

Contacts

WaSH-Mia / SATREPS Office

Water Resource Engineering Program, 2nd FL, G-block,
Institute of Engineering, Tribhuvan University, Pulchowk, Lalitpur, Nepal
TEL: +977-1-5545368
<https://www.jica.go.jp/project/english/nepal/008/index.html>

University of Yamanashi

International Research Center for River Basin Environment
4-3-11 Takeda, Kofu Yamanashi 400-8510 Japan
e-mail: coe@yamanashi.ac.jp
https://www.facebook.com/ICRE.UY?_rdc=1&_rdr

JICA Nepal Office

National Life Insurance (NLIC) Building, 3rd Floor, Lazimpat, Kathmandu, Nepal
(PO Box 450, Kathmandu, Nepal)
<http://www.facebook.com/jicanepal>
<http://www.jica.go.jp/nepal/english>

(Oct. 2017)



The Project for

HYDRO-MICROBIOLOGICAL APPROACH FOR WATER SECURITY IN KATHMANDU VALLEY, NEPAL

WaSH-Mia / SATREPS



Background

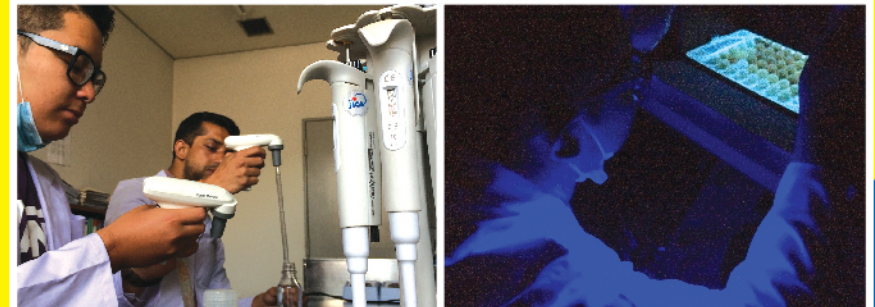
Water security is considered as one of the 21st century challenges for science and society, and for Kathmandu Valley where water supply in quantity and quality has not been adequate due to high water demand, water contamination and so on, caused by population growth and industrialization etc.

Through the various activities for achieving the project purpose, the project aims to understand status of water environment in the valley, develop locally-fitted biological-based water treatment technology and low-energy & low-cost water supply systems, and also envisages establishing a common ground of water security among stakeholders in the valley so that it becomes a Kathmandu model replicable to growing urban settlements of developing countries.

The project formation

In the project, five working groups have been formed and performing their tasks.

Working group 1, 2 and 3 carry out comprehensive evaluation of water-quantity, water-quality and microbial contamination respectively in order to elaborate water security maps of those aspects that will be finally combined as an integrated water security map to be used for identifying high priority areas for installing water treatment systems.



Project for Hydro - microbiological Approach for Water Security in Kathmandu Valley, Nepal (WaSH - Mia/SATREPS)

Project Purpose

Management system on potable water resources - shallow and deep groundwater, and surface and rain water - is enhanced.

Output 1

Potable water resources situation, including water demand, consumption and supply in Kathmandu Valley, is studied and future forecast is predicted.

Working Group 1:

1. To collect data (population, industrial distribution, land use etc) and predict the potential water demand.
2. To collect and organize the data of natural environment, (hydro -meteorology, terrain, geology).
3. To estimate spatial and temporal distribution of water resources and the long term variation trends.
4. To elaborate a water security map of potable water resources (water demand, water supply, consumption).
5. To investigate alternative techniques to utilize water resources (rainwater recharge/harvesting etc.).

Output 2

Water pollution situation of shallow and deep groundwater and surface and rain water is studied.

Working Group 2:

1. To investigate water quality (tap/well/ tanker /bottled/ground/river water).
2. To identify the sources, spatial and temporal variation of water pollutants.
3. To elaborate a water security map of water quality including 5 factors: ammonium nitrogen, nitrate nitrogen, iron, nitrate - nitrogen stable isotopes, and ammonium -nitrogen isotope.
4. To investigate the water quality factors which affect water treatment performance.

Output 3

Microbiological situation of shallow and deep groundwater, and surface and rain water in Kathmandu Valley are studied.

Working Group 3:

1. To investigate indicator microorganisms (E.coli, etc.) and waterborne pathogens in environmental water (tap/tanker/bottled/ground/river water).
2. To estimate the sources and dynamics of waterborne pathogens.
3. To elaborate a water security map of microorganisms (indicator bacteria, waterborne protozoa, bacteria, and viruses).
4. To investigate the distribution of beneficial bacteria for water purification.
5. To elaborate a water security map of waterborne infections.

Output 4

Appropriate locally-fitted, compact and distributed water treatment system (LCD) for ground / surface water in Kathmandu valley is developed.

Working Group 4:

1. To research and develop prototype dropping nitrification system coupled with multi denitrification bio-film systems (hydrogen oxidizing denitrification and ANAMMOX).
2. To research and develop prototype enhanced constructed wetland system.
3. To research and develop the prototype sponge tray water treatment system and sand filtration system.
4. To install demonstration LCD water treatment systems and investigate their performances.
5. To improve the LCD water treatment systems.

Output 5

Social and economic evaluation of the LCD water treatment system installation in Kathmandu valley is studied.

Working Group 5:

1. To investigate a present situation of the conventional water treatment facilities in KTM.
2. To quantify an improvement of water safety, resulted from the LCD installation.
3. To identify social and economic issues on installation and implementation of the LCD in KTM.
4. To develop and formalize strategies on introduction of the LCD.
5. To assess an improvement of water safety and its ripple effects, by the LCD introduction in KTM.

Output 6

A task force to enhance the social implementation is organized.

1. To invite Nepalese researcher(s) from each working group and related governmental section(s) to organize the task force.
2. To elaborate an integrate water security map on water supply/demand balance, gap between water supply and consumption, pollution source-related information of nitrogen compounds and pathogens, waterborne infection risk, and water stress of local people.
3. To make up a proposal elaborating decision making process.
4. To organize the on-site collaboration and training programs in Japan to foster researchers and staffs for sustainability of the Project.

The project period: May 2014 to October 2019

The project organization

Project Director : Dean of IOE/ Tribhuvan Univ
Project Manager : Prof. F. Kazama, Univ. of Yamanashi
Prof. N.M. Shakya, IOE/ Tribhuvan Univ

Main Implementing bodies:

Japanese side : JICA, JST, UY
Nepalese side : TU (IOE, IOM, CDG), MoWSS, KVWSMB, KUKL, AITM
Partners in Nepal : CREEW, SEN

About SATREPS

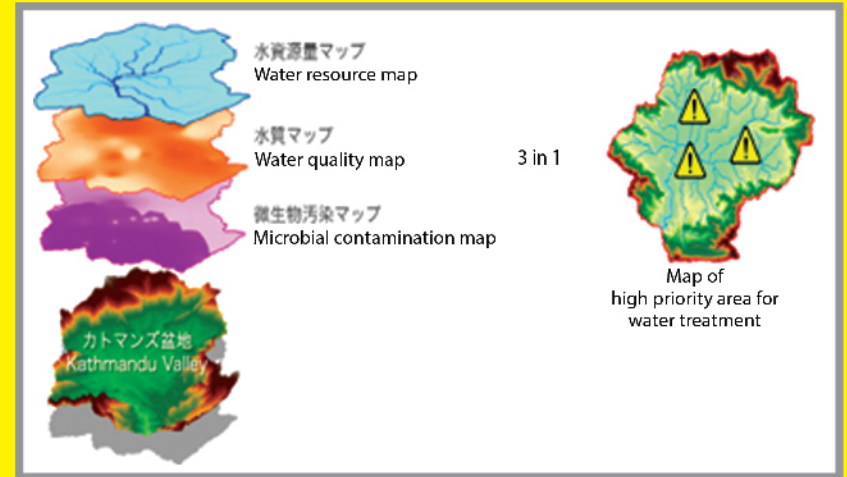
This project is built on research relationship between Univ. of Yamanashi and Tribhuvan Univ., and first ever project implemented in Nepal as SATREPS (Science and Technology Research Partnership for Sustainable Development), which is a Japanese



government program that promotes international joint research. The program is structured as collaboration between the Japan Science and Technology Agency (JST) and the Japan International Cooperation Agency (JICA). Based on the



needs of developing countries, the program aims to address global issues and lead to research outcomes for practical benefit to both local and global society.



The water treatment research group (working group 4) works on developing “Locally-fitted, compact and distributed water treatment system (LCD)” to which some key technologies, such as dropping nitrification coupled with denitrification bio-film, and sponge tray are applied. LCDs are installed in some selected areas in Kathmandu valley for demonstrations.

Working group 5, a socio-economic assessment research group, analyzes impacts of the LCDs application to the communities, quantify an improvement on water security derived from LCD and draw up a strategy on introduction of LCD in Kathmandu valley.



Besides the working groups, a task force comprising members from the five working groups acts to interlink each working group in order to promote on-site collaborations, training programs and materializing

outcomes e.g. an integrated water security map.