



Project: GRANDE
“Glacier Retreat impact Assessment and
National Policy Development”

BOLIVIA - JAPON
2010 - 2015

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(Santiago , Septiembre 2015)

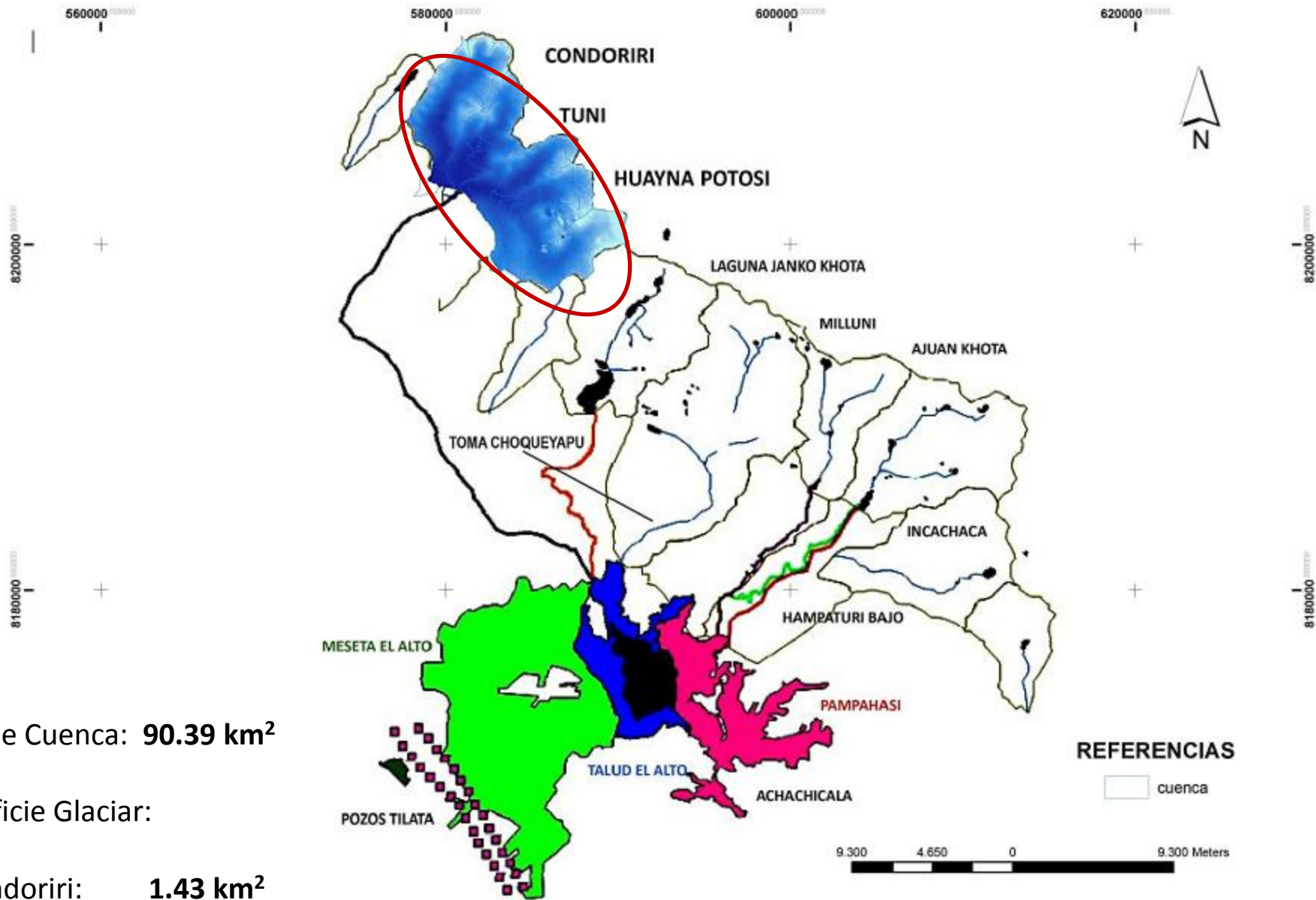


Figura 1: Ubicación geográfica del área de estudio

Fuente: Elaboración propia con datos de EPSAS, IHH

Area de Cuenca: **90.39 km²**

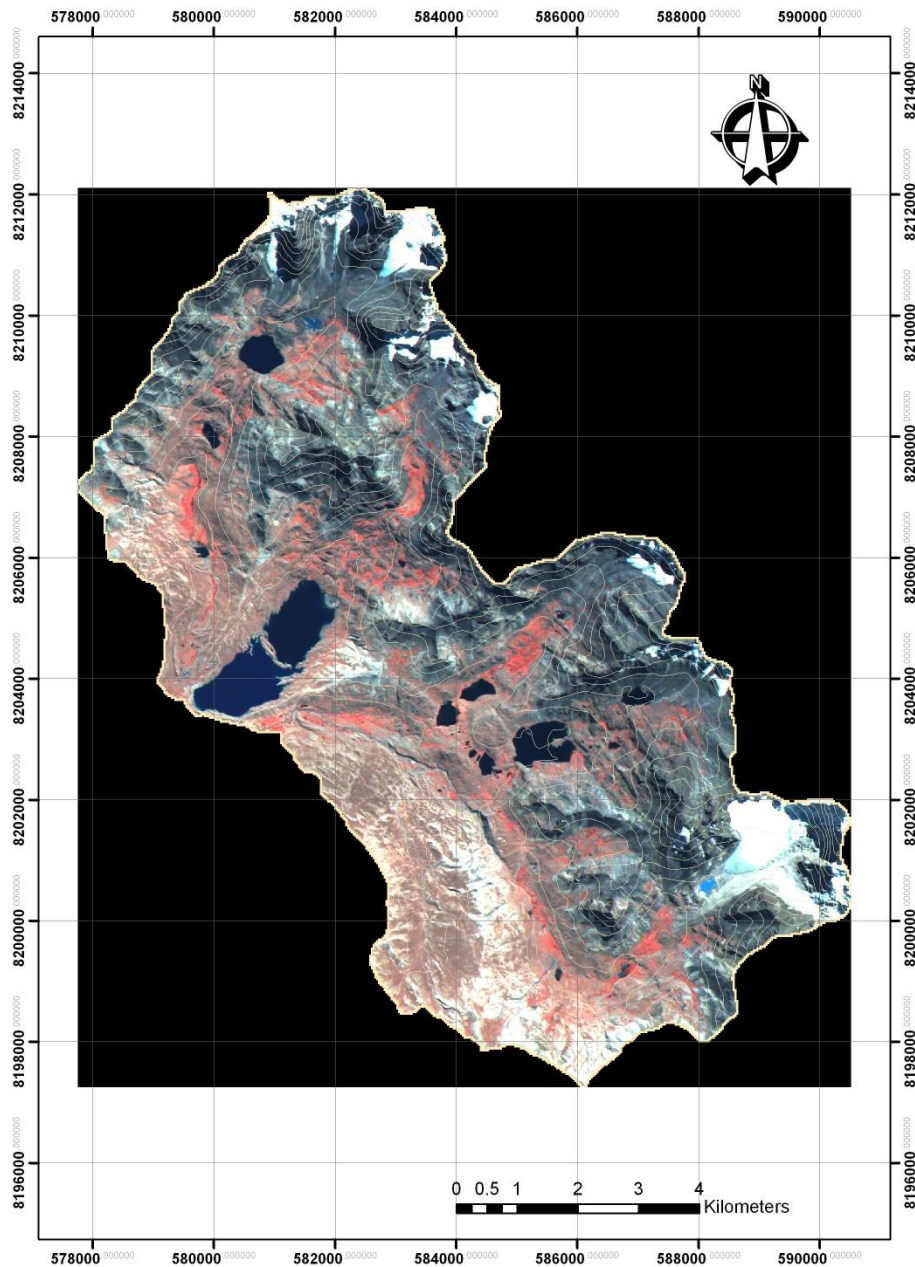
Superficie Glaciar:

Condoriri: **1.43 km²**

Tuni: **0.56 km²**

Huayna Oeste: **1.78 km²**

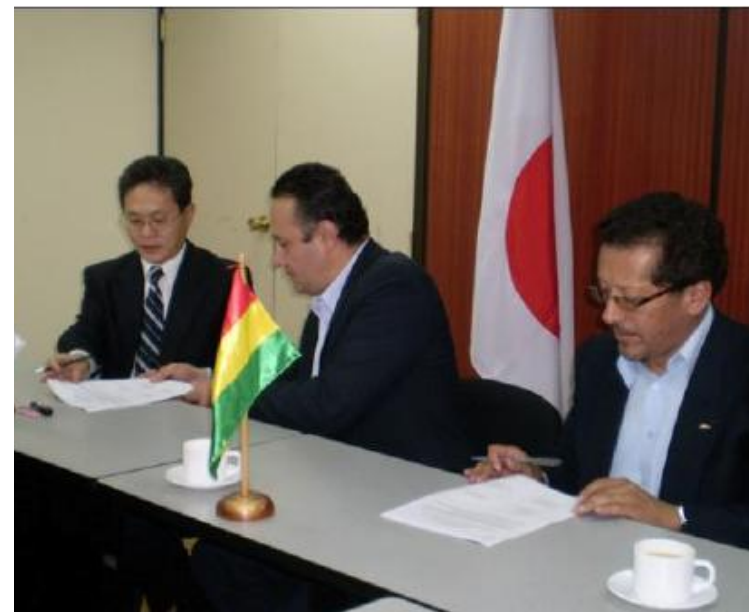
CUENCA: CONDORIRI-TUNI-HUAYNA OESTE



Proyecto GRANDE

Glacier Retreat Adaptation for
National Policy Development

2010 - 2015



OBJECTIVES OF THE PROJECT



Development of a support system for the formulation of strategies for water resources management under climate change scenarios, in the cities of La Paz and El Alto.

Project Framework

Group1
Glacier

Group2
Runoff

Group3
Sediment

Group4
Water
Quality

Group5
Water Management



Universidad Mayor de San Andres
Instituto de Hidraulica y Hidrologia (IHH)
Instituto de Ingenieria Sanitaria y ambiental (IIS)

M.Sc & Ph.D. students, Researchers



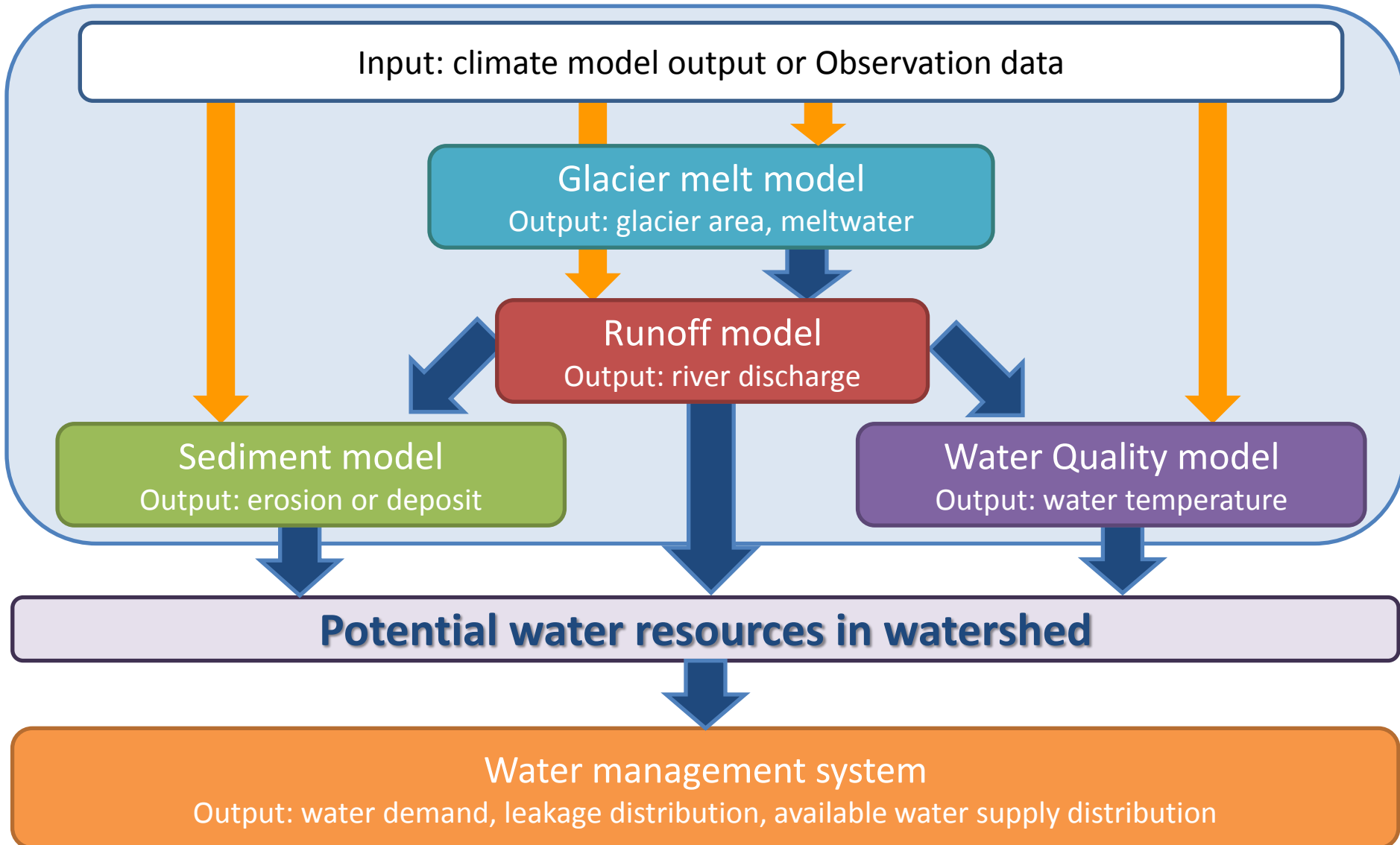
Tohoku University
Department of Civil Engineering
Department of Geophysics
International Research institute of Disaster Science

Tokyo Institute of
Technology

Fukushima
University

Nihon
University

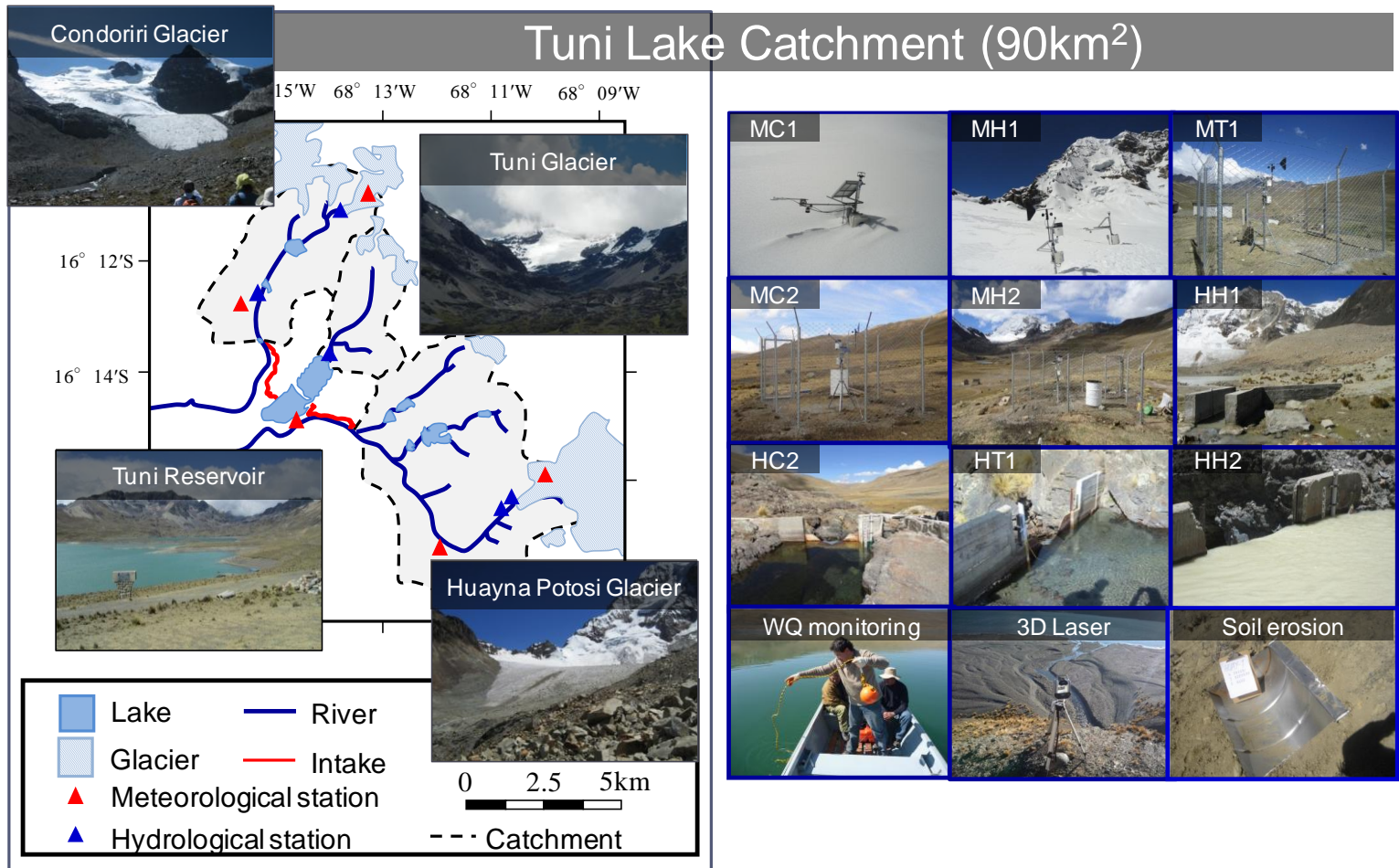
Framework of water resources model



Achievements and results of the “GRANDE” project

Equipment:

A monitoring system of the basin mainly on glaciers:
Condoriri Tuni and Huayna Potosi; with meteorological
observations and flow observations points.



Achievements and results of the “GRANDE” project

Simulation Models and user guides:

- 1 Glaciological modified degree-day model
- 1 Glaciological energy balance model
- 1 Runoff and water balance model
- 1 Erosion and sediment transport model
- 1 Water quality in reservoirs model
- 1 Integrated water resources management.



Bolivian students trained in Japan:

- 6 M.Sc
- 2 Ph.D.

1 F. Ledezma



2 V. Moya



3 P. Fuchs



4 E. Humerez



5 G. Leonardini



6 G. Ledezma



7 G. Ticona



8 F. Mercado



Achievements and results of the “GRANDE” project

Japanese students

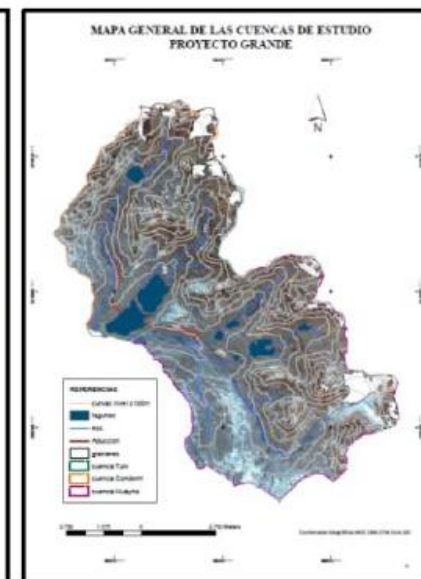
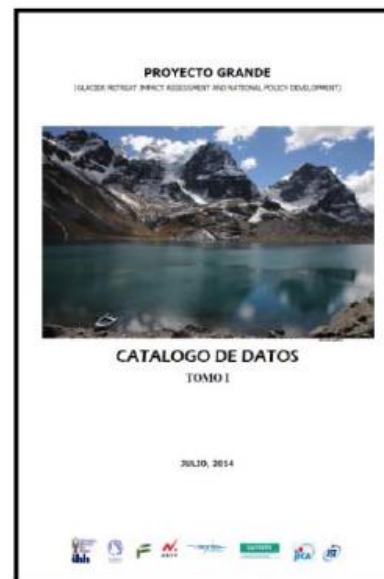


Achievements and results of the “GRANDE” project

Activity Report

GRANDE Data Catalogue

GRANDE project published data catalog version 1 in July, 2014. This catalog illustrates study area, and meteorological, hydrological and water quality data measured in GRANDE project. These data were very valuable to understand climate change effect in Andean mountains as well as model development for water resources management. In addition, we are discussing more useful ways to use data with Bolivian government and water-related company. Version 2 are also going to be published in February, 2015.



Achievements and results of the “GRANDE” project

GRANDE Water Resources Platform

On October 27, 2014, UMSA and MMAyA signed an agreement on establishment of GRANDE Water Resources Platform. This platform provides opportunity to share scientific knowledge of climate change impact and discuss adaptation of water resources management among university, government, water-related company and development aid agency.

On December 1, second meeting of GRANDE platform was held at IIS-UMSA and members were MMAyA, UMSA, Tohoku University, SENAMHI, EPSAS, Municipal Government of La Paz, El Alto Municipal Government, JICA, World Bank and the Inter-American Development Bank attend meeting. Platform is planning to apply outcome of GRANDE in water management.



Photo: Platform meeting on December 1, 2014

Training in Japan for bolivian decision makers



Photo: Lecture of sewage treatment with artificial wetland by Dr. Nakano



Photo: Operation space at Sichigashuku dam



Photo: Nanbuyama water treatment plant




Photo: Tasting drinking water produced by Nanbuyama water treatment plant

CONCLUSIONES

- La disponibilidad de agua depende del equilibrio entre la **OFERTA** (lluvia + fusión de glaciér) y la **DEMANDA** (Consumo de agua en sus diferentes usos).
- Los modelos de clima muestran una clara tendencia de *incremento de temperatura* pero aun se tiene demasiada incertidumbre con la precipitación (fluctuación de **-11% hasta +15%**).
- En las próximas tres décadas la superficie glaciér en la cuenca Tuni perderá de **45 a 60%** y el agua de fusión glaciér disminuirá de **25 a 45%** respecto al periodo actual.
- Bajo las condiciones actuales, la contribución proyectada del agua de fusión glaciér al embalse Tuni es de **10-20%** del volumen total.
- Un incremento en las tasas de precipitación en el futuro puede compensar la pérdida por aporte glaciér.
- El peor escenario se daría en una situación de *incremento de temperatura* y una **disminución de las precipitaciones** (lluvias), lo que podría provocar una reducción del aporte de agua al sistema en un **40%**, poniendo en riesgo un normal abastecimiento de agua.

Thank you for your attention

 GRANDE International Symposium, JST/JICA SATREPS  
October 20, 2012, Tohoku University

