

NATIONAL REPORT ON IHP-RELATED ACTIVITIES

Japan

Various activities of UNESCO have been implemented under the support of the Japanese National Commission for UNESCO with financial contribution in the form of Fund-in-Trust (JFIT) for the Promotion of Science for the Sustainable Development. Japanese National Commission for UNESCO has discussed and made proposal on “Sustainability Science” which is a scientific concept as the integrated approach to build a truly sustainable society. At the occasion of 36th General Conference in November 2011, Japan has submitted a proposal on “Sustainability Science” to UNESCO (see Annex I). This concept contributes to the International Hydrological Programme (IHP) of UNESCO from the view of promoting sustainable development and sustainability science within the framework of UN Decade of Education for Sustainable Development 2005 - 2014 (DESD). Based on this concept, Japanese National Committee for IHP of UNESCO is expected to solve complex global challenges through following activities with a cross-cutting approach in collaboration with all the studies including social and human sciences, in addition to changing value. The following summary includes the activities of Japanese National Committee for IHP of UNESCO undertaken during July 2010 to May 2012.

1. ACTIVITIES UNDERTAKEN IN THE PERIOD JULY 2010 – MAY 2012

1.1 Meetings of the IHP National Committee

1.1.1 Decisions regarding the composition of the IHP National Committee

The composition of the Japanese IHP National Committee is as follows:

Members of the IHP National Committee as of May 2012.

	Name	Position	E-mail
Chair *	TAKARA Kaoru	Prof., DPRI, Kyoto Univ.	takara.kaoru.7v@kyoto-u.ac.jp
*	UEMATSU Mitsuo	Director and Prof., CICAORI, Univ. of Tokyo.	uematsu@aori.u-tokyo.ac.jp
*	SUZUKI Kunio	President, Yokohama National Univ.	k-suzuki@ynu.ac.jp
	OKI Taikan	Prof., IIS, Univ. of Tokyo	taikan@iis.u-tokyo.ac.jp
	KAWAMURA Akira	Prof., Tokyo Metropolitan Univ.	kawamura@c.metro-u.ac.jp
	KOIKE Toshio	Prof., Univ. of Tokyo	tkoike@hydra.t.u-tokyo.ac.jp
	SHIMIZU Yoshihisa	Prof., Kyoto Univ.	shimizu@biwa.eqc.kyoto-u.ac.jp
	TACHIKAWA Yasuto	Assoc. Prof., Kyoto Univ.	tachikawa@hywr.kuciv.kyoto-u.ac.jp
	TANAKA Shigenobu	Deputy Director, ICHARM	s_tanaka@pwri.go.jp
	TANIGUCHI Makoto	Prof., RIHN	makoto@chikyu.ac.jp
	TSUJIMURA Maki	Prof., Univ. of Tsukuba	mktsuji@geoenv.tsukuba.ac.jp
	NAKAMURA Kenji	Prof., HyARC, Nagoya Univ.	nakamura@hyarc.nagoya-u.ac.jp
	NAKAYAMA Mikiyasu	Prof., Univ. of Tokyo	nakayama@k.u-tokyo.ac.jp
	HORI Tomoharu	Prof., WRRRC, DPRI, Kyoto Univ.	hori.tomoharu.3w@kyoto-u.ac.jp
	WATANABE Tsugihiko	Prof., RIHN	nabe@chikyu.ac.jp

Notes:

- * Member of the Japanese National Commission for UNESCO;
- CICAORI: Center for International Collaboration, Atmosphere and Ocean Research Institute;
- DPRI: Disaster Prevention Research Institute, Kyoto University;
- HyARC: Hydrospheric Atmospheric Research Center, Nagoya University;
- ICHARM: The International Centre for Water Hazard and Risk Management (UNESCO Category II Centre);
- IIS: Institute for Industrial Sciences, University of Tokyo;
- RIHN: Research Institute for Humanity and Nature; and
- WRRRC: Water Resources Research Center.

Secretariat of the Japanese National Committee for IHP, UNESCO:

c/o Ms. HORIO Taka

Japanese National Commission for UNESCO,

Ministry of Education, Culture, Sports, Science and Technology (MEXT)

3-2-2 Kasumigaseki, Chiyoda-ku, Tokyo 100-8959, Japan

E-mail: “Natcom Japan” <jpnatcom@mext.go.jp>

TEL: +81-(0)3-6734-2585 / FAX: +81-(0)3-6734-3679

1.1.2 Status of IHP-VII activities

Various activities relating to IHP-VII (2008-2013) Themes have been implemented since 2008 as follows.

THEME 1: Adapting to the Impacts of Global Changes on River Basins and Aquifer Systems

FA 1.1 – Global changes and feedback mechanisms in hydrological processes in stressed systems

- Global water cycle assessment: IHP contribution to GEOSS [Univ. of Tokyo]

There are number of activities led by Prof. Koike (Univ. of Tokyo) and others as:

in Asia

- International Coordination Group (ICG) Meetings on the Global Earth Observation System of Systems (GEOSS) and Asian Water Cycle Initiative (AWCI) (GEOSS/AWCI/ICG)
 - 2nd GEOSS/AWCI/ICG Meeting, Tokyo, Japan, 16-17, April 2008
 - 3rd GEOSS/AWCI/ICG Meeting, Beijing, China, 6 November 2008
 - 4th GEOSS/AWCI/ICG Meeting, Kyoto, Japan, 6-7, February 2009
 - 5th GEOSS/AWCI/ICG Meeting, Tokyo, Japan, 15-18, December 2009
 - 6th GEOSS/AWCI/ICG Meeting, Bali, Indonesia, 13 March 2010
 - 7th GEOSS/AWCI/ICG Meeting, Tokyo, Japan, 5-6, October 2010
 - 8th GEOSS/AWCI/ICG Meeting, Seoul, South Korea, 6-8 October 2011

in Africa

- 1st African Water Cycle Symposium, Tunis, Tunisia, 6-8 January, 2009.
 - 1st Task Team meeting in preparation of the Second GEOSS African Water Cycle Symposium, Geneva, Switzerland, 23-24 September 2009
 - 2nd African Water Cycle Symposium, Addis Ababa, Ethiopia, 6-8 January, 2011.
 - GEO-UNESCO Joint Workshop on Earth Observation and Capacity Development for IWRM at River Basins in Africa, Nairobi, Kenya, 12 - 14 January 2012.
 - 3rd African Water Cycle Symposium, Libreville, Gabon, 27-29 February, 2012.
- Interaction between hydrological cycle and physical/biochemical oceanography by cooperation between IHP and IOC [JAMSTEC, Univ. of Tokyo, Kyoto Univ.]
- IHP-IOC sessions are organized at the meetings of Japan Geoscience Union (JpGU) at Makuhari Messe in May 2011 and in May 2012.

FA 1.2 – Climate change impacts on the hydrological cycle and consequent impact on water resources

- Climate change research focusing on impacts on water-related disaster risk using “Earth Simulator”: MEXT Kakushin Project (2007-2012).
- Global Earth Observation System of Systems (GEOSS) and Asian Water Cycle Initiative (AWCI) [Koike]
 - GEOSS/AWCI training course for the Climate Change Assessment and Adaptation Study, Tokyo, Japan, 11-12 March 2011
 - 1st AWCI Climate Change Assessment and Adaptation (CCAA) study Workshop, Seoul, South Korea, 6 - 8 October, 2011
- GWSP-Asia: HydroChange2008 Conference, Kyoto, Japan, 1-3 October 2008:
HydroChange 2008 conference was held in Kyoto on October 1-3, 2008, and more than 180 papers were presented. The conference was organized by RIHN, GWSP, IAHS with co-sponsored by EOMF and IAHC. The conference results was published as a book “From headwaters to the ocean” from Taylor and Francis.
http://www.chikyu.ac.jp/HC_2008/
- Groundwater research such as GRAPHIC.
International symposium on “Groundwater as key for adaptation to changing climate and society” was held in Kyoto on November 14, 2010. The symposium was organized by RIHN, UNESCO-

IHP-GRAPHIC, DPRI (Kyoto University), HyARC (Nagoya University), and MEXT, and more than one hundred people attended the symposium.

http://www.chikyu.ac.jp/archive/topics/2010/e-topics_101114.html

- GWES (Groundwater in Emergency Situations).
Great Eastern Japan Earthquake and Tsunami showed the importance of groundwater use in emergency situation during disasters.
- Collaboration with Mongolian UNESCO Chair on Groundwater.
The monitoring system of the groundwater has been launched in Ulaanbaatar, capital city of Mongolia as one of the major activities of 2nd Phase activities of UNESCO Chair on Sustainable Management of Groundwater Resources in Mongolia.
- Second Phase of PUB project in cooperation with IAHS [Kyoto Univ.].
Climate change research under the MEXT Kakushin program was intensively conducted from 2008 to 2012.
Climate change research on dam safety and dam functions at JCOLD.

FA 1.3 – Hydro-hazards, hydrological extremes and water-related disasters

- A Global Center of Excellence (GCOE) Program at Kyoto University “Sustainability/Survivability Science for a Resilient Society Adaptable to Extreme Weather Conditions” adopted for 2009-2014. Interdisciplinary research and education at Ph.D. level is implemented at Kyoto University for extreme weather and water conditions [Takara, Tachikawa and others].
- A new task force on frequency analysis for non-stationary hydrological time series in ICHARM initiated since 2009
Flood damage investigation of Thai flooding in 2011 was conducted in Thailand in cooperation with various Thai authorities.
Intensive observation of radioactive materials and numerical modeling of the movement was intensively conducted at the river basins in Fukushima.
- Improving the predictability of hydrological extremes in ungaged or poorly gaged basins using new measurement technology and promoting the local use of satellite information for improved river basin management in partnership with GEOSS.
The predictability of the largest recorded flood at the Kumano River basin in 2011 was examined to verify the performance of a hydrologic model for predictions of extreme events [Tachikawa].
Space Application for Environment (SAFE), Asia-Pacific Regional Space Agency Forum (APRSA) [Koike]
Demonstration projects:
 - Hong River, Viet Nam, 2008-2010
 - Sangker River, Cambodia, 2009-2012
 - Indus River, Pakistan, 2010-2012
- Case studies on human security and water-related disasters.
- Japan has experienced very severe water-related disasters in 2010-2012. Especially, the Great East Japan Earthquake and Tsunami (GEJET) damaged Japan very much, causing the tsunami disasters in wider coastal zones and its aftermath including radioactive contamination issues from nuclear power plants in Fukushima.
- Best practices on water risk management
 - * ICHARM, as an ICFM5 Secretariat organized the 5th International Conference on Flood Management (ICFM5) in Tokyo from 27 to 29 September 2011.
 - * ICHARM has started a UNESCO funded project “Strategic Strengthening of Flood Warning and Management Capacity of Pakistan” in response to the unprecedented Indus river flood disaster (2012-2013).
 - * ICHARM had announced a flood inundation forecast of Chao-Phraya river basin to help local people in emergent operation (2011-).

* Flood forecasting and management [ICHARM, PWRI, IFNet, JMA and universities] under the MEXT Kakushin Program from 2007 to 2012, changes of water-related disasters and water resources under global warming were investigated.

FA 1.4 – Managing groundwater systems’ response to global changes

- Groundwater resources assessment under the pressure of humanity and climate change (GRAPHIC) [Research Institute for Humanity and Nature (RIHN)]
UNESCO-GRAPHIC organized several international activities including symposiums and training courses to evaluate the effects of climate change and human activities on groundwater resources. Many case studies are synthesized by books including “Groundwater System Responses to Changing Climate (eds.: Taniguchi and Holman)” and “Climate Change Effects on Groundwater Resources: A Global Synthesis of Findings and Recommendations (eds.: Treidel et al.)”, from Taylor and Francis.

FA 1.5 – Global change and climate variability in arid and semi-arid regions

- Hydrological and ecological impact assessment of long-term global warming on river basins in the world [Kyoto Univ.]
DPRI initiated the Japan Egypt-Hydro Network (JF-HydroNet) with the coordination with three Egyptian Institutions under the umbrella of GCOE-ARS project at Kyoto Univ. for a joint research and education project on the water resources and environmental problems of the Nile Delta of Egypt [Prof. Tetsuya Sumi, WRRC, Kyoto Univ.].

THEME 2: Strengthening Water Governance for Sustainability

FA 2.1 – Cultural, Societal, and scientific responses to the crises in water governance

- Community-based integrated river basin management as a HELP follow-up [Univ. of Tokyo, Kyoto Univ.]
To share the knowledge of hydrologic modeling techniques and enhance the understanding of hydrologic predictions, CommonMP (Common Modeling Platform for water-material circulation analysis) was developed at the National Institute for Land and Infrastructure Management (NILIM). The hydrologic modeling software is a tool for construction of hydrologic models that anyone can download from the NILIM home page [Tachikawa et al.].

FA 2.2 – Capacity development for improved governance; enhanced legislation for wise stewardship of water resources*

- Research on “virtual water”
Developed inventories of the virtual water/water footprint of industrial commodities [The University of Tokyo]
Dispatched an expert for the ISO/TC207/SC5/WG8 Waterfootprint and supported developing the community draft [The University of Tokyo]
- Collaboration with IHP-LAC for Rio de La Plata Basin Workshops
Preparatory Meeting for 6th International Workshop of Regional Approach of Development and Management of Reservoirs in La Plata River Basin [Dr. Yosuke Yamashiki, Kyoto Univ.]
- Relative impact evaluation in water resources dynamics and social systems with large development in river basins [Kyoto Univ.]

THEME 3: Ecohydrology for Sustainability

FA 3.1 – Ecological measures to protect and remediate catchments process

- Participation in ecohydrology research development
- Effect of forest devastation on water resources and environmental issues [Univ. of Tsukuba, Kyoto Univ., Kyushu Univ., Univ. of Tokyo, Tokyo Univ. of Agriculture and Technology]
- Ecohydrology symposia and sessions at AOGS meetings
Ecohydrology session (JHW02: Interaction between fresh water and ecosystem in the coastal zone) was organized at IUGG2011 meeting on July 2, 2011 at Melbourne, Australia.

FA 3.4 – Groundwater-dependent ecosystems identification, inventory and assessment*

- Frontier of sustainable groundwater management systems based on groundwater flow process in arid/semi-arid region in cooperation with China and Mongolia [Univ. of Tsukuba, Hiroshima Univ., Kumamoto Univ.]
- A new CREST Project on the impact of the forest thinning on the groundwater recharge has been launched since 2010 [Univ. Tsukuba, Kyoto Univ., Univ. Tokyo, Kyushu Univ., ...]

THEME 4: Water and Life Support Systems

FA 4.3 – Achieving sustainable urban water management

- Hydrogeological and sociological survey on development processes of East-Asian cities co-existing with floods [Kyoto Univ.]
- Human impacts on Urban subsurface environments were evaluated in seven Asian cities including Tokyo, Osaka, Seoul, Taipei, Bangkok, Jakarta and Manila by RIHN project (<http://www.chikyu.ac.jp/USE/index-e.html>) . The results were shown in a book edited by M. Taniguchi “Groundwater and Subsurface Environment – Human Impacts in Asian Coastal Cities – “ from Springer, Mar. 2011.
- New CREST (Core Research for Evolutional Science and Technology) research projects supported by the JST (Japanese Science and Technology Agency) since 2009 for Innovative Technology and System for Sustainable Water Use
The JST adopted 17 projects: 7 in 2009, 6 in 2010 and 4 in 2011.

FA 4.4 – Achieving sustainable rural water management*

- Development of a new flood management method utilizing paddies into river management against global warming [National Institute for Rural Engineering (NIRE), Univ. of Tsukuba, Univ. of Tokyo]

THEME 5: Water Education for Sustainable Development

FA 5.1 – Tertiary water education and professional development

FA 5.2 – Vocational education and training of water technicians

FA 5.3 – Water education in schools

FA 5.4 – Water education for communities, stakeholders and mass-media professionals

- Nagoya University Training Courses: The 20th and 21st Training Courses have been conducted by Nagoya University and Kyoto University, respectively, with collaboration of Research Institute for Humanity and Nature (RIHN) , etc.
- ICHARM Training Programmes and a one-year Master Degree Program on water-related risk management in cooperation with the National Graduate Institute for Policy Studies (GRIPS) supported by JICA.
- ICHARM has been jointly conducting a three-year doctoral course, “Disaster Management”, with GRIPS since October 2010.
- Six short term training courses have been conducted about Hazard Map, Early Warning System and Climate Change Adaptation, November 2010-May 2012. [ICHARM]
- Capacity building and education for observation experts for continuous monitoring of terrestrial environments in Asia [Univ. of Tsukuba]
Workshops focusing on the training for the young scientists and engineers in the field of water and environment were held in July 2010 and 2011 in Tunisia, October 2010 and September 2011 in Mongolia in collaboration with UNESCO Chair Program on Groundwater in Mongolia and Environmental Diplomatic Leader Education Program, funded by MEXT.

Other regional and cross-cutting themes activities include:

- (1) **Catalogue of Rivers:** The format of the Catalogue of Rivers for Southeast Asia and the Pacific, Vol. 6 was announced at the 15th Session of IHP Regional Steering Committee (RSC) for Southeast Asia and the Pacific (SEAP) in Manila, the Philippines, on 22-23 November 2007. Japanese contribution to Vo. 6 is the Yoshiigawa, of which draft was prepared by Dr. Hidetaka Chikamori, Okayama Univ. This volume contains seven rivers from seven countries with the inclusion of first

time contributions from Korea (D.P.R.), Mongolia and Myanmar, and brings the total number of rivers catalogued in the region, including those in volumes I to VI, to 121. The information of previous five volumes locates at:

http://flood.dpri.kyoto-u.ac.jp/ihp_rsc/riverCatalogue/index.html

(2) **Asian Pacific FRIEND:** With the dissemination of information from the SEAP region it is hoped that there will be better understanding and co-operation on matters related to water resources within each country as well as regionally. Of particular importance was the establishment of the Asian Pacific FRIEND, a UNESCO-IHP regional collaborative project, and the Asian Pacific Water Archive (APWA) that archives and makes available hydrometeorological and related data for Asian Pacific FRIEND projects and other IHP related activities in the region. Japan has been contributing to Asian Pacific FRIEND since its first Technical Sub-Committee (TSC) meeting in Kuala Lumpur in May 1997.

(3) **Hydrology for Environment, Life and Policy (HELP):**

No activities during this period.

(4) **Prediction in Ungauged Basins (PUB) by IAHS:**

PUB-Japan members will attend IAHS 90th anniversary PUB Symposium, Delft, the Netherlands, on 23-34 October 2012.

(5) **International Flood Initiative (IFI), International Sediment Initiative (ISI) and International Programme on Landslides (IPL):**

- Contribution to IFI as secretariat

ICHARM has been serving as the secretariat of the International Flood Initiative (IFI), a joint initiative with international organizations such as UNESCO (IHP), WMO, UN/ISDR, UNU, IAHS and IAHR. ICHARM manages the IFI website (<http://www.ifi-home.info/>) and compiles inputs, materials and tools provided by member agencies, while also providing its own outputs. ICHARM made active contribution to the organization of the ICFM5, held in Tokyo in September 2011.

- ICHARM, as an ICFM5 Secretariat organized the 5th International Conference on Flood Management (ICFM5) in Tokyo from 27 to 29 September 2011. More than 450 participants from 41 different nations and region participated in the conference. More than 250 participants came from abroad and others came from Japan. The ICFM5 Secretariat received 417 abstracts covering all the announced topic areas. The ICFM5 international scientific committee reviewed all submitted abstracts for relevance to the ICFM5 objectives. In total, 256 presentations were delivered during the 3-day conference at various opportunities including plenary sessions, special sessions, oral parallel and poster sessions.

-During the 19th Session of RSC-SEAP on 24-28 October,2011 the organizer invited Professor Manfred Spreafico (UNiv. of Berne, Switzerland), the leader of ISI, and organized an ISI session on the first day of the IHP Symposium EXTREME2011.

1.2 Activities at national level in the framework of the IHP

1.2.1 National/local scientific and technical meetings

(1) The JFIT Annual Reviews and Evaluation Meetings on the Proposed Science Sector Activities of UNESCO Office Jakarta were held in the UNESCO Jakarta Office in May 2011 and May 2012. The status and progress of the UNESCO science programmes in the region were reported and evaluated. Jakarta Office explained the IHP-WINGA ASPAC (Water Interoperability Networks for Global Change Adaptation in Asia and Pacific Region) project, which includes four components: RSC activities, IHP Training Course, Flood Disaster Prevention and Mitigation Measures in ASPAC region, and Sustainable Water to Improve Tomorrow's Cities Health – Integrated Programme for Asia (SWITCH-*in-Asia*).

(2) IHP Training Course Task Forth Meetings were held several times in Tokyo and Uji (Prof. Uyeda, Prof. Nakamura, Prof. Takara, Prof. Kojiri and Dr. Takemon) and in Kyoto (Prof. Uyeda, Prof. Nakamura, Prof. Takara) to discuss the organization of the Training Courses, the plan for the 22nd Training Course, future direction, and the reviews.

- (3) The 28th IHP National Committee meeting was held at MEXT on 7 May 2012 to discuss various issues relating to the 20th Session of IHP Intergovernmental Council (June 2012) and IHP-VIII (2014-2021).

1.2.2 Participation in IHP Steering Committees/Working Groups

Regional Steering Committee (RSC) for IHP in Southeast Asia and the Pacific (SEAP):

- (1) The 18th RSC was held in Hanoi, Vietnam in conjunction with the International Conference “Hydrological Regime and Water Resources Management in the Context of Climate Change HWCC2010” on 8-12 November 2010. The RSC Secretariat Prof. Takara was re-elected for 2010-2012. [Takara, Kawamura, Tachikawa]
- (2) The 19th RSC was held in Kyoto, Japan on 24 to 28 October 2011. The RSC adopted a resolution “Archiving hydrological disaster management/reduction technologies”. Dr. Trevor Daniell (Australia) was elected as the RSC Chairperson. [Takara, Tachikawa]
- (3) IHP Eighth Phase (IHP-VIII) Task Force meeting at UNESCO Headquarters on 5-7 June 2011.
- (4) The 8th Steering Committee meeting of IWRM Guidelines at River Basin Level Initiative at UNESCO Headquarters on 7-11 December 2011. [Mr. Otsuki, a steering committee member]

1.2.3 Research/applied projects supported or sponsored

- MEXT Kakushin Program “Flood forecasting and management” 2007-2012, changes of water-related disasters and water resources under global warming [ICHARM, PWRI, IFNet, Kyoto Univ., Univ. Tokyo and others]
- Global COE Program “Sustainability/Survivability Science for a Resilient Society Adaptable to Extreme Weather Conditions” 2009-2014 sponsored by MEXT-JSPS [PL: Prof. Kaoru Takara]
- JSPS-Asian Core Program, " Research and Education Center for the Risk Based Asian Oriented Integrated Watershed Management," 2011-2015 [PI: Prof. Yoshihisa Shimizu].
- Program for Leading Graduate Schools “Inter-Graduate School Program for Sustainable Development and Survivable Societies” 2011-2018 sponsored by MEXT-JSPS [PC: Prof. Kaoru Takara]

1.2.4 Collaboration with other national and international organizations and/or programmes

The Japanese IHP National Committee has been closely collaborating with:

- (1) Some committees in the Science Council of Japan (SCJ),
- (2) The national government and its branches relating to hydrology and water resources administration,
- (3) Nagoya University for IHP Training Courses and Graduate School and other universities and research institutes,
- (4) The Japan Water Forum (JWF),
- (5) World Meteorological Organization (WMO), and
- (6) International NGOs/NPOs such as the International Association of Hydrological Sciences (IAHS), the International Water Resources Association (IWRA) and the International Consortium on Landslides (ICL).

1.2.5 Other initiatives

ICHARM: International Centre for Water Hazard and Risk Management under the auspices of UNESCO was established in Tsukuba, Japan in March 2006, after getting accreditation by the member states of UNESCO at the 33rd General Conference of UNESCO. Dr. Kuniyoshi Takeuchi, the former chairman of the Japanese National Committee for UNESCO-IHP, was assigned as the founding Director of ICHARM. In its inception, ICHARM has been playing core roles in research, training, and information networking activities on water-related disasters at global levels. The activities are expected to contribute in the prevention and reduction of water-related disasters,

focusing on flood related disasters at the initial stage. It is important to cooperate with existing UNESCO water Centers such as IHE in the Netherlands, IRTCES in China, HTC in Malaysia and RCUWM in Iran, etc. The outline of ICHARM is as follows.

- 1) Objectives: The objective of the Centre is to function as the world centre of excellence to provide and assist implementation of best practicable strategies to localities, nations, regions and the globe to manage the risk of water related disasters including flood, drought, landslide, debris flow, storm surge, tsunami and water contamination. The Centre conducts research, capacity building and information networking activities in an integrated manner for preventing and mitigating the impacts of water related disasters and thus to achieve sustainable and integrated river basin management.
- 2) Functions:
 - (i) to promote scientific research and to undertake effective capacity-building activities at the institutional and professional levels;
 - (ii) to create and reinforce networks for the exchange of scientific, technical and policy information among institutions and individuals;
 - (iii) to develop and coordinate cooperative research activities, taking advantage particularly of the installed scientific and professional capacity of the IHP networks, WWAP, the IFI/P and relevant programmes of non-governmental organizations, international institutions and networks;
 - (iv) to conduct international training courses for practitioners and researchers on the global level; and
 - (v) to organize knowledge and information transfer activities including international symposia or workshops, and to engage in appropriate awareness-raising activities;
- 3) Structure: The center is established as a part of the Public Works Research Institute (PWRI) and operated under the responsibility of its Chief Executive, with the advice from the Advisory Board. See other information at: <http://www.icharm.pwri.go.jp/html/about/index.html>

The events related to the ICHARM are summarized as below.

- (1) UNESCO Science Sector Flood Mission to Islamabad, Pakistan (23-26 August 2010)
- (2) Water and Development Information for Arid lands-Global Network G-WADI meeting 24 September 2010, Cairo, Egypt
- (3) ICHARM Advisory Board (IAB) Members as third IAB held on September 2010.
- (4) Seminar “Early warning system for flood disaster mitigation”, 6-7 November 2010, Hanoi, Vietnam
- (5) Short course “Early warning system for flood disaster mitigation”, 6-7 November 2010, Hanoi, Vietnam
- (6) Workshop on “Space Application to Reduce Water-related disaster risk in Asia”, 7-9 December 2010, Bangkok, Thailand
- (7) Explanation meeting for inspection reports to ADB, 9-24 December 2010, Dhaka, Bangladesh and Solo, Indonesia
- (8) Visit of UNESCO Evaluation Team to ICHARM (13-14 January 2011)
- (9) International workshop on Education for managing hydrological extremes and related geo-hazards, 24-26 January 2011, Islamabad, Pakistan
- (10) Meeting with UNESCO and Pakistan Governmental organization for the support of Pakistan flood disaster mitigation, 26-28 January 2011, Islamabad, Pakistan
- (11) Discussion with UNESCO for finding mission to the flooded areas of Sri Lanka, 20-29 January 2011, Sri Lanka
- (12) “Local Emergency Operation Plan with Hazard Map” The second phase was conducted for four weeks from 12 January to 16 February 2011 in Japan by ICHARM . Twelve people participated from Bhutan, Indonesia, Lao PDR, Myanmar, Nepal, Pakistan, Tajikistan, Thailand and Bangladesh.
- (13) “Capacity development for Adaptation to Climate change” has been conducted for 5 weeks from 8 February to 10 March 2011.
- (14) Workshop on Developing Capacity for resilience to water-related disasters in Pakistan through Space Applications and Disaster Risk Management, 1-4 March 2011, Islamabad, Pakistan
- (15) Organize stakeholder workshop in Dhaka and conduct community based disaster risk reduction activity, 9-24 March 2011, Solo, Indonesia.
- (16) Training on floods and climate change for 20 engineers and governmental officials from Sri Lanka, 10-24 July 2011, Bangalore, India 12 July 2011, Islamabad, Pakistan
- (17) Signing Ceremony of the project Strategic Strengthening of Flood Warning and Management Capacity of Pakistan,

- (18) ADB-TA 7276-REG IFAS New Version Installation and Training Workshop with BBWS Solo and CRBOM engineers, 4-6 July 2011, Solo, Indonesia
- (19) “Local Emergency Operation Plan with Hazard Map” The third and last phase were conducted for four weeks from 4 July to 2 August 2011 in Japan by ICHARM. Eleven people participated from Bhutan, Indonesia, Lao PDR, Myanmar, Pakistan, Sri Lanka, Tajikistan, and Bangladesh.
- (20) The 2nd international MAHASRI /HyARC Workshop on Asian Monsoon and Water Cycle, 22-24 August 2011, Nha Trang, Vietnam
- (21) Inception meeting for Strategic Strengthening of Flood Warning and Management Capacity in Pakistan, 17-19 August 2011, Bangkok, Thailand
- (22) ADB Water Learning Week, 8-10 November 2011, Manila, Philippines
- (23) Progress report with regard to ADB TA7276 Bangladesh Component, 16-19 November 2011, Dhaka, Bangladesh
- (24) 2nd IFAS Training Workshop, 20-27 November 2011, Solo, Indonesia
- (25) Sentinel-Asia Flood WG-IFAS Seminar 16-29 November 2011, India, and Myanmar
- (26) Parallel Session for ADB Water Learning Week and field survey, 8-14 November 2011, Manila, Philippines and Bangkok, Thailand
- (27) Field Survey for Chao Phraya flood, 24-29 November 2011, Thailand
- (28) IFAS Workshop in Tehran, 6-9 February 2012, Tehran, Iran
- (29) Field Survey and Discussion meeting with NDRI, 13-22 December 2011, Nepalgunj and Kathmandu, Nepal
- (30) 8th Steering Committee meeting of IWRM Guidelines at River Basin Level Initiative, 7-11 December 2011, Paris, France
- (31) International Training Workshop of Stakeholders Capacity Building in Flood Warning and Management, NUST, Islamabad, Pakistan, 20-23 December 2011, Islamabad, Pakistan
- (32) Field survey for the “Project on a Comprehensive Flood Management Plan for the Chao Phraya River Basin”, 11-16 December 2011, Thailand
- (33) Cooperation to JICA, “The Project for Building Disaster Resilient Societies In Central Region in Vietnam”, 10-14 January 2012, Hanoi and Hue, Vietnam
- (34) Knowledge sharing workshop on water-related disaster risk management, 11-25 January 2012, Kathmandu, Nepal
- (35) 1st joint seminar of integrated water resources management for Chao Phraya River by strategic formulation committee for water resources management of the kingdom of Thailand, 14 January 2012, Thailand
- (36) Making Implementation Partners Agreement for “Strategic strengthening Flood warning and management capacity of Pakistan” with UNESCO on 20 January, 2012
- (37) Field survey for the JICA course “General Information on Capacity Development For Flood Risk Management with IFAS”, 28 January to 4 February 2012, Kenya, Africa
- (38) ADB-TA 7276-Reg. Workshop on Flood Vulnerability Assessment, 7-11 February 2012, Phnom Penh, Cambodia
- (39) The 6th World Water Forum, 12 -17 March 2012, Marseille, France
- (40) Assessment of flood and inundations under the effect of climate change in lower West Rapti River Basin in Nepal, March 5 2012, Kathmandu, Nepal
- (41) ADB TA 7276-REG-Courtesy visit to the DGWR Ministry of Public Works and IFAS Follow up Training for Engineers, 2-6 March 2012, Jakarta, Indonesia
- (42) ADB-GWP meeting on Integrated Flood and Water Resources Management, 15-16 April 2012, Manila, Philippines
- (43) Workshop “Capacity Development for Integrated Flood Risk Management in Pakistan” as short term training course from 15-24 May 2012.

1.3 Educational and training courses

1.3.1 Contribution to IHP courses

UNESCO IHP Nagoya Training Courses (TC) have been held by Nagoya University since 1991 every year. Topics of the course were relevant to fit the IHP-VII themes: Water Resources for Sustainable Development, Hydrology and Water Resources under Vulnerable Environment, and Water Interactions (Systems at Risk and Social Challenges). The host or convener body is the Hydrospheric Atmospheric Research Center (HyARC), Nagoya University. After the 19th TC, the Disaster Prevention Research Institute (DPRI), Kyoto University joined as a convener body. After that, HyARC and DPRI took the convener role alternatively. This made the TC have wider scope

including water resources and disaster prevention. About ten participants from East and Southeast Asian countries selected by UNESCO Jakarta Office took lectures and practices every year in the training course. The 20th was with a title of “Groundwater as a key for adaptation to changing climate and society” under a collaboration of the Research Institute for Humanity and Nature (RIHN), the 21st was with “Introduction to river basin environment assessment under climate change” organized by DPRI.

An important development of TC is information dissemination on website. The broadcasting of the lectures to universities in Asia via Internet was successfully performed with collaboration of EST (Engineering, Science, and Technology) programme. When the visiting participants and some graduate school students join the TC's, the number is limited as only 10-20. The lectures are now available via internet, and many participants at remote sites can join the TC's. The lectures are also opened to graduate school students in the host universities such as Nagoya University and Kyoto University. TC is a good opportunity for graduate school students, and conveners of TC encourage graduate students to join the TC's.

1.3.2 Organization of specific courses

ICHARM has been providing a training course on flood hazard mapping (5 weeks every year) since 2004. In November 2007, 16 trainees participated from 8 countries in Asia Pacific region.

ICHARM also has been conducting a one-year master's program, “Water-related Disaster Management Course of Disaster Management Policy Program,” since 2007 in collaboration with JICA and the National Graduate Research Institute for Policy Studies (GRIPS). Seven students in the class of 2008 graduated on 16 September 2009 with a master's degree in disaster management. The class of 2009 started the program on 6 October 2009 with 13 students. The new doctoral program in disaster management started its admission process in December 2009 in collaboration with GRIPS.

ICHARM organized a short-term training course with JICA as Local Disaster Operation Plan with Flood Hazard Mapping Training Course (in 2010-2011)

This training course is designed especially for flood management organizations to enhance organizational resilience against floods. The course started in 2010. The second phase was conducted for four weeks from 12 January to 16 February 2011. Twelve people participated from Bhutan, Indonesia, Lao PDR, Myanmar, Nepal, Pakistan, Tajikistan, Thailand and Bangladesh. During the four weeks, the participants studied local disaster prevention practiced in Japan through lectures, exercises and field trips, and finally made an action plan for future activities in flood management for their own local areas. The third and last phase were conducted also for four weeks from 4 July to 2 August 2011. Eleven people participated from Bhutan, Indonesia, Lao PDR, Myanmar, Pakistan, Sri Lanka, Tajikistan, and Bangladesh.

as well as Master's Course Program “Water-related Disaster Management Course of Disaster Management Policy Program”, and Doctor Course Program, “Disaster Management.”

1.3.3 Participation in IHP courses N/A

1.4 Cooperation with the UNESCO-IHE Institute for Water Education and/or international/regional water centres under the auspices of UNESCO

- (1) Dr. Takahiro Sayama (ICHARM) visited UNESCO-IHE on 8 to 13 September 2010, giving a lecture at Summer Seminar.
- (2) Dr. Shigenobu Tanaka (ICHARM) attended “International Workshop on Water Disaster” held by UNESCO-HidroEX(Brazil) on 17 to 19 November 2010, giving a lecture.
- (3) Dr. Guangwei Huang (ICHARM) attended the course “Climate Change in Integrated Water Management” on 10 to 16 July 2011 as an exchange instructor under the agreement with UNESCO-IHE.

1.5 Publications

- (1) Lecture materials for the 20th IHP Training Course “Groundwater as a key for adaption to changing climate and society” via website “<http://www.ihpnagoyaforum.org>”.
- (2) The textbook for 21st IHP Training Course in 2011, “Introduction to river basin environment assessment under climate change”, Nagoya University, Kyoto University and UNESCO.
- (3) «IWRM Guidelines at River Basin Level» Part 1: Principles, UNESCO-IHP, WWAP and NARBO, 24 pp., ISBN: 978-92-3-104100-6.
- (4) «IWRM Guidelines at River Basin Level» Part 2-1: The Guidelines for IWRM Coordination, UNESCO-IHP, WWAP and NARBO, 173 pp., ISBN: 978-92-3-104101-3.
- (5) «IWRM Guidelines at River Basin Level» Part 2-2: The Guidelines for Flood Management, UNESCO-IHP, WWAP and NARBO, 76 pp., ISBN: 978-92-3-104102-0.
- (6) «IWRM Guidelines at River Basin Level» Part 2-3: Invitation to IWRM for Irrigation Practitioners, UNESCO-IHP, WWAP and NARBO.
- (7) Taniguchi, M. and Holman, I. “Groundwater system responses to changing climate”, Taylor and Francis, 2010, 200pp
- (8) Taniguchi, M. ed. “Groundwater and Subsurface Environments – Human Impacts in Asian Coastal Cities – “, Springer, 2011, 312pp
- (9) Treidel, H., Martin-Bordes, J.L., Gurdak, J.J. eds., “Climate Change Effects on Groundwater Resources: A Global Synthesis of Findings and Recommendations” , CRC Press Taylor and Francis Group., 2011, 414 pp.
- (10) In Forms of Community Participation in Disaster Risk Management Practices Flood risk management culture and its role in changing natural and physical environments of lower West Rapti river basin in Nepal Gautam M. R., Osti R., Gautam D. R., Inomata, H., Dhakal S. Osti R. and Miyake K. (Eds.), Nova Science Publishers, Inc., New York 2011
- (11) Forms of community participation in disaster risk management practices Rabindra Osti, Katsuhito Miyake NOVA Science Publisher Mar 2011
- (12) Tsunamis Causes, Characteristics, Warnings and Protection Chapter 4 Application of Coastal Forest in Tsunami Disaster Mitigation Rabindra Osti, Dinar Istianto Neil Veitch and Gordon Jaffray (Eds.), Nova Science Publishers, Inc., New York 87-112 2010
- (13) Planning and Design of Tsunami-mitigative Coastal Vegetation Belts Shigenobu Tanaka, Dinar Istiyanto, Daisuke Kuribayashi Technical Note of PWRI No.4177 Aug 2010
- (14) Dynamics of hydrometeorological and environmental hazards, Environmental Hazards A. W. Jayawardena The Fluid Dynamics and Geophysics of Extreme Events, Lecture notes series, Institute for Mathematical Sciences National University of Singapore Vol. 21 229-267 2011
- (15) Large-scale Flood Report Ali Chavoshian ICHARM Book Series ICHARM No. 1 1-207 Sep. 2011
- (16) Forms of Community Participation in Disaster Risk Management Practices Rabindra Osti, Katsuhito Miyake Forms of Community Participation in Disaster Risk Management Practices NOVA science NY USA 1-170 Jun. 2011
- (17) Groundwater Management in Mongolia “Bridging Disciplines and Sectors”, 24th February 2011, University of Tsukuba, 19 pp.
- (18) Proceedings of IHP Symposium on Extreme Events: “Meteorological, Hydrological and Tsunami Disasters: Social Adaptation and Future (EXTREME2011)”, Kyoto University Uji Campus, 24-26 October 2011.
- (19) Special Issue: Predictions in Ungauged Basins –Japan Society of Hydrology and Water Resources, Y. Tachikawa, Y. Yamashiki, and M. Tsujimura (Eds), Hydrological Processes, vol. 26, Issue 6, John Wiley & Sons, March, 2012.

1.6 Participation in international scientific meetings

1.6.1 Meetings hosted by the country

- (1) International Symposium “Groundwater as a key for adaptation to changing climate and society” was held at Kyoto on 14 November 2010, co-organized by RIHN, UNESCO, Japanese National Commission for UNESCO, HyARC, DPRI and MEXT.
- (2) UNESCO Chair Workshop on International Strategy for Sustainable Groundwater Management: Transboundary Aquifers and Integrated Watershed Management was held at the University of Tsukuba, Japan on 24 February 2011.
- (3) Special event entitled “International Forum on Mega-Water-Disaster”, which was held on the first day (27 September 2011) of ICFM5 at UNU. For this purpose, some high-level national and international officials were invited for the conference.

- (4) International symposium, “Floods – A global problem that needs local solutions”, was jointly held by ICHARM and UNU on 28 September 2010 at UNU in Tokyo. The symposium was followed by a panel discussion on “Global cooperation to help local solutions” by members of international disaster prevention organizations.
- (5) The 5th International Conference on Flood Management (ICFM5) was held in Tokyo on 27-29 September 2011. Japan with more than 450 participants gathered from 41 different nations throughout the world.
- (6) IHP Symposium on Extreme Events: “Meteorological, Hydrological and Tsunami Disasters: Social Adaptation and Future (EXTREME2011)” (24-28 October 2011) was held in conjunction with the 19th Regional Steering Committee Meeting for UNESCO-IHP for Southeast Asia and the Pacific in Kyoto, organized by Japanese National Committee for UNESCO-IHP; DPRI; Global COE Program “Sustainability/Survivability Science for a Resilient Society Adaptable to Extreme Weather Conditions” (GCOE-ARS); UNESCO Jakarta Office: 96 participants from 23 countries.
- (7) IUGG-IAHS Sub-Committee Meeting was held in Makuhari, Chiba, Japan on 23 May 2012 at the occasion of JpGU (Japan Geoscience Union) meetings on 20-25 May 2012 [Taniguchi, Takara, Tsujimura].

1.6.2 Participation in meetings abroad

- (1) FRIEND Database Harmonization Workshop at UNESCO Headquarters, 7-8 June 2010. Dr. Hidetaka Chikamori (Okayama Univ.) attended as the representative of AP-FRIEND.
- (2) The 10th IHP-IAHS George Kovac Colloquium “Hydrocomplexity: New Tools for Solving Wicked Water Problems” at UNESCO Headquarters, 2-3 July 2010. [Nakajo]
- (3) Emeritus Prof. Tadashi Tanaka attended the international conference on “Transboundary Aquifers: Challenges and New Directions”, which took place from 6-8 December 2010 at UNESCO Headquarters in Paris and was convened by UNESCO IHP and IGCP programmes, IAH, and UNEP.
- (4) IRDR Conference 2011 took place in Beijing, China, from October 31 to November 2, 2011. The conference was hosted by the Integrated Research on Disaster Risk International Programme Office (IRDR) and the China Association for Science and Technology. Prof. Takeuchi (ICHARM) served the session B1 “Improving the Quality of Decision-Making Practice—Japanese Earthquake” as a chairperson.
- (5) The 6th World Water Forum « Time for Solution », Marseille, France, 12-17 March 2012 [Takara, Watanabe and others]
- (6) The 20th Session of the IHP Intergovernmental Council at UNESCO Headquarters, 4-7 June 2012. [Takara, Tachikawa and others]

1.7 Other activities at regional level

- 1.7.1 Institutional relations/cooperation
N/A
- 1.7.2 Completed and ongoing scientific projects
N/A

2. FUTURE ACTIVITIES

2.1 Activities planned until December 2012

- (1) The 20th Session of the IHP Regional Steering Committee (RSC) for Southeast Asia and the Pacific will be held in Malaysia in November 2012.
- (2) The 22nd IHP Training Course with the theme “Precipitation Measurement from Space and its Applications” will be held in Nov.-Dec. 2012 (see Annex II).
- (3) The International Workshop of the UNESCO Chair in Mongolia will be held at Ulaanbaatar in July/August 2012.
- (4) ASLO summer meeting: Lake Biwa, 8-13 July 2012
- (5) IAHS-IHP Joint National Workshop for Water Issues, MEXT, Tokyo, 15 October 2012.

2.2 Activities foreseen for 2013 - 2014

- (1) IAHS/IASPEI/IAPSO joint Assembly – Knowledge for the Future: Gothenburg, Sweden on 22-20 July, 2013
- (2) Groundwater-surface water interaction research in arid/semi-arid regions (Mongolia, Tunisia, China) in collaboration with Alliance for Research on North Africa and Japan-China Center on Hydrological Cycle Research, University of Tsukuba.
- (3) ISRS2013 (The 12th International Symposium on River Sedimentation, Kyoto Japan, Sept. 2-5, 2013)
- (4) The 21st Session of the IHP Regional Steering Committee (RSC) for Southeast Asia and the Pacific will be held in Rep. Korea in 2013.

2.3 Activities envisaged in the long term

- (1) Participation in IHP-VIII projects and RSC activities.
- (2) Information dissemination through a web page of the National Committee.
- (3) Activities relating to “Sustainability Science” that is a key promotion by the Japanese Commission for UNESCO

Proposal to UNESCO on “Sustainability Science”

Overview

Science has brought about extremely beneficial, remarkable transformations for humankind. The progress of science has developed the advanced technology and improved the possibility of human in a lot of fields and expanded its sphere of activities.

On the other hand, the application of scientific advances and the development of human activities have not only engendered obvious benefits but have brought about negative impacts such as exhaustion of limited global resource, ecological disorder, atmospheric and oceanic contamination, climate changes, enlarged and complexed natural hazard and reduction in biodiversity.

Here, challenges are mounting such as the expansion of economic inequality between developed and developing countries caused by modern-day economic activities supported by the development of science and technology.

The biggest problem which we come up against today is sustainability of an earth system. The science plays a significant role in solving this problem.

In order to make the best use of science and technology in a responsible way without abuse, it is important to seek appropriate solutions through building up discussions with the participation of a wide range of people.

Further efforts are required so that a consensus may be reached through the process of open debates on how science should be promoted and utilized, how its negative impacts should be controlled and on the nature of science itself.

In obtaining such mutual agreement, it is important to take note that the modern environmental, economical and social system is extremely complicated and comprised of problems that are not independent but closely interrelated.

On the side of the science which contributes to solve the problems, specialization and subdivision of science are advanced, causing the difficulties to deal with various global problems

only by an individual branch of science.

Therefore, all the cooperation is encouraged among the plural disciplines, and it should not be only fields of so-called natural science and the technology.

The complicated challenges in the contemporary society are deeply related to people's minds, sense of values, social systems, the behavior of people or deed of enterprises, which are also influenced by the selection of government policy.

Though new findings in natural science are necessary to figure out several global challenges, it is not sufficient. It is essential to solve complex challenges genuinely with a cross-cutting approach among all the studies including social and human sciences, in addition to changing values.

We must continue to ask the question whether science as a whole is managing to achieve the goal of a sustainable society and to connect science to the building of a sustainable society.

In order to do so, the consilience is required by the general mobilization of various sciences.

It is necessary to recognize that the science is required not only to ensure intergenerational equitable treatment and to correct the disparities between developed and developing countries but to respond to the new challenges of the sustainability of an Earth system including global and abiotic factors.

What is “Sustainability Science”?

We aim to use a new scientific concept, in the form of “Sustainability Science”, as the integrated approach to build a truly sustainable society.

The concept of “Sustainability Science” was officially introduced at the World Congress “Challenges of a Changing Earth 2001” in Amsterdam organized by the International Council for Science (ICSU) and other international organizations.

The origin of the concept goes back to the Brundtland Commission, formally the World Commission on Environment and Development held in 1987 which called for “Sustainable Development”.

This Commission proposed the concept of “Sustainable Development” from the perspective of intergenerational equity through “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” and made an appeal to the world that development which aimed for coexistence between the economy and the

environment was necessary – a recommendation which gained a lot of support.

“Chapter 35” of “Agenda 21” addresses the contribution of science and technology for sustainable development as its theme, which was adopted at the United Nations Conference on Environment and Development held in Rio de Janeiro in 1992.

10 years after the Rio Conference, the first World Summit on Sustainable Development was held. The Plan of Implementation adopted at the Summit reviewed the status of the progress of implementation of Agenda 21 and proposed as a means of implementation that improvements be made to policy and decision-making at all levels, which would include urgent action at all levels, through the improvement of a cooperative framework particularly between natural scientists and social scientists as well as between scientists and policy makers.

And now, various checks are being implemented as government-level international efforts in preparation for next year which will celebrate 20 years since the Rio Conference.

On the other hand, since the concept of sustainability developed without an adequate academic basis, its connection with the science that supported it was not always clear.

In the 1990s, ICSU initiated a study of science and technology for sustainability. In 1999, the “Declaration on Science and the Use of Scientific Knowledge” and the “Science Agenda – Framework for Action” intended to put the principles into action were adopted at the World Conference on Science held in Budapest, Hungary.

As a result, increasing momentum developed for the creation of sustainability science, and studies were repeated and mainly carried out by the US and European academic world including Japanese society.

These studies primarily made contributions to the individual discipline of science contributing to the sustainable development proposed at the Rio Conference, but we believe that these studies does not achieve anything notable for the consilience which is being sought today.

Today, what we need to tackle these global challenges is not a separate discipline.

Bearing in mind the need for correction of the North-South gap and to ensure intergenerational equity and variety of values, integrated science which aims to pursue sustainability and well-being on a temporal-spatial scale spanning over the globe, society and people is required which is capable of serving the entire human race without compromising the ecosystem.

This is an approach of new science which integrates knowledge in all areas including social and human sciences.

We aim to use this very concept, in the form of “Sustainability Science”, as the basis for a vision to resolve the urgent issues the international community faces and to lead to a global society which is truly sustainable.

And, an important role of UNESCO in the science field must be the promotion of such Science.

UNESCO, reflecting on the ravages of World War II, has included science in its development from the onset, and has been working in cooperation not only with UN agencies but with ICSU, International Social Science Council (ISSC) and International Council for Philosophy and Humanistic Studies(ICPHS) as well as other organizations since its inception, and has been working on the issues not just from the perspective of natural science but from the viewpoint of social and human sciences.

Moreover, UNESCO as the leading agency of Education for Sustainable Development (ESD) has played a vital role to promote the principles proposed to the international society under the leadership of the Japanese government through a perspective of the importance of education for establishing the sustainable society.

Therefore, the Japanese National Commission for UNESCO anticipates that UNESCO will show powerful leadership for the promotion of “Sustainability Science” and proposes the following points.

Proposals to UNESCO

1. Promote “Sustainability Science” and establish an implementation structure. To be specific:

- 1) From the viewpoint of “Sustainability Science”, implement unified management with a view to strongly collaborating with the social and human science sector and the natural science sector, and reflect the principle of “Sustainability Science” which is an integrated approach into the next medium-term strategy (37C/4) and the programme and budget (37C/5) based on the strategy.
- 2) Have scientists, policymakers and others participate and have UNESCO take the initiative to establish a forum at an early date where all the discussions which thus far have been held separately can be coordinated.

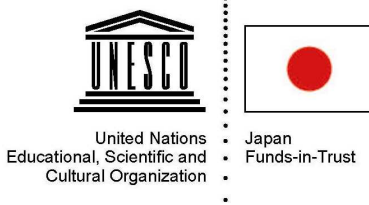
2. Focusing on the fact that UNESCO is a forward-looking agency, show a concrete image of “Sustainability Science” which looks to the shape of the world in 30 years’ time and will be useful for every country and region, and develop diverse measures through various initiatives. To

be specific:

- 1) Align and integrate separate scientific knowledge to utilize as wisdom and launch a structured, multidisciplinary initiative programme, serving needs of the society.
 - 2) Build a network among various sites to promote “Sustainability Science”, follow the achievements of the activities and business models of such sites, consistently reflect these in the forum abovementioned 1. 2), and develop them.
 - 3) Focus on the development of human resources who will be able to sustainably tackle global challenges through cooperation among various fields in order to promote “Sustainability Science”. In particular, considering the collaboration and relations with ESD, implement and accelerate education to foster knowledge and wisdom which makes wise use of science, cultivated through tradition from the stage of primary education.
3. Develop diverse measures in order to encourage a larger number of countries and stakeholders to realize the significance of “Sustainability Science” and participate in promoting it. To be specific:

- 1) Depending on the development of “Sustainability Science”, hold conferences which foster political leadership and continue to disseminate messages to global opinion leaders who have influence on the international community aiming for the penetration of sustainability science,
- 2) Hold workshops and other events highlighting the characteristics of each region with the participation of other international agencies, governments, the industry and NGOs in order to promote and assess the activities on a regional level.

We anticipate that these proposals will greatly contribute to the formulation of the next medium-term strategy (37C / 4).



The Twenty-second IHP Training Course
Precipitation Measurement from Space and its Applications

18 November - 1 December, 2012

Nagoya, Japan

Hydrospheric Atmospheric Research Center, Nagoya University

Supported by

Water Resources Research Center, Disaster Prevention Research Institute, Kyoto University

Japan Aerospace Exploration Agency

National Institute of Information and Communications Technology

Outline

A short training course on precipitation measurement from space and its applications will be programmed for participants from Asia-Pacific regions as a part of Japanese contribution to the International Hydrological Program (IHP). The course is composed of a series of lectures and practice sessions.

Precipitation is one of the major components of the Earth climate system. Precipitation has also a big impact as a major fresh water resource to the ecosystem and human activity. Thus, observation of precipitation distribution is crucial not only for understanding and predicting changes of precipitation under the current global climate change but also for human activities. Global or even locally, precipitation observation is, however, difficult, because it has large spatiotemporal variations.

Progress of Earth observation technology from space is remarkable. The observation targets are land/ocean surface conditions, air quality, cloud distribution, etc. Precipitation is one of the major targets of Earth observation from space. However, the spatial and temporal resolutions and accuracy of the rain retrieval from space are far from sufficient. To meet the requirements, along with the sensor and rain retrieval algorithm developments, other ideas to construct global precipitation maps have emerged. One is the so-called "constellation" satellites in which multiple satellites data are utilized to construct global precipitation maps. The other is data merging in which the satellite precipitation data and ground-based rain gauge data are combined. Nowadays, several satellite-satellite based precipitation maps have already been available, and tests on utilization of the maps to short-term weather forecast, river runoff prediction and flood warning have already started.

In this training course, the basics of precipitation retrieval from space and current global precipitation maps will be introduced. The accuracy will also be included. Examples of global precipitation maps from space will be demonstrated. Practices are for learning skills to utilize the precipitation maps.

For further Information please contact:

Giuseppe Arduino
Programme Specialist in Hydrological/Geological Sciences
UNESCO Office, Jakarta
Jl Galuh (II) No. 5, P.O. Box 1273/JKT
Jakarta 12110 - Indonesia
Tel. : (62-21) 739 9818 ext. 837
Fax. : (62-21) 7279 6489
Email : g.arduino@unesco.org;
with copy to Ms. Eva Mia Siska
em.siska@unesco.org

Please also check the IHP Nagoya Training Courses website:

www.ihpnagoyaforum.org