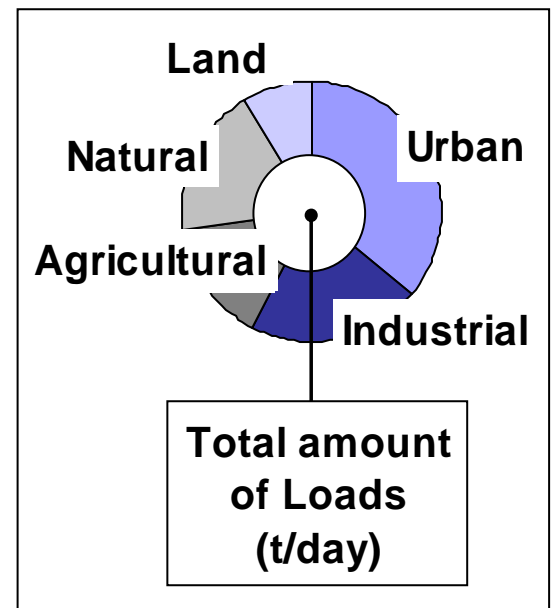
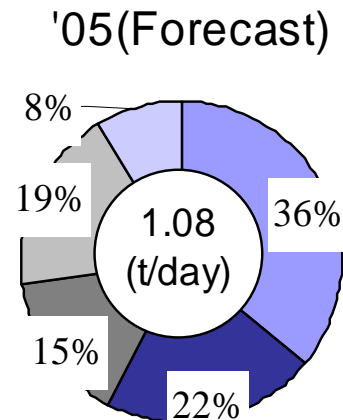
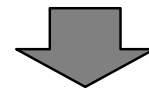
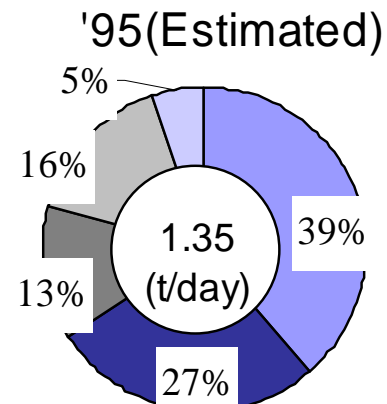
COD



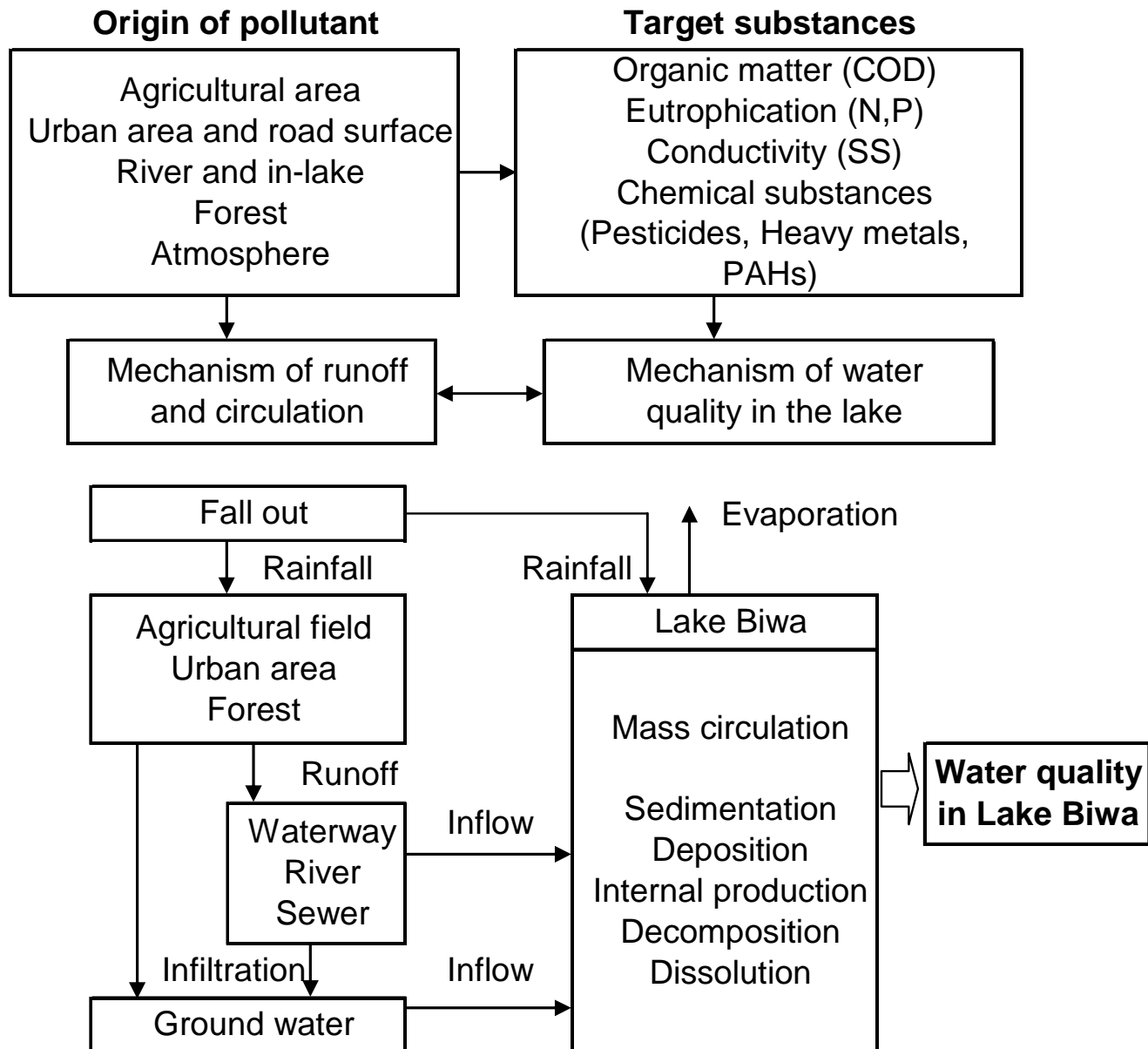
T-N



T-P



Mechanism of Diffuse Pollution



Introduction to Research for Environment at Ritsumeikan



*Research Group on
Environmental Engineering
Department of
Environmental Systems Engineering
Faculty of Science and Engineering
Ritsumeikan University*

立命館大学理工学部
環境システム工学科
環境工学グループ

Research Group on Environmental Engineering

Department staffs in are collaborating in teaching and studying activities on environmental engineering subjects.



- Chair Prof. Kiyoshi Yamada Environmental Planning
- Prof. Jun Nakajima Water Environmental Engineering
- Prof. Koji Amano Environmental Systems
- Prof. Naoyuki Kamiko Hygiene Engineering
- Prof. Atsushi Ichiki Environmental Policy
- Assoc. Prof. Takashi Higuchi Atmosphere Environmental Engineering
- Lecturer Victor Muhandiki Environmental International Cooperation

Activities in Environmental Engineering

River and Lake Basin Management

Wastewater Treatment

Air Pollution Control

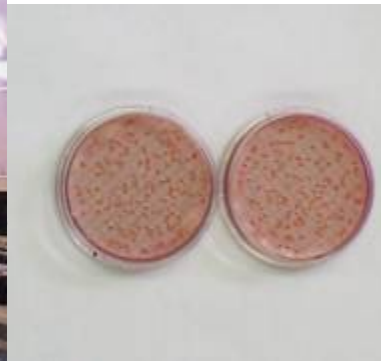
Pollutant Runoff Control

Solid Waste Management

Life Cycle Assessment

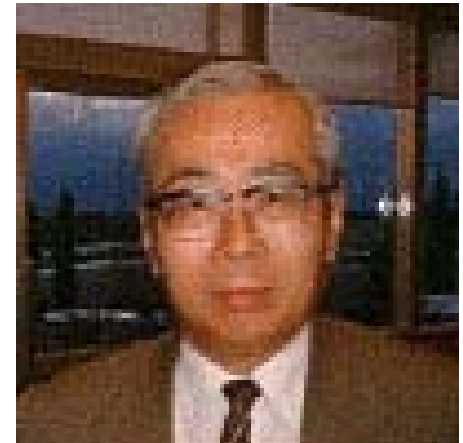
Evaluation of International Cooperation

Urban and Regional Planning



Examples of the study themes (Prof. Yamada)

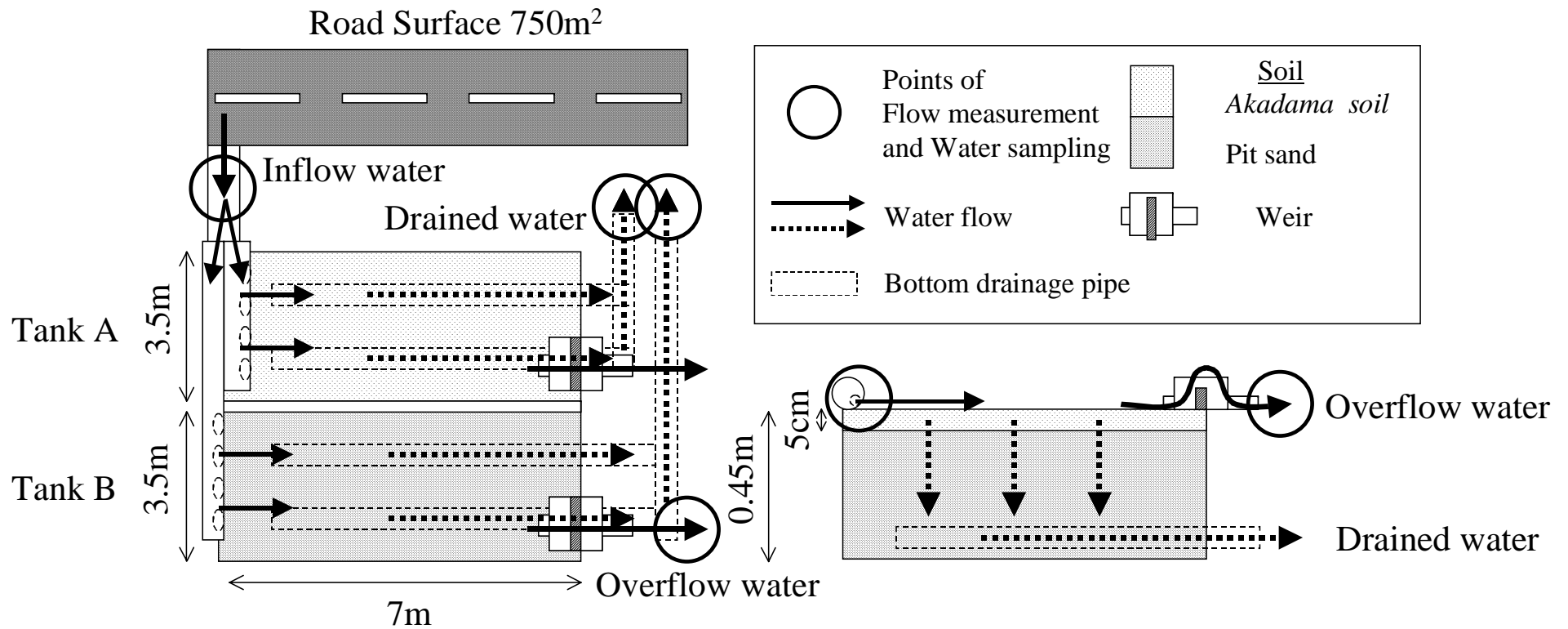
- Urban diffuse pollution analysis
- Urban BMPs
(Diffuse pollution and its control)
- Water demand prediction for water supply
(Urbanized/urbanizing areas)
- Evaluation of international cooperation projects
(Developed/developing countries)



Example-1: Pilot Study on Soil Purification Facility for Runoff from Road Surface



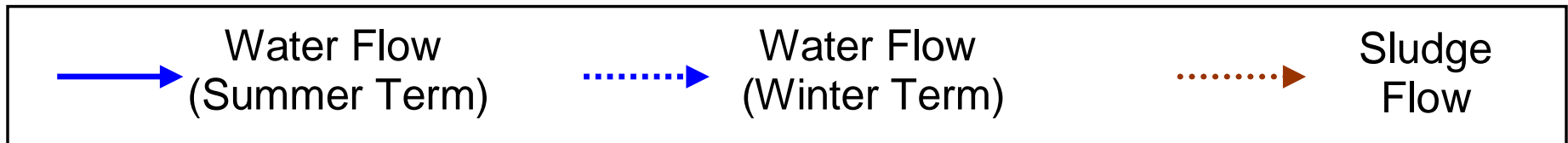
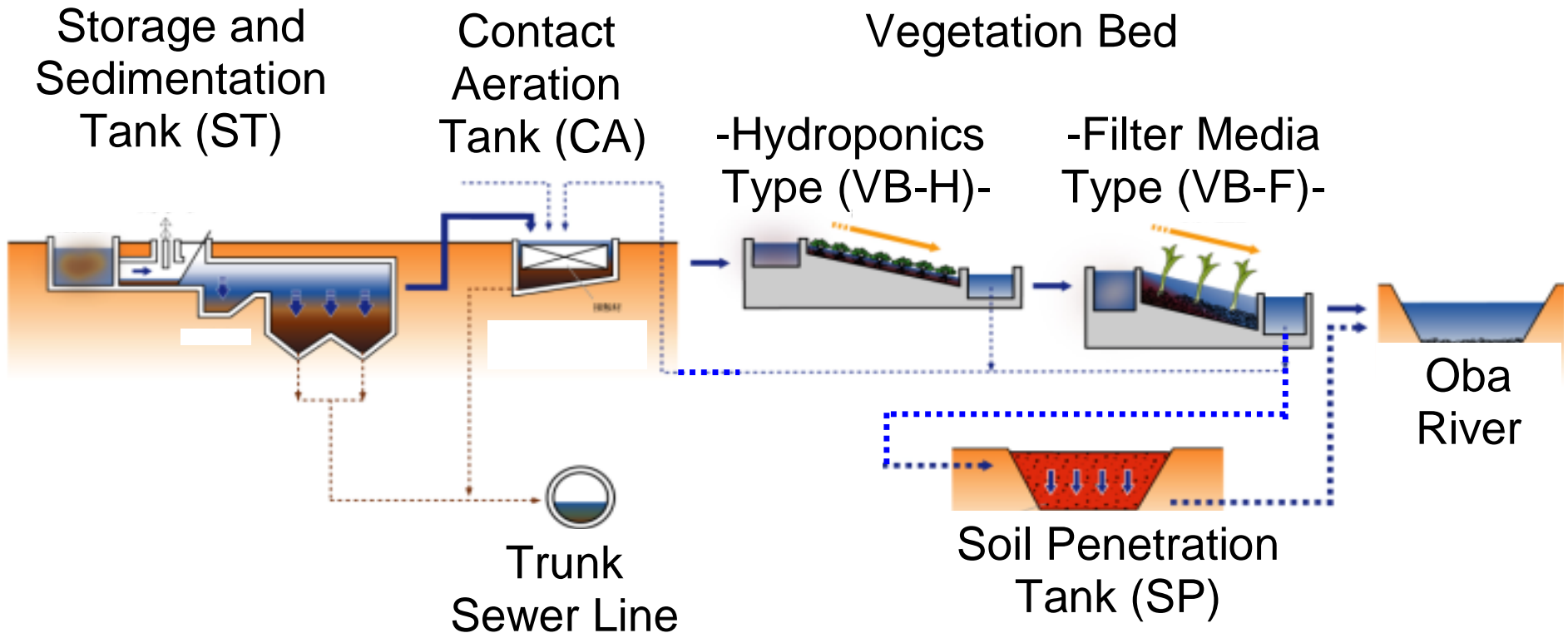
Example-1: Outline of Facility



Example-2: Evaluation of Treatment Facility for Stormwater from an Urban Area



Example-2: Outline of Facility



Example-3: Study on Restoration Technique for Reed Communities on Lake Biwa Shore



Examples of the study themes (Prof. Nakajima)

- *Advanced wastewater treatment*
- *Small-scale on-site treatment of domestic wastewater (Johkasou system)*
- *Disinfection method applicable to small-scale on-site type water treatment facilities*
- *New methodology for estimation of wastewater treatment performances*
- *Arsenic removal from ground water*



Individual house type Johkasou (anaerobic filter-contact aeration process)




Examples of the study themes (Prof. Amano)

- Environmental load analysis through material life cycle
(estimation of CO₂ production and energy consumption)
(electrical products, housings, wood and lumber, food, etc.)
- Reduce of amount of domestic solid wastes
(effect of introducing measures in local governments)
- Estimation of environmental activities by LCA
(biomass energy, sewage treatment, etc.)
- Analysis for scattered waste on road
(methodology for measurement and behavior)
- Analysis of water quality monitoring data in Lake Biwa
(application to data from the automatic measuring system)



Examples of the study themes (Prof. Kamiko)

Range of treatability in WTP;

	SS	pathogens	Crypto
Rapid filtration	○		
Chlorination		○	
Membrane filtration	○	○	○
Alternative disinfection		○	○

Examples of UV disinfection reactors:



Examples of the study themes (Prof. Ichiki)

- Diffuse pollution analysis in lake basin
(from urban area and rural paddy field)
- Behavior of micro pollutants in urban areas
(PAHs from city road and highway)
- Characteristics of pollutants falling from atmosphere
(behavior through source – gas – water)
- Pollutant runoff in urban drainage
(evaluation using bioassay)
- Agricultural pollutant runoff from paddy field area
(nitrogen and phosphorus behavior)
- Development of support system for management of
pollutant runoff
(application of GIS)



Examples of the study themes (Prof. Higuchi)

- Biofiltration of Gaseous Pollutants

Biofiltration is...

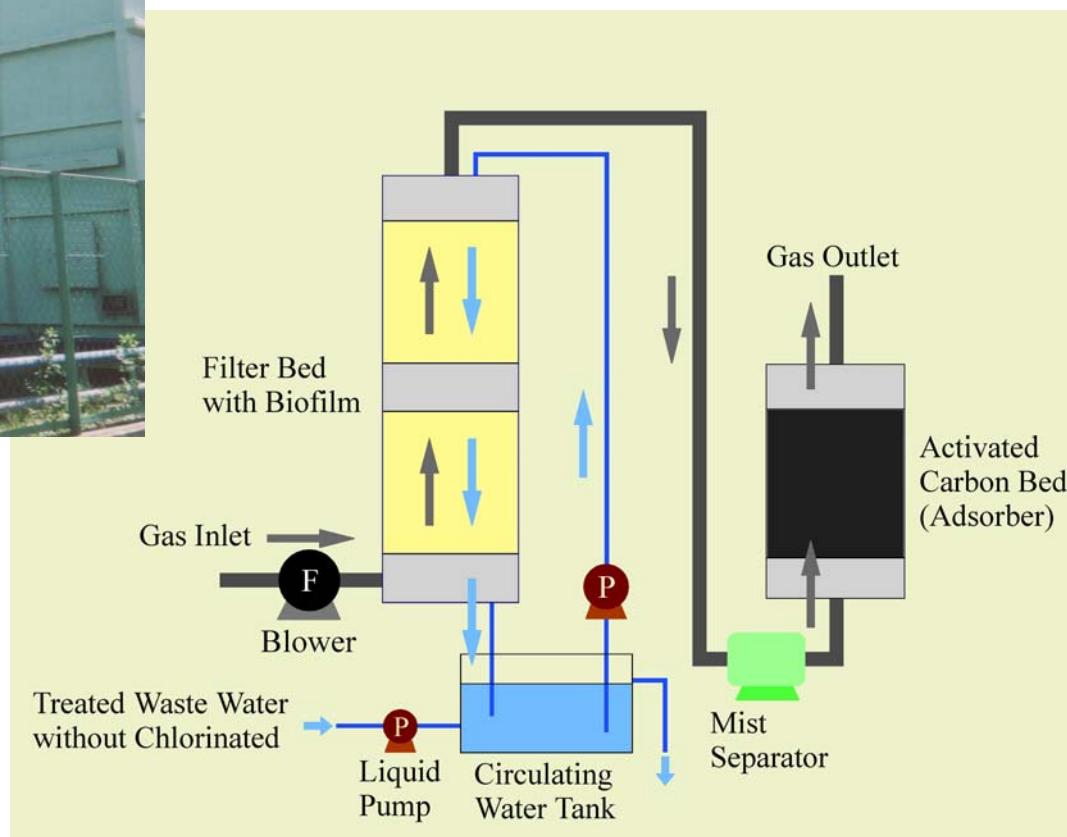
Method or equipment which treat air pollutants or gaseous odorants by passing through microbe-adhering filters

- Development of a Biological Treatment System for Gaseous VOCs



バイオフィльтраレーション装置(生物脱臭装置)の典型的構造

Typical Structure of Biofiltration Equipment (Biological Deodorizer)



Examples of the study themes (Dr. Muhandiki)

- Evaluation of international cooperation projects
(Developed/developing countries)
 - In cooperation with Prof. Yamada
- Integrated Lake Basin Management (ILBM)
(where we are and where we are going)



Thank you very much.