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## **WORKING GROUP ON IRRIGATION DEVELOPMENT AND MANAGEMENT (WG-IDM)**

### **SCOPING DOCUMENT**

Approved by the Working Group on 9<sup>th</sup> November, 2016 Chiang Mai, Thailand

#### **Introduction**

Developing irrigation is undoubtedly essential for meeting the challenge of properly feeding the planet for the next decades. But it will not be achieved without managing water in irrigation, aiming ultimately at producing more food with less water. Water management in irrigation must deal with quantities withdrawn from natural environment or made available at the end of another usage, and returning to environment or to another usage, but also with the quality of abstracted and returned water. It requires therefore a clear distinction, understanding and application of 'consumptive' and 'non-consumptive' water use, with beneficial and non-beneficial irrigation on the one side, and recoverable and non-recoverable drainage on the other (Perry, 2007)<sup>1</sup>. It is commonly understood that 'non-consumptive' water use does not substantially change the withdrawn water. But one must keep in mind that a 'substantial change' may be defined differently in different countries (FAO, 2010)<sup>2</sup>.

Water from various origins is used to supply irrigation: Surface water from close resource or transported on long distance, groundwater from shallow water tables or from deep aquifers as well. Multiple resources may be available at the same place, differing in operation cost, in quantity and in quality. Other usages often compete with irrigation. Therefore, an assessment of the total amount of water available during an irrigation season is essential for determining the optimal consumptive as well as non-consumptive use, the latter remaining available for a second usage. Dependent on the local conditions, groundwater irrigation may be more efficient than surface water schemes. Both may be used together on the same spot. However, especially in arid and semi-arid conditions, there is often a need to stop over-exploitation and ensure sustainable use by technological and institutional interventions so that, where possible, storages could be used during the drought periods.

There are many successful practices, and research findings potent works and non-conventional pathways of achieving irrigation development and management in a way which will allow increasing food production while decreasing pressure on water resources. A few of them are rated as outstanding contributions in water conservation across the world. Many go unrecognized, as well. There is urgent need to explore all those innovations and share with stake holders i.e. irrigation managers and policy makers. There is also need to strengthen the process of transfer and dissemination of water management skills to the farmers, their organizations, and to the organizations in charge of water management at system level, from professional experts, consulting firms, international organizations, through feedback on success stories as well as lessons learnt from failures.

In this Scoping Document the relevant aspects of each of these items will be reviewed and the objectives, state of knowledge on the topic and the Workplan will be presented.

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<sup>1</sup> Perry, C., 2007. Efficient irrigation; inefficient communication; flawed recommendations. *Irrigation and Drainage*, v. 56, no. 4, p. 367-378.

<sup>2</sup> Amit Kohli, Karen Frenken, Cecilia Spottorno - AQUASTAT Programme – FAO, 23 September 2010, revision 23 May 2012



## **Objectives**

*Relevance of the Working Group:* The relevance of the WG can be specified as follows:

- (a) the topic of water management in irrigation is relevant to the vision and mission of ICID and of interest for its members, in all countries with a high, medium and low Human Development Index<sup>3</sup>;
- (b) the WG is expected to contribute to effective implementation of the Strategy Theme Schemes and to other strategy themes for that matter;
- (c) sustainable water management in irrigation is of crucial in many regions of the World, especially in the arid and semi-arid zones where water scarcity and mining of groundwater resources is a well-recognised problem;
- (d) worldwide, there is still confusion on the issue of thrifty use of water. ICID has taken a clear position with respect to this item, based on the paper by Chris Perry (2007). Water saving can only successfully be evaluated by comparing the disposition of water before an intervention and the disposition afterwards. In its activities, especially with respect to water management of irrigation in arid and semi-arid areas, the WG can prepare clear messages with respect to this important issue;
- (e) development and sustainable management of irrigation is part of integrated water resource management, a key issue for achieving human development goals as regards access to quality food, drinking water and sanitation.

*Relevance of the Working Group to the scope of the Thematic Area*

Sustainable water management at both resource and system level is not only an important requirement in support of global food production, but also for the livelihood of the rural population and for environment. In addition there is the important aspect of integrated river basin management where irrigation is generally the major water user. In quite numerous systems there is 'over' irrigation, which may result in waterlogging, salinization and wasting of water. On the other hand 'deficit' irrigation may result in yield reductions and salinization of the root zone. Therefore a crucial question is what would be optimal irrigation development strategy and water management approach in irrigation under the local conditions. The WG will be exploring the subjects under its scope from perspective of "schemes" and thus is relevant to the Thematic Area.

*Existing gap that the Working Group is expected to fill*

WG-IDM will address several issues not fully included in past WGs' scope of works, for instance Groundwater management and more globally IWRM. Working on both irrigation development and its management, it will allow bridging possible divides through integrated approaches. Taking into consideration the actual multiple use of water in irrigation schemes should allow better assessing the global water needs, quantity wise as well as quality wise.

Other ICID WGs or Task Forces (TF) that have a related scope of work are: WG-SON-FARM, WG-DROUGHT and WG-CROP. The scope of new WG-WSI (now WG-WATS), WG-R&M (now WG-M&R), WG-IMT (now WG-IOA) and WG-DRG (now WG-SDRG) is also more or less related to the issues to be addressed by WG-IDM.

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<sup>3</sup> *Low Human Development Index.* Most of the countries in Africa, several countries in Asia, one country in Central America and most of the smaller countries in Oceania; *Medium and High Human Development Index.* Most of the Eastern European countries (including Russia), most of the countries in Central and South America and in Asia (including China, India, Indonesia and Pakistan) and several countries in Africa; *Very High Human Development Index.* Most of the countries in Western and Central Europe, North America and some countries in Central and South America and in Asia, the larger countries in Oceania and one country in Africa.



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*Water secure world free of poverty and hunger through sustainable rural development*

The WG-IDM has taken good note of the mandate and activities of these Workbodies when preparing this Scoping Document. All these WG, under Theme Leaders' guidance, will:

- (a) keep paying attention that neither redundancy nor gap will exist between their respective work.
- (b) coordinate their work so as to enhance their complementarity.

For instance, WG-IDM should deal with water management at both basin (IWRM) and system (or scheme) levels, irrigation management at field level being within WG-SON-FARM's scope, and re-use of treated waste waters within WG-PQW's one.

### **State of knowledge on the topic**

#### *Other International Organisations that are working on the subject*

There are several other International Organisations that have programs and activities on this topic. This especially concerns the:

- (a) Food and Agriculture Organisation of the United Nations (FAO);
- (b) most of the 15 research institutes that are organised within the CGIAR Consortium, especially IWMI, ICARDA, IFPRI, ICRISAT;
- (c) International Fund for Agricultural Development (IFAD);
- (d) other research institutes and Universities;
- (e) professional international water associations, like: IAH, IAHR, ICOLD, IHA, IWA, IWRA, as well as national ones not incorporated within ICID;
- (f) multilateral development banks: ADB, AFDB, IADB, WB;
- (g) international partnerships: GWP, OECD, WWC;
- (h) institutes for international education: UNESCO-IHE...

#### *The niche that ICID is expected to fill in this area*

The specific niche that this WG can fill on the issue bulleted under "Scope" can be formulated as follows:

- (a) to exchange information and network on the issues in order to be up to date with new developments, methods and approaches;
- (b) to prepare and present reports and/or case studies on recent development of irrigation in the countries that are represented in the WG, and in least developing countries which benefit from cooperation with the countries that are represented in the WG;
- (c) to identify the examples or the opportunities of South-South cooperation in irrigation development and management improvement;
- (d) to collect and review manuals, guidelines as well as research works on sustainable water management in irrigation (at system and basin levels);
- (e) to consult with ICID Central Office on the continuation of data collection with respect to developments in irrigation management methods in the Member Countries (MC);
- (f) to organise international workshops, seminars or symposia on the issues.

This can be the basis to present recommendations and if mature a position paper on key issues on developing irrigation and sustainable water management, and in fine to prepare an overview paper on the state of the art on the topic for publication in *Irrigation and Drainage (IRD)*.



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*How is the Working Group expected to collaborate with the other International Organisations?*

International Organisations can contribute to the activities of the WG by nominating Permanent Observers (PO). On the other hand presentations of the work and achievements of the WG can be presented at the occasion of events organized by International Organisations.

### **Work Plan**

*Refer Annex 2 of the proposed tentative Work Plan, which of course has to be enriched by the WG itself during the first step of its work.*

### **Scope**

The core question is "What would be the optimal irrigation development strategy and water management approach in irrigation under local conditions, taking into account the probable effects of climate changes? What is the resulting development potential for irrigation?"

Given the whole context, the scope of works for answering this question would be too broad. All the related issues could not be addressed in the same time, and the Group should act step by step, the first global step being identifying the conditions for good water management in irrigation, the issue of developing irrigation being to be addressed afterwards. Within this global first step in respect with water management, a major issue is how to properly approach the water balance in irrigation.

Therefore, the WG is expected to investigate, analyse, and disseminate information on new developments and to formulate recommendations focusing on the main issue of water balance approach in irrigation. Subsequently, the action plan for the coming three years will concentrate on:

- (a) assessment of consumptive use of water for irrigation and resulting water balance at system level ;
- (b) water demand management according to available resource(s) and system capacity;
- (c) assessment of water loss in various components of irrigation systems, appraisal of water made available for another use downstream (non-consumptive);
- (d) ground water development and management for irrigation including conjunctive use of surface and groundwater in irrigation, artificial recharge of aquifers from canals "losses" and "excessive" irrigation
- (e) water measuring methods and devices and relevant technology (flow rates and volumes).

As a further step, the WG will address the following issues

- (a) drivers for and resistances at system level to improve irrigation management;
- (b) social issues to be considered along with technical and economical ones;
- (c) management of multi-use hydraulic systems, and interdependence between uses;
- (d) performance evaluation of irrigation schemes and benchmarking;
- (e) ways towards economical performance enhancement (cost reduction and efficiency improvement).



Attention should be drawn on the fact that the recommendations made by WG-IDM may be:

- (a) "common", i.e. "universal" relevant in all cases and under various conditions,
- (b) Specific to particular regions or sub-regions.

#### *Target audience*

The target audience for this working group will be managers of irrigation systems, consultants, researchers, government agents, farmers' organizations, manufacturers and staff of International Organisations working on the topic.

#### *Outputs*

The following outputs can be expected from this WG:

- (a) although it is an indirect output sharing of knowledge and experience by representatives of NCs will also enable them to disseminate this knowledge within their country;
- (b) guidelines on sustainable water management in irrigation;
- (c) condensed overview of existing key books, manuals, guidelines and other relevant publications on the topic;
- (d) the WG is expected to organise at least one workshop, seminar or symposium in three years at occasion of an international ICID meeting;
- (e) overview paper on the topic for publication in *Irrigation and Drainage (IRD)*

#### *Timelines*

While irrigation development and water management in irrigation are very important issues in light of its role in support of global food production it is recommended that the initial term of this WG will be set at six years. The timeline would have to be based on the scope of work and the expected output. Details of the timeline would have to be formulated and refined during the inaugural meeting of the WG.

#### *Collaborators and dissemination strategy*

The WG would have to base its activities on an open attitude with a clear scope for invitation of outsiders that are interested in the topic on a PO, or ad hoc basis.

The dissemination strategy should be based of reaching those who can apply the findings and recommendations of the WG in their research and especially in policy development, decision making and implementation in practice.

