



## **MEDIUM TERM PLAN 2007-2009**

**June 2006**

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CPWF is a program of the Consultative Group on International Agricultural Research (CGIAR)

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## Abbreviations and Acronyms

ARI	Advanced Research Institute
APSIM	Agricultural Production Systems Simulation
AREO	Agricultural Research and Education Organisation
ASB	Andean System of Basins
BC	Basin Coordinator (of the CPWF)
BFP	Basin Focal Project
BRB	Benchmark River Basin
CA	Comprehensive Assessment (of Water Management in Agriculture)
CATIE	Tropical Agricultural Research and Higher Education Center
CBO	Community Based Organisation
CCER	Centre Commissioned External Review
CGIAR	Consultative Group on International Agricultural Research
CIAT	Centro Internacional de Agricultura Tropical
CPMT	Challenge Program Management Team
CPWF	Challenge Program on Water and Food
CSIR	Council for Scientific and Industrial Research
CSIRO	Commonwealth Scientific Industrial and Research Organisation
DHI	DHI Water and Environment
DSSAT	Decision Support System for Agro-technology Transfer
DVD	Digital Versatile Disk
EMBRAPA	Brazilian Agricultural Research Cooperation
EPMR	External Program Management Review
FGDC	Federal Geographic Data Committee
GECAFS	Global Environmental Change and Food Systems
GEC	Global Environmental Change
GIS	Global Information System
IAA	Integrated Aquaculture-Agriculture
IAASTD	International Assessment of Agricultural Science & Technology
IBWMS	Integrated Basin Water Management Systems
ICARDA	International Centre for Agricultural Research in the Dry Areas
IDIS	Integrated Data Information System
IFPRI	International Food Policy Research Institute
IGB	Indo-Gangetic Basin
ILRI	International Livestock Research Institute
INRM	Integrated Natural Resource Management
IPG	International Public Goods
IRBO	International River Basin Organisation
IRD	Institute de Recherche pour le Developpement
IRRI	International Rice Research Institute
IWMI	International Water Management Institute
IWRM	Integrated Water Resources Management
JIRCAS	Japan International Research Center for Agricultural Sciences
KRB	Karkheh River Basin
MDG	Millenium Development Goals
MTP	Medium Term Plan
MUS	Multiple User Systems
NARES	National Agricultural Research and Extension System
NGO	Non-Governmental Organisation
NWSPP	National Water Sector Perspectives Plan
OVC	Orphans and Vulnerable Children
PES	Payment for Environmental Services
PVS	Participatory Variety Selection (by farmers)
QSMAS	Quesungual Slash and Mulch Agroforestry System
R&D	Research and Development

QTL	Quantitative Trait Loci
SC	(CGIAR) Science Council
SEI	Stockholm Environment Institute
SDC	Swiss Agency for Development and Cooperation
SGP	Small Grant Program
SRI	System of Rice Intensification
STAR	System of Temperate and Tropical Aerobic Rice
SWAT	Soil and Water Assessment (tool)
SMS	Short Message Service
TL	Theme Leader (of the CPWF)
UCDavis	University of California, Davis
UNEP	United Nations Environment Programme
WEPP	Water Erosion Prediction Model
YRB	Yellow River Basin

## PART 1: OVERVIEW

### 1 Introduction, context and program discussion

#### 1.1 Introduction

This introductory section covers the period since the submission of the last Mid-Term Plan until present, and concentrates on the following areas:

- > Principal areas of progress.
- > Developments in 2005 and early 2006.
- > Changes to the CPMT strategic plan.
- > Research achievement highlights.
- > Program progress.

At this point – just under half way (two years and six months) in the implementation of the first CPWF phase (and three-and-a-half years since inception began) governance and management processes are running smoothly, the program is in reasonable financial health, and technical processes – such as issuing new calls and obtaining reviews by the CPWF Expert Panel on Scientific Quality – are familiar, although they must be adjusted to each specific instance.

Fifty-two projects – from the first competitive call, Basin Focal Projects (BFPs) and small grants for impact - are contracted and funded. All but six of the fifty-two were selected competitively by the CPWF. Some have been running nearly two years, but a majority are one year old or less. Early results – and better understanding about the details of results that can be expected – are beginning to flow. Synthesis research – a major and important challenge, and the key to the added value of the program – is also beginning to function.

A second competitive call is very important strategically to “fill gaps” in the initial CPWF research portfolio and to maintain interest and momentum. The challenge has been to obtain sufficient funding alongside other important demands, especially the BFPs. An increased contribution from the World Bank for 2006 and confirmation of likely funding from the European Commission for 2006 has enabled a modest second call to be initiated. A call for concept notes is currently advertised. The call and priorities are available on the CPWF web page [www.waterandfood.org](http://www.waterandfood.org).

Working from gaps identified by CPWF theme leaders (TLs) and basin coordinators (BCs) in previous CPWF priorities and from summaries specially contracted by the CPWF from the Comprehensive Assessment on Water Management in Agriculture (CA), TLs and CPWF Management Team (CPMT) prepared a focussed set of priorities that was submitted for review to the CPWF Expert Panel. At the CSC meeting held in Cairo (May 2 – 3), the CPWF Steering Committee confirmed six research priorities to focus the second call. Each project will have a funding ceiling of US\$ 0.5 million and will be expected to deliver results in two years, to coincide with the completion of the CPWF's first phase.

## 1.2 Program research highlights

The seven MTP 'projects' reflect the main research thrusts of the CPWF. Therefore, MTP projects 1 – 5 represent the five thematic areas of research around which CPWF research is structured in the Research Strategy. Project 6 represents the portfolio of (currently four, soon to be eleven) Basin Focal Projects, and Project 7 is the Small Grants for Impact program that is aimed at a better understanding of the uptake of water related technologies. Research is undertaken within these 7 projects by contracted multi disciplinary teams and by the theme leader and basin coordinators who provide technical guidance and undertake synthesis of the results. The highlights presented in this section describe early results from projects as they are yet to mature sufficiently to offer significant new research results and tools that impact broadly on MTP project activities. For simplicity, individual projects are referred to throughout this document by the contract number (i.e. PNxx). A list of currently contracted projects is at Annex 1. Progress reported refers to 2005.

### MTP Project 1: Crop and water productivity

This project has developed interventions (technologies, policies) that will lead to the improvement of crop water productivity by (a) plant breeding for water efficient and stress-tolerant crops; (b) water-saving farm practices; (c) management of water supply based on field water requirements; and (d) policies and institutions.

In 2005, eleven CPWF-funded projects addressed crop water productivity as their main focus, with activities in all of the nine CPWF benchmark basins. The project portfolio includes a wide range of crops, environments, scale levels (molecular level, plant, field, agro-ecosystem), and approaches. Methodologies vary from biotechnology tools for breeding (QTL mapping, marker-assisted selection, gene pyramiding), to conventional breeding, controlled field experiments, farmer-participatory variety selection and natural resource management, crop modeling, GIS, and remote sensing.

In Northern China, aerobic rice yields of 4.7 to 6.6 t ha<sup>-1</sup> were recorded, and in the Philippines of 4.0 to 5.9 t ha<sup>-1</sup> (PN16). The aerobic rice systems developed used 30-50% less water than lowland rice in controlled field experiments. In Ghana, improved cowpea varieties with enhanced drought-handling capacity and resistance to heat stress were developed in PN6. Participatory germplasm screening and the development of appropriate management practices are complementary approaches to account for the interaction of genetic traits and the environment, and to the discovery of regulatory genes. In Eritrea, PN2 developed a farmer-participatory multi-location testing and selection program of parental lines, segregating populations and breeding lines of barley, wheat, chickpea, lentil, faba bean, cowpea and grass pea under drought stress. In PN7, a major QTL for salinity tolerance in rice has been mapped on chromosome 1, designated *Salto1*, accounting for up to 80% of variation in tolerance. Two minor QTLs were also mapped on chromosomes 10 and 12. Efforts are ongoing to fine-map *Salto1* to facilitate tagging for use in marker-assisted selection. Farmer-participatory evaluation of best bet technologies to increase water and nutrient use efficiencies are being undertaken by several of the theme 1 projects (PNs1, 5, 6, 8, and 11). In the coastal regions of Vietnam, the areas that are suitable for rice-aquaculture production system were delineated as specific resource management units in PN10. In these units, the farmers' perception that the rice-shrimp rotation system is less disease-prone than monoculture shrimp system will be scientifically investigated

A conceptual framework for the analysis and improvement of crop-water productivity was developed. This framework elaborates basic principles to increase water productivity, while coupling high yields with reduced use of scarce water resources: (a) increase transpirational crop water productivity, (b) increase the storage size for water in time or space, (c) increase the proportion of non-irrigation water inflows to the storage pool, and (d) decrease the non-transpirational water outflows of the storage pool. The framework was illustrated with examples at the plant, field and (small) agricultural landscape level, for cropping systems found in semi-arid areas to flooded rice in monsoon climates.

This project led the assessment of rice and water in the Comprehensive Assessment of Water Management in Agriculture (CA).

## **MTP Project 2: Water and people in catchments**

During 2005, important research was carried out to explore ways in which to improve how water and other resources are used in upper parts of catchments with a view to improving the quality and availability of water, and in turn the livelihood options, available to people living downstream.

Several projects have made conceptual and/or empirical progress towards understanding and documenting the relationships between water, livelihoods, and poverty at multiple scales. This knowledge is fundamental to designing interventions that are both sustainable and equitable. PN20, developed a conceptual framework to look at the relationships between collective action, poverty and scale. This project also adopted and developed a participatory poverty tool to assess water-poverty relationships in the communities of three catchments in the Nile and the Andean System of Basins (ASBs). The results showed that there are many direct and indirect relationships between water and poverty, and that there are likely to be trade offs between environmental security and poverty alleviation that will have to be addressed via political processes. PN28 found, on the basis of empirical evidence in four of the benchmark basins (Limpopo, Mekong, Indo-Gangetic and Andes), that where water services are multiple-use by design they are more responsive to poor people's needs and have a greater impact on reducing poverty. Although many water systems are designed to allow for limited alternative use outside, for example, domestic and irrigation water uses, this flexibility is often insufficient to have a significant impact on poverty. Water system designs need to be considerably more flexible if they are to positively impact poverty.

Projects also worked on improving soil, water and nutrient management to make better use of scarce water, and to limit downstream effects of cropping practices. Important advances were made in the improvement of catchment hydrology knowledge: PN17 surveyed water productivity and the yield gap in rainwater harvesting systems for eight districts in the Mzingwane catchment (Limpopo) and indicated presence of in situ water harvesting that, if combined with the use of fertilizers, improved water productivity. During 2005, hydrological modeling (using SWAT- Soil and Water Assessment Tool) was completed for two pilot sites in the Andes: Fuquene (Colombia) and Altomayo (Perú). Soil and greenhouse gases samples were collected in Fuquene (Colombia) in order to measure the impact of land uses and management practices on soil properties, on carbon sequestration and on hydrological externalities. Non-point sources of nitrates and phosphates were identified using natural stable isotopes in Fuquene to help establish causal relationships between water pollution and land uses. The point of this work is to identify opportunities for users in the lower catchment to pay those in the upper catchment for environmental services. PN30 constructed a delineation tool to map wetlands using Landsat images, which serve

as a means to analyzing historical land use changes in wetlands. This is the first such tool, and will permit land use researchers and planners to better incorporate wetlands into their analyses.

Other projects developed a better understanding of social and hydrological systems, and how they interact: PN22 built an optimization model for externalities valuation and opportunity cost calculation. Results for Fúquene illustrated that conservation farming practices had positive impacts on erosion control, water soil retention, employment generation and improvement of farmers' incomes; PN30 elaborated a research framework to produce a series of integrated crop production, hydrological, ecological and socioeconomic models for scenario analysis and the determination of trade-offs between wetland uses and human welfare. MTP Project 2 carried out a social networks analysis and its application to relations between the actors who manage water resources and the biophysical conditions in two upper catchments.

All projects expect to produce some generalizable recommendations and guidelines for policy. Target audiences include governments, NGOs and civil society. While in most cases it is too early to expect results in this MTP Project, some projects can already see policy implications in their results. In PN28, Learning Alliances - a monitoring and evaluation method involving individuals and institutions were established at community, intermediate and national levels in pilot sites where MUS approaches are being designed and implemented.

### **MTP Project 3: Aquatic ecosystems and fisheries**

Significant progress has been achieved in areas of the development of frameworks for policy and institutional arrangements for managing aquatic ecosystems and fisheries; The development of tools and methodologies to assess the economic value of aquatic ecosystem goods and services; increasing the area under integrated agri-aquaculture in basins, and the improvement of culture-based fisheries management in reservoirs.

During 2005, this theme gained considerable insights into the question of institutional mechanisms for good governance in fisheries through (a) five state-of-the-art reviews commissioned during 2004, that portrayed the current status and the needs for generating additional knowledge and (b) preliminary outputs being generated by five projects (PN 10, 30 and 34, 35, 52) in the Mekong, Indo-Gangetic, Nile, Volta and Limpopo basins. Environmental flows has been identified as an important area of research. Projects addressing this issue are part of the second competitive call for concept notes. The second call should also result in strengthening research addressing governance and valuation issues.

Work focused on ensuring the achievement of good governance has recognised the importance of participation by all stakeholders in decision-making processes. This is also true to ensure that the benefits derived from aquatic ecosystems are equitably distributed. Decentralization and co-management are the two essential elements of fisheries governance reforms. Likewise, the evolving concept of co-management has great relevance in reservoir fisheries and IAA. Other work has focussed on laying down the principle of developing inland fisheries as a tool for enhancing water productivity on an environmentally sustainable and socially equitable basis. These pertain to riverine fisheries, fisheries of small water bodies, culture-based fisheries and aquaculture.

Other projects focusing on this Thematic area have provided early results, such as the development of decision-support tools and an institutional framework for the integrated, multipurpose management of a dual fresh- and brackish-water regime to

meet the needs of diverse water users and the environment in Vietnam (PN10). Interim findings in the Mekong have provided new insights into the governance of fisheries resources by identifying options for designing and developing a community-level fishery management system that can be scaled up (PN52).

Work has started on understanding the social and economic viability of a new approach of combining agriculture and fish culture in seasonal floodplains under different socio-cultural and institutional environments (PN35). This will lead to design of appropriate institutional arrangements for different social settings. The project made a detailed analysis of the governance arrangements for fish culture in irrigation systems (canals, fields, reservoirs) with a view to harnessing the full social value of these resources.

A framework for analyzing trade-offs between food production/security and environmental security among wetland users is being developed in the Limpopo basin (PN30). This draws on a comparative analysis of social welfare benefits accruing from various options for wetland water use for agriculture and the trade-offs among them, including the issues related scales of intensity.

Another project has started developing inventories on reservoir resources in each of the selected benchmark basins focussing on a variety of variables, production potential and potential yield gaps (PN34). This will lead to detailed assessments of their fisheries and the implementation and testing of the most technically viable and socially acceptable models for enhancement in each of the selected study reservoirs, based on predictive potential production indicators and different fisheries management scenarios developed under the project. The ultimate output is envisaged as an increase in reservoir productivity with a subsequent improvement in the livelihoods of the local communities, without adverse environmental or social impacts.

#### **MTP Project 4: Integrated basin water management systems**

This project contributes to enhancing water productivity through the generation, dissemination and application of knowledge in three complementary areas – innovative technologies and management strategies; effective policies and institutional arrangements and decision support tools and information. In 2005, the research activities focused on three key areas:

Conceptual frameworks have been developed that build on existing frameworks for analyzing water productivity in rain-fed and irrigated crop production systems. These include a conceptual framework for livestock water productivity (PN37); a framework for analyzing trade-offs associated with wetland utilization and the role of water productivity improvements in reducing negative impacts (PN30); and a framework for combining the best of traditional practices and modern techniques in dam operation so as to maximize benefits for those living both upstream and downstream of a dam (PN36). An integrating framework was also developed to explore the role of increasing water productivity in enhancing human and ecological wellbeing, concomitantly. These frameworks play a key role in improving our understanding of the complex processes that determine basin-level change in land, water and agricultural production systems. They are particularly useful in identifying where interventions are needed to enhance water productivity and to identify strategies and options for minimizing negative impacts. These frameworks also facilitate communication of these complex concepts to policy makers, practitioners, and farmers.

Researchers associated with this project have carried out activities aimed at raising awareness of the challenges, opportunities and priorities for action associated with increasing water productivity in ways that enhance human and ecological well-being, concomitantly. Two projects, (PN36 and PN46) identified collaborative arrangements with other global initiatives that address dam development issues. PN36 is working closely with the Dam Development Project of UNEP and is expected to play a key role in providing insights into agricultural water management issues in dam planning and operation. Another two projects (PN38 and PN51) have raised awareness of the nature and extent of waste water irrigation, its potential contribution to poverty alleviation and associated health risks and how to reduce these in the Volta basin. These projects have played an important role in revealing how wastewater can be used safely to increase agricultural water productivity. They are also working with farmers, traders and vegetable consumers to identify promising approaches to reducing health risks through low cost wastewater treatment, dilution of wastewater with surface and groundwater, irrigation technologies, crop production and vegetable handling techniques. The awareness of water constraints to livestock production has been raised by PN37, and the potential contribution of improving livestock water productivity to poverty reduction and to reducing land and water degradation. Interactions with policy makers and other officials of government departments charged with responsibilities for land, water, environment, irrigation and crop production has led to improved dialogues and a shift towards integrated and holistic approaches to addressing livestock, water, crop and environmental issues. Livestock water has been included as a major research focus of ILRI. PN40 and PN47 have raised Awareness has also been raised of water governance challenges and opportunities in Volta and Limpopo basins (PN40 and PN47).

A number of projects were involved in developing, testing and adapting tools and methods that they will use to identify appropriate interventions for enhancing basin-level water productivity. Emphasis has been placed on understanding the impacts of local-level land, water and production system management on food security, poverty alleviation, water availability and ecological conditions of aquatic ecosystems in different parts of the basin. As part of this work, an innovative approach to using remote sensing data to assess the distribution of reservoirs and their water balances has been developed (PN46). Information developed from such an analysis is then used to assess the impacts of small reservoirs on the quantity, quality and timing of water use in downstream river reaches.

### **MTP Project 5: Global and National Food and Water Systems**

In 2005, research activities were carried out through a combination of case studies in benchmark river basins, overall project conceptual development, and international conferences and meetings. The project has four research areas: (a) globalization, trade, macroeconomic, and sectoral policies, (b) transboundary water policies and institutions; (c) incentives, investments and financing of agricultural water development and water supply; and (d) adapting to changes in the global water cycle. The project developed a first conceptual framework that allows it to analyze the four sets of key research activities in an integrated fashion.

Similarly, case studies developed conceptual frameworks using two basic approaches: (a) scenario analysis, including drivers, agricultural outputs and services, and development goals; and (b) stakeholder participatory research and institutional analysis. Applying the scenario approach, PN48 has developed working papers on the key drivers of India's water future, including population and economic growth, funding availability for irrigation and water supply, and key social and environmental constraints. Similarly, PN53 has started to use scenario analysis to

identify options for rural areas to adapt to increasing climate variability and climate change, by eliciting stakeholder perceptions on climate change impacts and adaptation measures, and by implementing two large household surveys that will allow econometric estimation of the determinants of adaptation to climate change in case study sites. Using a bottom-up participatory research and institutional analysis, projects developed and started to apply frameworks for Democratizing Water Governance (PN50<sup>1</sup>), for Groundwater Governance (PN42), for the Inclusion of Indigenous Principles (PN47), and for Multi-scale Interactions in Watersheds (PN20).

Finally a project-level organized workshop entitled “Globalization and Trade: Implications for Water and Food Security” took place at the headquarters of the Tropical Agricultural Research and Higher Education Center (CATIE) in Turrialba, Costa Rica. The workshop aimed to identify research gaps, opportunities for collaboration among disciplines, and avenues for policy reform for the research area on Globalization, Trade, Macroeconomic, and Sectoral Policies.

### **MTP Project 6: the Basin Focal Projects**

In late 2005 the first set of four commissioned BFPs were contracted and initiated, although with more delay than had been anticipated. A BFP ‘Coordination Project’ has also been established led by two senior scientists. This project provides scientific oversight and direction to the individual BFPs and undertakes research, including commissioned, on issues that cut across all river basins. Each ARI-led team arrived with highly developed competences, that continue to expand as they realise the full range of disciplines required to tackle the particular research problems presented within each basin. Concepts of water poverty and water productivity have been expanded to provide a basis for analysis at basin scale. A series of working papers discussing these and other issues have been developed, and are available on the BFP website.

Analytical methods have invariably started in the core team members’ discipline areas and have expanded to form a coherent set of methods that are capable of representing the complex interplay between hydrology and rural livelihood systems. Detailed methods vary to account for different attributes of basins, but the following components are common to all:

- > A three-level understanding of water agricultural processes at basin, community-level and household scale.
- > Basin-wide analysis of hydrology.
- > Community-level analysis of livelihood systems
- > Rules (quantitative or qualitative) that link the two systems.

The Global Environmental Change and Food Systems (GECAFS) project is a comprehensive and interdisciplinary research program focused on understanding the interactions between food systems and global environmental change (GEC). A small project is being supported in the IGB to clarify the multiple links between water stresses, global environmental change and impacts on the food system. Research has commenced at five field sites to: (a) assess methods to analyze the relationship between poverty and vulnerability to water stress in the context of food systems, and

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<sup>1</sup>PN50 only received funding in 2006, but started activities in 2005.

(b) develop methods to map specific relationships among poverty, food security and water over time and space, across basins. Preliminary food system matrices have been developed for all sites, and both primary and secondary data collection is under way. These matrices will be used to assess the vulnerability of the food systems to water stress, and to provide information about how this is linked to poverty.

An ex-ante impact assessment review has been initiated with CIAT and IFPRI. Impact assessment is an essential process to identify (a) the degree and nature of change that can be plausibly be expected from research; (b) the impact pathways and (c) partners necessary to increase likelihood of positive change. A program of workshops is being initiated in all basins to develop this capacity in all projects, basin coordinators, BFP Central and the CPWF secretariat. Workshops have been completed in the Volta, Mekong and Karkheh river basins, and a workshop is planned for the Indo-Gangetic in June 2006). These workshops are providing the basic data in order to undertake analysis including the identification of extrapolation domains and basin-scale impact modelling. Scenario analysis will also be undertaken, taking out high potential research outcomes to their likely status over 25 years, and to the global level.

A third BFP wide contract is with the International Data Information System (IDIS) project, jointly supported by CPWF and IWMI. IDIS offers an Internet platform for exchange of data and insight about basins. BFP Project scientists are being actively encouraged to engage with IDIS, through design of products suited to their needs. The following products/services are currently available:

- > A generic and scalable database that is distributed across multiple locations,
- > A flexible and efficient data extraction process
- > Data fusion methodology to compile time-series from multiple data sources,
- > DVD-data kits for each basin, containing all shared data and core GIS/Remote Sensing data,
- > A powerful yet easy-to-use web mapping service that allows inspection of basin data at multiple scales,
- > Metadata (FGDC standard).
- > An (experimental) SMS message-based service to provide information, advice and alerts to farmer groups and other stakeholders.
- > A full data-set has been loaded for the Karkheh. Negotiations are on-going for data-loading for other basins.

### **MTP project 7: Small grants for Impact**

This is a new addition since the last MTP but does not indicate any deviation from the CPWF Research Strategy as the projects are firmly lodged in the innovation and outreach phases of the research strategy. Following independent competitive assessment and selection in November 2005, fourteen high-quality projects were contracted in January 2006. They are active in 12 countries, located in seven of the nine CPWF Benchmark Basins (no proposals were received for the Sao Francisco and Yellow River basins). The topics include:

- > Surface, groundwater, runoff, rainwater harvesting (Bolivia, Colombia, Ethiopia, India, Nepal, Tanzania, Thailand and South Africa).
- > Water storage and distribution (Ecuador, India and Nepal).

- > Training women to increase water-holding capacity of soil (Colombia and Uganda).
- > Multiple use water systems (Thailand).
- > Market-based approaches to on-farm water productivity (Cambodia and Ghana).
- > Farmer to farmer exchanges and farm-led experimentation (Bolivia, Colombia and Ecuador).
- > Outscaling best practices (Colombia, India and Iran).

Results are due in the first half of 2007.

The projects are intended to increase the effectiveness of the CPWF in producing global public goods, through providing information that can be used to influence or inspire the creation of policy that can improve agricultural water productivity. The projects will provide examples of impact of water and food technology on end users, and provide examples of potential CPWF results, as well as being a learning opportunity for researchers. Although modestly funded, the small grants program has enabled the CPWF to obtain expanded participation of NGOs (especially national ones) and CBOs, and a higher proportion of projects led by national institutions, both NGOs and NARES. More information regarding the projects is available on the CPWF web page, [www.waterandfood.org](http://www.waterandfood.org).

### **1.3 Synthesis research**

Synthesis research is the process of producing new insights by integrating findings from different research outputs (from CPWF and elsewhere). Its main purpose therefore is to capture the results coming out of CPWF projects, integrate them with each other and with results coming from research in other programs and to determine their relevance in the project/basin areas and beyond. Synthesis research is fundamental to producing added value in the CPWF and to ensuring that the cross-basin and cross-theme potential of our work on water-food-environment is fully exploited.

So far, implementing synthesis research has been one of the principal challenges faced by the CPWF, because of the new ground that we are breaking. The last year has seen rapid evolution of the strategy, coinciding with availability from projects of results that are sufficiently significant to be worth synthesising.

The elements of the synthesis strategy as presently conceived are:

- > Basin profiles for each benchmark basin that draw together the available information in each, also at the commencement of CPWF research.
- > A 'CPWF baseline report' that describes the situation facing the program in its themes and basins at the start of the implementation, and that summarises the technical focus to be adopted.
- > First attempts at synthesis by each theme leader and basin coordinator, referring to the progress up to October 2005.
- > A 'CPWF 2005 synthesis report' based on those theme and basin syntheses, but more summarised and in a uniform style.

Of these, seven of nine basin profiles have been finalised and edited and are ready for web publication (and a limited print run). The baseline report is now in final

professional editing. It will be released via the webpage and distributed alongside the CPWF 2005 synthesis report. Individual theme and (as appropriate) basin synthesis reports will be available via the webpage.

The 'paper' synthesis products, especially theme leader and basin coordinator synthesis, and the 2005 Synthesis Report, were conceptually based on the project M&E system, in which six-monthly and annual project reports included space for project leaders to inform others in the CPWF (especially theme leaders and basin coordinators) about the most promising early results. This was to be supplemented by information gathered during email, telephone and in-person contacts by TLs and BCs. In reality, the system has not proved very effective in 'harvesting' early results – there is a tendency to continue to report and discuss programmed activities, project-by-project, sub-theme by sub-theme. This is possibly because project leaders are not accustomed to viewing their scientific data in terms of likely impact. For that reason, we plan to add an additional strategy, namely an experiment in web-based synthesis, due to commence in approximately July 2006. This will attempt to 'capture' results and ideas from on-going projects (CPWF, but also, potentially non-CPWF) through a few direct, impact-related questions posed each month. Theme leaders will design the questions with the communications coordinator. Basin coordinators, project researchers and others will post their answers on the web, which we hope will stimulate discussion. At the end of each month, the accumulated information will be added to a 'knowledge store' of synthesis topics already available on the web, and new topics will be posted.

Depending on the results of the experiment, this process should lead to a regularly updated 'knowledge store' of CPWF synthesis available on the CPWF webpage, and possibly to regular 'print' synthesis publications. The web-based process is also intended to provide input to the November 2006 CPWF International Forum on Water and Food and to the 2008 CPWF Results Conference.

## **2 Implementation of EPMR recommendations**

No EPMR has been carried out for the CPWF as yet. The expected date is mid 2007. At present, a CCER is being planned for later in 2006.

## **3 Highlights of the 2007 Project Portfolio**

### **3.1 Research highlights**

Successful projects from the CPWF's first call will continue to be implemented during the course of this year, and results will begin to emerge more robustly in this year. Small Grants for Impact will continue to be implemented during this time, and results are expected from these projects in the first half of this year.

The CPWF's second competitive call will have been held in late 2006. Contractual negotiations and initial implementation of these projects (at least eight) will commence in early 2007.

In this year, the number of Basin Focal Projects (BFPs) will have increased from four river basins under the first phase, to ten under the second to include all Benchmark Basins, and the Niger River Basin. BFPs from the first phase will continue to progress and initial results will be delivered.

The International Forum on Water and Food will have been held in November 2006, and besides its contributions to synthesis research, will also have identified any changes in key areas for research focus, and priority areas for research and development investment. Both of these outputs will play a substantial role in planning for the implementation of the CPWF's second phase.

The CPWF has planned a publication series which will certainly include Working Papers, Research Papers, Synthesis Reports and possibly a BFP Working Paper series. These will start emerging in 2006, and throughout 2007.

In this year, results from the synthesis research process (which will itself have been honed, clarified and supported by innovative techniques and methods of harvesting research data), will become an increasingly visible output from the CPWF. None of these activities present strategic changes to the CPWF Research Strategy.

### **3.2 Partnership highlights**

No major changes have occurred to the existing collaborative arrangements of the CPWF. Partnerships play an integral part in the CPWF's characteristic process of implementation and research execution. Additional partners will be added to the CPWF network through the second call, the second phase of the BFPs, and through possible additions to the CPWF's Consortium Steering Committee.

The CPWF continues to explore ways in which to maximise the added value brought about by these relationships, turning them into tangible research results of development and policy relevance. Key activities include basin working group meetings, theme leaders' meetings and project leaders' meetings. The relevance of these relationships will have been revealed during the November 2006 International Forum on Food and Water, where they will be specifically showcased.

## **4 Differences between the last MTP and the present research and reporting portfolio**

### **4.1 Updated frameworks in this Medium Term Plan**

There are important differences between the project logical frameworks in this MTP and those in MTP 2006-08. Both used the CGIAR's new format of outputs-intended users-outcomes-impacts, and so outwardly appear similar, but this hides several key changes. However, this does not reflect any changes in the actual Research Strategy or in collaborative arrangements.

In the MTP 2006-08, the frameworks were devised from the initial design material for the five Themes of the CPWF, with an additional early-stage framework added for the Basin Focal Projects. As an interim measure the thematic frameworks were broken down into major or overall outputs on the basis of the original frameworks for

the design of the program. This was useful but contained a number of fundamental flaws. Chief among these was the lack of rigour in the logic of the theme strategies. When these were analysed in detail as part of our introduction of the impact pathways approach, it became clear that a number of revisions were required in order to demonstrate the causal links between activities, outputs, outcomes, and impacts. The main difference, therefore, lies in the fact that the frameworks in this MTP have been revised to follow the impact pathways identified for the various theme outputs, and they are consequently more coherent and rigorous in their logic.

In this MTP we have also followed Science Council guidance more closely in defining the projects at MTP level, and their various components. This is not straightforward for the CPWF, which has a single overall structure divided into a number of complementary but not exclusive technical themes, and which works in a number of geographical areas based on identified benchmark river basins. Research is conducted through contracted projects many of which cover more than one theme and work in more than one basin. This overlap, which is essential for good science, makes it difficult to assign each of the program's research projects to a distinct project at the MTP level. This has been done by assigning each research project to the theme to which it mainly contributes, and allocating it as an output target for the year in which its main outputs are scheduled to be complete.

We have also considered the nine benchmark river basins, although we do not treat these as MTP projects. To do so would mean that the activities described under the Theme MTP projects are replicated in the basin projects, albeit at different geographical scales. Logical frameworks and impact pathways are, however, here presented partly at the request of the Science Council, but also so that it is properly explicit as to how each basin has its own impact pathways that accord with the theme-based science that is at the heart of the CPWF.

## **4.2 The CPWF's use of impact pathways**

The exercise of devising clear impact pathways for the Medium Term Plan 2007 to 2009 led for the first time to the CPWF's creation of problem trees for projects, research themes and benchmark basins. This proved to be a valuable exercise in that it helped project leaders and co-ordinators to identify more clearly the causal chains of outcomes that link research outputs to theme and basin impacts. The fact that the program was able to carry out the problem tree analysis in a relatively short period of time bears testament to ongoing problem identification and priority-setting work in the CPWF (including a gap analysis and concordance exercise, and the Comprehensive Assessment). Project leaders found the problem tree approach to be particularly useful since it demonstrated clearly how the current research activities are contributing to the project objectives, and helped to clarify the areas where gaps still exist in the research strategies.

## **4.3 Other changes**

The Small Grants for Impact projects are here included as a separate project, with its own narrative, log frames and impact pathway. As mentioned above, logical frameworks, a narrative and impact pathways are presented for the CPWF benchmark basins. These are not treated as an MTP project. Finally, an effort is

made to list all of the CPWF's partners. It must be appreciated that these are very numerous, and it is not possible to go into the nature of these partnerships to any great degree. This MTP uses the partnership classifications suggested by Ryan<sup>2</sup> and understands them as follows:

- > Primary research: any institution that leads a project is understood as the primary researcher.
- > Secondary research: any institution identified in a project proposal that is primarily concerned with research work, but is not the lead research institution, is understood to be a secondary research partner.
- > Catalytic role: any institution that plays a primary research roll is also understood to serve as a catalyst for the other institutions involved in the project. Partner institutions who play secondary research roles but which are also networks are also understood to play catalytic rolls.
- > Advocacy roles are understood to be those institutions that will receive research results and promote them.
- > Facilitation roles are understood to be those that relate to institutions who receive research results and facilitate their uptake amongst other institutions, dissemination and/or the provision of facilities for project administration and/or research.
- > Funding roles are mentioned only in the first partnership matrix, describing program-level partners, because this is the only place that they are relevant. All other partnership matrices provide resource allocations against each partner identified. Where a partner is involved in two or more projects, the sum of resource allocations is provided. All projects with which an institution are associated are indicated in brackets alongside the institution.

For the sake of clarity, partnerships are discussed at the programmatic level and then at the MTP project level. Because partners are relevant at both theme and basin levels, significant repetition occurs. In the case of each partner identified, the CPWF project(s) number in which it is involved is indicated in brackets.

## **5 CPWF financial indicators**

- > *Long term adequacies of reserves*: given that the CPWF has no annual surplus or deficit, this indicator does not apply.
- > *Short term liquidity*: the CPWF has sufficient cash to meet the ongoing financial commitments of the program.

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<sup>2</sup> International Public Goods and the CGIAR Niche in the R for D Continuum: Operational Concepts (November 17, 2005)

> **Annex 1**

<b>Project</b>	<b>Brief Title</b>	<b>Basin</b>	<b>Countries in which research is carried out</b>
1	Crop Water Techology & Markets	Limpopo 100%	Mozambique, South Africa, Zimbabwe
2	Water Productivity Improvement in Eritrea	Nile 100%	Eritrea
5	Rainwater and Nutrient Use Efficiency	Volta 100%	Ghana, Burkina Faso
6	Strategic Innovations in Dryland Farming	Volta 100%	Ghana
7	Improving Productivity in salt affected areas	Indo-Gangetic 60% Mekong 20%	India, Bangladesh, Vietnam, Egypt, Iran
8	Improving Water Productivity in karkheh	Karkeh 100%	Iran
10	Coastal Resource Management for Improving Livelihoods (CRESMIL)	Mekong 60% Indo-Gangetic 40%	Vietnam, Bangladesh
11	Upper Catchment Rice Landscape Management	Mekong 60% Red River 40%	Lao PDR, Vietna, Myanmar, Thailand
12	Yellow River Rainfed Consevation agriculture	Yellow River 100%	China
15	Unraveling Mysteries of Quesungual System	Lempira (Honduras) 60% Calico (Nicaragua) 25% Andean (Colombia) 15%	Honduras, Nicaragua, Colombia
16	Aerobic Rice System (STAR)	Indo-Gangetic 25% Mekong 25% Yellow River 25% Other 25%	China, India, Thailand, Lao PDR, Philippines
17	IWRM for Improved Rural Livelihoods	Limpopo - 100%	Zimbabwe, Mozambique, South Africa
20	SCALES	Andean 50% Nile 50 %	Uganda, Kenya, Ecuador, Peru, Bolivia, Colombia
22	Environmental Services Promoting Rural Development	Andean 50% Nile 50%	Colombia, Ecuador, Peru, Bolivia
23	Resources Management for Sustainable Livelihood	Indo-Gangetic 100%	Nepal, India
24	Livelihood Resilence in Dry Areas	Karkheh 100%	Iran
25	Companion Modeling and Water Dynamics	Mekong 90% Bhutan 10%	Thailand, Vietnam, Bhutan
28	Multiple Water Use	Andean 25% Indo-Gangetic 20%Limpopo 25% Mekong 20%Nile 10%	South Africa, Zimbabwe, Ethiopia, Tanzania, India, Nepal, Thailand, Vietnam, Cambodia, Nicaragua, Colombia, Ecuador, Peru
30	Wetlands, Social welfare & Environmental Security	Limpopo 100%	South Africa, Zimbabwe, Mozambique
34	Improved Fisheries in Tropical Reservoirs	Indo-Gangetic 33% Nile 33% Volta 33%	Nigeria, Zambia, Zimbabwe, Mozambique, India, Egypt, Ghana
35	Community Based Fish Culture	Indo-Gangetic 55% Mekong 35% Niger 10%	Cambodia, Vietnam, Bangladesh, India, Mali
36	Improved livelihoods through dam management	Nile 100%	South Africa, Ethiopia, Mozambique
37	Nile Basin Livestock Water Productivity	Nile 100%	Sudan, Ethiopia, Uganda, Egypt, Kenya, Tanzania
38	Safer peri-urban vegetable production	Volta 100%	Ghana, Burkina Faso

40	Integrating Governance and Modeling	Andean 50% Volta 50%	Ghana, Chile
42	Groundwater Governance in IGB & YRB	Indo-Gangetic 50% Yellow River 50%	India, Bangladesh, Pakistan, Nepal, China
46	Small Multi-Purpose Reservoir Ensemble Planning	Limpopo 33% Volta 33% Sao Francisco 33%	Ghana, Burkina Faso, South Africa, Zimbabwe
47	African Models of Transboundary Governance	Limpopo 50% Volta 50%	Ghana, Burkina Faso, Botswana, Zimbabwe, South Africa, Mozambique
48	Strategic Analysis of River Linking	Indo-Gangetic 100%	India
50	Enhancing Multi-scale Mekong Water Governance.	Mekong 100%	Cambodia, Lao PDR, Myanmar, Thailand, Vietnam, China
51	Waste water irrigation - opportunities and risks	Volta 100%	Ghana, Burkina Faso
52	Mekong Fisheries Management Institutions	Mekong 100%	Cambodia, Lao PDR, Vietnam, Thailand
53	Food & Water Scarcity under Global Change	Nile 100% Limpopo 50%	Ethiopia, South Africa
54	Basin Focal Project: Coordination	10 Riverbasins (incl Niger)	
55	Basin Focal Project: Volta	Volta 100%	Ghana, Burkina Faso, Mali, Togo, Benin, Cote- d'Ivoire
56	Basin Focal Project: Sao Francisco	Sao Francisco 100%	Brazil
57	Basin Focal Project: Karkheh	Karkheh 100%	Iran
58	Basin Focal Project: Mekong	Mekong 100%	Cambodia, Lao PDR, China, Vietnam
SG 501	Water for economic sufficiency	Mekong 100%	Thailand
SG 502	Market strategies for water productivity	Mekong 100%	Cambodia
SG 503	Sustainable water system innovations adoption	Nile 100%	Tanzania
SG 504	Growing rice with mulch	Mekong 100%	Thailand
SG 505	Enabling Endogenous Water Technology Development	Andean 100%	Ecuador
SG 506	Improved water catchment and use-efficiency	Volta 100%	Bolivia
SG 507	Water-control for Small Plot Farming Systems	Indo-Gangetic 100%	India, Nepal
SG 508	Harit Sankalp - Greening Alwar District	Indo-Gangetic 100%	India
SG 509	Water for Food Security in Tigray	Nile 100%	Ethiopia
SG 510	Associated cropping and rainwater harvesting	Andean 100%	Colombia
SG 511	Up/out-scaling strategies in Karkheh	Karkheh 100%	Iran
SG 512	Affordable Irrigation for Smallholder farmers	Indo-Gangetic 100%	India
SG 513	Food Security in Southern Uganda	Nile 100%	Uganda
SG 514	Sekororo Rainwater Harvesting Project	Limpopo 100%	South Africa

