

REPORT**INTERNATIONAL HYDROLOGY:
The UNESCO International Hydrology Programme,
WMO Hydrology and Water Resources Programme,
and International Association of Hydrological
Sciences**

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The United Nations includes a number of agencies which emphasize technology transfer in the water sector; these include the Food and Agriculture Organisation FAO, the Economic and Social Commissions (including, in our region, ESCAP — the Economic and Social Commission for Asia and the Pacific), Unesco, and the World Meteorological Organisation WMO. In addition, a number of non-governmental organisations or international associations of scientists are active in the water sector; perhaps best known in New Zealand is the International Association of Hydrological Sciences IAHS.

New Zealand has formal links with many of these organisations, but relatively little direct use is made by professionals here of the resources that they provide. This is perhaps because, in general, we have well-established links with colleagues overseas, and ready access to information through published literature. This note provides information on the two major UN programmes in the water sector, and the IAHS, to encourage use of their resources.

INTERNATIONAL HYDROLOGY PROGRAMME, UNESCO*Background*

The IHP was launched in 1975, as a successor to the International Hydrological Decade. Although the IHP is basically a scientific and educational programme, Unesco has directed its activities toward practical solution of the world's water resources problems. In line with recommendations of the 1977 United Nations Water Conference, the objectives of the IHP have been gradually expanded to cover not only hydrological processes in relationship with the environment and human activities, but also the scientific aspects of use and conservation of water resources to meet the needs of economic and social development. A multidisciplinary approach is taken to the assessment, planning, and rational management of water resources, to provide solutions to basic problems related to (among others) the lack of reliable water supplies and sanitation, shortage of food and fibre, inadequate supplies of electrical energy, pollution of surface and ground waters, erosion and sedimentation, floods, drought and navigation.

There is now an increasing emphasis on managing water resources for sustainable development, and adapting to the changing climate and environmental conditions which have become more evident since the inception of the IHP.

Thus, the fourth phase of the IHP (1990–1995) has been entitled “Hydrology and water resources for sustainable development in a changing environment”. It has three sub-programmes:

- (a) Hydrological research in a changing environment.
- (b) Management of water resources for sustainable development.
- (c) Education, training, the transfer of knowledge, and public information.

Essentially, the IHP is intended to help co-ordinate efforts in hydrology and the scientific bases for water management. It combines efforts of national, regional and international governmental and non-governmental organisations, with the one overriding goal of helping nations to help themselves. IHP National Committees promote and co-ordinate national water resources information, documentation, and transfer of knowledge from and into their countries.

Implementation

The detailed plan for IHP-IV is being implemented via a series of projects, each with defined objectives, products, activities, and methods; Table 1 shows a representative project, to which New Zealand contributes by providing a member of a technical working group.

The method of implementation varies, as does the group of people responsible for each project. Commonly, projects are carried out by small working groups consisting of experts in the particular topic. Members are usually drawn from several countries, representing a wide geographical spread—a major purpose of Unesco being to promote international contact, communication, and understanding. Some projects are implemented by National Committees of particular countries, particularly those of direct concern to the country. In general, IHP programmes are vehicles for co-ordinating activity by different individuals, institutions, or countries; often they facilitate work that would be done anyway, for example by drawing in data from other countries.

Results of IHP projects are disseminated in a variety of ways:

- through seminars, symposia etc, often in association with IAHS or a national scientific association;
- via the Unesco publication series “Studies and reports in hydrology”, and “Technical papers in hydrology”;
- a less formal Unesco series of “Technical documents in hydrology”, which presents working group reports and guidance material;
- regional training courses and seminars.

Many institutions carry out activities under the aegis of Unesco, for example hydrology courses offered by the University of Roorkee, India, or the University of New South Wales.

Benefits

The primary beneficiaries of the IHP are developing countries, which are provided with training and access to technology which they would not otherwise receive. However, European water scientists in particular also use IHP to facilitate their research. International collaboration is very much aided by the IHP, a Unesco IHP “label” on a research project, conference, or request for information

TABLE 1—Representative projects included in UNESCO's International Hydrology Programme, 1990-5.

SUB-PROGRAMME E		EDUCATION, TRAINING, THE TRANSFER OF KNOWLEDGE AND PUBLIC INFORMATION
Theme	E-1	Education and training of senior technicians
Project	E-1-1	Education systems for hydrological technicians
Objectives		To prepare guidance material for the organisation at national level of continuing education activities for higher technicians and to assist in the establishment of courses on the basis of an assessment of the training needs and facilities.
Products		Technical report with guidance material on the assessment of training needs and facilities National needs and facilities Establishment of training courses on the basis of pilot courses at national level
Activities		Establishment of national and regional education systems Compilation of guidance material and its applications at national level
Method of Implementation		International working group to develop guidance material Consultants to assist in the establishment of national courses and education systems IHP/NCs, national training institutions and WMO Utilisation of material developed by IHP workshop on technology transfer

evidently has significant value. Australia, too, appears to have a strong commitment to the IHP. New Zealand has to date had difficulty in developing effective links with the IHP; there is nominally a NZ National Committee for the IHP but it has only a Chairman: (Dr Richard Ibbitt of DSIR Marine & Freshwater); and a Secretary: (Dr M. P. Mosley), and no other members. It functions primarily as a contact point. However, a number of New Zealanders have attended IHP seminars and meetings recently, and the Committee will continue to watch for opportunities for beneficial contact.

HYDROLOGY & WATER RESOURCES PROGRAMME, WMO

Background

One of the purposes of WMO is "to promote activities in operational hydrology and to further close co-operation between Meteorological and Hydrological

Services". The function of the Hydrology and Water Resources Programme (HWRP) of WMO is to fulfil this purpose.

The overall objective of the HWRP for the decade 1992–2001, which is a component of the WMO's Third Long-Term Plan, is:

"To ensure the assessment and forecasting of the quantity and quality of water resources, in order to meet the needs of all sectors of society, to enable mitigation of water-related hazards, and to maintain or enhance the condition of the global environment".

These needs include the planning, design and management of water projects, including forecasting and control. HWRP aims to develop the capabilities in developing countries through technology transfer and technical assistance, to assess their own water resources on a continuing basis, to respond to threats of floods and droughts and meet all requirements for water and its use and management.

Programme Organisation

The HWRP consists of three programmes:

- Operational Hydrology Programme — Basic Systems;
- Operational Hydrology Programme — Applications and Environment;
- Programme on Inputs for Global Issues.

Hydrological elements are also embedded in several other WMO programmes, such as the Tropical Cyclone Programme and the World Climate Programme, which are closely co-ordinated with the appropriate components of the Hydrology and Water Resources Programme. There are strong links between hydrology and meteorology through the hydrological cycle, and WMO promotes the co-ordination of methods and activities of those involved in the two disciplines.

The Operational Hydrology Programme is planned and executed by the WMO Commission for Hydrology (CHy). CHy also reviews activities under the Programme on Inputs for Global Issues, but responsibility for implementation lies elsewhere, as it is based on agreements with other international organisations and the activities to be undertaken are decided by the WMO Executive Council and the Secretary-General.

The HWRP supports a wide range of activities related to education, training, and technical co-operation in the field of operational hydrology. Regional aspects of projects covered by the HWRP are implemented principally by the six regional associations of WMO, one of which is RAV, Southwest Pacific.

Implementation

OHP-Basic Systems. The Operational Hydrology Programme (OHP) provides the framework for the majority of the scientific and technical aspects of WMO activities in operational hydrology. The OHP-Basic Systems covers the collection, transmission and storage of data, and its main long-term objective is:

"To provide guidance to, and support for, national Hydrological Services in development of their physical and human resources and in their provision of services".

Its projects, include institutional co-operation of hydrological services; standardisation and regulatory activities; hydrological networks and instrumentation; data collection and storage; technology transfer; and human resources development.

Support for the transfer of operational technology is through the Hydrological Operational Multipurpose Subprogramme (HOMS).

The main activities of the Programme are implemented through CHY rapporteurs, either individual experts or subject-oriented working groups, assisted by consultants and seconded experts. Regional aspects are developed by the regional associations through their working groups on hydrology.

Certain projects under the OHP-Basic Systems are linked closely with the Instruments and Methods of Observation Programme, which is concerned with the standardisation of existing instruments, and the development of new instruments and observation techniques for WMO Programmes. Similarly, other projects require collaboration with the World Weather Watch Programme, which provides meteorological data, information and forecasts for a variety of uses, including those of hydrological services.

As with other WMO Programmes, the OHP-Basic Systems is dependent on Members' support and inputs. In addition, collaboration between hydrological and meteorological services at the national level and between the hydrological services of individual Members is essential.

Operational Hydrology Programme — Applications and Environment. The OHP-Applications and Environment covers hydrological modelling and forecasting and provision of data for projects and environmental protection. It brings together hydrological and meteorological activities in support of water-resource development, hazard mitigation and environmental protection. Its activities contribute to meteorological and climatological programmes of WMO which have important hydrological components, such as the Tropical Cyclone Programme (TCP) and the World Climate Programme (WCP).

The long-term objective of this programme is:

“To ensure the identification and effective application of hydrological and related data for the design, construction and operation of water-resource projects, for hydrological forecasting and for the protection of the environment”.

The majority of the activities under the OHP-Applications and Environment are implemented under the auspices of the Commission of Hydrology, with the major inputs being provided by CHY rapporteurs and working groups. Contributions are made under this programme to the TCP, the WCP and to other WMO Programmes by CHY rapporteurs, the WMO Secretariat, or by seconded experts and consultants.

Programme on inputs for global issues. As a follow-up to the 1977 UN Water Conference, WMO takes the lead, jointly with Unesco, in international activities relating to water-resource assessment. Many international programmes call for expertise in operational hydrology which it is the duty of WMO to supply, under this component programme of the HWRP, and it also involves regional projects associated with large international river basins and collaboration with non-governmental scientific and technical organisations.

The main long-term objective of the programme is:

“To increase the effectiveness of WMO activities in operational hydrology at the national level through inter-organisational collaboration in the water field”.

WMO participates in inter-agency activities within the UN on such matters as water policy and environmentally sound management of water resources. Collaboration with WHO relates principally to water quality monitoring and the assessment of water supplies, for example within the context of the follow-up to the International Drinking Water Supply and Sanitation Decade. WMO works together with FAO on such topics as hydrological mapping and data processing, and with IAEA on safety standards for power plants and response to nuclear accidents.

One major new development is the launching by the UN General Assembly of the International Decade for Natural Disaster Reduction (IDNDR), 1990 to 1999. It is being implemented as an interagency activity in which WMO has an important role.

The products of the HWRP include:

- courses and workshops on various aspects of operational hydrology;
- Operational Hydrology Reports on a wide range of topics;
- documents such as the WMO Guide to Hydrological Practices and the WMO Technical Regulations, both presently being revised;
- major international conferences, such as the 1990 Technical Conference on the Economic and Social Benefits of Meteorological and Hydrological Services;
- technology transfer via HOMS and the international contacts arranged through the auspices of WMO.

Benefits

The HWRP provides an avenue by which hydrologists develop contacts and collaborate. The Programme's budget is insufficient to do more than provide secretariat support, pay some of the costs of meetings, and provide a small number of training courses. The bulk of its work is carried out by Members and individuals, under the umbrella provided by the Programme.

The HWRP is strongly focused on the needs of developing countries, but many of its products benefit all its Members. The heaviest representation at CHy meetings is commonly by delegations from the USA, USSR, China, and UK, none of which are dependent on technology transfer from other countries. New Zealand involvement in WMO hydrology activities has been increasing during the 1980s, for example through attending conferences and workshops, participation in preparing the HWRP for 1992-5, and provision of the CHy Rapporteur on Hydrological Services.

The principal contact with the HWRP is the Hydrological Adviser to New Zealand's Permanent Representative to WMO, normally “the head of a Member's hydrological service”, and in New Zealand's case presently Dr M. P. Mosley of DSIR. His role is, in general, to ensure that the HWRP as far as possible reflects New Zealand's interests, to provide New Zealand input into HWRP projects (e.g. provide data requested by CHy rapporteurs), and to disseminate information from WMO to those in New Zealand likely to be interested.

INTERNATIONAL ASSOCIATION OF HYDROLOGICAL SCIENTISTS

The IAHS is well-known amongst New Zealand hydrologists, principally for its sponsorship of international symposia, its Publications, Hydrological Sciences Journal, and Newsletter. It works closely with UNESCO, WMO, and other groupings, particularly the International Union of Geodesy and Geophysics. In particular, it is associated with the international World Climate Programme — Water (which is jointly sponsored by WMO and the International Council of Scientific Unions), and is responsible for implementation of several projects.

New Zealand scientists have a relatively limited amount of effective involvement with the formal IAHS programme, but a significant involvement in terms of attending symposia, and arranging visits which are facilitated by the informal IAHS “network”. The National Correspondent for IAHS is Dr Andrew Pearce (Forest Research Institute, Christchurch).

DISCUSSION

New Zealand’s relative wealth gives hydrologists free access to information available from overseas, and enables a significant funding of freshwater research. This, together with the good personal links with overseas colleagues enjoyed by many New Zealand hydrologists, reduces our dependence on international programmes, which tend to focus on the needs of developing countries.

On the other hand, a surprising amount of hydrology is undertaken, on the international scene, under the auspices of Unesco, WMO, and IAHS, and is facilitated by the links fostered by their programmes. Because of New Zealand’s isolation, this country should maintain effective contact with these programmes, as avenues by which our awareness of international advances in hydrology can be maintained.