

WORLD METEOROLOGICAL ORGANIZATION

Weather, Climate and Water



Comprehensive Report on WHYCOS and on Status of HYCOS Projects Underway

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1. CONTEXT

The World Hydrological Cycle Observing System (WHYCOS) was launched in 1993 by WMO as a follow-up to the International Conference on Water and the Environment (1992) [Ref. 1] and United Nations Conference on Environment and Development (UNCED), Rio, 1992 as a major long-term initiative to improve basic knowledge of water resources assessment and management.

The first project was started in collaboration with the World Bank in 1995 for the Mediterranean basin. The WHYCOS immediately generated and continues to generate interest in hydrological communities around the world, which is evident from the number of components that have been requested from different regions of the world. However, only three HYCOS components have so far been implemented. Further, certain concerns have been raised in respect of the sustainability of some of these components once financial support has come to an end.

The Fourteenth Congress requested the Secretary-General to prepare a comprehensive report on the status of HYCOS projects underway and assess their state of implementation and sustainability. This evaluation is a follow up on this direction of the Congress and has been taken up at policy level reviewing the policies that govern the programme, the sustainability of the programme, the financial arrangements for its implementation and management of activities of the programme.

The evaluation report is divided in two parts. Part A evaluates the programme in its entirety under the given situation discussed above and Part B takes an overall view on the progress made in various HYCOS components.

2. INTRODUCTION

As a follow up to the directions of Fourteenth Congress [Ref. 2], the WHYCOS International Advisory Group (WIAG) [Ref. 3] discussed at length the issues raised within the overall context of the discussions during the Congress and earlier deliberations of WIAG and Cg-XIII. The WIAG looked at various options and needs for a full mid-term evaluation of the programme; the funds required for such an exercise and recommended that the vice-president, with the assistance of the Secretariat, prepare the first draft of a comprehensive report in the form of an internal mid-term evaluation of the programme. In January 2004, the CHy Advisory Working Group (AWG) advised that the report should cover the current status of the implementation of the programme and the constraints and challenges to meet its global objectives.

This report serves the purpose of fulfilling the management needs of information, accountability, and decision advice and the prime objective of learning and improving.

The report is expected to contribute directly to decision-making, as WHYCOS is a long-term initiative, and provide a mechanism through which funding agencies; programme managers and participating countries can learn about the processes and performance of the efforts. It is considered as a step towards improving the overall functioning of the programme. As such this **in-term** evaluation is expected to provide guidance on the future components of the WHYCOS programme.

PART A: EVALUATION

3. CONCEPT, RATIONALE AND DESIGN

3.1 Social, scientific and economic needs

The United Nations Conference on Environment and Development (UNCED), Rio de Janeiro, 1992 was an attempt to reconcile, amongst others, water resources development and environmental protection. Agenda 21 [Ref. 4] was produced as a blueprint for the future. The freshwater chapter (Chapter 18) of Agenda 21 recognized that knowledge of the hydrological cycle, in terms of quantity and quality forms the essential basis for effective water resources management. Adequate information is essential for wise management of water resources.

While demand for water is increasing throughout the world, increasing pollution is likely to reduce the quantity of water of suitable quality. Different uses of water compete within national boundaries and there are about 260 river basins and numerous aquifers which are shared between two or more nations. Competition for water in such conditions may constitute a threat to peace, but it could also be used to bring countries together around the negotiating table and work as a catalyst for cooperation and collaboration.

In these circumstances, planning and decision-making must achieve new levels of integration, reliability, and acceptance. This calls for timely, accurate and comprehensive information about the status of water resources and for complementary information about the economic, social, and environmental dimensions of water use.

Unfortunately, in many parts of the world, the systems for collecting and managing water-resources related information are inadequate, and are often deteriorating. The ability of the NHSs to provide information on the status and trend of water resources is declining. They are unable to maintain their systems for acquiring water-related data, and for disseminating it to decision makers, engineers, and the public. Particular difficulties include lack of resources to maintain observing stations, differing procedures for collecting data, variations in quality assurance procedures and standards between different agencies and countries, unreliable telecommunication systems, and outdated systems for information management.

For these reasons, the World Meteorological Organization (WMO), in association with the World Bank, launched the World Hydrological Cycle Observing System (WHYCOS) in 1993. Other partners joined the initiative later.

The need for monitoring systems, data archives, resource assessment and pollution monitoring, protection and control has been recognized in various country reports of the UNDP and World Bank. Sub-Saharan Africa Hydrological Assessment [Ref. 5] highlighted the decline of monitoring networks, absence of computer based archives, and lack of qualified staff as a result of funding cuts to the hydrological services. This situation is true for many other countries. The World Bank has specially looked at these issues in its Technical Publication No. 263 "A Guide to the Formulation of Water Resources Strategy" [Ref. 6].

3.2 The Original Concept of WHYCOS

To counter these trends, and to assist its Members in maintaining and improving their observational and information systems, WMO developed the WHYCOS concept.

It was developed as a global programme, modelled on the World Weather Watch of the WMO; with the objective of setting about 1000 stations sited on the major rivers and measuring 15 variables, such as flow, sediment, water chemistry and on bank meteorological variables and using the same information and telecommunications technology. It was seen as part of a future UN Water Information System to provide a means for the international community to monitor more accurately water resources on a global level, and to better understand the global hydrological cycle. At the same time it was expected to enhance the capacity of National Hydrological Services (NHSs), so that they are ready to meet the demands placed on them for sustainable development.

The main original objectives as brought out in WMO brochure No. 876 [Ref. 7] are:

- Strengthening the technical and institutional capacities of hydrological services to capture and process hydrological data, and meet the needs of their end users for information on the status and trend of water resources;
- Establishing a global network of national hydrological observatories which provide information of consistent quality, transmitted in real time to national and regional databases, via the Global Telecommunication System (GTS) of WMO, and
- Promoting and facilitating the dissemination and use of water-related information using modern information technology such as the World Wide Web and CD-ROMs.

It has a double-thronged component: a support component, which strengthens cooperative links amongst participating countries having common hydrological problems and an operational component, which helps to achieve “on the ground” implementation at regional and international river basin levels.

The concept of WHYCOS as a **global network of reference stations** which transmit hydrological and meteorological data in near real-time, via satellites, to national hydrological services and regional centres, appeared to have been marketed more strongly in the early stage.

After years of experience in developing different components it was realised that there was a need for a clear distinction to be made between the objectives of the global concept of WHYCOS and those of the regional HYCOS components.

3.3 Evolving Concept

While the original concept, aims and principles of WHYCOS are sound, a slightly different approach of the implementation of WHYCOS has evolved, primarily in response to the experience gained from practical applications.

Although, Cg-XII had pointed out that the first priority for WHYCOS was to meet the needs of the countries, to begin with greater emphasis had been placed on the concept of a global database to capture data and information on the hydrological cycle. It is argued that to a certain extent this focus was at the expense of what should have been the major thrust of the WHYCOS concept in a bottom up approach by supporting regional and basin HYCOS projects. That is, while the concept is global in nature, the benefits of capturing data for specific purposes at the regional and national level should have been the initial focus.

Recognizing the above facts the WIAG members in the first meeting in 1998 reiterated the overall goal of WHYCOS as: *“To work towards a global water observation and information system”*. But at the same time it re-oriented its objectives as follows:

- To strengthen the technical and institutional capabilities of national Hydrological and Hydrometeorological Services through training and capacity building;
- To develop and enhance information systems for providing reliable water-related data, information and products to meet users’ needs (for example, flood forecasting and warning, drought forecasting and water resources management);
- To establish a global network of key national observing stations for providing consistent, high-quality data on water quantity, water quality and weather, transmitted in real-time to national and regional data centres;
- To promote and facilitate the dissemination and use of water-related information through up-to-date technology;
- To stimulate water resources assessment activities;
- To strengthen cooperation at the basin, regional and international levels as a contribution to integrated water resources management;
- To enable the availability and use of water-related information for larger scale applications in other WMO and international scientific programmes; and
- To establish a framework of guidelines and compatible standards for data collection, storage,

Further, during the WIAG meeting in June 1999, while discussing the outcome of Cg-XIII on the WHYCOS programme, it was noted that the global concept of the programme remained a leading objective. The WIAG appreciated that the global concept was driven by scientific needs and by the need of governments and intergovernmental bodies for rendering advice on the state of the world’s water resource. However, it recognised that the regional developments were driven by the priorities of the countries for socio-economic development. It recommended to adopt a bottom-up approach to ensure the involvement of the countries concerned and respond to their needs.

As a result the WHYCOS changed its focus to a basin approach (2000) [Ref. 8] and is now being developed in the form of regional components referred to as HYCOS, which meet the objectives and priorities expressed by the National Hydrological Services (NHSs) and end-users of the participating countries. Each of the HYCOS components is independently implemented and tailored to specific national and regional needs in the basin. ***A HYCOS component should be launched when the countries concerned have expressed their collective desire for such a development, and their commitment to making it a success.***

The objective of meeting the water resources development needs in the countries realised through water resources assessment and monitoring at the basin level, and as such the main goal of the programme right from the onset should have been the regional and basin wise water information systems. Such regional and basin wide information systems put together can build the global information system and cater for the needs of the global scientific community. As pointed out earlier, this shortcoming was realized during the early

stages of the programme (Ref 9) and corrective measures were taken during 1999 and 2000 to shift the focus on to basin wise approach.

Implementation on a basin or regional scale enables each HYCOS component to address the particular needs of the participating countries and their NHSs and the end users and establish institutional and financial arrangements. It allows each HYCOS project to select activities and procedures and design products, which are specific to the hydrological characteristics of the basin/region.

3.4 Resources

3.4.1 Financial Resources

The HYCOS components are implemented in three successive stages: the initiation stage, the implementation stage and the maintenance stage. The initiation stage includes reaching agreement among participating countries, defining a set of needs for the component and developing a proposal for submission to funding agencies. This stage is fully funded from the internal resources of WMO. The implementation stage includes the detailed project formulation and execution at the national and regional levels. The implementation stage is funded by the financial partners (donors). The post implementation phase to sustain the network and infrastructure created under the HYCOS projects is expected to be the responsibility of the national governments and funded through their own resources. This is for sustainability of the system and should be addressed from the start of the project.

On an average 40,000 to 50,000 CHF were annually allocated for the WHYCOS development activities from HWRP regular budget. Resources from the Hydrology Trust Fund have also been used but to a limited extent.

The missions for pursuing the components were generally taken up by the staff along with other tasks related to the HWRP activities in the region. This prolonged the initial negotiations with the participating countries and sometimes also prolonged the whole negotiations for the project. ***There is need for creating a dedicated fund with sufficient resources for taking up activities under the WHYCOS programme including project identification and formulation.***

The funding for implementation stages of the projects essentially comes mainly from the donor agencies. This calls for communicating clear understanding of the objectives of the programme and its identifiable outcomes to the potential donors. There is need for advocacy and a systematic campaign and marketing policy to raise funds for the programme.

The extensive advocacy taken up during 2002 and 2003 by participating in the various international and regional conferences both at technical and political level helped in putting basic hydrological data needs at the top of the political agenda and a priority.

This was demonstrated, for example, through the declaration of the Pan African Implementation and Partnership Conference on Water, (December 2003, Addis Ababa, Ethiopia) where the African Ministers responsible for water have committed themselves:

“To foster data and information exchange as a baseline requirement to ensure improved early warning and forecast, especially in trans-boundary basins. To support the expansion of the World Hydrological Cycle Observing System (WHYCOS) and other networking mechanisms to cover all regions and river/lake basins in Africa.” [Ref. 10].

The basin approach for the development of HYCOS components also attracted donors and earned financial support from the donors with development interests in the basin. The case of AOC-HYCOS in West Africa is a fitting example. The development of basin HYCOS components in the form of Niger-HYCOS and Volta-HYCOS as follow-up to AOC-HYCOS, combined with the political commitment by the AMCOW has created fresh interest in the donors to support the programme in the region.

3.4.2 Human Resources

The staff members responsible for activities in the regions also looked after the activities related to WHYCOS in their respective regions. This arrangement is appropriate for the ground implementation of the programme.

However, there is need to create a mechanism for developing the software components such as common guidelines, quality assurance procedures, and product development. Common guidelines for implementation of WHYCOS or development of a Web site are essential tools to provide guidance and exchange of information and experiences across different HYCOS components. ***There is need to develop a dedicated mechanism for providing software inputs for the WHYCOS programme and individual HYCOS components. There should be mechanism to provide extra technical manpower to support such activities.***

4. MANAGEMENT AND IMPLEMENTATION

4.1 Management

Countries, mostly through expression of an interest in WMO constitutional bodies, requested the development of the HYCOS component without being aware of the obligation in the process. As result more than twenty projects were initiated. This resulted in thinly spreading of both financial and human resources. ***It is advisable to concentrate on developing a few of the components especially those with stronger country and/or donor commitment*** [Ref. 2]. There is need to set guidelines for inclusion of a request for development of a component into the portfolio.

The staff dealing with the programme needs to be better equipped with the latest project management techniques and provided special training in monitoring and post project evaluation. All the projects should have post project evaluation as in the case of SADC/HYCOS Phase I [Ref. 11].

A marketing policy and strategy should be developed to attract potential donors for support to put the programme in full swing. ***There is strong need for a marketing strategy for WHYCOS to get across to donors the concept of WHYCOS as a tool for poverty alleviation through sustainable development.***

There is need to develop a communication and advocacy strategy by bringing out more publications and information material or means of communication for sharing the common goals, objectives and methodologies with potential partners. ***There is also a need for documents that clearly lay down the roles, procedures, responsibilities and obligation of each of the collaborating partners in order to avoid any ambiguity.*** The WHYCOS Guidelines under preparation along with information pamphlets can serve this purpose well. ***There is need to make use of modern Information Technology. A WHYCOS web site, regularly updated, along with a regular electronic newsletter are seen as a must and an economic option for exchange of information.***

4.2 Implementation

It is noted that the regional institutions or river basin authorities, on recognizing the need for cooperation in water resources among its member states or strengthening its hydrological services, conveyed their intentions to the WMO without proper consultations with the potential participating countries. In certain cases where consultations were taken up with participating countries, major issues were marginalized. As a result, in certain projects, some participating countries did not actively participate in the HYCOS components, which slowed down the negotiation process in the project. However, early involvement of participating countries in the development of the project had positive effects on project implementation.

The process of reaching agreement among participating countries to proceed with establishing a HYCOS is an essential first step, to ensure that there is a strong commitment to the concept, and that the system is maintained in post project stage. Further, defining the set of needs to be met by the HYCOS component to underpin sustainable economic and social development in the participating countries, and specific needs for capacity building in their hydrological services involves a number of stakeholders from within the participating countries. These processes take a considerable amount of time and persistent negotiations.

Although one of the main objectives of the HYCOS projects is to encourage and enhance data exchange among participating countries, this issue has always been a major obstacle towards cooperation amongst participating countries. Data sharing issues have to be adequately addressed during the initiation stages of the projects. This issue was evident because of the absence of a clear agreement amongst participating countries, prior to the project's development, to share the collected data. In some projects, an agreement to share only information and products, not the raw data, solved the problem.

The issue of meeting the cost of DCPs installation during the implementation phase in some countries presented a major problem, as it was not clearly mentioned in the project document.

Capacity building is a common objective of any HYCOS project. It has been achieved at different degrees in the projects in accordance with the targets set out in the project document. Training in the core areas like water resources assessment, quality management in hydrological observations etc have to be internalized both in the project document as well as in the actual training carried out under the project. The training needs of countries have to be addressed in totality. ***There is need to be more assertive at the project development stage to incorporate the comprehensive training needs of the countries in the project document. The experience of some projects also show that the timing of training events has to match the project implementation schedule.***

4.3 Collaborations

The implementation of an inter-disciplinary programme like WHYCOS calls for cooperation and coordination between different players with specific roles and responsibilities. To begin with there are a number of user groups in the countries that have interest in the water resources assessment and information and data related to water resources.

Different countries sharing a basin are often driven with divergent interests. They are the key players who sometimes need external efforts to bring them together to cooperate on the issues related to trans-boundary waters in a basin. The WHYCOS process can play a key role in this direction and encourage member countries to cooperate and collaborate for the mutual benefit of the people of these countries. The regional agencies, institutions and groupings are also motivated and driven by the similar concerns for the development of the

regions and do play a crucial role in the WHYCOS programme. The financial resources to put all the good intentions into practice are to be made available by the donor agencies which have their priorities and special development interests in certain regions and countries. In addition there are a number of technical institutions that are engaged in the regions in technology transfer or in research activities of global and regional nature. All these stakeholders have certain specific roles to play for which they need to be consulted. ***There is a need to bring all the players at the same level of information regarding aims, objectives and methodologies to achieve the agreed goals.***

In order to establish a common conceptual basis and to ensure consistency of practice and results, overall coordination is provided by the WHYCOS International Advisory Group (WIAG). It was established by service note No. 12/98 [Ref. 12] and comprises:

- The president of CHy (Chairman);
- One representative of each HYCOS component being implemented;
- Regional Hydrological Advisers of Regions where HYCOS components are being developed;
- The member of the CHy Advisory Working Group responsible for WHYCOS;
- One Representative of each of the External Support Agencies (ESAs) providing support to the programme;
- Representatives of the WMO Secretariat (HWR) and other Departments as appropriate.

In addition, observers are invited to participate in certain meetings depending on the agenda.

The WIAG meets once every year to exchange information, look at the policy issues, provide guidance and discuss other matters. Similarly, there is a WHYCOS Coordination Group (WCG), which coordinates the activities on WHYCOS within the WMO Secretariat, to ensure links with the other programmes like GCOS, WWW, and GTOS etc. There have been six meetings of each of these groups since their creation.

WIAG and WCG have proved to be excellent and effective mechanisms to bring all the stakeholders together. ***However, there is need to make use of modern tools of communication for improving the coordination, enlarging this consultation mechanism, and reviewing the need for having annual sessions.***

It is desirable to identify certain collaborating institutions in different regions to meet the specific technical demands of the projects in the regions. These institutions could also participate in conducting training courses within the HYCOS projects in accordance with the needs of countries.

4.4 Technology Transfer and related problems

One of the objectives of the initial concept of WHYCOS was to get the hydrological data in real-time by using DCPs and transmitting through the GTS of WMO. Irrespective of the real-time need for the information, most of the sites established under the HYCOS were provided with DCPs, which were installed in remote sites. Some of these remote stations, being un-manned, were vandalized. There were also problems of non-availability of spare parts and breakdowns. As a result, the maintenance represented a major problem at the country level.

The technology used for data transmission have to be the most appropriate for the regions and have to be decided taking into account the infrastructural and economic conditions in the project region.

It is important that these issues are addressed right from the project initiation stage and carried into the implementation stage. Only the technology that could be easily absorbed under the given infrastructure facilities in the participating countries should be utilized. This issue is closely linked with the long-term sustainability of the components and programme as a whole.

5. SUSTAINABILITY

The long-term sustainability of a HYCOS component is considered a pre-requisite and should be addressed right in the initial stages of the project development. Sustainability of a HYCOS project would depend on:

- o The commitment of the countries;
- o The type of technology used;
- o The robustness of the project elements; and
- o The capacity of the country to absorb and maintain the technology.

To ensure successful international cooperation at the basin level, political support at the highest level is required. Such technically intensive project implementation requires capacity building in the region, sufficient resource allocation and political commitment to ensure sustainability.

The commitment of the countries to continue supporting participation of their NHSs in the day-to day activities such as data collection, operation and maintenance of the network, quality control and primary processing of data, database updating, preparation of products, dissemination of data and information, etc., must be firm and persistent. If necessary, this should be demonstrated through ***the establishment of MoU's with Governments to get their commitment to sustain the project in the medium- and long-term by including it in their national programmes.*** Such an agreement at the initiation stage would help ensuring commitment from the participating countries.

It is important to choose the right type of instruments and technology for the HYCOS components, which can withstand environmental conditions in the participating countries and require basic minimum maintenance, which could be taken up by the countries from within their technological competencies.

At the time of development of the project document, or before deciding the detailed specification of the instruments and equipment, an overview of the available hydrometeorological equipment and the technology being used by the countries should be taken, including the facilities, expertise and infrastructure available for their maintenance. At the same time greater emphasis needs to be placed on building the capacity of the countries to set up a maintenance unit, which could be outside the NHSs, if the circumstances deem it necessary.

6. DATA EXCHANGE AND SHARING

Most of the implemented projects succeeded in establishing an information system for water resources assessment, monitoring and management through putting in place regional databases. They have acted as important regional tools for strengthening regional cooperation. The project management unit (PMU) and the project regional center (PRC) created under the projects have proved to be effective and important components in the

structure of any HYCOS project. They have to continue its functions after the implementation stage.

The water community is a very heterogeneous group both within and without the national boundaries. In most of the countries water issues are being dealt with by a number of institutions divided under various disciplines as well as geographical administrative units. There is need for all the stakeholders in a basin to share this information, which is increasingly being recognized.

However, water being bound to a basin, the need to exchange information across the river basin boundaries has never been felt strongly by the water community. The sharing of water among various riparian countries is always a political issue, especially when the basin suffers from shortages. The political relations between the neighbouring countries, instead of the water management needs sometime overshadow the scientific issues and the politics, rather than the water management needs decide the policies of sharing water related data.

With this background, one of the major obstacles at the project formulation stage has been in convincing the member countries to participate in the regional components as the programme is looked at with suspicion. The project initiation stages have therefore taken longer than expected.

Further, under the present procedure, even after a country joins a component, there is no formal obligation on the part of the participating country to share the data. ***A Memorandum of Understanding based on WMO Resolution 40 (Cg-XII) [Ref. 13] and Resolution 25 (Cg-XIII) [Ref. 14] for sharing and exchanging water-related data should be drawn amongst participating countries at the project initiation stage.***

Countries should also be encouraged to share the hydrological data and products generated by HYCOS projects not only within the participating NHSs, but also all economic and social stakeholders concerned with water-related issues, including the general public. The agreement should also stipulate putting the products and information on the Web-site of PRC.

7. RECOMMENDATIONS

1. The ownership of the WHYCOS programme and its regional components should remain within WMO while the countries have ownership of implemented projects. The role of WMO should be spelt out clearly in all three stages; initiation stage, implementation stage and the post project stage.
2. Available management techniques should be used in implementing the programme through appropriate monitoring and evaluation procedures.
3. There is need for developing a marketing strategy for attracting donors to support potential projects.
4. WHYCOS Guidelines is an essential document to identify objectives, goals, procedures, and responsibilities of each partner. After finalisation, it should be widely circulated among all interested countries as well as potential donors and other collaborating partners.
5. New HYCOS projects should be developed according to these Guidelines.

6. Countries should accept to comply with WMO WHYCOS Guidelines as a prerequisite for developing any new HYCOS project.
7. HYCOS components should be demand driven addressing the needs of the region for greater commitment to sustain the project in the long run.
8. There should be firm commitments from interested countries regarding specific issues such as agreement on exchanging data and sharing historical data available in the country with the regional database. In this regard, each HYCOS component should identify the basic data to be exchanged.
9. There is need to streamline the funding mechanism for the initiation stages by creating a separate fund. The staff cost recovered from the ongoing projects should be reinvested in supporting the development of other potential components by transferring to this fund.
10. HYCOS components should be prioritized in order to concentrate efforts on supporting those with stronger country and donor commitment in their favour.
11. Capacity building should be a major element in the implementation of any HYCOS project. WMO by its interaction with countries through WGHs is in a position to identify the capacity building needs.
12. Development of products of national and regional interest under the projects should be given high priority in all the HYCOS project stages.
13. The hydrological data and products generated by HYCOS projects should benefit not only the participating NHSs but also all economic and social stakeholders concerned with water related issues.
14. WMO should provide more technical support to the project through technical inputs in finalization of specifications, evaluation of tenders, the selection of resource persons and active participation in evaluation and monitoring.
15. The technology to be used for equipments and data transmission should be the most appropriate for each specific region, considering infrastructural and economic conditions of participating countries.
16. There is a need to identify institutions to be associated with WMO as collaborating centres for developing the WHYCOS programme and its components.
17. Review mechanism should be established for the projects and the programme.
18. Links need to be established amongst the HYCOS projects and also with other related projects in the regions. The possibility of using Internet links should be included.
19. Countries should be encouraged to set-up measures to ensure security of installed equipment and networks.
20. An agreement with MoUs among participating countries and Project Regional Centre should be established to clearly define responsibility and commitment of each party and the long-term sustainability of the regional database.
21. There is a need for periodic evaluation of the projects, particularly midway and one year after project completion.

PART B: STATUS OF HYCOS COMPONENTS

The WIAG emphasized the need to prioritize HYCOS projects of different regions and concentrate efforts on supporting those with stronger country and donor commitment in their favour. The Secretariat reviewed the status of the different projects and classified them in six categories under three groups as follows:

1. Implemented projects
(Completed)
2. Under implementation
(Field implementation started – Funds committed by donors)
3. Advanced development stage
(Detailed project document available – Part funds committed by donors)
4. Preparatory stage for implementation
(Project proposal available – funded by WMO)
5. Conceptual stage
(Country commitments received and Project brief prepared - funded by WMO)
6. Under consideration
(Country request received)

A detailed brief on the status of each project in the above categories is described in Annex 1.

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STATUS OF HYCOS COMPONENTS AS OF FEBRUARY 2005

Project	Status			
	Participating countries	Funding and management	Achievements or Expected Outputs	Remarks
Implemented projects (Category 1)				
MED-HYCOS	Albania, Algeria, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, France, Greece, Italy, Jordan, Lebanon, Malta, Morocco, Romania, Serbia and Montenegro, Slovenia, Spain, The former Yugoslav Republic of Macedonia, Tunisia, Turkey (20 countries)	Donor: World Bank Grant: US\$ 1,700,000 Pilot Regional Centre (PRC): Institut de Recherche pour le Développement - IRD (France) Executing Agency: WMO	<ul style="list-style-type: none"> Enhanced cooperation among participating countries Establishment of a network of 31 DCPs Development of a Mediterranean hydrological Information system accessible via the Web Training for the staff of the participating NHSs 	Implementation: 1997 – 2001
SADC-HYCOS (phase I)	Angola, Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, United Republic of Tanzania, Zambia, Zimbabwe (11 countries)	Donor: European Commission Grant: US\$ 2,400,000 PRC: Department of Water Affairs and Forestry - DWAF (South Africa) Supervising Agency: WMO	<ul style="list-style-type: none"> Installation of a network of 43 DCPs, Development of an Internet based Hydrological Information System Training for the staff of participating NHSs Enhanced cooperation among participating countries 	Implementation: 1998-2001
AOC-HYCOS (pilot phase)	Burkina Faso, Cape Verde, Chad, Gambia, Ghana, Guinea, Mali, Mauritania, Níger, Nigeria, Senegal (11 countries)	Donor: France Grant: FF 2,000,000 PRC: AGRHYMET and Niger Basin Authority - NBA (Niger) Executing Agency: WMO role:	<ul style="list-style-type: none"> Consolidation of the development of the Regional Hydrological Observatory of Western and Central Africa Support to the data collection activities of participating countries Enhanced cooperation among participating countries 	Implementation: 1999-2002

Cat. 1 Implemented projects (external funding ended)

Cat. 2 Projects under implementation (field implementation started or funds already committed by donor(s))

Cat. 3 Advanced development stage (detailed project document available or partial funding already committed by donor(s))

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Cat. 5 Conceptual stage (country commitment received and project brief prepared, funded by participating countries and/or WMO)

Cat. 6 Countries requested WMO support for project development

Projects under implementation (Category 2)				
Niger-HYCOS	Benin, Burkina Faso, Cameroon, Chad, Côte d'Ivoire, Guinea, Mali, Niger, Nigeria (9 countries)	Donor: France Grant: 3,000,000 PRC: Niger Basin Authority - NBA (Niger) Supervising Agency: WMO	<ul style="list-style-type: none"> Reinforcing national data observation and collection capacity (49 DCPs) Developing national hydrological information systems Establishing a regional information system Training Enhanced cooperation among participating countries 	Funds committed by donor Preparatory phase to start soon Implementation: 2005 – 2009
Volta-HYCOS	Bénin, Burkina Faso, Côte d'Ivoire, Ghana, Mali, Togo (6 countries)	Donor: France Grant: € 1,000,000 PRC: Ecole Inter-Etat d'Ingénieurs de l'Équipement Rural – EIER (Burkina Faso) Executing Agency: WMO	<ul style="list-style-type: none"> Developing a regional infrastructure for data collection, management and exchange (16 DCPs) Support the development of a regional cooperation framework Enhanced cooperation among participating countries 	Funds committed by donor Preparatory phase to start soon Implementation: 2005 – 2009
SADC-HYCOS (phase II)	Angola, Botswana, Democratic Republic of Congo (DRC), Lesotho, Malawi, Mauritius, Mozambique, Namibia, South Africa, Swaziland, United Republic of Tanzania, Zambia, Zimbabwe (13 countries)	Donor: European Commission, The Netherlands Grant: € 4,500,000 PRC: Department of Water Affairs and Forestry - DWAF (South Africa) Supervising Agency: WMO	<ul style="list-style-type: none"> Consolidation/redesign of the regional observation network, Development of the sub-regional and national water resources information systems, Development of hydrological products Enhanced cooperation among participating countries 	Funds committed by donor Preparatory phase to start soon Implementation: 2005 – 2008

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Projects in advanced development stage (Category 3)				
Carib-HYCOS (CIC)	Barbados, Cuba, Dominican Republic, France (Guadeloupe and Martinique), Haiti, Jamaica, Trinidad and Tobago (8 countries)	Donor: France Estimated budget: € 3,000,000 PRC: IRD in Martinique Supervising Agency: WMO	<ul style="list-style-type: none"> • Modernization and strengthening of national activities in WRM • Establishment of a network of about 40 – 50 DCPs • Promotion of international cooperation among small island states • Promotion of the exchange of information, technology and experience 	Partial funding contributed by donor, for project preparatory phase. Project document prepared. Preliminary meeting held in Dec. 2004. Implementation: 3 years (starting 2005)
HKH-HYCOS	Bangladesh, Bhutan, China, India, Nepal, Pakistan (6 countries)	Donor: USA Estimated budget for phases 1 and 2: US \$ 1,834,414 Supervising Agency: WMO	<ul style="list-style-type: none"> • Establishment of a regional network of 18 DCPs • Establishment of a regional Flood Information System; • Provision of near real-time meteorological and hydrological information (especially flood forecasting). • Enhanced cooperation among participating countries 	Partial funding contributed by donor Project document prepared Preliminary test phase to be launched in 2005 Implementation: 8 years (3 phases)
IGAD-HYCOS	Djibouti, Eritrea, Ethiopia, Kenya, Sudan, Uganda (6 countries)	Donor: European Commission Estimated budget: € 5,200,000 Grant: € 195,000 (project formulation) Supervising Agency: WMO	<ul style="list-style-type: none"> • Establishment of a regional network of 50 DCP's • Creation of a regional information system • Promotion of national capacity in water management • Enhanced cooperation among participating countries 	Detailed project document available, funding being sought, funding being negotiated with the European Commission Implementation: 4 years (starting 2005)

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Projects in preparatory stage (Category 4)				
Mekong-HYCOS	Lao PDR, Thailand, Cambodia, Viet Nam (4 countries)	Estimated budget: US \$ 4,905,420 Supervising Agency: WMO (proposed)	<ul style="list-style-type: none"> • Establishment of a real time data collection and transmission system based on a network of 60 hydro and 40 meteo DCPs • Strengthening of the capability of NHSs to provide timely and accurate monitoring and forecasting services • Enhancement of regional cooperation; 	<p>Project proposal available</p> <p>Country consultations to be started in early 2005</p> <p>Period of implementation is expected to be 6 years</p>
Baltic-HYCOS	Belarus, Czech Republic, Estonia, Finland, Germany, Latvia, Lithuania, Poland, Russian federation, Slovakia, Sweden, Ukraine (12 countries)	Estimated budget: € 2,360,000 Executing Agency: WMO (proposed)	<ul style="list-style-type: none"> • To establish a system to acquire, manage and disseminate water resources and water-related environmental data and information (40 DCPs). • To foster the adoption of standardized practices of data and information management and dissemination. • To enable the international exchange of water-related data and information • To enhance cooperation among participating countries 	<p>Project proposal available, submitted for funding to the European Commission (FP5) but not retained</p> <p>Period of implementation is expected to be 3 years</p>
Pacific-HYCOS	Cook islands, Fiji, Nauru, New Caledonia, Niue, Papua New Guinea, Solomon Islands, Vanuatu (8 countries)	Estimated budget: US\$ 2,197,990 Supervising Agency: WMO (proposed)	<ul style="list-style-type: none"> • Establishment of national capacity in water resources assessment • Establishment of basic hydrological monitoring and data capture systems • Establishment of hydrological databases and information systems 	<p>Project proposal available.</p> <p>Funding being sought.</p> <p>Period of implementation is expected to be 5 years</p>
Projects in conceptual stage (Category 5)				

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Nile-HYCOS	Burundi, Democratic Republic of Congo, Egypt, Eritrea, Ethiopia, Kenya, Rwanda, Sudan, United Republic of Tanzania, Uganda (10 countries)	Estimated budget: US\$ 2,500,000 Executing Agency: WMO (proposed)	<ul style="list-style-type: none"> • Improvement of data collection, management, storage and exchange • Reinforcing hydrological forecasting (floods and droughts) and water management • Promoting integration of hydrological data with socio-economic and environmental data • Enhancing cooperation among participating countries 	<p>Countries committed</p> <p>Project brief prepared, suspended during institutional reform process of regional institution</p> <p>Period of implementation is expected to be 2 years</p>
Amazon-HYCOS	Bolivia, Brazil, Colombia, Ecuador, Peru, Venezuela (6 countries)	N.A.	<ul style="list-style-type: none"> • Promoting the knowledge about hydrological processes through the use of new technologies and reinforced human resources. • Stimulating the cooperation between hydrological services through the establishment of a information network and of a regional center • Enhancing cooperation among participating countries 	<p>Project brief prepared, waiting for countries' commitment</p>
Aral-HYCOS	Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan, Uzbekistan (5 countries)	Estimated budget: € 4,000,000	<ul style="list-style-type: none"> • Developing a hydrological information system for the Aral Sea basin; • Providing assistance to the participating countries in capacity building • Enhancing collaboration with other projects and programmes in addressing environmental issues • Enhancing cooperation among participating countries 	<p>Countries committed, project brief prepared, funding being negotiated with the Swiss Agency for Development and Cooperation (SDC)</p> <p>Period of implementation is expected to be 2 years</p>

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Arctic-HYCOS	Canada, Iceland, Norway, Russian Federation, USA (5 countries), in cooperation with international scientific programmes	Estimated budget: US \$ 1,230,000	<ul style="list-style-type: none"> • Establishment of a basic network of hydrological stations in the Arctic drainage basin • Establishment of a regional data bank for real time and historical data and uniformization of data practices. • Harmonization and integration with other relevant international observation networks (GCOS, GTOS, GOOS, AMAP, etc.). • Enhancing cooperation among participating countries 	<p>Countries committed</p> <p>Project brief prepared</p> <p>Part of WMO contribution to the International Polar Year (2007-2008).</p> <p>Period of implementation is expected to be 2 years</p>
Black Sea-HYCOS	Bulgaria, Georgia, Republic of Moldova, Romania, Russian Federation, Turkey, Ukraine (7 countries)	N.A.	<ul style="list-style-type: none"> • Achieving better understanding of regional hydrometeorological processes and environmental trends • Promoting the exchange of standardized and consistent data; • Providing transboundary co-operation especially in dealing with extreme events and in capacity building • Enhancing cooperation among participating countries 	<p>Countries committed</p> <p>Project brief prepared</p> <p>No further development due to lack of funding</p>

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Danube-HYCOS	Austria, Bosnia Herzegovina, Bulgaria, Croatia, Czech Republic, Germany, Hungary, Serbia and Montenegro, Slovakia, Slovenia, Republic of Moldova, Romania, Ukraine (13 countries)	Estimated budget: US\$ 2,150,000	<ul style="list-style-type: none"> Improved observing networks and data management facilities Improved data accessibility, exchange and dissemination; Improved forecast reliability and timeliness, and delivery of hydrological information products to support the Danube conventions. Enhancing cooperation among participating countries 	<p>Countries committed</p> <p>Project brief prepared No further development due to lack of funding</p> <p>Period of implementation is expected to be 4 years</p>
La Plata-HYCOS	Argentina, Bolivia, Brazil, Paraguay, Uruguay (5 countries)	Supervising Agency: WMO (proposed)	<ul style="list-style-type: none"> Promoting the knowledge about hydrological processes through the use of new technologies and reinforced human resources. Stimulating cooperation between hydrological services through establishment of an information network and a regional centre 	Project brief prepared, waiting for countries commitment
Lake Chad-HYCOS	Cameroon, Central African Republic, Chad, Niger, Nigeria (5 countries)	N.A.	N.A.	Country request received Preliminary steps ongoing for developing a project brief
Senegal-HYCOS	Mali, Mauritania, Senegal (3 countries)	N.A.	N.A.	Country request received Preliminary steps ongoing for developing a project brief

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STATUS OF STATIONS IN THE IMPLEMENTED HYCOS PROJECTS

HYCOS PROJECT	NUMBER OF STATIONS			REMARKS
	PLANNED	INSTALLED	WORKING	
MED-HYCOS	47	31	12 (as of 5 March 2005)	Each participating country designated sites to be equipped with DCPs according to its priorities and interests.
SADC- HYCOS	51	49	25 (as of 11 March 2005)	At the end of the first phase, 43 stations had been installed and subsequently 6 more were installed.

**EXTRACTS FROM PROCEEDINGS OF WMO CONSTITUENT BODIES, WORKING GROUPS
AND OTHER GROUPS****Fourteenth Congress, Geneva, 5-24 May 2003**

3.5.1.20 Congress expressed its appreciation for the development of WHYCOS through the various HYCOS components and recommended that efforts be substantially intensified so as to ensure a rapid and successful implementation of such projects. Congress requested the Secretary-General to prepare a comprehensive report on the status of HYCOS projects under way and to assess their state of implementation and sustainability.

Fifty-Sixth Session of Executive Council, Geneva, 8-18 June 2004

7.1.18 The Council noted that the WHYCOS coordination mechanism established by the Secretary-General continued to serve as a most valuable vehicle to review the programme activities and to develop future plans. It was informed on the outcome of the meetings of the WHYCOS International Advisory Group and the WHYCOS Coordination Group, which were held in the WMO Secretariat in 2003 and 2004. The Council was pleased to learn that HYCOS guidelines were in an advanced state of preparation and requested the Secretary-General to ensure that the first draft of the comprehensive report on HYCOS projects be submitted to its fifty-seventh session.

Twelfth Session of Commission for Hydrology, Geneva, 20-29 October 2004

6.3.10 The Commission was briefed on the development of the preparation of the first draft of the Guidelines on WHYCOS and appreciated the work of the authors and the Secretariat undertaken for the preparation of that valuable document. The Commission also felt that the Guidelines should not be prescriptive, except for some topics such as data exchange, regional cooperation and ownership.

Third session of CHy Advisory Working Group, Geneva, 23 to 27 February 2004

3.4.1 The meeting was informed that Cg-XIV had requested the Secretary-General to prepare a comprehensive report on the status of HYCOS projects and to assess their state of implementation and sustainability. The meeting noted that the issue had also been discussed at the sixth session of WIAG in November 2003 and it was recommended that the Secretariat prepare and circulate the first draft of the status report to WIAG members for comments.

3.4.2 The AWG supported the WIAG view that the report should cover the current status of implementation of the regional components, their success and pitfalls, the challenges, the international exchange of data, standardization issues and how the global concept of the project is proposed to be retained. The report shall address also the issue of long-term sustainability of the HYCOS components after the end of the external support. It shall also provide advice and suggestion on how to mobilize further funds for the development of the programme and analyze the development strategy.

3.4.3 The AWG requested that a draft of the report should be circulated to the CHy President (also in his capacity as chairman of WIAG), the vice-president and the member of the AWG responsible

for WHYCOS for their comments. After incorporating the comments from WIAG and AWG, the President will decide on the issue of presenting it to CHy. Subsequently, the revised draft should be submitted to the Executive Council in 2005.

**Sixth meeting of WHYCOS International Advisory Group (WIAG),
Geneva, 24 – 26 November 2003**

4.9 In response to the request by Congress for a comprehensive report on WHYCOS, the meeting recommended that the Secretariat prepares the first draft of a comprehensive report on the status of the WHYCOS and, after incorporation of comments of the members of WIAG place it before CHy in its next session in October 2004 for inputs and views of the member countries. Later the revised draft should be submitted to the Executive Council in 2005. The final version shall be presented at the next Congress. The report should cover the current status of the implementation of the programme, its achievements, constraints, and challenges to meet global objectives of the programme and the way forward to meet the desired objectives.