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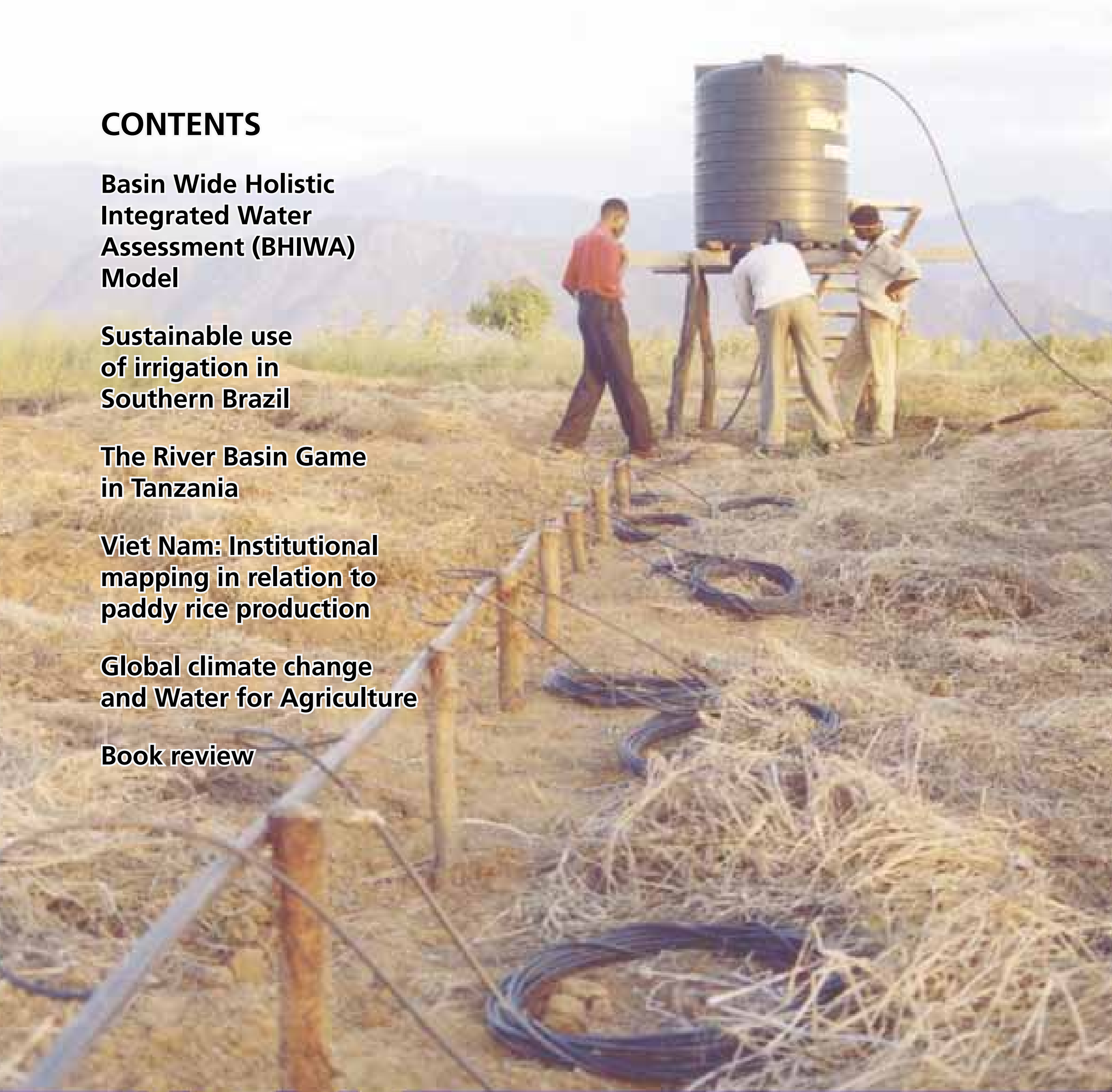

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Submission of material
GRID invites short written contributions, principally for the Diary and Forum sections. They may include photographs or drawings, which must be of high quality and suitable for reproduction at reduced size. Contributions should be sent to: International Programme for Technology and Research in Irrigation and Drainage (IPTRID), Land and Water Division (NRL), Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, 00153 Rome, Italy.

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Installation of low pressure drip irrigation close to Makanya, Tanzania. *(FAO/V. GILLET)*

Aim and scope

GRID is published to assist communication between researchers and professionals in the spheres of irrigation and drainage. It informs readers about IPTRID activities and about research and development in irrigation and drainage with a view to stimulating international debate on these issues.

GRID is produced for professionals working or having an interest in irrigation and drainage projects in developing countries. It covers all relevant disciplines including engineering, agriculture and the social sciences.

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A welcome from the Programme Manager

Dear Reader,

On GRID

Our GRID 26 is the first issue of 2007. I invited our Senior Technical Officer, Mr Hervé Levite, to be a Guest Editor for this issue and as such he has been primarily responsible for putting it together. As we did last year, we expect to continue publishing in four languages: English, French, Spanish and Arabic. As it is now customary, our new issue will take you around the globe, among others, from Viet Nam we learn about institutional mapping, from the Middle East about training of water professionals there, moving to Tanzania the River Game is explained, crossing the ocean to Brazil informs us about their sustainable use of irrigation in their southern region, and from Canada a warning on climate change.

Our interview features Mr Rudolph Cleveringa, Senior Water Adviser from the International Fund for Agricultural Development (IFAD). He provides a candid view on his organization's goals and efforts and how IPTRID may be able to assist in their endeavours. Our main article is tied to our agreement with ICID to promote the Country Policy Support Project (CPSP), where an IPTRID Secretariat staff summarizes the Basin Wide Holistic Integrated Water Assessment Model or BHIWA.

Finally, we call your attention to the Book Review section where we cut across institutions and themes: A CPSP-related work in China, a thesis on management transfer from Colombia, IPTRID's new Issue Paper on informal irrigation, and a look at the latest FAO Land and Water discussion series paper dealing with water desalination.

On our work

The IPTRID Governance meetings held in September 2006 in Kuala Lumpur came just after our August issue (GRID 25) and thus were not reported. These yielded important actions to be taken for the future of the Programme. Changes in donor funding mechanisms with preference for more bilateral arrangements have had a negative impact on our Programme finances. Thus, the Programme Manager has been instructed to renew the efforts to identify and secure new contributors while conserving the present support. The idea of a new home for IPTRID located in the developing world found many supporters, a matter that will need to be decided by mid-2007. It was also recommended that the Programme concentrate on fewer issues as a way to sharpen its focus and increase its "added value".

With respect to our activities, the Programme has continued its involvement and support in a varied number of issues, while some activities have also come to closure. On the former, capacity on designing and managing water projects was strengthened in Jordan and Yemen; studies to better understand the path for research uptake continued in Egypt and are planned for Ethiopia. On the latter, the first phase of our CISEAU project was completed and an extension is now under consideration. Likewise, the initial support to the ESPIM project came to closure with the Viet Nam and Cambodia review; Laos and Thailand are expected to follow.

Finally, I am pleased to report that the Workshop on Monitoring and Evaluation of Capacity Development Strategies held in September 2006 was successfully implemented. It was the fourth and final of the cycle in our effort to provide in-depth understanding of the issues surrounding capacity development of irrigated agriculture.

Carlos Garcés-Restrepo
IPTRID Programme Manager

Interview with Rudolph Cleveringa

Our fourth interview led us to the International Fund for Agricultural Development, where Mr Rudolph Cleveringa, Senior Technical Advisor provides a candid view of his organization undertakings and how IPTRID may be able to fit in the specific domain of agricultural water management activities. [Editor's note]

On IFAD

With regard to IFAD's mandate "Enabling the rural poor to overcome poverty", could you summarize what are your strategies in agricultural water management?

Indeed IFAD targets the rural poor and vulnerable households within the framework of the Millennium Development Goals.

Therefore Land and Water Resources Management is a key concept. It needs to be considered both in terms of rural livelihood (risk, vulnerability, gender equality, etc.) and Agricultural Water Management (water for food, feed and, fibre) but in harmony with water for domestic and artisanal processing, environment and health.

IFAD's Strategic Framework 2003-06 and the new one for 2007-10 both stress Access to Productive Assets and Technology as one of three key pillars for development effectiveness.

In this context we are currently elaborating a Water and Rural Livelihoods strategy which will definitively tilt towards operational issues and "hot topics" such as pro poor rural institutions where we, by and with farmers, and together with our other stakeholder-partners can make a difference.

Currently, there seems to be an emerging trend to bring back agricultural water management (AWM) to the forefront of international fora, namely: the World Bank, the Blair Report on Commission for Africa and the Camdessus Report on financing Infrastructure. Are you part of this effort and in agreement with the principles of harmonization contained in the Paris declaration on aid effectiveness?

IFAD, as opposed to other international financial institutions, never abandoned investments in AWM because (a) it forms the backbone of poor rural livelihoods and rural economies, and (b) it corresponds to our mandate. Not only did the proportion of investments increase over the last decade, but the volume of financing also went up and represents today 60-80% of IFAD investments.

We are actively involved in various international platforms such as UN Water and the CGIAR, and fora (World Water Forum and Stockholm Water Week) but we also participate in "alternatives" such as the Bradford/Wageningen/ZEF Initiative on non-mainstream solutions to "uncomfortable" challenges in Land and Water Governance.

On harmonisation, IFAD is part of the Global Donor platform that tries to build synergies, and I must stress the fact that since its creation, IFAD has always promoted country ownership, which is a strong element of the recent Paris declaration.

On IFAD-IPTRID collaboration

After the IPTRID/IFAD study on "Appropriate water-lifting technologies in West Africa" what other types of similar collaboration do you think is possible in order to strengthen our Networks?

The entrée points I see are:

- IFAD should look at IPTRID Knowledge and networks, its capacity to synthesize: knowledge, its experience in capacity building, its possible role in needs identification.
- IPTRID should approach IFAD and its networks in order to participate in its Research & Development grant initiatives, to learn about project linking and upscaling experiences.

In the context of the new orientation of IPTRID's mission, emphasizing the uptake of research and exchange (R&E) of technology, (and less on specific and direct capacity

development), can you advise about new and useful needs related to irrigated agriculture?

The core question is whose needs are we talking about? As I said before, IFAD's focus is on the development of pro poor rural institutions. Therefore, I would suggest the following areas as of relative importance to IPTRID and partners:

- **Indigenous Water Technologies**, such as qanats, rainwater harvesting techniques, terraces, subaks, etc. that may offer scope for efficiency gains on water productivity in the context of a more holistic view of cultural values and livelihood respect and empowerment. What to do in fragile states, where services have collapsed, is yet another issue.
- **Gender-sensitive and age-specific** agricultural and multiple water use interventions have to be designed with and by those farming communities in the context of large socioeconomic changes (growing urbanization, feminization of agriculture, diseases such as HIV/AIDS, etc.). The explicit inclusion of power relations and (inter)dependencies around such interventions needs to be better understood to secure lasting, sustainable benefits and impact.
- **Environment and Energy** – Irrigation Technologies will have to be environmentally balanced, not only in terms of health aspects, but also in terms of energy and added value footprints. Subsidizing local energy costs for cheap pumping is not realistic anymore. The governance of water for energy (white power) as well as water to produce bio-fuels, will be a big question when addressing rural poverty reduction.
- **Bridging the blue-green water gap** is one of the main challenges. Low cost, replicable methods and tools should be picked up locally. Patents and trademarks may further restrict massive uptake. The rural-peri-urban nexus should be exploited more and safe re-use of grey water merits specific attention. Urban diets, which are much more water-intensive than rural diets, need to be acknowledged. Water Technologies to produce perishables and/or livestock and its artisanal processing represent another challenge area. Last but not least, choices to raise the resilience of the rural poor to droughts and floods need to be (locally) identified. Paid watershed or environmental services may fall into this category.

In the context of an increasing water scarcity in certain countries/regions how important do you see the use of non-conventional waters (NCW) in support of small-scale irrigation?

NCW such as brackish waters are being extensively researched (e.g. ICARDA, ACSAD, ICBA). However, reuse of grey water is not a non-conventional water any more as we can see in examples from Ghana, Peru or the Jordan Valley. The use of fognets in other settings may present options to sustain drinking water and home-gardening, sometimes even larger scale operations. The balance between spot wise "public attention drawers" and relevance for massive poverty reduction merits attention as well as where all of this water, conventional or not, is going.

We would like to know more about farmer-friendly crop and livestock interactions and technologies that consume less water resist more water stress or can stand low quality water. And, last but not least, although debatable, the over-focus on blue water (irrigation, surface storage) must change to a better mix and balance with green water (rainfed, subsurface storage). This can also be achieved through innovations such as paid watershed services to landscape users. In Kenya and other parts of SSA IFAD is at the forefront of these concepts.

What do you see as the main constraints to the expansion of irrigated lands in Africa?

First of all I do not believe this is a cure-all to effectively combat Rural Poverty. The Collaborative Study on Investments in Agricultural Water Management for Poverty Reduction and Economic Growth in SSA, in which IFAD took a lead part, has highlighted the pros and cons of expanding irrigated lands in Africa.

A main reason for not expanding is that the IFIs have been busy focusing on their own investment programmes rather than looking at private sector investments in securing Water for Agriculture. We like to emphasize that farmers are very much part of that private sector. Good Data is also a problem. Government data usually reflect formal irrigation only, but the informal irrigation sector may well be handsomely bigger. The Challenge Programme reports that in Ghana we have a 10:1 ratio, the informal sector being estimated at 45 000 hectares whereas the official data confirm 5 000 hectares of formal irrigation.

What type of new water technology do you perceive as a real breakthrough in

[*continue from page 5*]

the context of introducing small-scale irrigation to poor farmers in the developing world?

Water security technology embedded in rural institutions accountable to their constituencies really may be the real thing. The recent UN Water brochure "Coping with Water Scarcity" has mentioned a series of issues that would contribute to such improved water tenure security. I do not believe in a quick-fix with a stand-alone technology, and I certainly do not share the idea that one can import technology from one place and dump it as a breakthrough in another. Careful needs, accessibility, adoptability and benefit analyses with and by resource poor farmers will have to preclude any external decision to introduce "real breakthrough" water technology, should it exist. ■

Nyanyadzi (south of Mutare in the east of Zimbabwe, HR Wallingford Ltd).

Basin Wide Holistic Integrated Water Assessment (BHIWA) Model

In April 2006 ICID and IPTRID signed an agreement that calls for the promotion and dissemination of material emanating from the Country Policy Support Programme (CPSP) implemented by the Commission. The agreement includes publicising the BIHWA model, presented in this article. Dominique Durlin, an IPTRID Secretariat staff put together this note based on material provided by ICID. [Editor's note]

Background

The 'Country Policy Support Programme (CPSP)' sponsored by The Netherlands Government was launched by The International Commission on Irrigation and Drainage (ICID) in 2002 and aims to contribute to generating effective options for water resources development and management. The goal is to achieve an acceptable food security level through sustainable rural development, in less developed countries. Policy planners and other professionals interested in projecting water scenarios at basin level required a flexible tool to simulate different policy options for use of water and other natural resources. For that purpose, the Basin Wide Holistic Integrated Water Assessment (BHIWA) model was conceived as an integral component of the CPSP project and as a reply to policy makers needs.

The model, scope and use

The model considers the entire water cycle and takes into account all types of water uses. The concept of BHIWA is illustrated in Figure 1. It provides the user the capability to deal with the entire land phase of the hydrologic cycle, from precipitation to evapotranspiration, and outflow to sea, including withdrawals and returns. The scope of the model is basically the Basin level but aggregated results make possible to assess the water situation at regional, country or global scale. The model evaluates the effects of water policies for past, present and future scenarios dealing with changes in sector demand and climate. Its capability as a water management tool is particularly efficient in the analysis and comparisons of scenarios and evaluations of the effects of policies options.

The model is a valuable tool and allows a good understanding of the water resources and needs. It facilitates the analysis of development and management options and creates a knowledge base for meaningful and transparent dialogue. It has been conceived to address the issues of integration of water use under three sectors namely: water for nature, water for people, and water for food. It facilitates the control of land use changes especially the expansion of irrigation to new lands and the assessment of the influence of rainwater harvesting and soil and water conservation practices on the total resource.

For using the model, a river basin is first to be divided into sub basins and each sub basin is to be divided into several homogeneous land parcels. The working of the model in its simulation phase is scenario-wise. For each scenario, the land use pattern for each parcel in each sub basin should be identified and data should be prepared accordingly for input to the model. The model provides for a maximum of 5 sub-basins and 25 parcels within sub-basins. A maximum of 10 scenarios can be studied at a time. The linkages with socio-economic and environmental aspects will be developed in a further phase.

The major advantage of the model is its flexibility allowing depiction of changes in land use and of human interventions through irrigation. It is also noticeable in its capability to depict surface and groundwater balances separately, including interaction between them, taking into account also the impacts of storage and depletion through withdrawals. Once the model is calibrated, it enables the user to simulate future scenarios of water resource development and management with respect to policy options at various scales.

The computer system and data required

The operating computer system is based on nine computation modules built in line with the concept presented in Figure 1. Those modules enable to input the appropriate set of data keeping in mind their role in the final result produced by the model. Additional worksheets facilitate data inputs and generate aggregated results in the form of tables and charts. This analytical approach provides a detailed description of the water resources and water consumption compressed at the final stage into a "global" water balance.

The model needs series of past and present data to establish an accurate calibration. As presented in figure 1, the complete set of data on water cycle is necessary to feed the model.

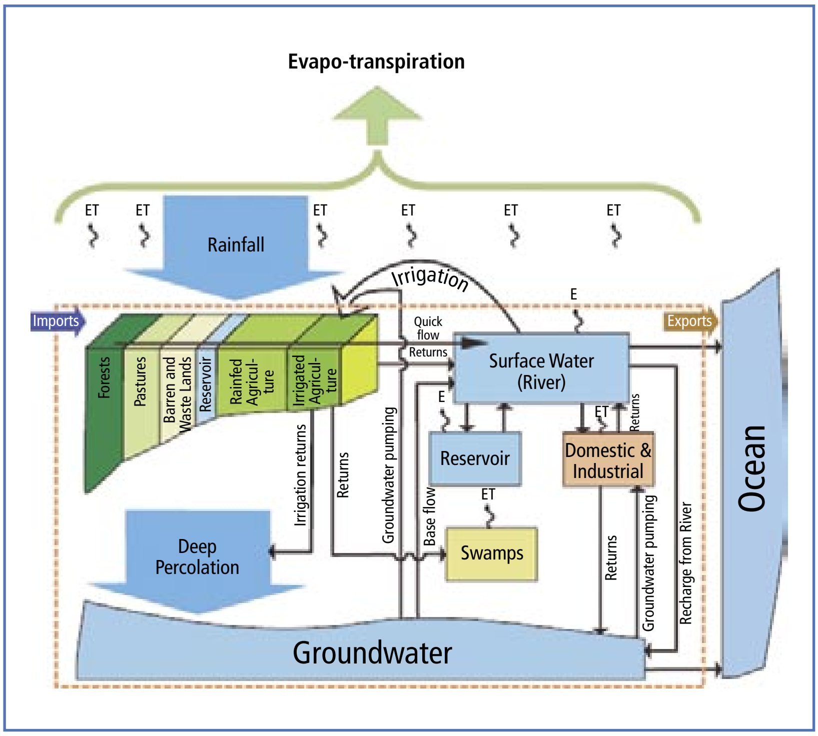

Figure 1. Schematic diagram of BHIWA model.

Hydrological and monthly climatic data, rainfall and runoff, the soil physical characteristics such as soil moisture capacities, and groundwater information on recharge and fluctuation are required. The water consumption by human activity and the need of the environment has to be carefully taken into consideration. A detailed investigation of the basin could provide the land use description and the classification of parcels by nature of evaporation. The crops statistics including data on gross and net areas under agriculture and irrigated agriculture, the crop-wise compositions of both, cropping calendar, crop water coefficient, and source-wise composition of irrigated area are also necessary information.

Data information about withdrawals and returns for irrigation use and Domestic and Industrial use are needed. All action to water development related to surface storage changes, imports and exports are also part of the data inquiry. All that can induces changes in the water balance is also considered such as the evolution of demography, actions taken to improve the water balance, the environment flow requirement (EFR), the irrigation efficiency in the water basin, etc. The model can be seen as data intensive.

Calibration and simulation of the model

The BHIWA model is first to be run in the calibration mode on the past or present conditions in order to decide the model parameters, and then, it can be run in the simulation mode for future scenarios. The calibration stage can be for a single year or a sequence of years depending upon the water balance in the concerned basin. The process for the calibration consists in comparing the result of the model with the known data. Parameters have to be modified, until they are compatible with reality. After finding an acceptable situation, the model can be shifted to the simulation mode. At that stage, by simulating the past conditions of little or no water use in the basin, the model can also help in setting up minimum reference flows for maintenance and enhancement of river ecology and environment. The comparison of such flows with projected future river flows help in determining indirectly limits on water withdrawals, including decline in groundwater tables to meet environment flow requirements.

The model runs on a simulation mode and does not enable users to directly set targets or goals. The user intervention is to input the changes in the basic data by specifying alternative scenarios to run the model. Each scenarios take into account different policies management including emerging possibilities, development plans, and adoption of improved water and soil management practices.

The model has been applied successfully in water basins in various countries with different numbers of scenarios: In India in the Sabarmati Basin eight future scenarios, past and present situation whereas in the Brahmani Basin only four future scenarios, past and present have been considered. In China the Jiaodong Basin and the Qiantang Basin have been evaluated through five future scenarios. In other countries, Mexico, Pakistan and Egypt, after national consultation it appeared that the Bhiwa model sould be adapted to the specific conditions of these areas.

Model outputs

When the data are fully provided, and the model calibrated, the program gives detailed results for each scenario in the form of table as well as bar charts. The BHIWA model calculates the overall water balance (Figure 2), but also separates surface and groundwater situation. An easy access to the intermediary results and graphs such as water consumption per sector, complete description of the irrigated land in terms of water sources, withdrawals, crops and seasons and land use regarding non cropped areas can prepared.

A final issue on the performance of BHIWA model is that various indicators internationally recognized for their significance on water stress situation (surface and ground water) can be calculated. The CPSP documents produce so far have selected some of these indicators to characterise the water basins. These global stress indicators show the situation regarding the water demand and return to surface and groundwater. They compare surface and groundwater withdrawals and returns to total water input for each scenario. ■

For further information please contact: IPTRID@fao.org or ICID@icid.org

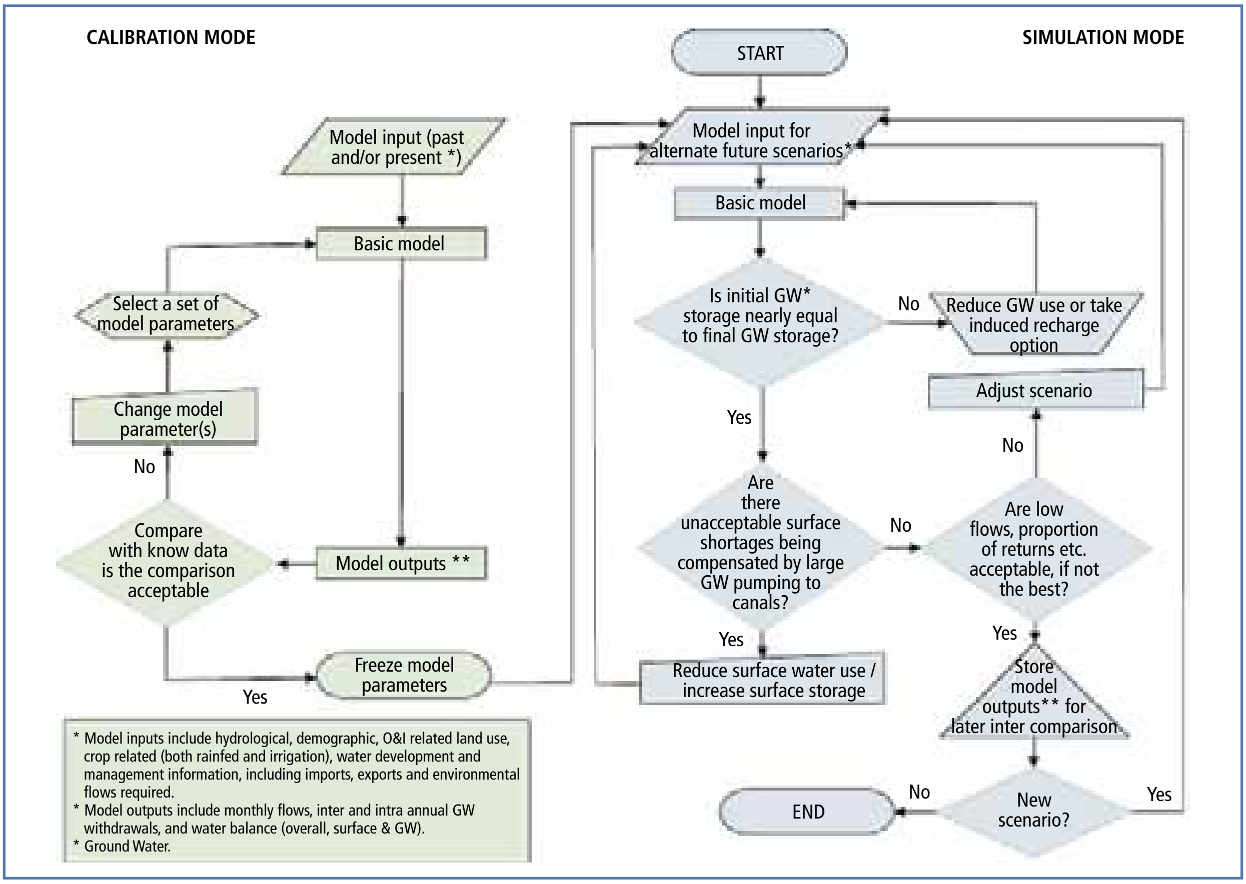

Figure 2. Logical sequence of BHIWA model.

The need for more small-scale irrigation research, a view from a former IPTRID staff member

Attention given to small-scale irrigation, primarily informal smallholder activities has fluctuated over the last few decades. Some argue that it is an inefficient use of resources if we are to provide sufficient food and fibre for the world and that large schemes with economies of scale are better. On the other hand small-scale irrigation can generate local supplies of food and income without much intervention from government agencies.

In sub-Saharan Africa small-scale irrigation is more widely practised than realized. The very fact that it is informal makes it invisible to official statistics. Inputs are low and the technology is relatively simple and easy to operate and maintain. Results are mixed but it is an agricultural activity that many poor communities want and are prepared to invest in. As such, small-scale irrigation development could be considered an appropriate strategy to alleviate poverty for rural smallholders. However, can it be improved, can it be made more successful and is any more research needed?

IPTRID Knowledge Synthesis Report # 3, "Smallholder irrigation technology: prospects for sub-Saharan Africa" maintained that irrigation has an important role in poverty alleviation; firstly because subsistence farming becomes more reliable; and secondly it improves the quality of agricultural produce and increases the market opportunities that smallholders can exploit. Note though that smallholders safeguard food security through irrigation before exploiting market opportunities.

IPTRID found that the uptake of appropriate smallholder irrigation technology was variable and that there is a continuing need to raise awareness and disseminate information about irrigation among rural people. At the agency/donor level, IPTRID has a role to formulate technical proposals and disseminate technical research results. Care is needed to ensure that the advantages of good scientific research are not lost and that results are understood by decision makers and donors alike. At the field level, imaginative well thought out material in the local languages is still required.

Good technical reliability is a key issue in smallholder irrigation. Research has shown that lack of reliability undermines success and leaves smallholders unwilling and unable to use water productively when it is next available. Poor quality, intermittently available, agricultural produce undermines the market opportunities that smallholders can exploit.

Despite considerable investment in applied research the uptake and application of findings has been limited Achieving positive research outcomes has proved to be especially difficult in the rural areas of poor countries. NGOs have had some success but much depends upon their continued presence in the field. However, it may be that too many technical research studies have failed to include both engineers and social scientists to ensure that demand for research takes account of the inevitable technical constraints as well as the socio/cultural ones.

The development gains of focussing assistance on smallholders have been widely debated. Developments that include funding for pilot demonstration and testing of smallholder irrigation in an operational environment appear successful. In Malawi, Zambia and South Africa, under the guidance of NGOs competent smallholders have championed particular technologies and business management skills and so encouraged other farmers.

The potential for smallholder irrigation to give impetus to rural growth in sub-Saharan Africa is enormous. A future focus could include the following:

Increasing the area of smallholder irrigation

New schemes can hardly be afforded by most of the governments in the region. Farmer financing of schemes is already developing, particularly in Kenya and some West African countries where highly developed horticultural markets in Europe offer reliable demand and farmers can be confident of repaying loans. Most farmers will require credit to finance new development and the issues of collateral and repayment planning must be addressed in parallel to the establishment of new irrigation.

A major strategy for increasing the area farmed by smallholders is the turnover of schemes to units and layouts that can be successfully managed by groups of farmers exercising autonomy over their irrigated area. So far, little attention has been given to this in Africa. It is complicated by needing to adapt hardware, establishing new

Nyanyadzi in Zimbabwe (HR Wallingford Ltd).

operational regimes and changing the habits and expectations of a large number of people.

Raising the level of performance

Marketing has been identified as a key issue in sustainable irrigation development. The strong link between reliability of water supply and effective marketing should not be ignored. Motorized pumps are a major source of unreliability and research into better methods of pump selection, operation and maintenance, and sustained financing has been promoted by IPTRID and others. Smallholders need this information or need to know where reliable information and advice can be obtained.

Governments and NGOs have promoted affordable, small and micro irrigation equipment. Among these technologies the treadle pump is one of the most popular and is clearly suited in terms of affordability and reliability to an important role in poverty alleviation. Ergonomic redesign of the treadle pump has enhanced its potential for poor people. However, the emphasis that was given to treadle pumps has diminished. There are reports of success from Zambia, Malawi and Kenya but no convincing research of the long-term improvements that have resulted from the introduction of these pumps and whether users have improved their livelihoods.

New micro systems

The poverty alleviation role of micro systems under land and water shortage conditions was demonstrated through the collector-well gardens in Zimbawe in the early 1990s. Other micro system applications, such as bucket drip systems have been tested for physical and social appropriateness in the African context. Innovative water management combined with low cost technologies should continue to be tested in community settings with participation in the monitoring and analysis of project results where possible. Individual farming families can exploit springs, streams and dambos (poorly drained depressions yielding shallow groundwater in the dry season). Development of garden food plots in established irrigation schemes or as stand-alone community gardens and through homestead water harvesting, as has been the case in South Africa, could give access to irrigation for people who have little or no resources.

Capacity building

More work remains to be done to ensure that all stakeholders including institutions are fully engaged in early, effective participation. Failures of participation can throw institutions, who have limited capacity to explore other methods, off-course. Smallholder irrigation in Africa is likely to remain in the informal sector but agencies can help by providing advice, opening markets to new technologies and perhaps encouraging smallholders though incentives. Building capacities for effective participation has also been found to be an essential element of successful turnover of schemes to farmers. In some cases improving the business skills of individual smallholder farmers may be an appropriate goal.

In summary

A brief examination of research and development over the last few decades shows that there is a wealth of knowledge about small-scale irrigation. This knowledge though is still not translated into understandable messages that can on one hand help shape policy, or on the other hand help smallholders be more effective in what they do. There is still a need for appropriate applied research but there appears to be little appetite to support such research in the donor community. IPTRID and its supporters need to continue to demonstrate that for much of sub-Saharan Africa small-scale, informal irrigation can alleviate poverty, can provide food and fibre and provide work that in turn can improve livelihoods and perhaps help in creating a healthier and better educated rural population. ■

For more information contact: Tom Brabben, HR Wallingford Ltd, UK at t.brabben@hrwallingford.co.uk

The sustainable use of irrigation in Southern Brazil

The irregular distribution of rains and the occurrence of long dry periods have increased the necessity to improve some practices of water management in Brazilian agriculture. A breakdown of a single harvest may disorganize the whole production structure of rural properties, significantly affecting the economical, social and environmental sustainability of the entire region.

Irrigation is an ancient agricultural procedure that allows permanent benefits for the rural sector. It still has, however, low use in many regions, in particular on small farms. This article aims to present an overview of irrigation in Brazil, with emphasis on the Southern Region, to evaluate potentialities and limitations of a sustainable use of irrigation.

Irrigation in Southern Brazil

The use of irrigation has increased in recent years in Brazil, particularly on big farms. It simply happened due to the necessity to reduce risks in the agricultural activities. However, there have been also significant technological improvements as both the industrial and farm levels, which allowed a recent modernization of equipment and field management. Still, many aspects could be changed, particularly when expanding and improving its use on small farms.

Brazil has more than 3 millions hectares under irrigation, corresponding to around 6 percent of its cropping area. It may represent a low percentage but the irrigated crops represent around 16 percent of the national agricultural production and 35 percent in financial value of production. On the other hand, it would be possible to expand irrigation to a potential area of around 16 million hectares. The potential area does not include plain soils, which would represent an additional increase of about 33 million hectares, thus raising the global irrigated area to around 49 million hectares.

The semi arid northeastern region has a long-established tradition of irrigated agriculture. That Region has adopted modern technology for tropical fruit production, particularly focused on export products to Europe. Recently, the tropical Central Region is undertaking a large expansion and modernization of irrigation. However, most of the Brazilian irrigated areas are located in subtropical southern and southeast regions. The production of grain crops represents the largest irrigated areas.

Rio Grande do Sul (the southernmost Brazilian state) has the largest irrigated area in the country, with more than 1 million hectares. The production of flooded rice by represents more than 90 percent of the irrigated crops. Most of the water used in rice production is derived from rivers, dams, and lagoons by pumping (57 percent) or by gravity (43 percent). The efficient use of irrigation is lower than 30 percent in many cases, and water consumption may reach twice the crop water requirement if technical recommendations are not adopted. This represents a high risk of negative environmental impacts, since rivers and reservoirs have supplied most of the water used for rice irrigation. Moreover, the high variability of rainfall represents an additional risk if the precipitations in fall-winter seasons are insufficient to fill the water reservoirs, as occurred in 2004 and 2005.

Meanwhile, the rest of the irrigated areas are getting the highest increment for grain production in the State, by using sprinkler systems through both conventional equipment (30 thousand hectares) or central pivot (35 000 hectares, see Figure 1). Drip irrigation has been used for fruit and vegetable production, around 5 000 hectares. The use of central pivots for maize production is increasing very fast, and represents around 30 000 hectares. There are more than 400 central pivot units in the State. Many of them are equipped with automatic meteorological station to monitor the water management.

The irrigation of maize seems to have many advantages, both because of its high sensitivity to water deficits and its high potential with improved levels of technology. In natural rain conditions, maize yield is very low in Brazil as compared to some traditional producers such as USA and Argentina. The average grain yield remained below 3 tonnes per hectare in the last 15 years in Rio Grande do Sul State. Besides, the annual productivity used to have intense oscillations, ranging from 1.5 to 4 tonnes per hectare.

In a ten-year series of experiments, irrigation allowed production levels of approximately 10 tonnes per hectare of maize in Rio Grande do Sul State. Meanwhile, it ranged from 1.5 to 10 tonnes per hectare without irrigation, with a mean yield lower than 6 tons per hectare. The oscillations in maize production reflect the high variability in rainfall, a typical weather pattern of summer seasons in most of the subtropical Brazilian zones. The study showed that reducing full irrigation to about 60 percent increased the irrigation efficiency. In conclusion, irrigation increases and stabilizes the maize production, allowing economic benefits in the region.

Irrigation in small farms of Southern Brazil

With the exception of rice, the use of irrigation is still low on small farms of Southern Brazil, even for important crops such as maize. Since maize has occupied most of the small properties, and considering its high sensitivity to water deficit, it would be reasonable to consider a high potentiality of using irrigation for this important cereal. The amount of rains is insufficient for maize crops and for most summer crops (even in normal years) and the spatial and temporal variability of precipitations is very high.

Besides improving and stabilizing the grain production of small farms in Southern Brazil, irrigation allows other indirect advantages for these properties. Increments in financial gains by using irrigation may prevent the inadequate exploitation of natural resources. At the same time, considering the increment and stabilization of productivity, it may permit the use of the best areas, thus allowing recuperation the natural forestry coverage of the marginal soils on these properties.

However, it may be possible not to have sufficient water for irrigated crops, in particular for big farmers. In these cases, the advantages of irrigation do not compensate the environmental costs and do not permit the ecological sustainability in the long term. This aspect tends to be different in the case of small properties particularly in southern Brazil. In general, the agroecosystems have a high production potential and the main limiting factor is the occurrence of droughts in the critical growth stages of crops. In the case of maize, a low amount of water (50 to 60 mm) in the critical period may be sufficient to guarantee a high yield such as 8 tonnes per hectare. Besides, maximum efficient water use occurs when maize crops receive irrigation applications between 60 and 80 percent of field capacity. This scenario permits consideration of irrigation on small farms as similar to an "insurance system" in preventing financial losses due to droughts.

The management of both irrigation and crops is a crucial aspect for the sustainability of small farms. It means to apply a minimum amount of water to obtain high productivity, preserving the natural water resources. Farmers must be advised to irrigate crops considering "when" and "how much" water is necessary. This means to monitor weather conditions as well as crop stages and soil moisture to estimate the best moment and water applications in each case. Depending on the phenological stage or soil water storage, plants may support some water stress with no significant yield losses, especially early in the crop cycle or close to maturity. This may allow saving water when the plants are not in the critical growth period.

Irrigation should not lead to soil degradation. Losses by erosion have been reduced through wide use of the zero-tillage system (no-tillage). In general, no-tilt soils have increased the water storage capacity and efficiency of irrigation use. Soil salinity is not a problem in Southern Brazil. On the other hand, the electric energy supply requirements may represent a limiting factor in the future, if irrigation becomes widely adopted.

The sustainable use of irrigation on small farms of Southern Brazil requires some structural improvements in terms of instruments and technology

The use of sprinkler irrigation has increased in the southern and southeast regions of Brazil. It permits increase and stabilization of the production of several cropping systems on a large scale, even under irregular relief conditions.

due to specificities of climate, soil and crops. This means to improve the level of knowledge, capacity of investments and equipment. Even in the case of medium and large farms, the use of irrigation needs improvements, in line with the specific soil-crop-climate conditions. The soil degradation during recent decades reduced the large scale soil-water storage. Consequently, the water deficits tended to increase in frequency and intensity, therefore increasing the necessity for irrigation. It means that soil management may improve irrigation efficiency, allowing water savings in a highly efficient cropping system. The farmers must consider irrigation as capable to improve the efficacy of the cropping systems if managed in accordance with the whole farming system. Therefore, irrigation may allow better conditions to farmers, communities and ecosystems, in a high pattern of economical, social and ecological sustainability. ■

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Ladderized irrigation – an emerging systemwide water-saving scheme

Dwindling water supplies from watershed sources affected by forest denudation, threaten the lifeline to downstream irrigation systems in The Philippines. The original design areas are now figments of the past, and most schemes continue to be difficult to irrigate. Such is the situation of the Libungan River Irrigation System on the Island of Mindanao 800 km south of Manila.

At the height of its initial operation from 1964 to 1974, the average discharge at the intake (11 cumecs) was more than sufficient to serve 9 000 hectares of land even with the traditional practice of continuous paddy-to-paddy flooding. In recent years the average intake discharge has fallen to 5 cumecs, and this has forced field engineers to devise other irrigation water management techniques, as well as halving the service area.

Reforestation is ruled out as an immediate answer because of its long establishment time, and because it is outside the influence of the irrigation engineers. A water management strategy called *zonification* was applied from 1994 to 2001. This involved dividing the 9 000 hectares into three zones, rotating water delivery among these zones and serving water to only two zones during the dry season while the third was left dry. The dry turn was rotated between the zones over a three-year period.

However, as a result of the dissatisfaction among farmers in whichever zone was left dry, field engineers were prompted to adopt other options. This led to the concept of *ladderized irrigation* where land soaking and land preparation are first done downstream. The efficiencies achieved are illustrated by the fact that the wet season irrigated area of 9 421 hectares is hardly different from the dry season irrigated area of 9 474 hectares (these figures are averaged over the last four years). Additionally, on a management level, fee collection efficiency almost tripled from a range of 3 to 4 million pesos annually before 2002, to a range of 8 to 13 million pesos after the application of the ladderized scheme. Moreover, the system office is now achieving a net surplus of income above expenses of 3.7 million pesos, compared to 1.5 million pesos before (1US$ = 50 pesos).

The *ladderized* scheme at Libungan RIS works by sub-dividing each zone of 3 000 hectares into 5 to 8 divisions, and with each division served by a single lateral or sub-lateral (see map). A cropping calendar based on monthly-expected river discharges (specific for each division) ensures that water is served to no more than 6 000 hectares (for periods when water is sufficient for intake discharges to meet the maximum irrigation delivery requirement). It also allows during periods of low river discharge (as in March, April and May) that supply (equivalent to 3-4 cumecs) for land soaking and land preparation on no more than 2 000 hectares. Therefore, in each zone, crops are at different growth stages (such as sowing, transplanting, vegetative and harvesting). In order to control insect and pest infestation, each division has two months of fallow period before the start of its cropping season.

Now in its fifth year of implementation, the method has been found to be quite demanding to organize and required the active participation of LGUs and IA officers. Nevertheless, it has achieved the participation of all stakeholders in programme planning and implementation. The tripling of collection efficiency on Irrigation Service Fees and increased functionality of Irrigator Associations are testament to the satisfaction generated in Libungan's irrigation community. ■

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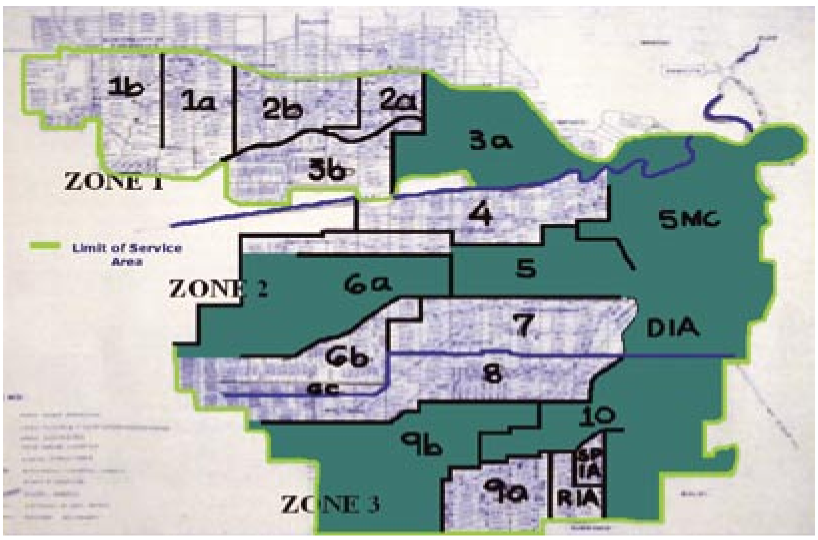

Pipe drainage technology for effective reclamation of saline coastal soils takes off in China

In the fall of 2006 during a periodic visit to the Yellow River Delta, it was observed that the successful reclamation of 7 000 hectares of coastal area initiated in 2001 had been successfully completed. Now cotton is grown on the saline and barren land that existed in 2000; yields are in the range of 3 000-3 500 kg/ha of seed cotton. Both the design and the implementation of the reclamation were carried out by the Kingchuan Company of Dongying.

The reclamation was carried out by implementing a modern pipe drainage system in addition to an open main drainage network and a surface irrigation system. The singular pipe drainage system is situated at a depth of around 1.5 metres and the spacing of the pipes is 25 metres apart. The effort makes the Yellow River Delta one of the first areas in China where pipe drainage for reclamation of coastal areas is used in a consistent and systematic way.

Within 2-3 years after reclamation, the soil salinity was reduced from ECe values above 40 dS/m to values of around 8 dS/m. The pipe drainage allowed an efficient leaching of the soil from natural rains (550-600 mm/year) and a relatively small amount of complementary irrigation (225 mm/year) making it possible to maintain proper salinity levels in the soil. During the first one or two growing seasons after reclamation baby bamboo was cultivated. This is a fiber crop that tolerates salinities of ECe values of more than 16 dS/m. By the third or fourth year after reclamation the salinity had been reduced to a level where cotton could be planted.

Thus, thanks to the pipe drainage system the amount of complementary irrigation water required for maintaining a favourable salt balance in the field is considerably lower than for areas where no pipe drainage is applied. In effect the application of pipe drainage results in a considerable saving of irrigation water.

The total cost of the reclamation, which includes pumping stations, a surface irrigation system and the open and piped drainage system, amounted to around 2 500 €/ha. The cost of the pipe drainage system was about one fourth thereof. The farmers, who each rent about 6.5 hectares of reclaimed areas, now earn a net income of 40 000 *rembimbi annually* or about €4 000. These levels of income place the farmers in the Chinese income class of "affluent citizens".

There is considerable scope for extending this reclamation technique making use of pipe drainage in the coastal areas and the salinized arid areas of China. New farm land and rehabilitation of abandoned farmland is urgently required in the country. This not only allows to compensate the land lost to urban settlement and industrialization but also to raise food production. ■

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Capacity Development through the River Basin Game in Tanzania

The River Basin Game (RBG) is a two-day workshop designed around a board game to help resolve conflicts over water. The game is a role-playing tool for promoting dialogue and decision-making on water resources where irrigation is present. The RBG is a physical representation of a catchment (or small river basin) as seen in the photo. The board has a slope and uses glass marbles to reflect upstream-downstream flow of water. Upstream abstractors/ users of water are favoured over downstream abstractors and users of water. This difference often gives rise to inequality in water access for rural people — which can result in conflict. The game allows local users to reflect on the distribution of water in various situations and to strategize accordingly by taking up roles such as 'advantaged upstream abstractor' or 'disadvantaged downstream abstractor'. The game then asks players to act both competitively and then cooperatively, and in doing so, helps contrast these responses. This generates discussion on ways to identify wasteful usage and then how to manage water more equitably.

There are four ways of using the River Basin Game:

With students and researchers of water management to teach common property management of water. This has worked well with both undergraduate and postgraduate students. The game has also been played with a group of scientists in order to discuss the nature of gaming in natural resource management.

With local resource users (farmers, livestock keepers, domestic drawers, etc.) of water to facilitate local decision-making with regard to the allocation of water. This type of game also allows external researchers to observe current problems and proposed solutions.

With higher-level decision makers to reveal the issues facing local users, and the beneficial and negative outcomes that their actions might have on them.

With both higher-level institutions and local resource users to generate a comprehensive picture of how mutual collaboration, flexibility and support is required to manage water at the basin level.

Where has the game been played so far?

The game has been played about fifteen times in different countries and at different levels. It has been used at about five workshops in Tanzania in both the Great Ruaha and Pangani river basins with local resource users and higher level decision makers. It has been used in DFID-funded Joint Wetlands Livelihoods project in the Hadejia Jama'are Komadugu Yobe River Basin in northern Nigeria again at two levels. The game has also been used with students at the University of East Anglia, and with training participants in South Africa. It was tested again recently in South Africa at two workshops, one with scientists and one with local resource users in the town of Sekororo in the Limpopo River Basin. On their own initiative, Thinksoft Consultants of Hyderbad, India have developed a version and used it successfully as a part of an induction programme for irrigation engineers. The University of Zimbabwe is considering using it as part of their Integrated Water Resources Management teaching.

How the game is played – a two-day event

Experience gained by the author over the last six years shows that the game is best played as part of a two-day workshop. The game itself is only in the morning of the first day. In addition, the benefits of the game are optimized if it is kept simple, and is employed with the aim of comparing outcomes of competitive individualistic behaviour against cooperative collective responses. The game is not designed to quantitatively help users allocate water – this stage comes afterwards in the discussions held.

Day 1 – Five sessions for playing the game

Phase 1: Introduction to the two-day event and demonstration of the game, including how it works, and what the basic rules for participation are.

Phase 2: Here the game demonstrates outcomes of 'individual' action to acquire marbles (Phase 2 is termed 'the search for water'). Users playfully jostle to position themselves at the most advantageous position at the top end of the game. Other tail-end players end up 'losing', bereft of marbles.

Phase 3: Individual action to acquire marbles (termed 'the search for money & livelihoods'). Here, the play is similar to Phase 2, but afterwards, the players discuss the livelihood consequences of not having water – and explore their coping strategies. This brings to the game a dimension of reality, and reveals to the 'real-life' top-enders present at the workshop the hardship that lack of water brings to others.

Phase 4: In this phase a collective or community response is requested – players adjust intakes to share marbles more fairly between all users at the table. To alter the distribution of marbles, the players adjust the small sticks that act as intakes to the canals. A number of rounds are played in order to bring home a sense of success and achievement when water is more equitably shared.

Phase 5: Initial discussion, particularly of the main problems identified in the catchment, plus some discussion on lessons, feedback, future action, assistance and summary (the main discussion is left until Day 2).

Day 2 – Four sessions for water users/ decision makers

Day 2 gives participants much more time to begin to develop a local strategy to help resolve their identified priorities. This happens via structured sessions, comprising:

Session 1 allows water users to brainstorm the methods they think work to maintain income and production while using less water. What have they observed? What practices save water but do not harm production? During this session outside experts should add to the ideas.

Session 2 is to prioritize these methods by a system of voting so that farmers and other users agree on what works best – these can become the basis for bye-laws and agreements by farmers so that they can try these methods.

Session 3 divides into two groups – one group discusses the role of the catchment authority, the other discusses all other formal institutions. Each group discusses how best these institutions should function to assist in conflict resolution and to support the new agreements.

Session 4 is to review what has been said, allow questions and answers, to reflect on the two days, to conduct an evaluation and crucially to specify the actions to be taken in the next few weeks.

Conclusions

Players benefit from having two days and a highly structured and organized schedule to 'problem-frame' their water issues in detail. Players call upon their own experiences to discuss issues, and do not need any specific prior training. In a relatively safe and sociable environment, the game creates a 'space' that utilizes serious play to demonstrate various dimensions of irrigation, water-based livelihoods and river basin management at the local level. The game verifies simple linear and spatial relationships between upstream abstraction and downstream water shortages (these relationships may seem obvious to outsiders, but often one would hear the upstream users saying that they did not realize the consequences of their actions on users some 50 km away). The game elicits many suggestions regarding solutions such as adding canals and using short season varieties, and revealed to users that they hold the key to managing water rather than relying on external agents and solutions (although timely suggestions from attendant technical experts were well received by participants). Consensus-building is encouraged by the game, particularly on agreements to start catchment-wide meetings to share water. The game demonstrates how the different organizations working in the basin should work with water users to remove constraints and to facilitate the new agreements generated at the workshop.

In summary, the game:

- can collectively increase the transparency of the whole situation and process;
- can change the boundaries of peoples' concept of the system of water management, aligning it more broadly and closer to hydrological and social realities;
- aids participants in exploring the social, economic and ecological rules of the sustainable use of water;
- can explore future scenarios and options resulting from participants' choices in the use and management of water;
- deepen participants' knowledge of hydrology, needs of other stakeholders, and other relevant factors;
- establish or help deepen cooperative relationships between stakeholders that potentially help the establishment of more effective water management and use;
- help stakeholders relate to scale; and
- help build trust and shared knowledge between stakeholders. ■

Further information on the game can be found at: http://www1.uea.ac.uk/cm/home/schools/ssf/dev/people/academic/Lankford/River+Basin+Game or contact Bruce Lankford, Senior Lecturer in Natural Resources, School of Development Studies University of East Anglia UK at: b. lankford@uea.ac.uk

River basin game in Tanzania.

Viet Nam: Institutional Mapping in Relation to Paddy Rice Production

The Water Resources, Development and Management Service of FAO (AGLW) is currently implementing the Japanese-funded project "Evaluation Study of Paddy Irrigation under Monsoon Regime" (ESPIM) which promotes an integrated water resources management approach with special emphasis on paddy rice production systems. The long-term objective of the project is to contribute to the enhancement of world food security and socio-economic development, to reduce poverty and to seek sustainable agricultural systems through the integrated and equitable management of water resources.

The immediate objectives of the project are: a) to develop an information and reporting system (IRS) for water in agriculture under monsoon regime; b) ;o promote and develop improved national monitoring capacities regarding irrigation and drainage; and c) to assist the policy-making processes for improving management of agricultural water resources.

AGLW, as one of the main partners of IPTRID, requested the Programme to collaborate in the implementation of the ESPIM project, specifically to reinforce the activities which are under the immediate objective "b" above. This was pertinent given that IPTRID had conducted some specific activities in the past, addressing this particular subject, including three international workshops in Moscow, Beijing and Kuala Lumpur in 2004, 2005 and 2006 respectively. An important element under those activities undertaken was to study the capacity needs in irrigation and drainage at the institutional level; this allowed the identification of both strengths and gaps of the existing capacities at this level and to set the stage for a full assessment. Thus, the intervention in the ESPIM project permitted IPTRID to engage in additional opportunities to draw lessons learnt from real case studies.

Henceforth, IPTRID engaged a consultant each from the Kingdom of Cambodia and the Socialist Republic of Viet Nam to conduct a study and produce a final report on Institutional mapping of irrigated agriculture in relation to paddy rice production. This article concentrates on the results emanating from Viet Nam.

The *institutional mapping* consists of describing and linking, through a series of charts, graphs, and schematic representations, the different existing institutions dealing with a particular subject and how they interact with each other. It includes documenting their field of expertise, activities, roles and resources. The mapping can be done for a particular activity, a sector, a country or even a region depending on the requirements.

Consequently, the study included a survey addressing a number of inter-related issues such as the role of the institutions, their functions and responsibilities, their organizational structure, the financial resources, the human resources and level of expertise, the institutional linkages and their relevance in the context of paddy rice production systems.

Results from Viet Nam

The analysis of results derived from the survey allowed the production of an institutional mapping showing the information collected in various different forms, among and between the institutions covered. Also, as a result of the study, a SWOT analysis (Strengths, Weaknesses, Opportunities and Threats) was likewise undertaken. The SWOT analysis allowed a first glimpse of the capacity needs assessment at national level, which is indicative in nature, and is briefly discussed below.

The SWOT analysis basically indicated that at national level, institutes and universities have highly qualified staff and solid networks with great opportunities to expand and provide services in their areas of expertise. However, the existing centralized government does not allow institutes to act as independent bodies. As a consequence and, despite staff's high education level, there is a lack of management skills and development and programme strategies do not exist. In contrast, regarding the Irrigation Management Companies (IMCs) and local participatory institutions, they are not completely subject to central authorities and have independence and autonomy to perform their duties without central supervision. However, still the lack of management skills and transparency make these institutions operate at a lower level than their potential capacities.

After reviewing and analyzing the existing institutions involved in irrigated agriculture in relation to paddy rice production, the following ones were visited and surveyed:

- The Water Resources Department (WRD), in the Ministry of Agriculture and Rural Development (MARD)

- The Viet Nam Institute for Water Resources Research (VIWRR)
- The Southern Institute for Water Resources Research (SIWRR)
- The Institute for Water Resources Planning (IWARP)
- The Southern Sub-Institute for Survey and Water Resources Planning (SIWARP)
- The Hanoi Water Resources University (HWRU)
- The Irrigation Management Companies (IMCs)
- Some participatory institutions (WUAs, irrigation teams, agriculture production cooperatives)

Table 1 allows summarizing some of the interactions of these institutions with the paddy rice production systems under a Monsoon regime in the country. It shows the nature of involvement and its relative importance. Furthermore, the Table tries to assign the degree of impact of each particular institution in relation to the paddy rice environment. It should also be noted (see below) that these institutions operate at different levels within the country: central, provincial and district; and represents both public and to a certain degree, emerging new private-oriented bodies.

The survey in Viet Nam clearly showed that the management of irrigation systems are closely linked to the central planned economy and that any intended reform on irrigation management will need to consider moving toward:

- Separation of administration and production functions within the organizations.
- Irrigation institutions must not be divided by geopolitical borders but by the scale of services provided.
- More flexibility according to the changes of agricultural production.

Table 1: Evaluation of involvement, importance and impact of Institutions in terms of paddy production in Viet Nam

Institutions	Involvement	Importance	Impact on paddy production
WRD/branches	Direct /Indirect	Very important	Strategic impact
VIWRR/SIWRR	Indirect	Important	Strong impact
IWRP/SIWRP	Indirect	Important	Strong
HUWR	Indirect	Normal	Not much
IMC	Direct	Very important	Very Strong
WUA	Direct	Very important	Strong

- Activate the participation of relevant stakeholders in irrigation system operation, maintenance and management.
- Gradually narrow the role and subsidies of government in investment and maintenance of irrigation systems.

To reach the above mentioned results, capacity strengthening for both the administration and the production systems is crucial. For the administration system, so far in Viet Nam, the irrigation modernization is understood as improvement of infrastructure and equipment and policies have always been focused on this aspect. On the other hand it is being increasingly recognized the importance of introducing "management skills" for the better use of water resources. This is, however, a new issue in Viet Nam, even for the research and planning institutes, and therefore, it still needs to be broadly disseminated.

Financially, all the institutions and agencies working in the field of irrigation must rely on the state budget. Planning and research institutions also receive funds from the state, however, their main income comes from consulting services and international assistance which has been increasing in recent years through projects funded by international donors.

For all the above, the institutional system in the irrigation sector is facing some difficulties. First of all there is overlapping of functions and responsibilities among institutions caused by a lack of specialization in the administrative, scientific and operational institutions. At the same time, there are gaps and unreasonable

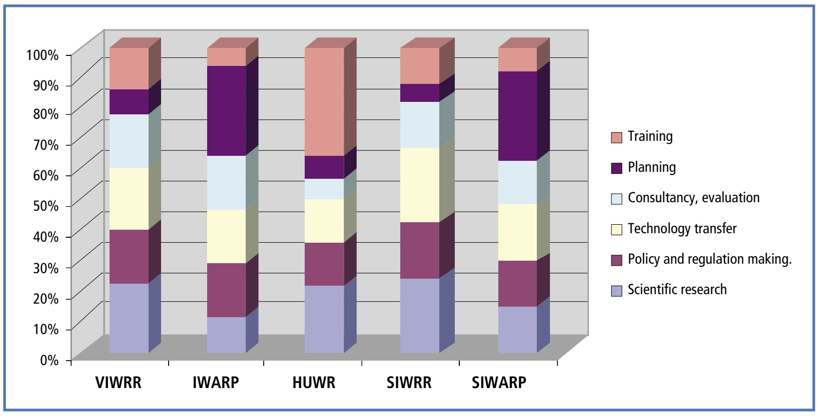
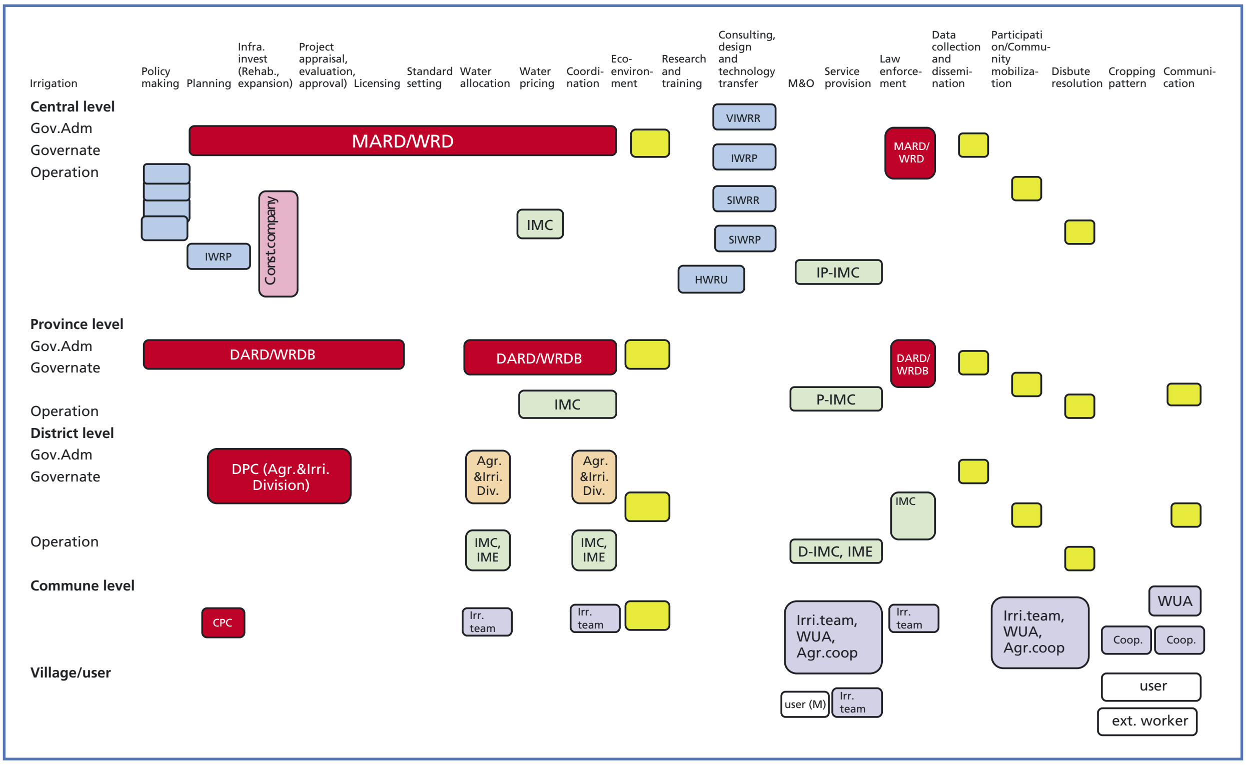


Figure 1. Functions of various Vietnamese institutions, as related to paddy rice production systems

Table 2: Map of institutions and responsabilities in irrigation management



organizational structures among institutions that need to be changed. Secondly, the institutional reform on cooperatives and irrigation management companies towards market orientation has not achieved the expected outcomes. Each institution has particular working areas and market regions. However, the majority of the scientific research and training related to irrigation is conducted by VIWRR, SIWRR and HUWR (see Figure 1).

According to the above study on the institutional system in Viet Nam, it can be said that there is already a well established network of different tiers in the governmental structure with a clear differentiation of the responsibilities and functions of every institution according to the level of action (See Table 2). However, there is still too much dependence on the central government for economic resources and administrative tasks which somehow limits the range of action of the provincial, district and communal institutions. As a result, decentralized institutions have the tendency to look for additional funds through external aid from international donors. Furthermore, they are constrained to offer services which they have been assigned at its inception, even if they are no longer needed because there is another institution which offers the same services on a higher scale. In that case we encounter an overlap of functions in Table 2. This may also lead to functions which are not sufficiently covered at any scale as is the case for the environment.

It is also recommended that, as decentralization or reform goes on, there should be capacity development programmes for staff of irrigation related institutions. These training programmes should accompany and be adapted to every action taken under the reform so that staff is skilled enough to face new challenges and perform their duties at their maximum capacities and with the minimum negative impacts. ■

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This article is based on a consultancy for FAO done by Mr Phong Tung Nguyen, of the Vietnamese Institute for Water Resources, Dong Da, Hanoi.

IPTRID's Experience with its WCA-infoNET Information Systems

In August 2001, IPTRID, with the financial support of the Department for International Development (DFID) of the United Kingdom, launched its Information System on Water Conservation and Use in Agriculture known as WCA-infoNET, an Internet-based integrated information platform which provides a knowledge base and support to researchers, practitioners and decision-makers in the field of agriculture, and available at http://www.wca-infonet.org). WCA-infoNET tries to pursue the policy of diversity of data input and linking, allowing organizations as well as individuals to contribute their information to the system, thereby sharing their knowledge with a growing water and agriculture community. WCA-infoNET aims to select carefully targeted, quality controlled and scientifically relevant information, submitted by an international network of partners, proposed by users or directly screened by a number of its own sources. Rationally stored, these materials remains on-line freely available for users.

Throughout its development path, WCA-infoNET experienced significant improvements in order to better meet users' needs and demands. The latest interventions have resulted in a simplification of its platform structure, facilitating user's browsing and information location. Likewise, a periodical newsletter was launched, informing users about recent activities and latest added materials.

After a year and half of conceptual design and intensive system development it was officially made accessible to the public in early 2002. WCA-infoNET achieved satisfactory results in terms of increasing information entered into the system, the so called "Knowledge Objects" or KOs. Starting with 750 KOs in February 2002, the system recorded 2 200 KOs in the beginning of 2005, increasing to 2 500 in late 2005, reaching currently 3 450 KOs, demonstrating a continuous improvement of the platform over time. Although the resulting monthly average increase of 55 KOs may sound relatively small compared to the number of pieces of knowledge available on the Internet, it is worth mentioning that each inputted KO undertook an in-depth thematic evaluation and sources ratification process thus ensuring the quality of the information entered.

Simultaneously, WCA-infoNET has experienced a successful and continuous rise in the number of visits defined as the activity of one individual entering the Web site for a pre-determine time threshold level (Figure 1). After a "running in" period, visits to the web site strongly increased from early 2004, with some tampering down occurring in late 2005 and early 2006, and now increasing again.

These positive results are counterbalanced by some other evidences: much effort should be done for stimulating stakeholders to regularly visit the system and avoid users browsing WCA-infoNET for a short time quitting after viewing few pages only.

Keeping in mind the global-reach objectives that led to platform creation, geographical origin of users has been constantly monitored. It is evident that WCA-infoNET has substantially contributed to "access to knowledge" especially in developing and transition countries. WCA-infoNET has reached now 162 countries, proving its effective role in making free selected information accessible worldwide. This encouraging outcome has, however, been curbed by the imbalance in the geographical distribution of users (Figure 2).

In spite of the slightly increasing participation trend from developing countries, recorded in the last two years, the web site traffic has predominantly remained intense in North America and Europe. While partly this situation can be expected due to imbalanced Internet access availability, such a result can also be linked to the lack of more actions from these countries in KO contributions.

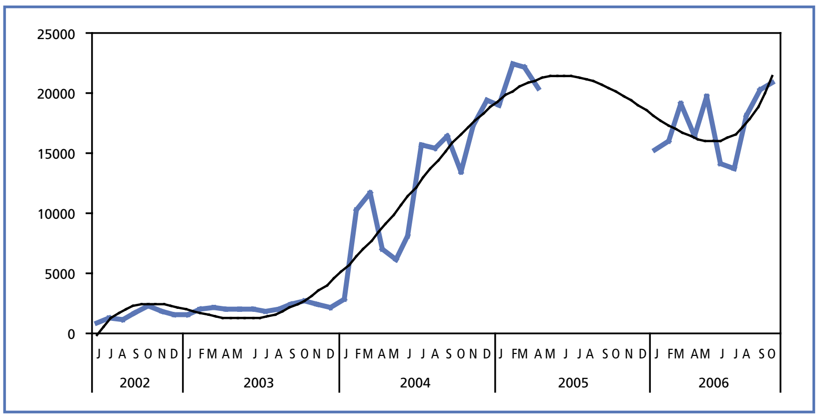

Figure 1. WCA-infoNET – Visits

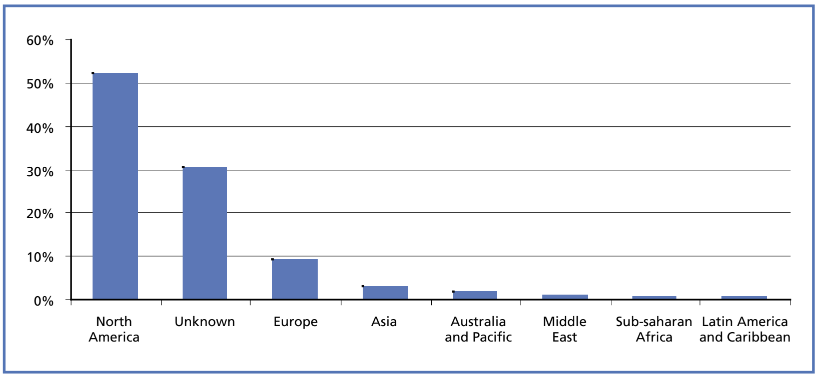

Figure 2. WCA-infoNET – Geographical distribution of users

An evaluation of WCA-infoNET (carried out in May 2005 by IPTRID management) denoted a lack of information available in the platform's Regional section, with two thirds of the country folders with one or no KO present. The same study highlighted the existence of a strong relationship between the number of visitors from certain countries and the corresponding number of KOs available from them.

To counter this situation, WCA-infoNET underwent an upgrading of its Geographical section, the so called "Regional View". The structure was simplified, and entries reclassified in accordance to the new structure and their geographical relevance. Likewise, considerable effort was made on increasing the number of KOs originating from less represented geographical Regions. Additionally, IPTRID thoroughly analyzed the constraints limiting the interaction and active participation in the system content enhancement by users from developing and countries in transition. IPTRID, recognizing the central role of WCA-infoNET, proposed complementing its regionally-focused actions as a means to effectively engage users from developing countries in knowledge sharing and dissemination. This has two objectives: i) providing them information that meets their specific needs and expectations; and ii) offering them a "platform" to disseminate information on their work under the shield of a well-known international organization.

WCA-infoNET and CISEAU (see next article) jointly contribute to enhance the reach of knowledge through means of Internet, a main pillar of the IPTRID Programme. Good results achieved up to now in terms of information collected and disseminated as well as the active participation of users' community prove the enormous potential of IPTRID efforts on information platforms initiation. However, more needs to be done in the coming future. IPTRID growing commitment to continue effectively operating its different knowledge systems bound by its ultimate goal of enhancing the reach of knowledge to a wider public need to be supported by a more active water users' community. Within the prospective of building a community-based information system, all stakeholders (both individuals and institutions) must rigorously contribute. This can be done through becoming a member and subscribing specific topics, participating in discussions and, more important, submitting own work. Only through a continuous and active support of users' community, the success of any information system can become a realistic goal. ■

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CISEAU Project: overview of the two-year pilot phase results

Background

The Project "Virtual Centre for Agricultural Water and its Uses", commonly referred to as CISEAU for its French acronym, was designed as a two-year exploratory phase from October 2004 to September 2006, funded by the French Ministry of Foreign Affairs. A main objective of this project was to set up a modern information tool for knowledge sharing on issues pertaining to the uses of water for agriculture. Another key objective was to establish a network of French-speaking water-related stakeholders and institutions from North and West African countries in order to develop and strengthen long-term South-South collaborations. The third objective was to facilitate the sharing and exchange of information between developed and developing countries. The targeted beneficiaries are diverse, among others: project designers, irrigation managers at various decision-making levels; ministries, land-use management companies, professional and farmer organizations, engineering firms, non-governmental organizations, educational institutions, co-operation agencies, etc. This article summarizes the achievements of the project's first two-year period.

Major activities

In line with its objectives, CISEAU concentrated on three main components.

Setting up an Internet-based platform; which is now available at http://www.ciseau.org/index.jsp. The project developed this Content Management System which creates a favourable environment for discussions and exchange of information. The platform has two types of functions: a) traditional, which includes events, technical sheets, directories, e-conference, virtual library and newsletters; and b) specific, that is pertaining *per se* to the project, and provides summaries, tool boxes and a question/answer arrangement about the priority topics identified during the project's defining phase. From its inception, the platform was designed in French and in English in order to overcome barriers to information sharing.

Information building and sharing in North and West Africa; this work concentrated on the identification of partners interested in south-south exchanges of relevant information related to environmental impacts of irrigation projects. Three countries from the former region (Algeria, Morocco, and Tunisia) and five from the latter (Burkina Faso, Mali, Mauritania, Niger, and Senegal) have been involved and have acted as pilot countries. Several missions were conducted in order to identify the most relevant focal points and five national workshops were organized to establish, collectively, a list of ten priority topics dealing with the relationship between agriculture water use and the environment: a) degradation of surface and groundwater quality, b) waterborne diseases, c) health hazards of waste water reuse, d) fighting secondary salinization, e) land degradation, f) desertification and deforestation, g) dam siltation, h) eutrophication i) difficult social restructuring and j) supporting low incomes farmers.

Facilitating North-South exchanges; Partners from the South strongly committed themselves by providing technical content as well as testimonials of their problems. They also moderated two electronic conferences which were designed as a main component under this activity (see box). In addition, two regional workshops were organized in order to validate the results of the specific, thematic information built and aggregated on the priority topics listed above: One in Rabat in July 2006 with more than 100 participants and six countries represented; and one in Bamako in September 2006 with ten countries and 150 participants. While space limitations do not allow listing all intervening national actors, it is important to acknowledge the enthusiasm and contribution of some of them: the departments of agriculture of Morocco, Mali and Niger; scientific organizations like IAV Hassan II in Morocco, INRGREF in Tunisia, IER in Mali and ISRA in Senegal. Finally, this pilot project phase was supported by national committees of the International Commission on Irrigation and Drainage (ICID); delegations of the European Union in Tunisia, Niger, Mali and the project IMARK of FAO (http://www.imarkgroup.org).

Due to the promising results of the pilot phase of the project, it is highly recommended that the project be extended to continue working on additional topics with additional countries and local partners such as the ICID national committees like AMID in MALI, ANID in Niger and ANAFIDE in Morocco. In the long-term the idea should be to make the CISEAU platform autonomous and truly managed by these national ICID committees.

Ciseau Web site: www.ciseau.org/index.jsp

Two electronic conferences under CISEAU

The first conference was titled "Extent of salinization and strategies for salt-affected land prevention and rehabilitation" and ran from 6 February to 31 March, 2006 (please, connect to http://www.dgroups.org/groups/fao/salinization-conf to access the log of the discussion). The exercise concluded that this is a complex issue that still causes large economic losses from reducing planted and harvested areas, social disruptions from land abandonment and negative environmental impacts from degraded lands and polluted rivers. Solutions were discussed such as techniques of bio-drainage, dry drainage, intermittent leaching or through a combination of various means, based on particular circumstances, including crop rotation, introduction of salt tolerant crops, organic manure, deep ploughing, mulching, conservation agriculture, and so forth, but where traditional drainage remains absolutely essential.

The second electronic conference titled "Water pollution: Impact of irrigation and agriculture intensification on water quality" ran from 23 May 21 July, 2006 (please, connect to http://www.dgroups.org/groups/fao/agripollution-conf to access the log of the discussion). The extent of the problem generated by pollution in the Southern countries is not questioned. However, those countries in the North have experienced similar problems and therefore cannot always be considered as good examples to follow. It was agreed that often solutions are neither simple nor easy to implement. Water quality of irrigation and the application method can have wide impacts on the type and magnitude of the pollution generated and can affect groundwater conditions. A major source of pollution is, of course, the application and type of pesticides and fertilizers used. It is necessary to monitor meticulously the pollution, by working with various institutions, and involving the farmers themselves and financial resources are necessary to reach that goal. ■

For more information, please send an email to ciseau@ciseau.org or the IPTRID Secretariat at: IPTRID@fao.org

Global Climate Change and Water for Agriculture

Climate is changing

It is well accepted in the scientific community that our climate is changing due to rising anthropogenic greenhouse gas emissions. According to the Intergovernmental Panel on Climate Change, the future degradation of soil and water resources will be a major challenge facing global agriculture (IPCC, 2001). The most recent climate predictions state that the global average surface temperature will increase by 2 to 7°C over the period 1900 to 2100. This temperature has already increased by about 0.6°C since the late 1800s (IPCC, 2001). Of course, regionally this increase has not been uniform, and in some areas, the average temperatures have even decreased (notably in Antarctica). However, in most of the fertile, agricultural regions of this world, temperatures are increasing as the levels of CO_2 in our atmosphere continue to rise. Currently, the CO_2 concentration in our atmosphere is 375 ppm, compared to pre-industrial times (before 1800) when it was approximately 280 ppm.

The effects of climate change on agriculture will vary by region and are expected to bring diverse and myriad changes. For the most part, the impacts of climate change that will affect agriculture will be through adverse changes in temperature and precipitation. These include droughts and floods. Drought effects include crop losses due to insufficient soil moisture availability.

In 2005, almost every corner of the globe was affected by either a drought, or a flood (Munich Re, 2005). The largest flood occurred at the end of July in the state of Maharashtra, in India, where heavy monsoon rains caused record rainfalls of 944 mm in 24 hours, and resulted in much loss to agricultural lands. Even highly developed countries such as Switzerland, Austria and Germany were not spared from severe August floods which set record water levels and flooded whole villages, as well as the surrounding crop land. By all accounts, 2005 was an exceptional year for flood occurrences, notwithstanding the flooding caused in the aftermath of hurricanes, such as Katrina, which was felt along the US Gulf Coast.

Munich Re (2005) also reported that droughts were of concern in 2005. From August to October, southern Brazil experienced its driest season in 60 years, with consequent high losses in the agricultural sector. Portugal and Spain also witnessed their driest season in 120 years; the drought lasted from January to October and caused severe forest fires during all seasons.

By December 2005, most countries in south eastern Africa (especially Malawi, Zambia and Zimbabwe) were facing their fourth year of water and food shortages in a row.

Rainfed agriculture will experience change

About 80 percent of the world's agriculture is rainfed. Most of the agricultural activities in Africa and developing countries rely on rainfed agricultural production, so any changes in precipitation will affect the majority of these farmers' livelihoods. Socio-economic impacts of reoccurring drier and warmer growing seasons include losses of crops and livestock, and where land

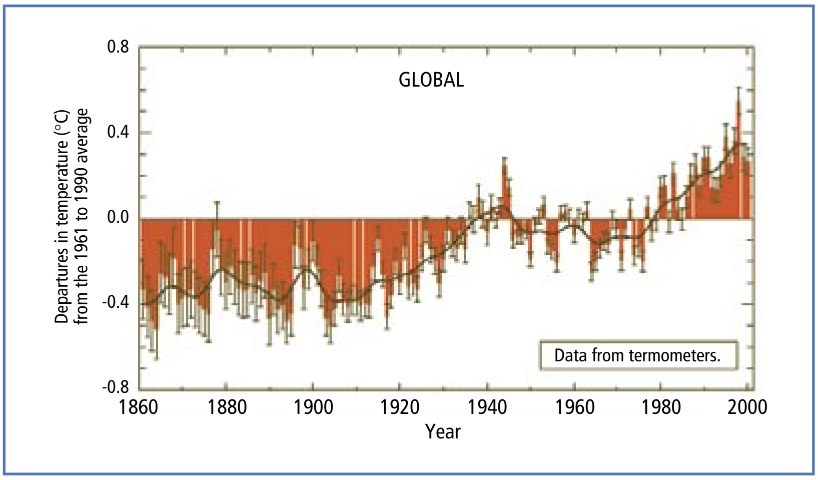

Figure 1. Combined annual land-surface air and sea surface temperature anomalies (°C) 1861 to 2000, relative to 1961 to 1990. Two standard error uncertainties are shown as bars on the annual number. (IPCC, 2001)

and water resources will be severely degraded due to extreme events, farmers will lose future land and potential fish catches. Farmers in these areas may also deplete food stored from previous years and lose possessions and infrastructure (including any irrigation) (FAO, 2003). These farmers may be forced to migrate to urban areas to earn a living, or they may have to move to climatic regions where crops can still be grown. Other than a limited availability of water, impacts of higher temperatures include a long-term decrease in soil fertility, an increase in the cost of livestock production, and an increase in pest incidences.

The groups that are most vulnerable to climate change are the low-income groups in drought-prone areas and flood-prone areas (FAO, 2003). In many of the world's vulnerable regions, climate change impacts will be exacerbated at the farm level, due in part to the degraded and eroded land bases. Factors such as deforestation, erosion, overgrazing, fires, cultivating on marginal land, land compaction, etc. have caused some land in developing countries to be frail and lack resilience to withstand the impact of extreme events. Food sustainability is particularly at risk in these areas. The impact of these adverse climate changes on agriculture is particularly of concern in Africa due to the lack of adaptation strategies, which are limited due to the lack of institutional, economic and financial capacity to support such actions. To this end, the World Bank has created a Climate Change and Agriculture in Africa project, dedicated exclusively to the impacts of climate change on agriculture in Africa and it looks at potential adaptation options (World Bank, 2002).

It is also worth noting that 18 percent of agriculture is irrigated and uses 70 percent of the available water for human use, which makes irrigated agriculture the largest water consumer (UNESCO-WWAP, 2006).

As pressure continues to increase on the irrigation sector through population increase, competing water uses by industry and hydropower, climate change will be an additional factor to take into consideration when planning for future management and use of water for food production.

A need to adapt

Organizations such as FAO, CGIAR and the World Bank have recognized the need for developing countries to adapt to climate change. FAO is concentrating its efforts on maximizing agricultural productivity from a given and limited amount of water. Their focus is heavy on the rainfed agriculture. Other programmes, such as the CGIAR *Challenge Programme on Water and Food* is looking at means to adapt to less rainfall. Current adaptation efforts tend to focus on dealing with water scarcity and coping with increased drought occurrences. In a World Bank report entitled "*Managing Climate Risk: Integrating Adaptation into World Bank Group Operations*", they state that climate change poses a major economic and social risk to national economies. As such, the World Bank Group is helping by integrating climate change adaptation into its existing priorities to integrate comprehensive climate

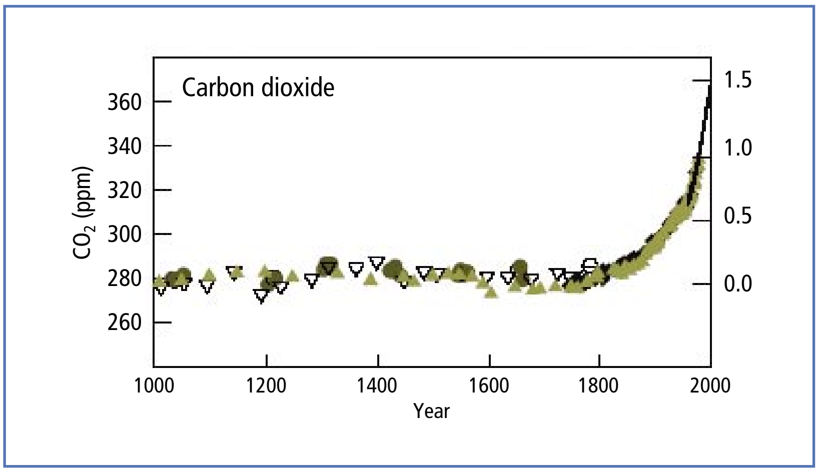

Figure 2. Changes in the atmospheric concentrations of carbon dioxide (CO_2). (IPCC, 2001)

risk management into development planning, programmes and projects. It is assisting developing countries to better manage climate risks in poverty reduction and sustainable development by incorporating adaptation into future risk management strategies.

It is the rainfed agriculture that will be most immediately and acutely affected by changes in precipitation regimes and intensities. Given that future temperature increases will place additional stress on these regions (by leading to less productivity and more water scarcity), it is important that measures be taken now to ensure sufficient water availability for agriculture, especially because climate variability and change will exacerbate any existing vulnerabilities of the given agricultural land base, and will risk making the poorest farmers the most vulnerable. ■

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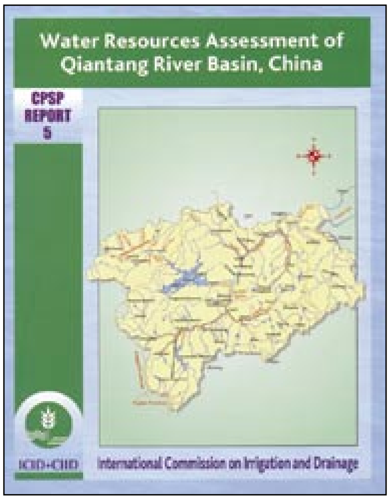


CPSP Report 5: Water Resources Assessment of Qiantang River Basin, China

The International Commission on Irrigation and Drainage initiated the Country Policy Support Programme (CPSP) based on the development of a water management model in order to analyse and evaluate the sectoral water demand and resource. In the context of CPSP, the Indian Association of Hydrologists developed the Basin Holistic Integrated Water Assessment (BHIWA) model, as a simplified tool that can be utilized in support of river water management. The model has been successfully applied in India and China, generating relevant information for decision makers. Herewith a brief review is presented of the study conducted on the Qiantang River Basin in China.

The Qiantang river basin, selected as a water rich basin, has a total drainage area of 55 558 km² with a water resource of 38.64 km³. The per capita annual water availability in the Basin in the year 2000 was 3 621 m³ and projected to be 3 389 m³ by the year 2025, due to a population projected to grow from 10.67 to 11.4 million.

The BHIWA model was calibrated for the present conditions (year 2000) and applied to derive responses corresponding to the past and future scenarios considering the evolution of three sectors of water users: agriculture, potable & sanitation and industrial. Besides the present situation and the "business as usual scenario" known as Future-I, four other scenarios are analysed. Figure 1 describes the past, present and future scenarios indicating the perceived water allocation for the various sectors.

Consumptive Use by Different Sectors

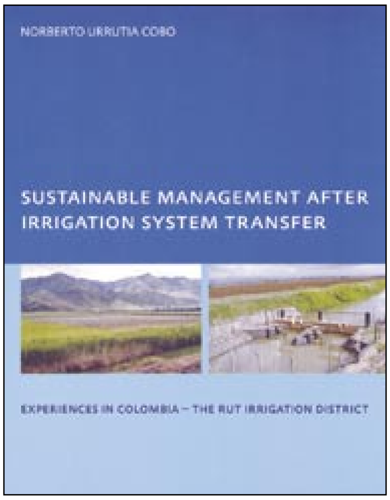
Under the present situation the total consumptive use is 25,322 Million m³ distributed as follows: 68 percent by nature (forest, pasture and barren land), 29 percent by the agriculture sector (rainfed and irrigated) and 3 percent by domestic and industrial sectors combined. Because the water resource generated from the rainfall amounts to a total of 57 958 Million m³ the surface water only covers the demand, and thus the ground water has not been utilized so far in this basin for irrigation purpose; but it is contemplated for scenarios Future-III, -IV and -V.

The major findings of the assessment confirm that the Qiantang River Basin is rich in water resources, both surface and groundwater. The water withdrawals are only a small part of the total (surface and groundwater) inputs, and this can be observed also in the future scenarios. The surface water resources are high in the area, hence the present use of groundwater is low (0.2 percemt of the total input for domestic and industrial use). However, it should be noted that the groundwater return flow is high in all scenarios.

The focus on scenario IV deals with maximum predictable expansion in all sectors. The total consumptive use is 27 150 million m³ corresponding to an increase of 7 percent compared to the year 2000. This reflects an expansion of the forest area and thus an increase of 4 percent of the nature sector consumption. It also reflects higher groundwater use for more industries as well as water exports to deficit areas in the basin. However, at the same time a better water management use is factored in.

In scenario F-IV, 20 percent of the total withdrawals will be groundwater and 270 million m³ will be exported to water basin deficit area. Nevertheless the total withdrawal from groundwater will remain 1.3 percent of the total input.

The Report makes a series of recommendations: i) conjunctive use of surface water and groundwater should be adopted for all three sectors, agricultural, domestic and industrial use; ii) since no deficit is readily perceived there is no need to recharge groundwater; iii) it is recommended to create reservoirs for storage purposes to supply deficit basin areas and also to better utilize the basin water resources; and iv) to prevent the risk of negative impact on groundwater quality the industrial sector should recycle the water.



Sustainable management after irrigation system management: experiences in Colombia – the RUT irrigation system

by *Norberto Urrutia-Cobo*

As part of its broad policy on Economic Liberalization, the Government of Colombia has transferred the management of 16 out of 24 public [districts] irrigation systems to water user associations. The Roldanillo-Union-Toro or RUT Irrigation System, with 10 000 hectares located in the Cauca Vally in southern Colombia, was transferred in 1989 to ASORUT, a water user association and is the base of this study.

The impact of such transfers has been very complex and outcomes vary from region to region. Today, some of the irrigation districts show organizational stability but others show poor management conditions. Currently, the RUT system seems to present a disappointing and gross mismanagement condition that translates into low overall performance. The author suggests that in order to reach a sustainable management, the water user association should follow an integral and participatory management approach, enlarging its span of action to fields beyond the explicit operation activities and contributing to the improvement of the standard of living of the farmers through encouragement of irrigated agriculture under criteria of sustainability, profitability, competitiveness, equity and multi-functionality.

Thus, the author in the study, leading to a higher degree, presents a conceptual framework for the establishment of a sustainable management that should be based on the interrelationship between community, environment, science and technology. For an effective implementation of such a framework the role of the Government, water user associations, farmers and supporting entities are considered to be the key elements. The RUT irrigation district, being one of the most promising in Colombia, has been selected as the study area where the conceptual framework has been intensively analyzed and evaluated.

The study concludes that irrigation management transfer, in general, must not be understood as a simple transfer of responsibilities to the users with the purpose to free the government of its financial burden, and to contribute to a lighter fiscal deficit. The IMT should only exist in the cases where favourable conditions allow a further strengthening of the management

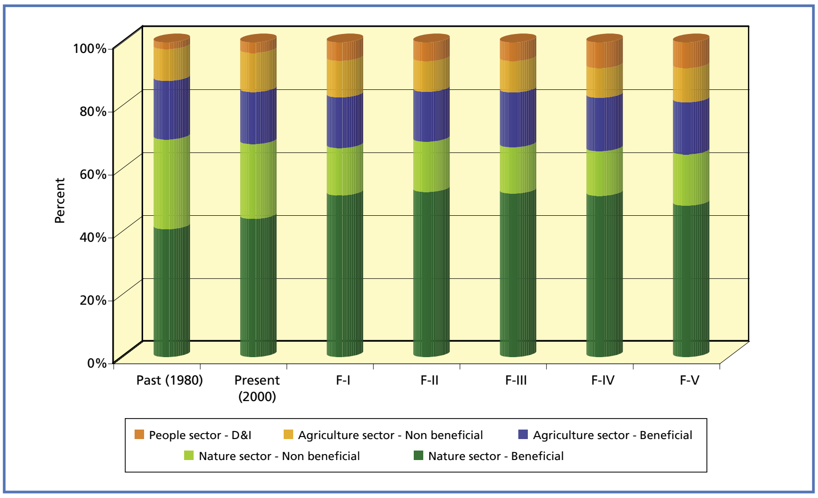
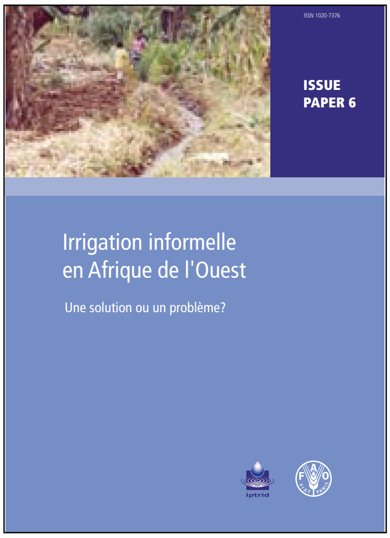


Figure 1. Consumptive use (ET) for different sectors

capabilities of the organizations taking over to exploit existing socio-economic, natural and human resources directed to the improvement of the living standards of the users.

The publication is available from A.A. Balkema Publishers at www.balkeman.nl

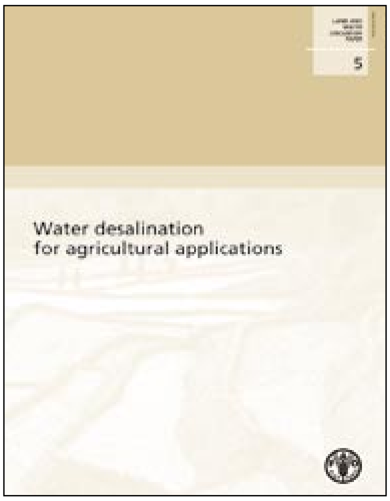


L'Irrigation informelle en Afrique de l'Ouest: Une solution ou un problème?

This is a new Issue Paper (IP # 6) of IPTRID available currently only in French. The paper aims to create awareness and generate discussion among the interested public and the agricultural water management community on the issue of informal irrigation. Indeed relatively few studies have been done on the subject and most of them focus on narrow aspects of informal irrigation in the context of urban and peri-urban agriculture. This issue takes a wider approach by exploring the role that this particular type of irrigation could play in the overall fight for improving food security in the developing world.

This publication, centred on West Africa, seeks to provide to the reader information to determine whether this type of small-scale irrigation – often not registered or recognized by the local irrigation authorities – could play a more positive role in the fight to address poverty alleviation and food security and indeed towards irrigation development. Through a literature review, it first clarifies the terminology and characterizes and locates this type of irrigation. A second section addresses the reasons for its emergence including the social, legal, institutional, economic and environmental context. Thereafter, the publication looks at Case Studies to analyze the technical and economical performances of informal irrigation systems. The paper then reviews elements on the advantages and inconveniences of informal irrigation: management, health, gender, etc. Finally, it offers different projections on the future of informal irrigation and concludes by making recommendations and challenging the reader to take a closer look at this sub-sector of irrigation: a solution or a problem?

The publication can be downloaded from the IPTRID webpage (www.iptrid.com). For more information, please contact: Virginie.Gillet@fao.org or payenj@yahoo.com



Water desalination for agricultural applications Proceedings of the FAO Expert Consultation on Water Desalination for Agricultural Applications 26-27 April 2004, Rome FAO Land and Water Discussion Paper 5

With worldwide concerns about water scarcity, agriculture is under pressure to improve water management and explore available options to match supply and demand. Desalination is a technical option to increase the availability of freshwater both in coastal areas with limited resources and in areas where brackish waters are available. Water desalination is the main source of potable water in some countries and in many islands around the world and it is also being used in certain countries to irrigate high-value crops. However, it has proven much less economic for agricultural application than the reuse of treated wastewater, even where the capital costs of the desalination plants are subsidized.

As a result of the increasing awareness of water desalination for agriculture, FAO organized an expert consultation entitled Water desalination for agricultural applications (Rome, 26–27 April 2004) to analyze the state of the art and examine long-term prospects, with a special focus on the economic feasibility of applying desalinated water in agriculture, specifically for irrigation, in comparison with the reuse of treated wastewater.

This discussion paper contains an introductory paper on water desalination, some keynote papers of the experts participating in the consultation, the summary report of the expert consultation and a technical summary with the conclusions and recommendations of the main topics discussed at the meeting.

This publication is available for on-line reading and/or downloading at ftp://ftp.fao.org/agl/aglw/docs/lwdp5_e.pdf

For additional information please contact Sasha Koo-Oshima, Water Quality and Environment Officer at Sasha.Koo@fao.org) or Julian Martinez-Beltran, Drainage and Salinity Management Officer at Julian.Martinez Beltran@fao.org

Two views of a large scale scheme in Ethiopia which contrast with the informal irrigation presented in the previous page.

Training Programme on "Project Design and Management for Professionals in the Water Sector in the Near East Region"

As part of its regional initiative to enhance the Capacity of Professionals in the Water Sector, the International Programme for Technology and Research in Irrigation and Drainage (IPTRID) jointly with the German Agency for Technical Cooperation (GTZ) organized a Training Programme on "Project Design and Management" in Egypt, Syria, Jordan and Yemen. The Training Programme was addressed to middle-to-senior level staff and attended by some 90 participants representing organizations/authorities including ministries related to water issues.

The objective of the Training Programme was to effectively enhance the knowledge and skills of professionals in the water sector throughout the project management cycle, from preparation to delivery, by means of five-day face-to-face training workshops in the respective countries. It also included an online resource forum (dedicated web site) to help increase knowledge and awareness of participants so that they are able to share experience with colleagues and representatives of partner institutions.

Covering a wide spectrum of experience and skills related to project design and management, participants were expected to come up with prioritized project ideas that can be developed into a concept note. This would then be converted through the completion of the training module into a detailed project proposal and used to perform structured reporting and follow up during the delivery phase of the project cycle.

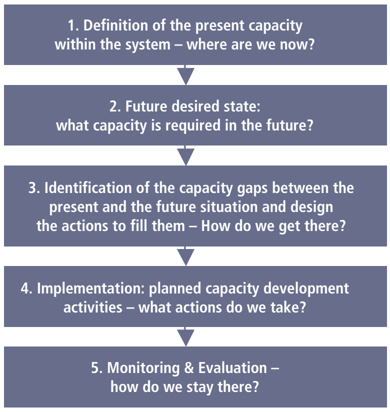
The training programme web site is password-protected allowing only participants from the four countries to access and join a moderated discussion on key aspects of project design and management. It includes: (1) outline of the training course and relevant materials that can be downloaded; (2) case studies of appropriate water resources projects from FAO/IPTRID and partner organizations;(3) templates and examples for funding and their processing; (4) information about potential sources of funding for water resource projects; (5) contact details of all institutions participating in the training programme; (6) useful links and contacts; and (7) real-time fora to facilitate dialogue between participants. The IPTRID programme is currently in the process of lifting protection, migrating the training programme web site into its server and opening it to the public. ■

For more information:
Contact Mr Maher Salman, Technical Officer, IPTRID/AGL at: Maher.salman@fao.org or visit the Training Programme provisional web site at: http://pdm.lead.org/

Monitoring and evaluation of Capacity Development Strategies in Irrigation and Drainage

14 September 2006 – Kuala Lumpur, Malaysia

The Workshop on "Monitoring and Evaluation of Capacity Development Strategies in Irrigation and Drainage" was held on 14 September 2006 in Kuala Lumpur during the 57th International Executive Council Meeting of the International Commission on Irrigation and Drainage (ICID). The organization was under the leadership of ICID and IPTRID as part of the activities of the Working Group on "Capacity Building, Training and Education" (WG-CBTE). It was the fourth and final workshop of a series which started in Montpellier in 2003 and continued in Moscow, Russia in 2004 and in Beijing, China in 2005; each one detailing one step of the framework and methodology identified during the first workshop and specified in the figure below. During the period covered by these events, the capacity development concept has evolved. Initially mentioned as "Capacity Building", it was thought of as a complementary component of the interventions to improve the performance of irrigation and drainage systems. Then it became an integral part of a strategy for sustainable and integrated agricultural water management.



The workshop consisted of six presentations based either on literature or on case studies from various countries such as India, USA, Indonesia or the hosting country, Malaysia. The time remaining allowed fruitful final discussions. The attendees tried to identify the main issues and points discussed during the day, as well as the unsolved questions that remain to answer concerning the monitoring and evaluation of capacity development strategies in irrigation and drainage. An important conclusion drawn is that very few projects of capacity development have an effective monitoring and evaluation system in place. One of the reasons identified could be that capacity development is a long term process, which has very few immediate and tangible impacts. It is therefore very difficult to build a system considering these characteristics. However the logical framework seems to be the more appropriate tool available presently, but some adjustments are required to reflect the quality of this long term process.

A summary of the final debate detailing the issues discussed introduces the proceedings of the workshop. They are currently under preparation for publishing, but draft proceedings are already available on the IPTRID web site. ■

For more information, contact: Virginie.Gillet@fao.org

Staff changes

Franck Besseat left the Secretariat on 30 September 2006 after 2 years as the project manager of the French-funded project "Virtual Center for Irrigated Agriculture", or CISEAU from its French acronym. Under the project, Franck set up an internet-based platform available, essentially a Content Management System and now available in both French and English. His responsibilities also included the establishment and promotion of a South-South network in collaboration with the ICID National Committees from North and West Africa and other water-related institutions. He also collaborated as Database Administrator for the information technology systems in support of our activities, as the IPTRID Information Officer. Mr Besseat moved to Canada to further pursue his professional career as an information technology specialist.

Maher Salman departed at the end of December 2006 after four years as a consultant and 18 months as technical Officer with the Secretariat. During his collaboration with IPTRID, among other things, he was responsible for our activities in the Near East region and managed WCA-Infonet and the CapDevWater databases. Maher played an important role in the promotion and publication of an Arabic version of GRID magazine. Recently, he organized the Syrian Symposium on Irrigation's modernization, the put together the on-going study on uptake of research in Egypt, and design and implemented a series of workshops on Project Cycle management in Egypt, Syria, Jordan and Yemen. He remains at FAO in support of the Water Development and Management Service (AGLW) under agreement with IPTRID.

Giulia Bonanno Di Linguaglossa left the IPTRID Secretariat on 31 December 2006 after almost 6 years with us. Giulia provided her services as Temporary Assistant Person (TAP) on and off until May 2003 when she became fixed term clerk. She supported the Programme Manager in dealing with the trust fund's accounts, and was responsible for the upkeeping of the mailing list. She was part of the GRID magazine editorial team dealing with layout and was essential for the publications process especially printing and dispatching. She contributed and facilitated recruitment of consultants and provided assistance to other staff as required. Giulia is continuing her work at FAO in the water service (AGLW).

DIARY

12-14 March 2007
Hydroptop 2007 – Le carrefour euroméditérranéen de l'eau. Marseille, France
Contact: Asiem, Hydroptop, Les Docks, 10 place de la Joliette, Atrium 10.3
13002 Marseille, France
Tel: + 33 4 91 59 87 87
Fax: + 33 4 91 59 87 88
E-mail: hydrotop@hydrotop.com
Web site: http://www.hydrotop.com

25-27 April 2007
International Seminar on River & Development "Environmentally Sound River Development"
Bali, Indonesia
Contact: Indonesian Association of Hydraulic Engineers (HATHI)
Tel/Fax: 62 21 739 8630
E-mail: hathi-pacto@cbn.net.id
Web site: http://www.riverdevt-2007.com

2-5 May 2007
4th Asian Regional Conference, 10th International Seminar on Participatory Irrigation Management, and International History Seminar on Irrigation and Drainage
Teheran, Iran
Contact: Iranian national Committee on Irrigation and Drainage (IRNCID). No. 24 Shahrsaz Alley, Kargozar St, Zafar St, Teheran, Iran
Tel: +9821 22257348
Fax: +9821 22272285
E-mail: info@pim2007.org
Web site: http://www.pim2007.org

15-19 May 2007
World Environmental and Water Resources Congress 2007
Tampa, Florida, United States
Contact: Leonore Jordan, Environmental and Water Resources Institute (EWRI) of the American Society of Civil Engineers (ASCE), United States
E-mail: ljordan@asce.org
Web site: http://www.asce.org/conferences/ewri2007/

21-23 May 2007
4th International Conference on Sustainable Water Resources Management 2007. Kos, Greece
Contact: Zoey Bluff, Conference Secretariat, Water Resources Management 2007
Wessex Institute of Technology, Ashurst Lodge, Ashurst, Southampton SO40 7AA
United Kingdom
Tel: + 44 (0) 238 029 3223
Fax: + 44 (0) 238 029 2853
E-mail: zbluff@wessex.ac.uk
Web site: http://www.wessex.ac.uk/conferences/2007/waterresources07/index.html

13-17 June 2007
5th IWHA Conference "Pasts and Futures of Water".
Tampere, Finland
Contact: International Water History Association (IWHA), Eija Vinnari
Tel: +358 3 233 0430
Fax: +358 3 233 0444
E-mail: iwha2007@tavicon.fi
Web site: http://envhist.org

12-18 August 2007
World Water Week. Stockholm, Sweden
Contact: Stockholm International Water Institute (SIWI), Drottninggatan 33
SE-111 51 Stockholm, Sweden
Tel: +46 (0)8 522 139 60
Fax: +46 (0)8 522 139 61
E-mail: sympos@siwi.org
Web site: http://www.worldwaterweek.org

2-6 September 2007, Pavia, Italy
22nd ICID European Regional Conference. Rome, Italy
Contact: D.ssa M. Elisa Venezian Scarascia, ITAL-ICID General Secretary
Via Sallustiana, 10 Rome, Italy.
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3-6 September 2007
10th International Riversymposium & International Environmental Flows Conference.
Brisbane, Australia.
Contact: Emily Smigrod, Riversymposium Event Coordinator
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Fax: +61 (0)7 3846 7660
E-mail: emily@riverfestival.com.au
Web site: http://www.riversymposium.com/index.php?page=Symposium2007

30 September – 5 October 2007
ICID 58th International Executive Council Meeting, USCID 4th International Conference on Irrigation and Drainage. Sacramento, California, United States of America.
Contact: US Committee on Irrigation and Drainage, 1616 17th Street, # 483 Denver CO 802002, USA
Tel: + 303 628 5430
Fax: + 303 628 5431
E-mail: stephens@uscid.org
Web site: http://www.icid2007.org

December 2007
2nd edition of SAFID on Informal Irrigation.
Ouagadougou, Burkina Faso
Contact: ARID S/c 2iE, 01 BP 594
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Fax: + 226 50 31 27 24
E-mail: arid@eieretsher.org
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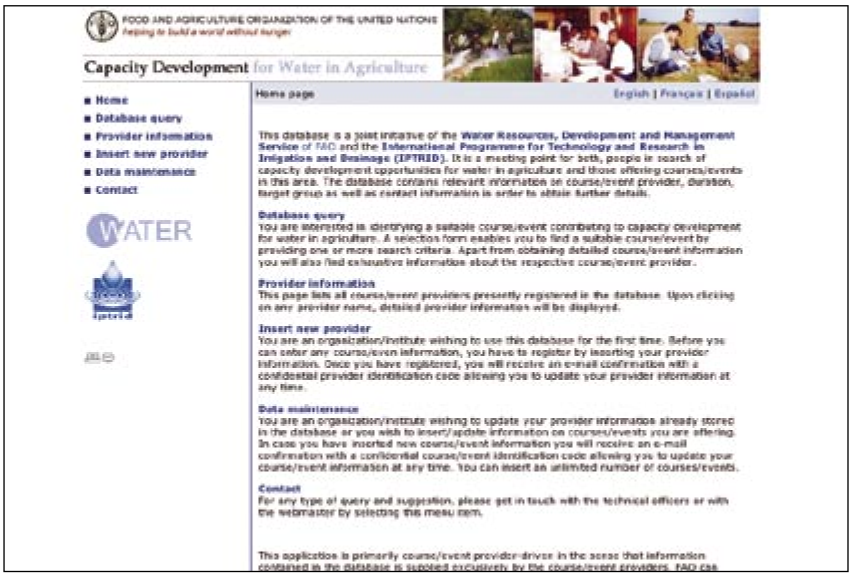
25-27 December 2007
1st International Conference on Water Resources Monitoring, Modeling and Simulation
Alexandria, Egypt.
Contact: Dr Carlos A. Brebbia, Wessex, United Kingdom
E-mail: ewra2007d@ewra.com
Web site: http://www.ewra.com

7-8 April 2008
Water Contamination Emergencies: Collective Responsibility. London, United Kingdom
Contact: The Royal Society of Medicine, London, United Kingdom
Tel: + 44 1359 221 004
E-mail: maggi@maggichurchouseevents.co.uk
Web site: http://dwi.gov.uk/conf/wce.shtm



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IPTRID

The uptake of Research and Exchange of Technology and Innovations in irrigation and drainage for a sustainable agriculture

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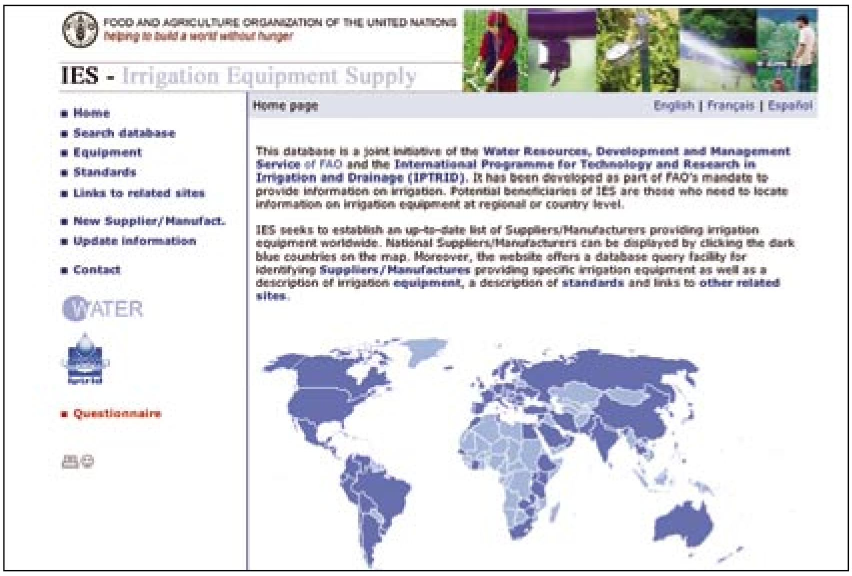

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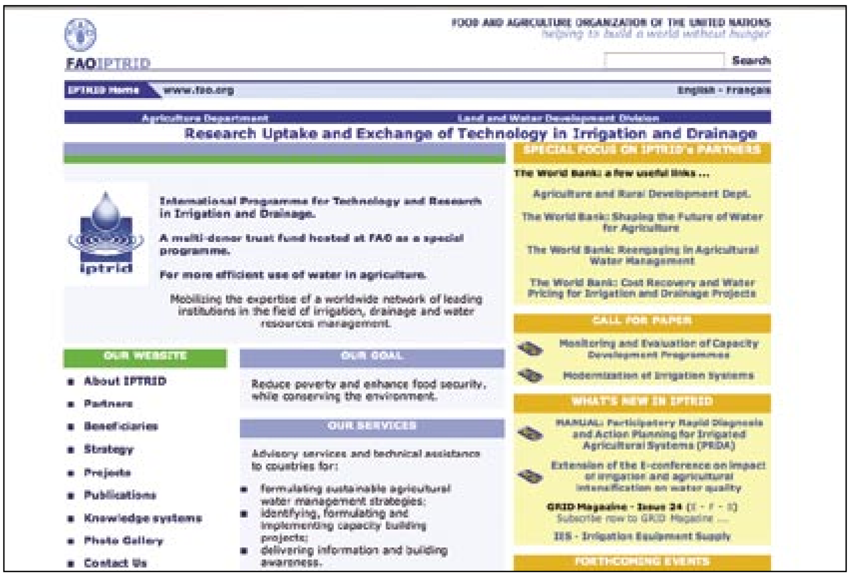

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