

NATIONAL REPORT ON IHP RELATED ACTIVITIES AUSTRALIA

1. ACTIVITIES UNDERTAKEN IN THE PERIOD OCTOBER 2006 – May 2008

At the 33rd session of the UNESCO General Conference (2005), Australia was elected to the IHP Intergovernmental Council.

1.1 Meetings of the IHP National Committee

IHP activities in Australia are carried out under the guidance of the national UNESCO Science and Technology Network. In order to facilitate the implementation of UNESCO activities in Australia and the region, a national IHP Australian Network was established in 1995 and this network acts as the IHP National Committee for Australia. There are no formal meetings of the IHP Australian Network. Activities are conducted largely between the members by telecommunications (e-mail). The activities of the IHP network are reported on at meetings of the national UNESCO Science and Technology Network. The Australian National Commission (NATCOM) for UNESCO (www.dfat.gov.au/intorgs/unesco) has 12 members, two parliamentary representatives and four honorary members. Mr Bruce Stewart and Professor Ian White represented the IHP National Network at these meetings.

1.1.1 Decisions regarding the composition of the IHP National Committee

The IHP Australian Network includes the following members. Summary details of all current members are listed below.

Name	Expertise	Organization
Bruce Stewart	Water Resources Assessment	Bureau of Meteorology
Tony Falkland	Island Hydrology	
Trevor Daniell	Urban, Low and High Flow Hydrology	University of Adelaide
Ross James	Hydrological Data & Networks	Bureau of Meteorology
Peter Martin	Public Relations	CRC for Weed Management
Ian White	Hydrology/Water Quality	Australian National University
Erwin Weinmann	Flood management/water resource management	Monash University
Ian Cordery	Flood/Drought Hydrology	University of New South Wales
Peter Dillon	Groundwater	Centre for Groundwater Studies
Anne Jensen	Ecotones	Wetlands Care Australia
Shahbaz Kahn	Sustainable irrigation systems	CSIRO now <u>Unesco (April 2008)</u>
Ray Volker	Groundwater	University of Queensland

1.1.2 Status of IHP-VI activities

The IHP Australian Network brings together many of the key hydrological research groups within Australia. As such, Australia is able to contribute towards IHP activities through the research programs currently existing in Australia. For example, the eWater Cooperative Research Centre (CRC) and other centres for research undertake activities which are closely aligned to the themes of IHP-VI. A description is provided below of some activities pertinent to IHP-VI.

- *Theme 1 - Global Changes and Water Resources*

A subset of the hydrological data collected by the State and Territory water agencies and the Bureau of Meteorology is contributed to international data centres for use in global and regional studies. The eWater Cooperative Research Centre (<http://www.ewatercrc.com.au/>) is continuing its research program that includes modelling hydroclimatic variability and impact on water

resources and aquatic ecosystems and rare events and resilience in hydrological and ecological risk assessment. The Indian Ocean Climate Initiative (IOCI) (<http://www.ioci.org.au>), a partnership of research organisations, is researching the impact of climate variability and climate change on the water resources of the southwest region of Australia. CSIRO (<http://www.csiro.au/>), Australia's national research organisation, has research programs addressing global and regional climate change, climate change impacts on natural resources including water and climate change adaptation strategies. Australian National University (ANU) together with Ecowise Environmental have been researching vulnerability and adaptation to global change in small island countries and have contributed to AusAID's Pacific vulnerability and adaptation project. The ANU, Ecowise Environmental and the University of Adelaide have been investigating the vulnerability of water supply catchments in the Australian Capital Territory to global change.

- *Theme 2 – Integrated Watershed and Aquifer Dynamics*

The Centre for Groundwater Studies (<http://www.groundwater.com.au>) has an extensive research program including research on groundwater/surface water interaction and is investigating how better to manage groundwater resources especially using aquifer storage and recovery. The ANU is researching artesian groundwater processes and modelling of groundwater changes in the lower Great Artesian Basin and in south eastern Australia. ANU, with Ecowise Environmental, are investigating shallow groundwater recharge, socio-cultural aspects of groundwater management and impacts of climate variability in low coral islands as a follow up to a UNESCO-IHP initiated project. As a result of a National Water Initiative (NWI) agreed by Australian federal and state governments all Australian water agencies are required to develop comprehensive water management plans. The plans are being developed through a process of extensive stakeholder consultation and watershed modelling. The process being employed and the resultant plans provide a valuable resource for similar projects elsewhere in the world.

- *Theme 3 - Land Habitat Hydrology*

The ANU and Ecowise Environmental have ongoing projects in conjunction with UNESCO-IHP investigating shallow groundwater recharge, water quality, impacts of land-use and extraction and socio-cultural aspects of groundwater management and impacts of drought in low coral islands. The ANU together with NSW Department of Primary Industry has been investigating estuary policy and management strategies to improve the health of estuaries. Research into hydrological process in and the sustainable management of wetlands is being undertaken in a number of universities and eWater Cooperative Research Centre and the ANU in conjunction with UNSW and the NSW Sugar Industry has been investigating the use of constructed wetlands to treat drainage from farm lands. The urban environment and water sensitive urban design are also areas of current research.

- *Theme 4 – Water and Society*

The National Land and Water Resources Audit (<http://www.nlwra.gov.au/>) and http://audit.ea.gov.au/ANRA/atlas_home.cfm) and the Water and the Economy study have produced a considerable body of data and information about the value, use, distribution and quality of water within Australia. Research on property rights of water and the structure, operations and social and economic impacts of water trading markets continues to receive a lot of attention in Australia and is a potential resource for similar projects in other countries. The ANU, the French agency CIRAD and Ecowise Environmental has undertaken research on the use of multi agent systems and companion modelling to support negotiations and reduce conflict over groundwater use in low atolls.

- *Theme 5 Water Education and Training*

Each of the Cooperative Research Centres (CRC) is required to undertake an active program of training to ensure their research and technology are transferred into practise as soon as possible. The water related CRCs are:

eWater CRC (<http://www.ewatercrc.com.au/>)

CRC for Water Quality and Treatment (<http://www.waterquality.crc.org.au/>)
CRC for Irrigation Futures (www.irrigationfutures.org.au/)

These CRCs are a partnership between universities and other research centres that also have educational and training programs. Some of the research centres are listed separately below.

Centre for Groundwater Studies (<http://www.groundwater.com.au>)

The purpose of the centre is to provide research, education and specialist services for Australian and International land and water industries with the objective of improving the management of resources affected by groundwater processes.

Centre for Environmental Applied Hydrology (<http://www.civaq.unimelb.edu.au/ceah>)

The Centre for Environmental Applied Hydrology is a research centre within the Departments of Civil and Environmental Engineering and Geography and Environmental Science at the University of Melbourne. Specific expertise covers all aspects of surface and groundwater hydrology, hydraulics and geomorphology.

Fenner School of Environment and Society, Australian National University (<http://cres.anu.edu.au>) conducts research and postgraduate training in spatial-temporal variability and characterisation of climate, integrated catchment management, groundwater modelling and hydrology, floods and droughts, coastal hydrology and land use, salinity, cultural and indigenous water issues, water and land policy and related socio-economic interactions, ecological economics.

The International Centre of Excellence in Water Resource Management (ICE WaRM) (<http://www.icewarm.com.au/>) is made up of a consortium of universities and has a strong focus on education and training. It promotes itself to international water resource management students to further their education in Australia and is also developing online courses for delivery in Australia and overseas.

International Water Centre (www.watercentre.org/) is a joint venture between University of Queensland, Griffith University, Monash University, University of Western Australia, International RiverFoundation, Moreton Bay and Catchments Partnership and the Queensland Government. The Centre aims to take Australia's expertise in whole of water cycle management to organizations in the rest of the World through Applied Research, Education and Training and Knowledge Services.

Professor David Waite, Director of the Centre for Water and Waste Technology & Dr Ashish Sharma, from School of Civil & Environmental Engineering at UNSW, are collaborating with Hohai University of Nanjing to develop joint research & Masters' level training programs in WATER MANAGEMENT through the Australia China Consortium for Water Research (ACCWR)

- *Crosscutting Program Components – FRIEND and HELP*

Collaboration in the Asian Pacific FRIEND project by provision of data, hosting a node of the Internet based Water Archive, and assisting in research activities. The CSIRO Griffith and Charles Sturt University Wagga Wagga is a Regional Coordinating Unit for HELP and the Lower Murrumbidgee Catchment has been classified as a Demonstration HELP basin and was the only Demonstration basin of the HELP Pilot Phase. The Burdekin basin and the Fitzroy basin have been classified as Operational Help basins. Both basins are in Queensland.

1.1.3 Decisions regarding contribution to/participation in IHP-VII

Australia is in a strong position to provide input across the range of Focal Areas identified. The research programs of the CRCs, CSIRO and relevant Australian University groups are closely aligned with the activities proposed within the four major theme areas. Some areas in which initial contributions are anticipated include:

Theme I- Global Change, Watersheds and Aquifers

Objective : Achieve improved definition of water dependencies in the face of continuing global change, assess particularly stressed areas and develop institutional synergies to mitigate them.

Primary Focal Area:

Focal Area I-1: Large-scale groundwater dependencies related to global change.

- The Great Australian Artesian basin and associated research activities.
- Frameworks for determining sustainable yield of aquifers

Focal Area I-2: Hydrological extremes in sensitive and stressed biomass and hydroclimatic zones e.g. small island developing states.

- Research activities involving the Pacific Island Countries

Focal Area I-3: Global change and feedback mechanisms of hydrological processes in stressed environments.

- The Murray Darling River Basin and GEWEX related research activities

Focal Area I-4: Changing global dynamics in aquatic environments: degrading ecosystems, especially those susceptible to sea level change, coastal sediment balance and pollutant accumulation.

- Research activities involving the Pacific Island Countries
- eWater CRC Research Activities on water quality and catchment processes
- Groundwater dependent ecosystems

Theme II: Governance and Socio-Economics

Objective: Strengthen good governance, wise stewardship of the resources; achieve capacity development and promote assured flow of finances.

Focal Area II-1: Culture, ethics and legislation for wise stewardship of water.

- Indigenous water knowledge and understanding
- Pacific Island countries culture and water issues

Focal Area II-2: Good Governance, capacity development and stakeholder participation. Empowerment of human resources.

- Assisting in training on MAR (management of aquifer recharge) including management policies, codes of practice
- Frameworks for determining sustainable yield of aquifers
- Aquifer storage and recovery

Focal Area II-3: Affordability, poverty alleviation and assured financing, for effective IWRM. Include 'water' in national PRSP'

- Implementation of IWRM in the Pacific Island Countries (assistance to SOPAC)
- Australian National Water Initiative

Focal Area II-4: Shared Water resources and conflict

- Water markets and water trading approaches
- International exchange of data

Theme III: Ecohydrology and Environmental Sustainability

Objective: Enhance the designation of water both as an abiotic resource, and as a service, delivered by eco system processes; identify, quantify and improve the critical linkages for environmental sustainability

Focal Area III-1: Water as a landscape agent: erosive capacity, mobile solvent, habitat for aquatic biota - interdependencies and regulation in biogeochemical cycling.

- Developing policy and programs to support ecosystem enhancement through ecosystem service production

Focal Area III-2: Complementing engineering solutions with ecological measures resulting in sustainable carrying capacity of ecosystems

- Developing policy and programs to support ecosystem enhancement through ecosystem service production
- National Approach to Biodiversity Decline

- Groundwater dependent ecosystems

Focal Area III-3: Urbanization pressures, sustainable cities, towns and villages; water and sanitation for mega cities

- Free exchange of information between the Australian Water Conservation Reuse Research Program and UNESCO

Focal Area III-4: Risk based environmental management (under uncertainty), especially climate change threats to ecosystem functions

- Biodiversity and climate change

Theme IV: Water Quality, Human Health and Food Security

Objective: Improved understanding of the distribution of abiotic and biotic pollutants in the water cycle and their impact on human health; access to water for long term food security

Focal Area IV-1: Methodologies for safeguards against water borne biotic and abiotic pollutants

Focal Area IV-2: Access to safe water, human health and integrated water resource management.

- A major new research project on storing wetland treated stormwater in a brackish aquifer for recovering potable water. This will be an icon project with much on HACCP that will be transferable to developing countries.

Focal Area IV-3: Non-conventional water resources: brackish water use and waste water re-use.

- major new research project on storing wetland treated stormwater in a brackish aquifer for recovering potable water. This will be an icon project with much on HACCP that will be transferable to developing countries.
- Free exchange of info from Australian Water Conservation Reuse Research Program and UNESCO

Focal Area IV-4: Access to water for food security in environmentally stressed zones.

- Climate variability and change and water resources for agriculture

1.2 Activities at a national level in the framework of the IHP

1.2.1 National/local scientific and technical meetings

- 30th Hydrology and Water Resources Symposium, 4-7 December 2006 Launceston, Tasmania
- 9th Australasian Environmental Isotope Conference and 2nd Australasian Hydrogeology Research Conference with the theme *Integrating research and Innovation*, 13-15 December 2006, Adelaide (<http://groundwater.com.au/aust-isotope-and-hydro-conferences.html>).
- The biennial convention of the Australian Water Association (AWA) (www.awa.asn.au) is the Australian water industry's largest and most prestigious event. It is an internationally recognised and well attended occasion, attracting delegates from across Australia and around the globe. The Ozwater 2007 Convention & Exhibition, was held 4-8 March 2007 in Sydney.
- 5th Australian Stream Management Conference, 21-25 May 2007, Albury, NSW.
- 3rd AWA WATER REUSE AND RECYCLING CONFERENCE 16th - 18th July 2007. University of New South Wales.
- RAINWATER & URBAN DESIGN 2007, 21-23 August 2007, Sydney. This event incorporated the 13th International Rainwater Catchment Systems Conference, 5th International Water Sensitive Urban Design Conference and 3rd International water Association Rainwater Harvesting and Management Workshop.
- 10th INTERNATIONAL RIVERSYMPIOSIUM & ENVIRONMENTAL FLOWS CONFERENCE, Brisbane 3 - 6 September 2007. The symposium includes the Thiess International Riverprize.
- Water for Life Forum 2007: Leading practice in water education was held on 19 September 2007 in Sydney.
- National Water Week, 21-27 October 2007 (www.nationalwaterweek.org.au)
- Greenhouse 2007 convened by CSIRO held 12-5 October 2007 in Sydney had the theme Projections, Probabilities People, Perceptions.

- Hydrological consequences of climate change symposium, November 15-16, 2007, Canberra. brings together Australia's leading climate and water scientists to improve understanding of the likely hydrological consequences of future climate.
- 5th National Waterwatch Conference (www.waterwatch.org.au) was held in Canberra, 26-29 November 2007.
- MODSIM2007, 8-16 December 2007, Christchurch, New Zealand. International Congress on Modelling and Simulation.
- Securing Groundwater Quality in Urban and Industrial Environments. Fremantle, Western Australia, 2-7 December 2007.
- 3rd NATIONAL WATER EDUCATION CONFERENCE, WATER EFFICIENCY 2008 and WICD 2008. All three conferences were held 30 March - 2 April 2008 on Queensland's Gold Coast. Education website ([Website 1](#)), Efficiency website ([Website 2](#)), WICD website ([website 3](#)).
- **2nd International Salinity Forum**, Adelaide, South Australia, 30 March to 4 April 2008
- **Water Down Under 2008**, incorporating the **31st Hydrology and Water Resources Symposium** and the **4th International Conference on Water Resources and Environment Research (ICWRER)**, Adelaide Convention Centre, 14-17 April 2008
- ENVIRO08 A conference and exhibition for showcasing the Australian environment industry. Will be held 5-7 May 2008, Melbourne (www.enviroconvention.com.au/).
- A number of meetings of the National Committee on Water Engineering, Institution of Engineer's have been held during this period. Some of the key purposes of these meetings are to coordinate and organise hydrology and water resources symposia and conferences, to coordinate the ongoing revision to the national hydrological design guidelines Australian Rainfall and Runoff, prepare Position Papers on key hydrological issues and to manage the publication of Australian Journal of Water Resources. Position Papers are now all available on the Institution of Engineers, Australia web site: (<http://www.eng.newcastle.edu.au/~ncwe/ncwePosPaper/ppHome.htm>).

1.2.2 Participation in IHP Steering Committees/Working Groups

Australian experts were nominated for a number of IHP-VI Theme Advisory Boards with Prof. Ian White being appointed as a Regional Representative to the Advisory Board for Theme 4 – Water and Society.

Prof Shahbaz Khan was Chair of the International Steering Committee of the Hydrology for the Environment, Life and Policy (HELP) Program and the Regional Coordinator for the Australasian region. Since April he has been in Unesco Paris as Chief, Sustainable Water Resources Development and Management Section, Division of Water Sciences. Mr Tariq Rana of CSIRO will be the new Regional Coordinator for for UNESCO HELP based at the CSU International Centre of Water for Food Security. Email Tariq.Rana@csiro.au.

CSIRO is the Australian research organisation linked to the Water and Development Information for Arid Lands – A Global Network (G-WADI) project set up by the IHP (www.gwadi.org/).

Prof Ian White was elected to the Governing Board of UNESCO IHE, Institute for Water Education, Delft, the Netherlands in 2006 and is a Member Editorial Board UNESCO- Cambridge University. Press International Hydrology Series.

Prof Trevor Daniell was elected Chairman of the Friend Inter-Group Coordinating Committee at it meeting in Havana, Cuba in December 2006. The 7th FIGCC Meeting was held in Adelaide on April 9th, 2008.

1.2.3 Research/applied projects supported or sponsored

As a follow-up to the UNESCO/SOPAC research projects in Kiribati and Tonga, Professor Ian White, ANU is Project Manger of an ACIAR (Australian Centre for International Agricultural

Research) sponsored project titled: Equitable Groundwater Management for the Development of Atolls and Small Islands. Its overall aim is to provide the basis for the sustainable use and equitable sharing of groundwater resources and their associated catchments between competing sectors, particularly agriculture, combining research on climate, groundwater, cropping and irrigation practices, economics, cultural traditions and social customs, and the aspirations and needs of stakeholders. A start has been made with the first phase of the project in Kiribati focussing on equitable groundwater use in North and South Tarawa. The project is being carried out in conjunction with the French agency CIRAD, the South Pacific Applied Geoscience Commission and government agencies in Kiribati and Tonga. This work is using Multi Agent Systems and a companion modelling approach to develop Negotiation Support Systems to minimise conflicts over water resource development and use.

The Australian Water Research Facility, a partnership between AusAID and the International Water Centre (www.watercentre.org/research/awrf) has a project to research catchment-based risk assessment in the Solomon Islands. The project will develop a framework for determining priorities for water resources management action in catchments.

White I., Falkland A., Metutera T. and Metai E. (2005). Effects of Landuse on Groundwater Quality in a Low Coral Atoll. Coliforms, Nutrients and Metals. ACIAR Project LWR1/2001/050, Equitable Groundwater Management for the Development of Atolls and Small Islands, prepared for the Australian International Agency for Agricultural Research, May 2005

White I., Falkland A., Perez P., Dray A. , Metutera, T. , Metai E., and Overmars M. (2005). Challenges in freshwater management in low coral atolls. Journal of Cleaner Production, Special Edition Water Management in Coastal Zones.

White I., Falkland A., Metutera, T. , Metai E., Perez P., Dray A. and Overmars M. (2005). Climatic And Human Influences On Water Resources In Low Atolls. In Proceedings Of The International Seminar On: Climatic And Anthropogenic Impacts On The Variability Of Water Resources Umr Hydrosociences Montpellier / Unesco / Omm Maison des Sciences de L'eau de Montpellier, 22 - 24 November 2005.

1.2.4 Hydrology for Environment, Life and Policy (HELP)

Australia continues to contribute to the projects established under the HELP banner: the Lower Murrumbidgee catchment in the Murray Darling River Basin, Burdekin River basin (Queensland), Fitzroy River basin (Queensland) and the Mount Lofty Ranges (South Australia).

Lower Murrumbidgee Catchment

Cooperation between researchers, farmers and industry in the Lower Murrumbidgee catchment, and its power to achieve useful and practical on-ground results, is the focus of this HELP initiative. The southern New South Wales catchment has been named as the UNESCO HELP program's first global reference basin. This means that the region's farmers, researchers and irrigation companies will be used as an example to showcase practical solutions for water resources management under competing water uses and economic concerns. The research efforts in the area are addressing problems including rising water tables and salinity, reduced river flows, legislative reforms, competition between water users (including the environment) and falling deep aquifer pressure levels. The catchment is significant; with 2730 farms spread over 560,000 hectares in the Murrumbidgee and Coleambally irrigation areas. Almost a quarter of the water extracted from the Murray-Darling Basin each year is used to produce more than \$1 billion worth of crops – almost 16% of Australia's agriculture produce. The lower Murrumbidgee catchment presents an excellent example of community involvement in hydrological research and the development of integrated catchment management policies using a range of tools. In addition,

CSIRO Griffith and Charles Sturt University Wagga Wagga have been accepted as a Regional Coordinating Unit for HELP.

Contact Point: Mr Tariq Rana (CSIRO) (tarig.rana@csiro.au)

Charles Sturt University, Wagga Wagga, New South Wales is nearing completion of the process of establishment the International IHP-HELP Centre of Water for Food Security (IC WATER) as a UNESCO Category II Centre. The Centre aims to emphasize the pursuit of sustainable development and integrated water resources management in rural and peri-urban food production zones, through the development of scientific research, education, training and awareness-raising at all levels. The development of appropriate policies and practices, the international networking of scientists and the transfer of information and knowledge through IHP-HELP twin basin approach. On 28-30 May 2007 Prof Siegfried Demuth and Mr Giuseppe Arduino visited Charles Sturt University to discuss the establishment of the centre.

Contact Point: Dr Shahbaz Khan (CSIRO) (shahbaz.khan@csiro.au)

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

As President of the WMO Commission for Hydrology and also Chair of the Australian IHP Network, Mr Bruce Stewart provides a link between the UNESCO IHP and WMO's Operational Hydrology Programme. Tony Falkland and Ian White are members of the Water Working Group of the Science, Technology and Resources Network of the South Pacific Applied Geoscience Commission. Ian White is a member of the Asian Pacific Association of Hydrology and Water Resources.

1.2.6 National Plan for water security

As a result of 10 years of drought across a large portion of the country, in recognition that past management of water resources has not been effective, and that the recent National Water Initiative was not achieving sufficiently rapid progress in improving water management, the Australian government has embarked upon a National Water Security Plan. The plan has funding of \$10B, will run for 10 years and includes the following components.

- a nationwide investment in Australia's irrigation infrastructure to line and pipe major delivery channels;
- a nationwide programme to improve on-farm irrigation technology and metering;
- the sharing of water savings on a 50:50 basis between irrigators and the Commonwealth Government leading to greater water security and increased environmental flows;
- addressing once and for all water over-allocation in the Murray-Darling Basin;
- a new set of governance arrangements for the Murray-Darling Basin;
- a sustainable cap on surface and groundwater use in the Murray-Darling Basin;
- major engineering works at key sites in the Murray-Darling Basin such as the Barmah Choke and Menindee Lakes;
- expanding the role of the Bureau of Meteorology to provide the water data necessary for good decision making by governments and industry;
- a Taskforce to explore future land and water development in northern Australia; and
- completion of the restoration of the Great Artesian Basin.

The release of the National Plan for Water Security has resulted in the passing of the first Water Act. Previously water management was covered by a range of legislation enacted by the eight State and territory governments

1.2.7 Other initiatives

1.3 Educational and training courses

1.3.1 Contribution to IHP courses

The Bureau of Meteorology provided input to the meteorology and climatology components of the SOPAC/UNESCO/WMO Hydrological Training Programme that was funded by NZAID and run over the 3 years to 2006 in Fiji.

1.3.2 Organisation of specific courses

A groundwater training course for the Ministry of Public Works and Utilities, Republic Of Kiribati was held at the Australian National University in 12-21 June 2007. The training course was designed to increase capacity in groundwater assessment, monitoring and management and included the maintenance and calibration of Ministry equipment.

1.3.3 Participation in IHP courses

1.3.4 Other

The Centre for Groundwater Studies (a joint venture between 9 research/educational institutions, government water management organizations and private consultants) organises a wide range of groundwater related training courses. Details of courses can be found at the web site <http://www.groundwater.com.au/conf/content.asp>. The centre has established strong links with institutions in the region, particularly in Indonesia, Malaysia, Thailand and China.

Funding support was provide to enable Mr Amos Ona from the PNG WWF to gain experience through participation in and presentation of a paper at the RiverSymposium held in Brisbane, September 2007.

The Brisbane-based International Water Centre announced a new Masters of Integrated Water Management course in December 2006. The course brings together expertise from Australia's leading universities to build capacity for today's water resource managers MIW website. The course starts August 2007.

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

Charles Sturt University, Wagga Wagga, New South Wales is nearing completion of the process of establishment the International IHP-HELP Centre of Water for Food Security (IC WATER) as a UNESCO Category II Centre. The Centre aims to emphasize the pursuit of sustainable development and integrated water resources management in rural and peri-urban food production zones, through the development of scientific research, education, training and awareness-raising at all levels. The development of appropriate policies and practices, the international networking of scientists and the transfer of information and knowledge through IHP-HELP twin basin approach. On 28-30 May 2007 Prof Siegfried Demuth and Mr Giuseppe Arduino visited Charles Sturt University to discuss the establishment of the centre.

1.4 Publications

White I., Falkland A., Metutera, T. , Metai E., Perez P., Dray A. and Overmars M. (2005). Climatic And Human Influences On Water Resources In Low Atolls. *In Proceedings Of The International Seminar On: Climatic And Anthropogenic Impacts On The Variability Of Water Resources Umr Hydrosiences Montpellier / UNESCO / OMM, Montpellier, 22 - 24 November 2005.*

Daniell T., and White I. (2005) Bushfires and their Implications for Management of Future Water Supplies in the Australian Capital Territory. *In Proceedings Of The International Seminar On:*

Climatic And Anthropogenic Impacts On The Variability Of Water Resources Umr Hydrosociences Montpellier / UNESCO / OMM, Montpellier, 22 - 24 November 2005.

F Ghassemi and I White (2007). Inter-basin Water Transfer: Case Studies from Australia, United States, Canada, China and India., Cambridge University Press, UNESCO International Hydrology Series, Jan 2007

Cordery, I; Weeks, B; Loy, A; Daniell, T; Knee, R; Minchin, S; Wilson, D (2007) Water Resources Data Collection and Water Accounting, Australian Journal of Water Resources; Volume 11, Issue 2; 2007; 257-266.

Daniell; Trevor, Nathan Rory, Chiew Francis and Osti Alexander, (2008) Chapter 11, Low Flow Forecasting, in World Meteorological Organisation, 2008, Manual on the Estimation and Prediction of Low Flows, Contribution to the topic Disaster Mitigation: Floods and Droughts (hydrological aspects), WMO

White I., Falkland A., Perez P., Dray A., Metutera T., Metai E., And Overmars M. (2007). Challenges In Freshwater Management In Low Coral Atolls. *Journal Of Cleaner Production* 15, 1522-8.

White I., Falkland A., Metutera T., Metai E., Overmars M., Perez P., and Dray A. (2007). Climatic and Human Influences On Groundwater In Low Atolls. *Vadose Zone Journal* 6, 581–590.

White I., Falkland A., Metutera T., Katatia M., Abete-Reema T, Overmars M., Perez P., and Dray A. (2008). Safe Water for People in Low, Small Island Pacific Nations: The rural-urban dilemma. *Development*, 51, (In press)

1.5 Participation in international scientific meetings

1.5.1 Meetings hosted by Country

See Section 1.2.1 of this report for international conferences hosted.

1.5.2 Participation in meetings abroad

Trevor Daniell participated in the Coordination Committee of the GRDC in Koblenz, 19 to 21 September 2007

Trevor Daniell and Francis Chiew participated in the FRIEND 2006 Meeting in Cuba on Climate Variability and Change-Hydrological Impacts.

1.6 Other activities at a regional level

A project titled: Enhanced Application of Climate Predictions in Pacific Island Countries is currently in progress to meet the general goals of improving weather and climate services and products. The AusAID funded project is developing a climate prediction capacity in participating countries, and in particular, is providing a framework for incorporating climate prediction information into planning across a broad range of agencies and industries. The climate prediction system being provided under the project is based upon the seasonal climate prediction system of the Australian Bureau of Meteorology, which has successfully issued climate predictions for some years. (www.bom.gov.au/climate/pi-cpp/)

The Pacific HYCOS Project proposal developed by WMO in 2001 has received funding through the European Union. The Pacific HYCOS Project was launched at a workshop in Brisbane, Australia 16-19 April 2007 organized Bureau of Meteorology (BOM) Australia, World

Meteorological Organisation (WMO), National Institute for Water and Atmosphere Research (NIWA), and Pacific Islands Applied Geoscience Commission (SOPAC). The meeting and workshop was funded by WMO, BOM and SOPAC.

1.6.1 Institutional relations/co-operation

No information available at this time.

1.6.2 Completed and ongoing scientific projects

Refer section 1.2.3 re ongoing Pacific Island projects.

2. Future Activities

2.1 Activities foreseen until December 2008

- 11th INTERNATIONAL RIVERSYMPIOSIUM & ENVIRONMENTAL FLOWS CONFERENCE, Brisbane, September 2008.
- National Water Week, October 2008
- 9th National Conference on Hydraulics in Water Engineering, 23 - 26 September 2008 at Darwin Convention Centre. Within this overall theme the conference sub-themes are: Climate Change, Methods in Hydraulics, Applied Hydraulics, Geophysical Hydraulics and Coastal Hydraulics.

2.2 Activities Planned for 2008-2009

- Continuation of assistance to Pacific Island Projects.
- Continuation of involvement in Asian Pacific FRIEND.
- Continuation of involvement in HELP
- Participation in the FRIEND Symposium 2010, Fes, Morocco, 25-29th October.

2.3 Activities envisaged in the long term

No information available at this time.