



CGIAR Challenge Program on
WATER & FOOD

ANNUAL REPORT 2005

Prepared for the
Consultative Group on
International Agricultural Research

June 2006

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Annex 1: Program level objective tree.

Annex 2: Current list of projects.

List of Acronyms and Abbreviations

AGM	Annual General Meeting
ARC	Agricultural Research Council
AREO	Agricultural Research and Education Organization, Iran
ARI	Advanced Research Institute
ASB	Andean System of Basins
BC	Basin Coordinator
BFP	Basin Focal Projects
BMZ	Federal Ministry for Economic Cooperation and Development, Germany
CA	Comprehensive Assessment on Water Management in Agriculture
CAADP	Comprehensive Africa Agriculture Program
CATIE	Tropical Agricultural Research and Higher Education Center
CBO	Community Based Organization
CENESTA	Centre for Sustainable Development & Environment, Iran
CCER	Centre Commissioned External Review
CGIAR	Consultative Group on International Agricultural Research
CIAT	Centro Internacional de Agricultura Tropical, Colombia
CP	Challenge Program
CPMT	Challenge Program Management Team
CPWF	CGIAR Challenge Program on Water and Food
CSC	Consortium Steering Committee
CSIRO	Commonwealth Scientific and Industrial Research Organization
DFID	Department for International Development
EMBRAPA	Brazilian Agricultural Research Corporation
EOI	Expression of Interest
EPMR	External Program and Management Review
EU	European Union
EC	European Community
FGDC	Federal Geographic Data Committee
GECAFS	Global Environmental Change and Food Systems
GIP	Gender, Institutions and Participation (Panel of the CPWF)
GIS	Geographic Information Systems
GTZ	Gesellschaft für Technische Zusammenarbeit
IAA	Integrated Aquaculture-Agriculture
IAASTD	International Assessment for Agricultural Science and Technology
ICARDA	International Center for Agricultural Research in the Dry Areas
ICT-KM	Information and Communication Technology – Knowledge Management
IDIS	International Data Information System
IFPRI	International Food Policy Research Institute
IFAD	International Fund for Agricultural Development
IFS	International Foundation for Science
IGB	Indo-Gangetic Basin
ILRI	International Livestock Research Institute
INERA	Institut de l'Environnement et Recherches Agricoles
IRBO	International River Basin Organization
IRD	Institut de Recherche pour le Developpment
IRRI	International Rice Research Institute
ISSER	Institute of Statistical, Social and Economic Research
IWMI	International Water Management Institute
JIRCAS	Japan International Center for Agricultural Sciences
JVA	Joint Venture Agreement
KRSPP	Knowledge Sharing in Research Pilot Project
MAE	Ministère des Affaires étrangères
M&E	Monitoring and Evaluation
MOU	Memorandum of Understanding
MTP	Medium Term Plan

MRC	Mekong River Commission
MUS	Multiple-use Water Systems
NARES	National Agricultural Research and Extension Systems
NEPAD	New Partnership for Africa's Development
NGO	Non Governmental Organization
NWRC	National Water Research Center
QTL	Quantitative Trait Locus
SDC	Sustainable Development Commission
SEF	Sahelian Eco-Farming
SEI	Stockholm Environment Institute
SIDA	Swedish International Development Cooperation Agency
SMS	Short Message Service
SWAT	Soil and Water Assessment Tool
TL	Theme Leader
UCDavis	University of California, Davis
UNEP	United Nations Environment Program
USA	United States of America
USAID	United States Agency for International Development
USD	United States Dollars
USDA	United States Department of Agriculture
WNT	WaterNet
WRI	World Resources Institute
YRCC	Yellow River Conservancy Commission

1. Executive Summary

Background

At this point – just under half way (two years and six months) in the implementation of the first CPWF phase (and three years and eight months 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 our Expert Panel on Scientific Quality – are familiar, although they must be adjusted to each specific instance.

The CPWF goal, or impact target, is to contribute to efforts by the global community to ensure that global diversions of water to agriculture are maintained at the level of the year 2000. The intention is that increasing food production will help to achieve internationally adopted targets for decreasing malnourishment and rural poverty by the year 2015, particularly in rural and peri-urban areas in river basins with low average incomes and high physical, economic, or environmental water scarcity or water stress. The program has a specific focus on low income groups within these areas. The objectives of the CPWF are therefore: improvements in agricultural production, sustainability of livelihoods in rural and peri-urban areas; nutrition levels; water quality and maintenance of water related ecosystems services. These positive objectives are complemented by a decrease in agriculture related pollution and water related diseases. (see the CPWF Program Level objective tree at Annex 1 extracted from the Medium Term Plan).

The CPWF addresses these objectives by contracting research within five thematic areas: crop water productivity; water and people in catchments; aquatic ecosystems and fisheries; integrated basin water management systems; and global and national food and water system. The 'living laboratories' for the research are nine river basins across the developing world, being the Indus-Gangetic, Yellow, Sao Francisco, Volta, Limpopo, Nile, Mekong, Karkheh and Andean system of basins. Theme based synthesis research adds value to the contract research and provides basin and global scale interpretations of research results. A suite of projects contracted under the small grants program is providing lessons on adoption of water and food related technologies used by non governmental organizations (NGOs). Results will be shared with researchers as part of the CPWF plan to increase the impact orientation of researchers. Basin focal projects (BFPs) provide a deeper understanding of water and poverty linkages and opportunities in each basin to better guide the development focus of our research. Finally, a capacity building program is promoting the integration of multidisciplinary, inter-institutional, basin level research by influencing the design of curricula, and mentorship of young researchers.

The CPWF continues to evolve at a fast pace, therefore this report covers progress during 2005 and into 2006 to ensure currency of information to the reader. The Secretariat is currently managing the second competitive call for research proposals and negotiating the final set of BFPs. Projects in the small grants program were also identified through competitive selection in 2005.

Research Accomplishments

The principal area of investment for the CPWF is the research portfolio. Fifty-two projects – from the first competitive call, basin focal projects and small grants for impact - are contracted and funded. All but six of the 52 were selected competitively by the CPWF. Some have been running nearly two years, but the 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. Work plans for the individual projects of the research portfolio are not included in this report, but are available separately in the form of milestones and Gantt charts.

The activities of the five theme leaders and nine basin coordinators include technical oversight and advocacy/facilitative roles – linking technical quality with support for out and up scaling - as well as quality assessment of contracted projects. Synthesis research is also undertaken by the CPWF theme leaders and basin coordinators as well as data collection and sharing, which is a component of the basin focal projects.

The technical outputs of the program are discussed at the thematic level. Theme one, focused on increased crop water productivity, is based in IRRI, Philippines. During 2005 projects within the

theme developed interventions (technologies, policies) that will lead to the improvement of crop water productivity by (1) plant breeding for water efficient and stress-tolerant crops; (2) water-saving farm practices; (3) management of water supply based on field water requirements; and (4) policies and institutions. In 2005, 11 CPWF-funded projects addressed "crop water productivity" as a main theme, 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.

The focus of theme two, based in CIAT, Colombia, is on people in catchments. During 2005, important research was carried out to explore ways to improve the use of water and other resources in upper parts of catchments. 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.

Theme three explores issues of aquatic ecosystems and fisheries and is based in WorldFish, Egypt. 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 (projects 10, 30 and 34, 35, 52) in the Mekong, Indo-Gangetic, Nile, Volta and Limpopo basins. Environmental flows have 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.

While these three themes work at the 'system' scale within the nine river basins, the strategy of the CPWF is to better understand the results of the research in terms of basin scale water management. Theme four, integrated basin level water management systems, based in IWMI, Sri Lanka explores the potential, at the basin scale, for enhancing agricultural outputs and profitability, and of reducing water use in agriculture by alleviating water constraints to agricultural production. This theme 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. 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. 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.

Theme five explores policy issues of the global and national food and water systems, and is based in IFPRI, U.S.A. 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 developed a 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. Finally a 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.

During 2005 the first set of four BFPs commissioned¹ by the CSC have been successfully contracted and initiated. Three workshops among BFP leaders and coordinators, with input from other key scientists, were held in May 2005 (Colombo), October 2005 (Zhengzhou, with a broader public at the International Yellow River Forum) and in February 2006 (Colombo). As intended, these allowed both convergence of ideas in the first set of BFPs and the publication of guidelines to accompany the competitive call for the second set of BFPs. Additional workshop outputs include methodological guidelines and final reports of the development phase (available on the CPWF website). Basin focal projects provide strategic research results that link project and basin level activities and help identify research needs at the global scale.

The small grants program is intended to enhance the adoption of high potential interventions for increasing agricultural water productivity and to provide a discussion point from which CPWF participants can guide applied research to ensure greater impact. Projects were selected based on their ability to identify existing small-scale or local-level water and agricultural management strategies or technologies that have the potential to improve agricultural water productivity at some wider scale. The range of technologies and knowledge being investigated include surface, groundwater, runoff and rainwater harvesting; water storage and distribution techniques; training women to increase the water-holding capacity of soil; market-based approaches to on-farm water productivity; farmer to farmer exchange and farmer-led experimentation; and out scaling best practices, among others.

Highlights and progress from a selection of projects are provided to illustrate the contracted research being undertaken within the themes.

Progress on other CPWF components

The capacity building program is increasingly active following the appointment of a capacity building officer in September 2005. The immediate focus of the officer has been to revise the strategy in light of wider consultations and analysis of where the value added is for the program, including an analysis of the capacity building currently being undertaken within most of the current research projects. This officer is expected to raise funds for the program from donors who wish to support capacity building as a specific development activity. The CPWF is also very active in providing communications products in order to share our experiences. There is a vast array of scientific meetings in water and agriculture, and the CPWF aims to be selective but to maintain a presence at the most important. The Knowledge Sharing in Research Pilot Project (KRSPP) was launched at an inception workshop in June 2005, with six CPWF projects participating in a joint initiative with IWMI. The project aims to promote a more demand-driven, interactive approach to research. The objective is that knowledge sharing (KS) is built into projects as an integral part of the research process, involving all stakeholders at the planning stage of project formulation and implementation.

Governance and management

Signatories to the Joint Venture Agreement (JVA), under which the CPWF operates, make up the membership of the Consortium Steering Committee (CSC). The committee is an autonomous policy and decision making body of the CPWF, meeting face to face once a year and otherwise through virtual means. Management of the CPWF was streamlined in 2005, and has a membership of six, including two 'external' members. Under the JVA, the five member CGIAR centers are tasked with management of the project portfolio. The managing centers work with the theme leaders and basin coordinators in ensuring quality control of the projects under their remit. All operations of the CPWF are managed, guided, and supported from the secretariat based in Sri Lanka where offices are provided by the International Water Management Institute. The secretariat has a small and dynamic team of international and national staff members.

Finance

There has been further positive progress in obtaining and continuing donor commitment. The CPWF has sufficient cash to meet the ongoing financial commitments of the program.

¹ Karkheh : IWMI, AREO, ICARDA; Mekong: CSIRO, MRC, SEI, JIRCAS; Sao Francisco: UC Davis, EMBRAPA; Volta: IRD, WRI, ISSER, INERA, INSS.

Lessons Learned

A selection of lessons is provided covering both technical and institutional issues. Other lessons are provided under the section on operational issues and challenges

2 Background

2.1 Program objectives and structure

The CPWF goal, or impact target, is to contribute to efforts by the global community to ensure that global diversions of water to agriculture are maintained at the level of the year 2000. The intention is that increasing food production will help to achieve internationally adopted targets for decreasing malnourishment and rural poverty by the year 2015, particularly in rural and peri-urban areas in river basins with low average incomes and high physical, economic, or environmental water scarcity or water stress. The program has a specific focus on low income groups within these areas.

The objectives of the CPWF are therefore: improvements in agriculture production, sustainability of livelihoods in rural and peri-urban areas; nutrition levels; water quality and maintenance of water related ecosystems services. These positive objectives are complemented by a decrease in agriculture related pollution and water related diseases. (see the CPWF Program Level objective tree on the CPWF website as part of the Medium Term Plan)

To address these objectives, the program is structured into five thematic areas at different scales. These are represented in a matrix:

SCALES			
GLOBAL	Global and National food – water system (5)		
BASIN	Basin Level water management system (4)		
SYSTEM	Agro – Ecosystems (1)	Aquatic Eco-systems And fisheries (2)	Upland Watersheds (3)

Five senior scientists, each based in one of the five CGIAR centers, lead the thematic areas.² The research is undertaken in nine river basins that act as 'laboratories' for the research. Representatives of National Agricultural Research and Extension Systems (NARES) guide the research activities in each basin. This approach ensures that regional priorities are addressed, that stakeholders are actively involved in the program, and that it has direct and measurable impacts on the quality of life in poor communities. The nine benchmark basins are the Mekong, Yellow River, Indo-Gangetic, Karkheh, Nile, Limpopo, Volta, São Francisco, and the Andean System of Basins.

2.2 Research strategy and priorities

The CPWF is placing a stronger emphasis on north-south and south-south partnerships. Increased emphasis is being placed on CGIAR centers as team members – undertaking a variety of roles beyond that of primary research agency. By identifying and supporting the most suitable institutions and RforD practitioners, CPWF promotes new, multidisciplinary and culturally diverse partnerships designed to produce and disseminate international public goods, while emphasizing the achievements of site specific-impact. We believe that forming diverse partnerships promotes innovative approaches to research, and greater potential for out and up-scaling of outputs. The structure of the CPWF supports this approach, with five distinct but complementary research themes (based in one of the five CGIAR Consortium member centers), and nine river basins that act as the 'living laboratories' for the research. A basin coordinator drawn from one of the NARES located in

² Theme 1: IRRI; Theme 2: CIAT; Theme 3: WorldFish; Theme 4: IWMI, Theme 5: IFPRI

the basin provides local 'insight' into the priorities and access to decision makers and the research community. The structure enables the CPWF to aggregate information across production systems and scales, allowing CPWF to assess options for enhanced water productivity.³

Synthesis research is the process of producing new insights by integrating findings from a broad range of project work (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.

Basin Focal Projects (BFPs) are innovative and recent additions to the research strategy. The challenge for the BFPs is to present a globally coherent picture of whole-basin systems that recognizes the large differences in hydrology (and consequent livelihood systems) within and between basins. The work of the BFP teams is therefore to show the link between poverty, agriculture, and water and to develop rigorous conceptual frameworks that enable scientists to analyze these links in other river basins at various scales of resolution, depending on the data available. The results will be useful for the CPWF and governments within the river basins, to identify strategic opportunities for poverty alleviation through improvements in agricultural water use. The immediate intent of these projects is to develop a scientific framework for evaluation and outreach (scaling up) of interventions (as developed in projects). During 2005 the initial four BFPs were contracted and implemented in the Mekong, Karkheh, Volta and Sao Francisco basins. The remaining five river basin teams are currently being identified through a competitive tendering process. The Niger basin is included on special request from the government of France who are providing funds through the Echel Eau program. Contracts are expected to be finalized and work started in October 2006.

A second innovative strategy introduced in 2005 is a Small Grants Program. The purpose of this initiative is to bridge the gap between research and development and emphasize impact and innovation through identification of existing small-scale or local-level water and agricultural management strategies or technologies that have the potential to improve agricultural water productivity at some wider scale. Technologies and management strategies discovered through the program can be used to inspire applied research across the entire CPWF project portfolio.

Synthesis research is a top priority because of the value it adds to the program. Linked to our other very high priority research, the basin focal projects, synthesis provides a new perspective, and increased understanding at different scales regarding water, poverty and agriculture. The main research portfolio of projects is central to the program as they provide a substantial basis for synthesis, as well as shorter term development impact achieved by others. Projects from the first call were selected against priorities prepared by thematic advisory groups, and were quite broad. Work by the CPWF management team, theme leaders and basin coordinators, followed by key input from the Comprehensive Assessment on Water Management in Agriculture, led to tightly focused gap-filling priorities for the second small competitive call. Small grants are a small investment intended to stimulate thought and interaction between researchers and down stream users. This is not a high priority, but a very useful tool. The capacity building program is present and integrated into almost everything that we do, particularly in the main research portfolio, as well as setting up specific capacity building activities to promote the CPWF research approach. It is an important priority for extrapolating the future research of the program.

³ For full details of the CPWF research strategy, please refer to the 2005 publication "CGIAR Challenge Program on Water and Food: Research Strategy 2005-2008" available on the CPWF web page. This document explains, in detail, CPWF's mandate, the research process, research emphases, outputs and outcomes generated, and the overarching approach of five thematic areas and nine river basins (outlined above) which form the core of the CPWF research strategy.

3 Research accomplishments

3.1 Overview

Fifty-two projects – 33 from the first competitive call, four basin focal projects plus the BFP coordinating project, and 14 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 the 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 call for concept notes is currently advertised on the CPWF web page. Working from gaps identified by theme leaders (TLs) and basin coordinators (BCs) in previous CPWF priorities; a concordance exercise that analyzed the portfolio following the first call, and from summaries specially contracted by the CPWF from the Comprehensive Assessment on Water Management in Agriculture (CA), TLs and the Challenge Program management team (CPMT) prepared a focused set of priorities that was submitted for review to the CPWF Expert Panel. The CSC selected six priorities and allocated funding of USD 4 million to the call. A full proposal stage will follow the assessment and selection of concept notes. It is planned that contracting is finalized in January 07 and that implementation commence immediately to reach completion in December 08.

A call for Expressions of Interest (Eoi) for the remaining Basin Focal Project river basins was published on 1 March 2006. The CSC approved Eois from 17 institutions that have been invited to prepare full proposals. These will again be subjected to external review and approval by the CSC of one project in each river basin. 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, and particularly the last three months, has seen rapid evolution of the strategy, coinciding with availability from projects of results that are sufficiently significant to be worth synthesizing.

The call for proposals of “small grants for impact” resulted in 14 high-quality projects being contracted in January 2006. They are active in 12 countries in seven of the nine basins.

3.2 Technical outputs

For ease of reference in this section, projects are referred to as project [number], a full list of all current projects is at Annex 2.

3.2.1 Theme One: Crop Water Productivity

Theme 1 developed interventions (technologies, policies) that will lead to the improvement of crop water productivity by (1) plant breeding for water efficient and stress-tolerant crops; (2) water-saving farm practices; (3) management of water supply based on field water requirements; and (4) policies and institutions. In 2005, 11 CPWF-funded projects addressed “crop water productivity” as a main theme, 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.

A project developing aerobic rice systems recorded yields of 4.7 to 6.6 t ha⁻¹ in Northern China, and in the Philippines of 4.0 to 5.9 t ha⁻¹ (project 16). This translates to a use of 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 that promise significant yield increase under semi-arid conditions. Participatory germplasm screening and 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, a project exploring these practices developed a farmer-participatory multi-location testing and selection program of parental lines. Working with the farmers, the project has segregated populations and breeding lines of barley, wheat, chickpea, lentil, faba bean, cowpea and grass pea under drought stress. Another project has mapped a major quantitative trait locus (QTL) for salinity tolerance in rice

on chromosome 1, designated *Saltol*, accounting for up to 80% of variation in tolerance. Efforts are ongoing to fine-map *Saltol* to facilitate tagging for use in marker-assisted selection which will significantly speed up the development of salt-tolerant varieties.

Farmer-participatory evaluations of best-bet technologies to increase water and nutrient use efficiencies are being undertaken by several of the Theme 1 projects (1, 5, 6, 8, 11). In the coastal regions of Vietnam, the areas that are suitable for the rice-aquaculture production system are delineated as specific resource-management units in project 10. In these units, the farmers' perception that the rice-shrimp rotation system is less disease-prone than monoculture shrimp system is being investigated.

A conceptual framework for the analysis and improvement of crop water productivity has been developed. This framework elaborates basic principles to increase water productivity, while coupling high yields with reduced use of scarce water resources to: 1) increase transpirational crop water productivity, 2) increase the storage size for water in time or space, 3) increase the proportion of non-irrigation water inflows to the storage pool, and 4) 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.

3.2.2 Theme Two: People in Catchments

During 2005, important research was carried out to explore ways to improve the use of water and other resources in upper parts of catchments. 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. Project 20 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 (ASB). 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. Project 28 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: project 17 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 (Peru). 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. Project 30 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: Project 22 built an optimization model for externalities valuation and opportunity cost calculation. Results for Fuquene illustrated that conservation farming practices had positive impacts on erosion control, water soil retention, employment generation and improvement of farmers'

incomes; project 30 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. Social networks analysis and its application to relations between the actors who manage water resources and the biophysical conditions in two upper catchments was undertaken at the thematic level. All projects expect to produce some generalizable recommendations and guidelines for policy. Target audiences include governments, NGOs and civil society.

3.2.3 Theme Three: 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 (projects 10, 30 and 34, 35, 52) in the Mekong, Indo-Gangetic, Nile, Volta and Limpopo basins. Environmental flows have 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 recognized 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 integrated Aquaculture-Agriculture (IAA). Other work has focused 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 (project 10). 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 (project 52).

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 (project 35). 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 (project 30). 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 focusing on a variety of variables, production potential and potential yield gaps (project 34). 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.

3.2.4 Theme Four: Integrated basin water management systems

This theme 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 (project 37); a framework for analyzing trade-offs associated with wetland utilization and the role of water productivity improvements in reducing negative impacts (project 30); 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 (project 36). 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, (project 36 and project 46) identified collaborative arrangements with other global initiatives that address dam development issues. Project 36 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 (projects 38 and 51) 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 project 37, 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 lead 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. Project 40 and project 47 have raised awareness of water governance challenges and opportunities in Volta and Limpopo basins.

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 (project 46). 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.

3.2.5 Theme Five: 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 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, project 48 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, project 53 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 (project 50), for groundwater governance (project 42), for the inclusion of indigenous principles (project 47), and for multi-scale interactions in watersheds (project 20).

Finally a project-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.

3.2.6 Basin Focal Projects

The first set of four BFPs commissioned⁴ by the CSC have been successfully contracted and initiated. Three workshops among BFP leaders and coordinators, with input from other key scientists, were held in May 2005 (Colombo), October 2005 (Zhengzhou, with a broader public at the International Yellow River Forum) and in February 2006 (Colombo). As intended, these allowed both convergence of ideas in the first set of BFPs and the publication of guidelines to accompany the competitive call for the second set of BFPs. Additional workshop outputs include methodological guidelines and final reports of the development phase (available on the CPWF website).

The content of the final reports is outlined below:

- **Overview of water related poverty:** There is improved insight emerging on the status of poverty within the basin. Analysis of water-related causes of poverty and likely opportunities for poverty alleviation is underway. By investigating variations in well-being within the basin and associated resource endowments, researchers are able to determine the poverty factors related to agricultural water management.
- **Analysis of water availability / access:** There is improved understanding among BFPs of water availability and access by different users. Quantitative analysis of temporal and spatial variability of water availability and use, at basin scale and for selected areas within the basin has begun. Research consists of describing the distribution of water to different users, and where this factor is significant to poverty alleviation; as well as quantitative analysis of committed water resources and opportunities for tapping un-committed water resources and re-allocation of water resources that would benefit the poor.
- **Water productivity analysis:** Analysis (quantitative and qualitative) of agricultural water productivity at basin and detailed scales, including an assessment of potential increases and their contribution to poverty alleviation has commenced. Principal agricultural systems (irrigated and rainfed) within the basin have been reviewed, focusing on those that have potential for agricultural growth.

⁴ Karkheh : IWMI, AREO, ICARDA; Mekong: CSIRO, MRC, SEI, JIRCAS; Sao Francisco: UC Davis, EMBRAPA; Volta: IRD, WRI, ISSER, INERA, INSS.

- Institutional analysis: There is improved understanding among BFPs of the institutional constraints to and opportunities for changes in water management for poverty alleviation. Research will document policy objectives, instruments and actions that affect the accessibility and productivity of water and analyze legal frameworks, institutional arrangements and governance processes with special reference to the poor or marginalized.
- Analysis of opportunities or risks of change: The above analysis will be used to identify investment or policy decisions that will significantly change or contribute to changes in water availability, access and productivity.
- Development of knowledge base: Plans are being executed to maximize the benefit from new and existing insights and data through effective knowledge sharing processes. IDIS data-sharing platform has been established (accessible through the CPWF website).

The BFP Coordinating Project guides and manages the research in all BFP river basins, developing concepts of water productivity and water related poverty, and identifying complementary research activities that span all river basins. Currently, three activities are contracted and these are briefly explained below.

Water Stress, Environmental Change, and Food Systems

The Global Environmental Change and Food Systems (GECAFS) component of the BFPs focuses on understanding the interactions between food systems and global environmental change. A small project is being supported in the Indus Gangetic basin 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 (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.

Impact Assessment

An ex-ante impact assessment review has been initiated with CIAT and IFPRI. The focus of this project is to contribute a neutral 'outsiders' view of the CPWF's existing and potential impacts, therefore contributing to the CPWF's continual process of learning and focusing our research agenda to best achieve our goals. Impact assessment is an essential process to identify (a) the degree and nature of change that can plausibly be expected from research; (b) the impact pathways and (c) partners necessary to increase the likelihood of positive change. A program of workshops is being initiated in all CPWF basins to develop this capacity among 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 late June 2006. These workshops are providing the basic data needed to undertake analysis including the identification of extrapolation domains and basin-scale impact modeling. Scenario analysis will also be undertaken, taking out high potential research outcomes to their likely status over 25 years, and to the global level.

Impact assessment has three objectives:

- To help create a more compelling vision for the CPWF by identifying, quantifying and describing some of the potential impacts and international public goods that CPWF is generating, or has the potential to generate.
- To develop impact assessment and evaluation methodology for use by the basin-specific focal projects and the CPWF in general.
- To help make CPWF impact more likely by piloting a novel monitoring and evaluation approach that fosters learning and innovation in the Program.

This project has catalyzed our thinking beyond the BFP initiative to explore the usefulness of these tools more widely within the CPWF from concept note and proposal development through monitoring and evaluation (M&E) and to medium-term plans (MTPs). A consideration is the link to

Center Commissioned External Reviews (CCERs) and External Program Management Reviews (EPMRs) of the CGIAR system. Another tool that the CPWF is exploring is Most Significant Change. This is a useful approach to capture unexpected developments along project impact pathways. (see www.mande.co.uk/doc/MSCGuide.htm). A discussion paper is under development that is available in its current draft form by email to cpsecretariat@waterforfood.org. Our conclusion is that the tools offer a sound foundation for: 1) impact-oriented project and program management; and 2) a plausible and sound ex-ante and ex-post impact assessment. A further conclusion is that research on impact pathways models can identify the optimum mix of interactions and partnerships to have the best chance to achieve impact.

Data Management

The International Data Information System (IDIS) project, jointly supported by CPWF and IWMI, is an activity of the BFP Coordination project. 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. IDIS will help researchers spend less time on data management and focus more on research and data analysis hence enhancing the utility of the data and helping reduce the length of the research lifecycle. In its first release IDIS provides access to data, metadata and graphs. All research data outputs from CPWF projects will be loaded into IDIS and made available to the public. The second phase release of IDIS is planned for November 2006 and will include access to spatial data and web mapping services. 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.

The IDIS web site can be accessed through the url: <http://dw.iwmi.org/>. Meta data storage details can be accessed through <http://geonetwork.waterandfood.org>.

3.2.7 Small Grants for Impact

The 14 projects contracted under the small grants program commenced in January this year and results are expected in the first half of 2007. 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).

The small grants program has enabled the CPWF to obtain expanded participation of non-government organizations (NGOs) (especially national ones) and community based organizations (CBOs), and a higher proportion of projects led by national institutions, both NGOs and NARES. Details of the projects can be found on the CPWF web page. The first reports from the project are due at the end of June. For a flavor of project activities there is an informative inception workshop report available on the CPWF web page for a project exploring conditions required for sustainable

adoption of water and moisture systems innovations in the Nile River Basin. The project is active in the Makanya watershed in Tanzania (the document is located under SG503).

A project in the Karkheh river basin is led by the local NGO CENESTA (SG511). The overall aim of this project is to out and up-scale community based water management strategies in the river basin. The project is working to empower local communities to organize themselves into formal or semi-formal groups that can effectively manage water and other natural resource use. Traditional methods of managing natural resources are being 'mined' from older community members and passed on to younger members before they are lost; and are being combined with the new knowledge resulting from the research of the two CPWF projects working in the Karkheh river basin.⁵ The three projects are complementary and are working together to add value to each other's work. The recent workshop on impact pathways was particularly useful to identify specific roles, sites (and therefore communities) and common constraints where mutual support and lobbying is best employed.

3.2.8 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 synthesizing.

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 summarizes the technical focus to be adopted.
- ▷ First synthesis products 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 summarized and in a uniform style.

Of these, seven of nine basin profiles have been finalized 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.

⁵ PN8: Improving Water Productivity, and PN24, Livelihoods Resilience in dry areas, both lead by ICARDA researchers in association with AREO scientists and others.

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.

3.3 Sub programs

Within the projects themselves there are many exciting examples of early progress that give the flavor of results we can expect. Below are some encouraging examples of early results and their practical applications - all clearly "international public goods" - from nine of the 33 "first call" projects. Note that they are in numerical order, so more component-oriented projects tend to come first and those with a more integrated view, later in the list.

Project 2: Participatory plant breeding in Eritrea. Participation of men and women farmers in selecting parents for crosses, selection among vast numbers of breeding lines and multi-locational testing has become almost "mainstream" as a methodology. This project is different because it focuses on the selection of several crops by the same groups of farmers (barley, wheat, chickpea, lentil, faba bean, cowpea and grass pea), particularly under natural very severe water stress. Progress has been extraordinarily rapid, with farmers already in possession of superior advanced lines, selected by them, of five of the crops. CPWF expects thus to contribute to developing a broadly applicable methodology that is suitable for areas with severe water stress. (See CPWF research highlight brochure available on the website)

Project 5: Integrated rain-fed farming in the Sahel. The project aims to understand the contribution to water and nutrient efficiency in the Volta basin of prototype methods originally designed in Niger for conditions of extreme water scarcity, namely the "Sahelian Eco-Farm" (SEF) and the Zai method of planting in water retaining pockets. SEF itself often makes use of the trees *Acacia colei* and *Ziziphus mauritania* along with annual crops, and grasses to stabilize micro-catchments. Responses from farmers in northern Ghana and Burkina Faso have been very positive. The adaptations they make – and the estimates of water productivity – will expand knowledge on how to extrapolate to other countries and basins systems that rely on water harvesting. (See CPWF research highlight brochure available on the website)

Project 10: Sustainable livelihoods in delta ecosystems. Seawater intrusion causes food insecurity for millions in delta ecosystems. This project has already mapped the extent of salt-water intrusion and modeled it so as to design decision support systems that guide more rational development of the rice + shrimp "boom" farming system in the Mekong delta. The experience from Vietnam is helping the development of the rice-shrimp farming system in Bangladesh and elsewhere. The topic of integrated delta ecosystems is of such widespread interest that the project has already organized one international conference and is planning another for March 2007.

Project 15: Understanding and extrapolating the Quesungual slash and mulch agroforestry system. Locally evolved and adapted farming systems often prove poorly adapted to what are apparently similar environments. Furthermore, although there may be general comments about their "good use of soil and water", detailed understanding of their performance across different environments is missing. We hope that a CPWF project focused on extrapolation of an indigenous agroforestry system from its native southern Honduras to other areas will set a different standard. Factors that determine its success in Honduras are quite specific (such as age and species of tree) but it is already being successfully extrapolated, through international farmer to farmer contact, to areas of Nicaragua. (See CPWF research highlight brochure available on the website)

Project 22: Payment for environmental services. The project explores, in five Andean sub-basins, the feasibility of credit arrangements and direct payments to poor producers living in upper catchments. Modeling to allow an ex-ante analysis of benefit maximization to different stakeholders and to the whole basin has been completed in Fuquene (Colombia) and Altomayo (Peru) and has led to practical experiments. In one, it is intended that a group of wealthier “downstream” farmers should act as guarantors to the bank of credit for small upstream farmers to invest in potato production practices that allow better downstream flow of clean water. In the other, urban water services are prepared to pay a premium to farmers who farm upper catchments more carefully; research is defining the parameters of that “good use”.

Project 28: Multiple use water systems. The project has documented evidence of multiple use systems practiced in five basins (it is the CPWF project that covers most basins) in three continents and ten countries. These all take poor people’s water needs into account. Typical advantages include reduced poverty and conflict, increased water productivity, gender-friendliness, local sense of ownership, willingness to pay and awareness of water quality issues. A workshop at the 4th World Water Forum attracted some 300 people. There is evidence there and elsewhere of great interest across different parts of the water and agriculture sectors; opportunities for integrated investment are already being discussed. (See IWMI Research Report 98, co-published with IRC and CPWF, available on the CPWF website)

Project 30: Wetlands-based livelihoods in the Limpopo. The loss of the world’s wetlands to agriculture and other uses is reported anecdotally as “50%” (including in early CPWF promotional documents). This project monitors the loss on the ground in selected communities in Mozambique, South Africa and Zimbabwe, through a range of participatory methods, including detailed mapping. There is accumulating evidence that loss of wetlands in these studies is approximately 50% in just the last 8 years and that the loss is causing major damage to the livelihoods of local people. On this basis, options for more sustainable interventions are being prepared with the local communities involved in the case studies.

Project 37: Livestock-water interactions in the Nile basin. The project commenced with case studies in Uganda, Ethiopia and Sudan. It is helping communities and leaders discover how to improve livestock and water management to combat rural poverty and hunger, while minimizing the negative effects on water supply and quality. It has applied water accounting systematically to livestock production for the first time, to determine opportunities to increasing livestock water productivity, and thus to determine where water can be freed for other uses. The work in Sudan is particularly important given that the Sudanese National Council of Science and Technology has identified water for animals as the number one underlying cause of present conflicts in the Sudan. (See CPWF research highlight brochure available on the website)

Project 47: African models of transboundary water governance. The project started by preparing a database of more than 150 African water treaties, many of which were previously unknown to today’s water scientists and policy makers. This information was shared at a workshop with African decision makers, as a basis for discussing African water law. The underlying project concept is to give Africans access to their own knowledge resources. The project has shown the importance of using traditional “transboundary” practice (between different groups, not necessarily countries) to inform and adapt more recent experience. (See www.africanwaterlaw.org).

4 Progress on other CP activities

4.1 Capacity Building

The goal of CPWF Capacity Building is to: *“Increase the ability of scientists to carry out integrated research on water and food with a basin perspective”*

The capacity building component of the CPWF is engaged in defining the suite of tools and modalities used for capacity building in the current portfolio of projects to better understand how they can be best extended to contribute to the needs of research institutions, universities, and their implementation partners in benchmark basin countries.

The major activities in 2005 and 2006 drew information from CPWF research activities and basins to inform the development of the capacity building strategy including:

- Surveys of theme leaders, basin coordinators, and African and Asian project leaders
- Needs assessments in Mekong, Limpopo, Volta, and Nile benchmark basins
- Revision of April 2004 capacity building strategy
- Program proposal development, including partnership building with Echel Eau, and the French Ministry of Foreign Affairs; and identification of institutional partners in four benchmark basins
- Donor visits in the EU and the USA
- Begin implementation of Mekong Theme 3 (Aquatic Ecosystems) training with Asian Institute of Technology and IWMI

In the CPWF benchmark basins, inter-institutional capacity is developed through our partnerships, which provide long term contact between NARES scientists, CGIAR centers, and ARI scientists. These multi year collaborations build capacity of senior staff in all institutions (NARES, CGIAR, ARIs), to undertake collaborative and interdisciplinary research by giving them an innovative framework to design and conduct research, and the experience working with one another. Within these collaborations, mentorship of junior researchers also takes place, many of whom have the opportunity provided by the CPWF to increase their level of education. For example, in the African benchmark basins, 86 people are enrolled in degree programs: 56 in the Limpopo; 11 in the Nile; and 20 in the Volta. The bulk of CPWF students in Africa (65 %) are studying for master's degrees, and 17 are PhD students. The basin approach of the CPWF provides opportunities for individuals and research institutions to build common information frameworks and research areas across their transboundary water sheds. Capacity building activities are often the basis for these opportunities.

4.2 Communications and public awareness

The objectives of the communications and public awareness strategy of the CPWF are:

- To inform the wider community of water and food researchers, policy makers, and development practitioners of CPWF goals and corresponding research and activities.
- To make water and food researchers, policy makers, and development practitioners aware that CPWF is an active and credible program that is well-positioned to have an impact on increasing water productivity in agriculture.
- To share among the CPWF research community knowledge and information that is of interest and useful to the work they are carrying out.
- To influence the research focus and practice of scientists, policy makers and development practitioners, encouraging basin-level perspectives and the use of partnerships.

4.2.1 Communications

The appointment of a fulltime Communications Coordinator from August 2005 has helped deal with the many demands in this area, although her actions were interrupted by illness and maternity.

New communications products have included:

- A completely revised and updated CPWF webpage that is also “lighter” for those with low speed internet connections. Further features being added are discussion areas (including the new design for interactive synthesis); a common platform for CPWF projects to share information; and an interactive reporting system for projects.
 - Basin profiles, the baseline document and the 2005 synthesis as described in the “synthesis research” section
 - Four “research highlight” brochures
 - Journal articles, research reports and working papers published directly by CPWF projects
 - The continuing CPWF newsletter (after a hiatus)
 - New material for PowerPoint presentations for the CGIAR-AGM and “CP Day” (in March 2006) at the World Bank
- A shared brochure among the four CPs (due to be published shortly)

The Communications Coordinator was also strongly involved in planning a CPWF seminar at the Fourth World Water Forum. A CPWF publications policy is in the final stages of development.

4.2.2 Public Awareness

There is a vast array of scientific meetings in water and agriculture. CPWF aims to be selective but to maintain a presence at the most important. CPWF has focused particularly on making presentations and mounting information booths at key meetings, including:

- The CGIAR Annual General Meeting where we presented a discussion seminar “CGIAR priorities and the CPWF research strategy in river basins” sponsored by the SDC and MAE France
- The 4th World Water Forum (March 2006) where we presented a seminar “Water for Food, Livelihoods and the Environment: Bridging the Gap through Partnership in Research”
- Stockholm World Water Week 2005.

TLs and BCs have continued to respond to key requests for participation including especially workshops of the projects that are part of their community of practice and various meetings for the International Assessment for Agricultural Science and Technology (IAASTD). As well as providing opportunities for scientific networking, these meetings also offer opportunities for follow-up of projects, negotiations and for contact with donors and potential donors. Since early 2006 we have also been planning two major undertakings that are critical for scientific networking, synthesis, and public awareness at the halfway stage of the first CPWF phase:

A major event for networking, synthesis, and public awareness in 2006 is the International Forum on Water and Food (formerly the “Synthesis Conference”). Details of the Forum are available on the CPWF web page.

4.3 Knowledge Sharing

The Knowledge Sharing in Research Pilot Project (KRSPP) was launched at an inception workshop in June 2005, with six CPWF projects participating along with IWMI project teams, as this is a joint initiative. The project aims to promote a more demand-driven, interactive approach to research. The objective is that knowledge sharing (KS) is built into projects as an integral part of the research process, involving all stakeholders at the planning stage of project formulation and implementation. The inception workshop, supported by the CGIAR ICT-KM Knowledge Sharing project, enabled discussion on knowledge sharing concepts and its practical application on the ground in research projects. It also facilitated the development of knowledge sharing concept notes and work plans describing knowledge sharing activities to be integrated into existing CPWF project plans.

Collaboration with the ICT-KM KS Project helped forge links with other CGIAR centers involved in piloting various knowledge sharing approaches and has led to useful learning on how to improve and increase institutional knowledge sharing.

The KSRPP has worked closely with the BFP impact assessment team in identifying mutually beneficial opportunities and complementary tools, and to work with CPWF projects as knowledge sharing, and networking for out and up-scaling, and therefore impact, are closely related. The KRSPP facilitated at workshops in the Volta and Mekong basins and took the lead role in introducing Most Significant Change to the Mekong workshop participants. In addition to knowledge sharing, these approaches support better project management and more innovative approaches in monitoring and evaluation. Project staff, designated as KRSPP focal points, have received practical training in conducting a variety of knowledge sharing tools.

5 Governance and Management

5.1 Consortium Steering Committee

The CPWF operates under a Joint Venture Agreement (JVA). Members of the agreement include five CGIAR⁶ centers; six NARES⁷ and one IRBO⁸ located in the river basins in which the CPWF operates; four ARIs⁹; and three NGOs¹⁰. The Members established a Consortium Steering Committee (CSC) comprising one representative of each Member organization. IWMI was nominated by the Members as the 'Leading Member' and the legal representative of the JVA. The CSC is an autonomous decision making body and does not report formally to any boards of the JVA Members to ratify decisions made by the CSC. The CSC meets once a year in person, and virtually as required for program operations. The 2005 meeting was convened in Canberra, Australia, at the offices of the CSIRO Division of Food and Water Resources, from x to x March. The main points for discussion and decisions at this meeting were the draft research strategy, and the concept of basin focal projects. The 2006 Meeting of the CSC was convened in Cairo, Egypt from 2-3 May.

5.2 Program Management Team

A streamlined six-person Challenge Program Management Team (CPMT) became fully established in August 2005 with the competitive selection of two members from the broader community of CPWF consortium institutions and project researchers. We consider the team a success in its integration and productivity. The "external" members have contributed a great deal to breadth, ideas, and products. At the same time theme leaders (TLs) and basin coordinators (BCs) have been freed of program management responsibilities as their interests are handled by one TL and one BC representative nominated by their constituents. The Program Coordinator and Program Manager continue their membership of the committee, the former being the Chair. The team meets in person at least four times a year, generally at the time of a CPWF initiated workshop (such as the CPWF Asia Project Leader's meeting in Vientiane, Laos PDR in February 2006 and the CSC meeting in Cairo, May 2006), or at international fora where the CPWF is actively participating (such as the Stockholm World Water Week in August 2006). The team meets virtually at least once a month to discuss program plans and ensure that decisions are made and acted on in a timely manner.

5.3 Project Management

Under the JVA, the five CGIAR centers are tasked with the substantive management of the project portfolio for which the centers can charge an overhead on contracted research of 4%. This includes administrative and management services, including reporting and project reviews to ensure quality and effectiveness of the research projects under the thematic area lodged within the center¹¹. The managing centers work with the TLs and BCs in ensuring quality control of the projects under their remit. An MOU was signed between the CPWF and the Managing Centers that set out the procedures under which the projects should be managed. This was to ensure equity across the five centers. A meeting is being convened in August 2006 of the centre representatives who provide

⁶ Centres of the Consultative Group on International Agricultural Research: IWMI, WorldFish, IRRI, IFPRI, CIAT

⁷ National Agricultural Research and Extension Systems: ARC South Africa; EMBRAPA Brazil; AREO Iran; NWRC, Egypt; ICAR India; YRCC China.

⁸ International River Basin Organisation: Mekong River Commission currently based in Laos P.D.R.

⁹ Advanced Research Institutes: CSIRO Australia; IRD France, JIRCAS Japan; UC Davis USA.

¹⁰ Non Government Organizations: CARE International USA; SEI Stockholm; WRI USA.

¹¹ A senior scientist from the five CGIAR centers leads one of the five thematic areas of the CPWF. Theme One: IRRI; Theme Two: CIAT; Theme Three: WorldFish; Theme Four: IWMI; Theme Five: IFPRI.

these management services, and the CPWF Secretariat in order to revisit the procedures and identify where efficiencies of operation can be made, and to enable the centre representatives to become more familiar with the rationale behind the procedures.

5.4 Operational issues and challenges

As the CPWF matures, processes run more smoothly. We continue however to innovate, including in the last year the following.

- Outcome mapping, impact pathways, network modeling and most significant change are being used together to develop an integrated system for CPWF reporting, M&E and impact assessment. We consider this one of the most exciting growing points in process, where we are contributing to the “cutting edge”.
- We have strengthened the “gender, institutions and participation” supervision in the Program both by the appointment of a specialist in that area as a member of the CPMT and by reviving, in a more agile, effective and economical form, the Gender, Institutions and Participation (GIP) panel that had suffered operational difficulties in providing effective screening and guidance for CPWF projects.

Process challenges have been manageable, but time-consuming, including:

- Defining plans for external review of the CPWF against a backdrop of evolving CGIAR processes.
- Waiting to receive the final version of the management audit report conducted in August 2005, so as to act on its recommendations. This has now been received. Recommendations include, among other things, reviewing copies of MoUs between the Managing Centers and their Partner Institutions to monitor conformity with operational standards, improving consistency of administrative documents, and adding resource staff to the CPWF Secretariat to assist with growing workload requirements, “...the CP Secretariat is now managing a lot more projects thereby generating additional work...another position that will assist with the devolution of some CP Coordinator tasks, the increased project workload...will help ensure the smooth flow of work practices going forward.” .
- Waiting for the appointment of CPWF-specific administrators by the Managing Centers (now done) so as to improve their understanding of CPWF processes, interaction with, and service to, project leaders. A meeting is now being convened in mid August 2006.
- Obtaining timely financial information from the dispersed sources on which we rely for program management.
- Adaptation to the needs of specific donors, especially for contracting and reporting.

A Growing List of Partners:

Broad partnerships are fundamental to the work of the CPWF. They lead to broad “buy in” to research and development and an active community that promotes the new technology, information, and policy guidelines that result from research. More fundamentally, the breadth of partnerships provides the information and ideas – often unexpected -- that are a precondition for “good science” and innovation. This is particularly the case since many of our partners have not worked together before. The potential of bringing new partners together is illustrated by this comment:

“Without the stimulus provided by the rules of the CPWF competitive call, we would not have considered bringing together such a wide range of partners from different basins” (Barbara van Koppen, leader project 28 -- multiple water use systems). This comment has been echoed by other project leaders.

Meetings of project leaders and researchers are an important mechanism for discovering and forging linkages among CPWF project researchers. After the “global” field workshop of project leaders in South Africa in November 2004, this year we have worked with a regional focus in Uganda (November 2005) and Laos (February 2006). The Laos meeting was particularly notable because, through an entertaining group dynamic, all the 18 projects present discovered potential linkages of mutual benefit with all other projects present.

As mentioned, the small grants program successfully expanded the participation of NGOs. Meanwhile, the first set of BFPs increased the visibility and participation of advanced research institutions (ARIs); this trend seems likely to continue in view of the offers for the second set of BFPs that include participation of ARIs and of private consultancies.

Present estimated distribution of project funding (not including central activities – themes, basins and secretariat) is 45% NARES, 41% CGIAR, 9% ARI, 5% NGO. A total of 198 different institutions participate officially in CPWF projects, providing expertise through agreements established by memoranda of understanding with the project lead institutions. The 2007-09 Medium Term Plan (MTP) provides more information on partnerships that exist across the project portfolio and within the river basins.

The partnership with the CA has been of particular importance in the last year, leading to two draft products – the CA-CPWF summary of priorities and scenario predictions for CPWF basins. Several CPWF TLs and BCs have participated as chapter authors or contributors and, for CPWF, the basin representative in the CPMT has ensured that the practical results of the partnership were provided in a form useful to the CPWF.

The CGIAR Secretariat has always emphasized the importance of partnerships among the Challenge Programs. The new CP for Sub-Saharan Africa (shortly due to end its inception phase) has opened more opportunities for collaboration. There is a geographical overlap between one of their three pilot areas (Lake Kivu) and the CPWF benchmark river basins; more opportunities are likely as they choose additional pilot areas. There has already been close interaction on process – particularly our advice on running competitive funding schemes, and their promised support to CPWF to have the CPWF considered as an integral part of the CAADP program of NEPAD¹². During the last two years, opportunities for technical collaboration with the Generation and Harvest Plus Challenge programs have been discussed in detail in selection and use of drought tolerant genetic material; however, the difference in phasing between the products of the other two CPs and the CPWF mean that this remains an opportunity for the future.

During the last year, the four CPs had intensive contacts at the CGIAR AGM and at the “CP Day” (March 2006) in the World Bank, where we all made public presentations to Bank and USAID staff and interacted with the CGIAR secretariat. Together we are about to publish a promotional leaflet on “CGIAR Challenge Programs”.

Looking into the future, the CPWF is using network models to ask questions about the types of partnerships that are desirable for research for development projects that promise a high level of impact. An important long-term effect of projects is the networks they form, strengthen and damage. Network maps help projects identify linkages, and think about how they wish to alter and strengthen them so as to achieve their purpose and goal. This helps people see they are part of a network, not just their organization alone, that will achieve impact. It also helps appreciate that the interactions between actors make the innovation process inherently unpredictable in the medium and long-term, thus placing more emphasis on the need for continual monitoring and evaluation to support adaptive project management. Relationships need to be prioritized – why some are more important than others – and indicators identified to be useful for planning and evaluation purposes. Partnerships in the basin focal projects may provide some insights as they have different sets of partnerships, yet aim for a common set of outputs. The classification of partnerships that best represent where on the research for development spectrum the CPWF investments and partnerships are located is also being explored. An initial attempt has been made using the classifications contained in Ryan (2005)¹³ for the 2007-09 Medium Term Plan.

¹² Comprehensive Africa Agriculture Development Program of the New Partnership for Africa's Development

¹³ International Public Goods and the CGIAR Niche in the R for D Continuum: Operationalising Concepts.

6 Finance

The Consortium Steering Committee approves the CPWF budget on an annual basis. Two tables are provided to illustrate the CPWF financial status. Table 6.2 presents the donor contributions received to end 2005 from all donors; table 6.3 presents receipts and expenditures of the program up to December 2005. The figures reflect the externally audited account statements.

The surplus of income over expenditure at the end of 2005 was due to several issues that result from the partnership structure of the CPWF. First, broad multi-disciplinary partnerships across multiple basins mean that project leaders have taken more time than they anticipated consolidating their teams and commencing implementation. This has resulted in a slower rate of expenditure in 2004 and 2005 than planned in their proposals. Projects are now maturing with a subsequent increase in expenditures.

Second, there is a long chain for reporting (from remote locations to partner institution headquarters to project lead institutes to managing centers to CPWF Secretariat). Thus, expenditures already incurred can take many months to appear in CPWF audited accounts.

Following the recommendations of a management advisory audit conducted in 2005 (and reported in 2006), the CGIAR Internal Auditing Unit has offered to help design solutions to this challenge. The introduction of a three tier system of audit requirements is being considered, based on annual budgets and a risk assessment of the financial management practices of each institution. Additionally, Lump-sum sub-contracting is being introduced as an option in the second call for proposals. These, and possibly other procedural changes, would enable the CPWF to provide more up-to-date expenditures than currently. Disbursements would be immediately recorded as expenditures rather than being held in an advance account until an external audit statement is received.

6.1 Other issues on financial management

There has been further positive progress in obtaining and continuing donor commitment which is very encouraging given the difficult recent funding circumstances of the CGIAR (including cuts from USAID and Japan).

- DFID confirmed that it will continue funding the CPWF at the present level of GBP 2.5 million per year for 2005/6 and 2006/7. Further funding beyond April 2007 is possible.
- The EC confirmed (June 2006) that it will provide €1.5 million (ca. USD 1.8 million) in 2006 of which part is reserved for approved but unfunded project 19 (upstream-downstream relations in the Blue Nile) and the remainder (€1.25 million approximately) is assigned to the second competitive call.
- After detailed requests by the CPWF Chair and Coordinator, the CGIAR Secretariat indicated that the World Bank contribution to the CPWF in 2006 will be USD 2.7 million. This represents an increase of USD 0.7 million over the assignment in 2005.
- In December 2005, SDC increased its funding to the CPWF to CHF 1.3 million (ca. USD 1.08 million) per year, effective 2005, of which all is unrestricted except CHF 0.2 million per year from 2006 onwards that is to be applied to broadening theme 2 links to soil, water, nutrient research networks (following a CN submitted by CIAT and CPWF).
- The French Ministry of Foreign Affairs indicated that a new phase of Echel-Eau is possible and that it intends to reach a decision by end-2006. Additionally, the steering committee of Echel-Eau, meeting in March 2006, assigned €0.5 million to a BFP for the Niger (to be managed integrally as part of the second set) and €0.5 million as restricted funding for projects in the Niger basin in the second competitive call.
- Germany (BMZ) invited the CPWF to submit a proposal by 30 April 2006. From various suggestions, the CPMT chose an approved but unfunded project on the dynamics of Tonle Sap (Mekong Basin).

6.2 Schedule of contributions received

	Brought forward from previous year	Funds received	Actual expenditure	Balance carried forward to next year
	US\$ '000	US\$'000	US\$ '000	US\$ '000
Year 2002				
World Bank	-	200	200	-
World Bank	-	1,500	432	1,068
Total	-	1,700	632	1,068
Year 2003				
Danish (DKK 3,000,000)	-	497	273	224
Netherlands (€ 1,500,000)	-	1,829	1,219	610
Norway (NOK 2.5m)	-	347	347	-
Sweden [SIDA] (SEK 800,000)	-	107	107	-
Switzerland [SDC] (CHF 500,000) - 2003	-	386	386	-
Switzerland [SDC] (CHF 800,000) - 2004	-	632	-	632
USDA	-	-	68	(68)
World Bank	1,068	1,500	2,555	13
Total	1,068	5,298	4,955	1,411
Year 2004				
Danish (DKK 2,100,000)	224	363	-	587
DFID (£ 1,250,000)	-	2,267	1,746	521
France (Euro 2,000,000)	-	2,668	-	2,668
GTZ (€ 350,000)	-	433	47	386
Netherlands (€ 537,357)	610	653	959	304
Norway (NOK 3m)	-	441	441	-
Sweden [SIDA]	-	-	58	(58)
Switzerland [SDC] (CHF 800,000) - 2004	632	-	526	106
USDA	(68)	68	-	-
World Bank	13	2,500	-	2,513
Total	1,411	9,393	3,777	7,027

Year 2005

Danish (DKK 2,100,000)	587	332	333	586
DFID (£ 1,250,000)	521	2,399	2,921	(1)
DFID (£ 1,250,000)	-	2,196	1,550	646
France (Euro 2,000,000)	2,668	-	9	2,659
GTZ (€350,000)	386	-	386	-
GTZ (€300,000)	-	350	114	236
Norway (NOK	-	371	150	221
Netherlands (€254,822)	304	315	309	310
Sweden [SIDA] (SEK 683,334) - 2004	(58)	104	46	-
Sweden [SIDA] (SEK 690,000) - 2005	-	85	85	-
Switzerland [SDC] (CHF 1,300,000) - 2005	106	1,041	583	564
World Bank	<u>2,513</u>	<u>2,000</u>	<u>3,161</u>	<u>1,352</u>
Total	<u>7,027</u>	<u>9,193</u>	<u>9,647</u>	<u>6,573</u>

6.3 Summary audited statement of receipts and expenditures

	2002 US\$'000	2003 US\$'000	2004 US\$'000	2005 US\$'000	Total US\$'000
Income					
World Bank	200	3,000	2,500	2,000	7,700
Netherlands		1,829	653	315	2,797
France			2,668	-	2,668
Norway		347	441	371	1,159
Switzerland		385	632	1,041	2,058
Sweden		107	104	86	297
Denmark		497	363	332	1,192
Germany			433	350	783
DfID			2,267	4,595	6,862
USAID (USDA)			68		68
Total income	200	6,165	10,129	9,090	25,584
Expenditure					
Program Support					
Program development	300				300
Secretariat	100	635	499	441	1,675
Total program support expenditure	400	635	499	441	1,975
Research					
First call			1,108	6,559	7,667
Basin focal projects				466	466
Program activities	232	1,504	545	344	2,625
Capacity building		-	18	53	71
Theme leaders		1,346	793	742	2,881
Benchmark basins		1,470	792	842	3,104
Research administration			22	200	222
Total research expenditure	232	4,320	3,278	9,206	17,036
Total expenditure	632	4,955	3,777	9,647	19,011
Surplus/(Deficit)	(432)	1,210	6,352	(557)	6,573
Balance brought forward	-	(432)	778	7,130	
Balance carried forward	(432)	778	7,130	6,573	

7 Lessons learned

The following lessons and challenges are particularly important for the coming year.

Technical

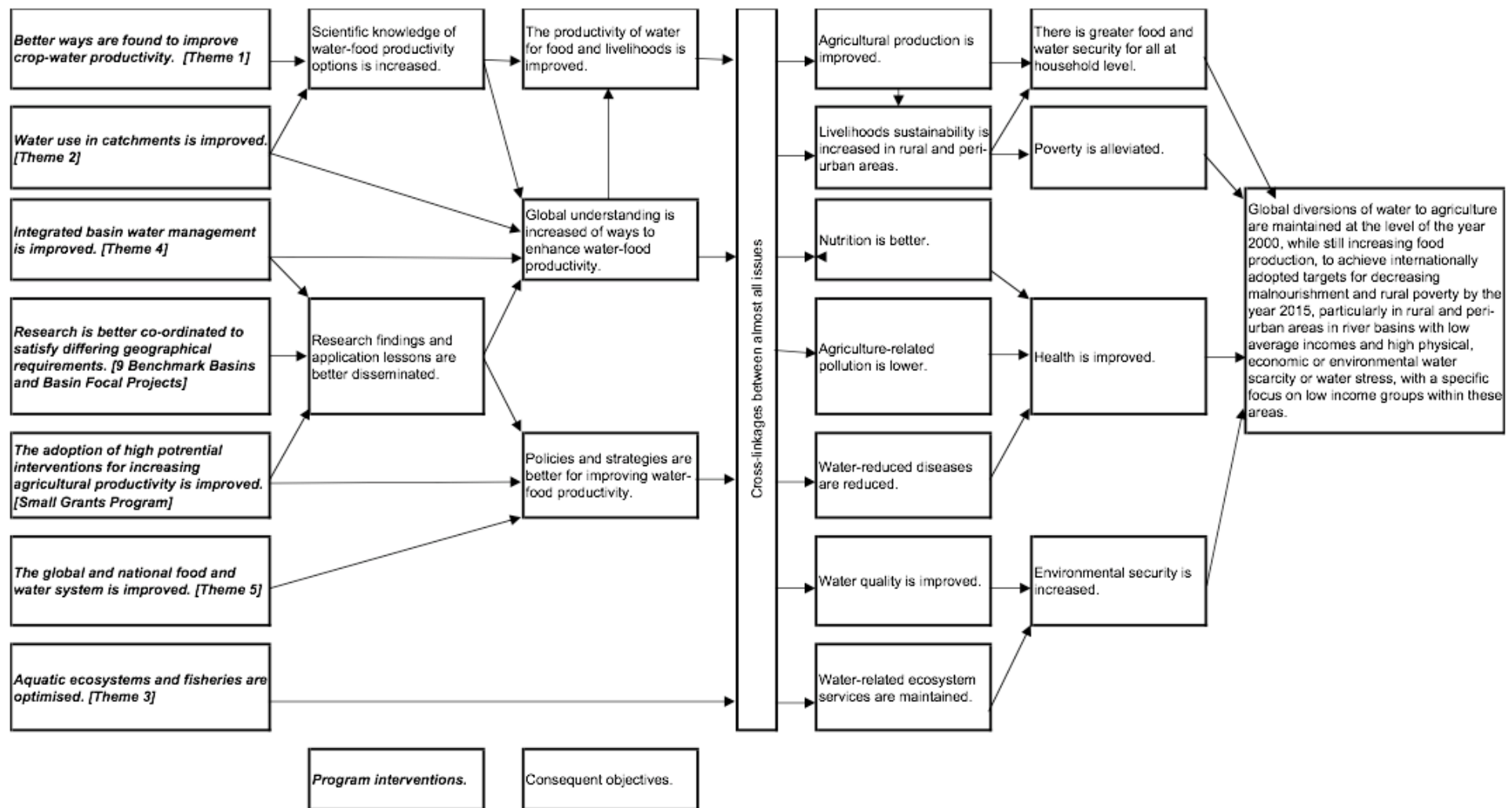
- Moving to greater focus despite the breadth of water-food-environment demands; the various investments in synthesis research and the second “gap-filling” competitive call will help us towards this.
- The demanding conceptual framework of attending to both water productivity and poverty; the BFPs in particular deal with this challenge, but it is present in most project and synthesis research.
- Synthesizing results and experiences in a diverse program with many actors; as mentioned above, researchers are not necessarily attuned to presenting results with a focus on future impact, nor are methods for synthesis research always clear to TLs and BCs.

Institutional

Several of the challenges facing the CPWF (and to some extent the other CPs) arise from the fact that they are a new model for doing business.

- CPs are expected both to help “change the way of doing business” among CGIAR centers and other institutions and produce results rapidly. That is in effect a trade-off, with which we are learning to live.
- CPs are increasingly expected to produce many of the same management tools (such as medium term plans¹⁴, reports on partnerships and division of funding by detailed CGIAR priorities) as CGIAR centers. This has two implications. First many of the tools are not necessarily suitable for CPs, so in order to experiment with changing the way of doing business, we need to invest extra effort and imagination, while still producing the required products. Second, we are asked to respond to these requirements without increasing management or support staff numbers.
- Present CGIAR funding mechanisms, with most funding allocations confirmed only one year at a time, are challenging for competitive research programs like the CPWF, that are based on contractual commitments to multi-year projects, where we need to plan and make commitments for several years at a time.

¹⁴ The 2007-2009 MTP, for example, required the preparation of 18 separate log-frames by the CPWF.



Annex 1: Program Level Objective Tree

Annex 2: Current List of Projects

Project 1
Crop Water Technology and Markets
Mary Mgonja

Project 2
Water Productivity Improvement in Eritrea
Stefania Grando

Project 5
Rainwater and Nutrient Use Efficiency
Ramadjita Tabo

Project 6
Strategic Innovations in Dryland Framing
Stephen Asante

Project 7
Improving Productivity in Salt affected areas
Abdelbagi M Ismail

Project 8
Improving Water Productivity in Karkheh
Theib Oweis

Project 10
Coastal Resource Management for Improving
Livelihoods (CRESMIL)
To Phuc Tuong

Project 11
Upper Catchment Rice Landscape Management
Sushil Pandey

Project 12
Yellow River Rainfed Conservation Agriculture
Rodomiro Ortiz

Project 15
Unraveling Mysteries of Quesungal System (QSMAS)
Edgar Amezcuita

Project 16
Aerobic Rice System (STAR)
Bas Bouman

Project 17
IWRM for Improved Rural Livelihoods
Themba Gumbo

Project 20
SCALES
Nancy Johnson

Project 22
Environmental Services Promoting Rural
Development
Alonso Moreno

Project 23
Resources Management for Sustainable Livelihoods
Dhruba Pant

Project 24
Livelihood Resilience in Dry Areas
Francis Turkelboom

Project 25
Companion Modeling and Water Dynamics
Francois Bousquet

Project 28
Multiple Water Use
Barbara Van Koppen

Project 30
Wetlands, Social Welfare & Environmental Security
M C Masiyandima

Project 34
Improved Fisheries in Tropical Reservoirs
Chris Bene

Project 35
Community-based Fish Culture
Madan Dey

Project 36
Improved Livelihoods through Dam Management
Matthew McCartney

Project 37
Nile Basin Livestock Water Productivity
Don Peden

Project 38
Safer peri-urban vegetable production
Robert Abaidoo

Project 40
Integrating Governance and Modeling
Nancy McCarthy

Project 42
Groundwater Governance in IGB and YRB
Karen Villholth

Project 46
Small Multi-Purpose Reservoir Ensemble Planning
Marc Andreini

Project 47
African Models of Transboundary Governance
Amy Sullivan

Project 48
Strategic Analysis of River Linking
Tushaar Shah

Project 50
Enhancing Multi-scale Mekong Water Governance
Louis Lebel

Project 51
Waste water irrigation: Opportunities and Risks
Helle Samuelsen

Project 52
Mekong Fisheries Management Institutions
Alyne Elizabeth Delaney

Project 53
Food and Water Security under Global Change
Claudia Ringler

Project 55
Basin Focal Project: Volta
Jacques Lemoalle

Project 56

Annex 2

Basin Focal Project: Sao Francisco
Stephen A. Vosti

Project 57
Basin Focal Project: Karkheh
Mobin ud Din Ahmad

Project 58
Basin Focal Project: Mekong
Mac Kirkby

Small Grant 501
Water for economic sufficiency
Sawaeng Ruaysoongnern

Small Grant 502
Market strategies for water productivity
Michael Roberts

Small Grant 503
Sustainable water system innovations adoption
Amon Z. Mattee

Small Grant 504
Growing rice with mulch
V.M. Salokhe Asian

Small Grant 505
Enabling Endogenous Water Technology
Development
Stephen Sherwood

Small Grant 506
Improved water catchment and use-efficiency
Cecil Osei

Small Grant 507
Water-control for Small Plot Farming Systems
Deepak Adhikari/Bob Yoder

Small Grant 508
Harit Sankalp - Greening Alwar District
Bharat Dayal

Small Grant 509
Water for Food Security in Tigray
Susan Burnell Edwards

Small Grant 510
Associated cropping and rainwater harvesting
Adam J. Rankin

Small Grant 511
Up/out-scaling strategies in Karkheh
Maryam Rahmanian

Small Grant 512
Affordable Irrigation for Smallholder farmers
Amitabha Sadangi

Small Grant 513
Food Security in Southern Uganda
Josephine Kizza

Small Grant 514
Sekororo Rainwater Harvesting Project
Stephen McFarlane