

WORKING GROUP ON ENVIRONMENT
Strategy Theme: Basin

DRAFT SCOPING DOCUMENT

Prepared by Dr Sylvain R. Perret, Dr Michael van der Laan, and Prof. Nobumasa Hatcho

1. Objectives

- 1.1 This document aims at scoping and formulating the new mandate and thematic areas for ICID Working Group on Environment (WG-ENV), in view of its extension of tenure after 2015 (completion of current mandate).

2. Introduction

- 2.1 ICID has long been concerned and addressing the issues associated with the environmental impacts of irrigation and drainage systems. These activities have more recently been driven by the WG-ENV, which was established in 2008. Completion of mandate was initially set at 2014, then later postponed to 2015.

3. What was achieved, what are the prospects for a renewed, extended mandate?

- 3.1 The original **mandate of ICID's WG-ENV** was formulated as follows:

“To provide guidance to policy makers, planners, designers, and managers in the irrigation and drainage sector on the environmental aspects of drainage and irrigation systems. The environmental aspects are physical, chemical, ecological, socio-economic and cultural, as well as concerns to the effects on climate and human health. By looking at environmental aspects, the working group will aim for the management of a sustainable environment, maximizing positive and minimizing adverse effects of irrigation and drainage systems”.

- 3.2 WG-ENV has not addressed all of the environmental aspects of I&D systems during the 2008-2015 mandate. The overall idea of a renewed mandate would be to redress this, to take account of latest global and regional environmental changes, and to address ecological, socio-economic, cultural, health-related aspects, along with a closer look at climate change related environmental interactions (mitigation and adaptation).
- 3.3 In 2011, a workplan was developed, in order to adjust actions to the changing global conditions and to better meet members' expectations and demands, yet aligned with the mandate. The workplan 2012-2014 included the following actions:

3.3.1 Action 1: Improving communication among WG-ENV members between annual ICID meetings

- (a) In view of the poor communication between members in between annual meetings, it was necessary to identify other pathways for continuous communication.
- (b) We attempted but failed to actually implement social-network based solutions (e.g. a LinkedIn group). However, ICID has set up a system for free on-line videoconferencing as an alternative. The first such online meeting of WG-ENV was held on March 19, 2015.
- (c) **Prospects for renewed mandate:** Such solution (e-meeting via internet-based videoconferencing, WebEx style) proved successful (yet for one event only), and therefore WG-ENV should continue using it. Continuous communication between larger formal events is clearly essential for the success of WG-ENV.
- (d) **Suggestion:** It is suggested that regular videoconferencing be explicitly mentioned as a communication tool in the next workplan.

3.3.2 Action 2: Addressing the issues of Agricultural Return Flow and Requirement for Environmental Flow

- (a) This topic had been on the agenda of WG-ENV since its inception (2008). Most of the work done and discussions focused on environmental flow, while little was done on agricultural return flows.
- (b) The main activities included: an International Workshop in Adelaide 2012, organized jointly with WG-PQW on “Irrigation, Water Quality and Environmental Flow”; various presentations in 2011 and 2013 by WG members and invited speakers during WG-ENV meetings; dissemination of documents and information by several WG members. Particularly documents on comprehensive reviews of Environmental Flow Requirement (EFR) estimation methods were posted on Dropbox.
- (c) **Prospects for a renewed mandate:** This theme has long been addressed and debated within the WG. Many WG members felt that, although an important topic, EF and EFR are a bit distant from the core concerns of WG-ENV: irrigation and drainage. In that sense, working on EF and EFR alone may not be relevant, especially since many other work bodies do it much more efficiently than WG-ENV. Other members reiterated that EF and EFR are important elements of water systems at basin level, yet insisting on the need to better link EF with ARF (contribution of ARF to EF to be clarified). Some members

indicated their firm interest in getting information on best practices, case studies, and methods to assess EFR, and the need for clear guidance, so that they can convey 'ICID-labeled' or '-endorsed' recommendations to national policy makers in their countries. Decisions on scoping the next mandate must also take into account the very poor attendance and contribution by WG-ENV members to the International Workshop in Adelaide 2012, organized jointly with WG-PQW on "Irrigation, Water Quality and Environmental Flow".

- (d) **Suggestion:** it is suggested that EF and EFR be dropped as themes to be addressed further in the renewed mandate of WG-ENV. Enough has been done (circulating documents, workshop etc.).

3.3.3 Action 3: Addressing the issues of "Environmental aspects of irrigation and drainage projects" and "Management of a Sustainable Environment (maximizing positive and minimizing adverse effects of irrigation and drainage systems)"

- (a) This topic was also on the agenda since the outset, yet not really addressed until 2010. It was decided to promote Life Cycle (LC) approaches (LC inventory, LC impact assessment) as effective means of studying the potential impacts of irrigation systems, equipment, activities on the environment, from a regional / basin perspective. LCI / LCIA approaches receive growing interest globally, for their potential towards more sustainable production processes, process / product labeling, environmental foot-printing, assessment of diverse regional and global impact categories (climate change, eutrophication, acidification, resource depletion, energy use, biodiversity loss, etc.). The objective was that ICID's WG-ENV forms a platform towards LCA awareness and use in irrigation and drainage community at global level.
- (b) An introduction to the application of LCA to irrigation systems was provided during the 2nd meeting in Yogyakarta, 2010. Although many WG-ENV members were initially unsure of the potential and benefits of the LC approach, it was decided to set up a WG task team on "LC Approaches Applied to Irrigation and Drainage Systems". The Chair, Vice-Chair, and Secretary of WG-ENV formed the task team; some interested members / observers joined at times. Task team activities consisted of:
- (i) Document and information sharing between LCA task team and WG members (background documents, recent literature on LCA application in irrigation and drainage);
 - (ii) Four presentations were made by task team members during the 4th WG meeting in Adelaide, 2012, on LCA (June 2012),
 - (iii) A draft WG report on "LC Approaches Applied to Irrigation and Drainage Systems" was compiled, including literature review and case study papers; the draft report was finalized in January 2015 and sent to ICID CO for consideration.
- (c) **Prospects for a renewed mandate:** Life-cycle based environmental impact assessment is now widely accepted, promoted, and implemented by international bodies (e.g. UNEP, EU, OECD), national environmental agencies, researchers, consultants and corporates on all continents. The irrigation and drainage sector, and broadly the agricultural sector, is still lagging behind, although awareness is growing, and progress is being made. WG-ENV at ICID has contributed to such awareness and progress. Although the group has been very active, and much has been achieved, there is still a lot to do regarding ingraining environmental impact assessments based upon LC approach (water foot printing, carbon foot printing, energy balance etc.) into national committee's working and practices. Besides, recent advances in social LCA provide avenues for discussion, capacity development and knowledge transfer in future still has to be done.
- (d) **Suggestion:** Environmental impact assessment of irrigation and drainage systems should definitely remain a core theme for the WG-ENV. Knowledge sharing and discussions on case studies on different approaches, methods and tools are much needed by most national committees. We suggest to keep this activity, not limited to LCA, and also to consider developing activities on social, human and economic impacts of I&D systems.

3.3.4 Action 4: Addressing specific issues of interest "Irrigation and Drainage projects and human health", "Environmental Standards and Norms; International vs. National Guidelines in EIA"

- (a) The topic has been included lately, on request of observers from Pakistan, Iraq, and Indonesia. Related documents have been circulated to interested members with request to take the lead and form a sub-group or task team on the issue, if needed.
- (b) Prospects for renewed mandate: Health and sanitary impacts are arguably important aspects of I&D systems, and need to be taken into account by WG-ENV.
- (c) Suggestion: Those aspects could be addressed as part of activities on social, human and economic impacts of I&D systems (see above).

4. Towards a new mandate for WG-ENV

4.1 Scope

- 4.1.1 Agricultural production keeps increasing worldwide, and yet, high global population growth rates, volatility in food prices, market and institutional failures result in food insecurity for millions, especially in developing and least developed countries. At the same time, environmental issues become significant and take a growing toll on human health, ecosystem integrity, resources availability, and economic performance of the eco-systems. In a global context of climate change, extreme events and increasing uncertainty with higher risks play an important role in providing food security.
- 4.1.2 In the triple challenges of the need to increase food production, protect the environment, and adapt to changing and uncertain climatic conditions, irrigation and drainage systems have a key role to play.
- 4.1.3 Irrigation and drainage systems worldwide interact with complex, dynamic and diverse environments which include physical, chemical, ecological, climatic, social, human and economic dimensions. Environmental sustainability is a moving target which evolves as the complex and dynamic relationships between nature and societies unfold and as new challenges emerge. The pillars of the 'Green Revolution', – high yielding varieties, use of agrochemical inputs, and mechanization, along with massive irrigation development – have had a definite positive outcome in increasing food production, which prevented hunger in many parts of the world in early sixties. But they also resulted in negative impacts on the environment in due course of time.
- 4.1.4 The way water in general and water for agriculture in particular is managed, may harm the environment in a variety of ways: groundwater depletion, land degradation and water contamination, depletion of resources, GHG emissions, and the loss of ecosystem services, biodiversity, and habitats. However, most irrigation and drainage systems also produce a number of goods, services and positive amenities, which benefit local communities and societies at large. Finally, recent trends on addressing rural development issues with respect to environmental dimensions put the local rural region or "territory"¹ (as a landscape connected to communities, with social and economic activities) to the fore. IWRM principles put river basin, catchments, irrigated territories, and the regional scale as relevant levels for decision-making and intervention. Recent concepts and theories from industrial ecology promote 'territorial intelligence' as the next relevant target (and lever) for rural and agricultural development.
- 4.1.5 With respect to these dimensions, four aspects are of major importance:
- What are **the positive amenities, services, goods**, etc. provided by irrigation and drainage systems? How can those be better characterized, quantified, and ultimately used in policy making, and in agricultural and rural development planning? What are the existing concepts and tools?
 - What are **the negative environmental impacts of irrigation and drainage systems**? What are the existing frameworks available to quantify such impacts?
 - What are **the negative social and economic impacts of irrigation and drainage systems**? What are the existing frameworks available to quantify such impacts?
 - How **could irrigation and drainage systems and local regions ('territories')** be better addressed as key levels for policy-making, and action with regards to minimizing negative impacts and maximizing positive services, beyond the farm level? How can the different operators, the economic, institutional, and social agents, who act at regional level, be better involved?
- 4.1.6 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.
- ### 4.2 Objectives
- 4.2.1 Relevance of the Working Group
- 4.2.2 The relevance of the WG can be specified as follows:
- The topic of the **environmental, social and economic impacts of irrigation and drainage systems** is relevant to the vision and mission of ICID and of interest to its members, in all the countries.
 - The WG is expected to contribute to effective implementation of **the Strategy Theme "Basin"** and possibly to other strategy themes for that matter (see below); the Basin level² is **the level where most**

¹ Caron (2015) reminds us that the use of the term « territory », although straightforward and unbiased in latin-originated languages, may be controversial or at least arguable in English. Indeed, "territory" is often connoted with political, or even military values in English, linked for instance to exploration, conquests, or discriminatory spatial organization and governance. Also, the national level is often the one associated with the term. On the contrary, we refer here to the local rural territory. See further below an end note that discusses rural territories as scientific and developmental objects.

² ICID has selected three strategic spatial scales for action of its workbodies: On-Farm, Scheme and Basin. WG-ENV has jurisdiction over the so-called Basin strategic theme; as a matter of fact, WG-ENV may address any scale deemed relevant to its mandate,

environmental impacts ultimately materialize and translate into consequences such as 1) human societies and humans (health, food security), 2) ecosystems (biodiversity, ecosystems' health, renewable resources) and 3) non-renewable resources (depletion or conservation).

- (c) It may be expected that in the years to come, the negative **environmental, social and economic impacts of irrigation and drainage systems will increase and will be more critically scrutinized**, because such systems may expand further, and are expected to be more intensively used for food production, **in view of global demographic trends and food security challenges**;
- (d) It may also be expected that **policy-makers take a closer look to environmental, social and economic impacts (positive and negative) of irrigation and drainage systems** as they become more significant in a context of climate change, consumer awareness on environmental issues, food safety and health, and socio-economic concerns. New institutions and legislation may develop consequently;
- (e) There have been **recent advancements in concepts and methodologies related to characterizing and quantifying environmental, social and economic impacts of irrigation and drainage systems**; it is ICID's mission to make sure such knowledge is made available to, and used by its member countries.

4.2.3 Relevance of the Working Group to the scope of the Strategic Thematic Area

- (a) For the relevance of the WG to the scope of the Strategic Thematic Area, the same argumentation is applicable as shown under the relevance. Most of the activities in irrigation and drainage have impacts, be they negative or positive. The WG-ENV recognizes the Basin level **as the territory that includes irrigation and drainage systems amongst other water and natural resource management systems, and interacting stakeholders and economic agents, with various activities and interests**. The Basin level (actually the catchment or watershed) is the level where most environmental impacts ultimately materialize and translate into consequences onto 1) human societies and humans (health, food security), 2) ecosystems (biodiversity, ecosystems' health, renewable resources) and 3) non-renewable resources (depletion or conservation).

4.2.4 Existing gaps that the Working Group is expected to fill

- (a) Renewed scope and mandate of the WG-ENV should include the latest initiatives on **ecosystem services and the multifunctionality of irrigation and drainage systems**, in order to better account for positive impacts, amenities and benefits from I&D systems. Recent research and literature recognize and document this diversity of functions, services and impacts in agricultural water systems, which may be identified as agro-hydro-ecosystems. The concepts of multifunctionality and ecosystem services are now globally used to characterize such situations, and often pave the way to innovative policies and institutions.
- (b) No other ICID WG or TF is currently formally addressing such concepts. An introductory presentation was made in Gwangju 2014 by Dr Perret, WG Chair. Further, a workshop is being organized during the ICID conference in Montpellier 2015. WG-ENV members have expressed their interest in the topic and suggested to include it in the new mandate.
- (c) Environmental impact assessment of irrigation and drainage systems should definitely remain a core theme for the WG-ENV. Knowledge sharing and discussions on case studies on different approaches, methods and tools are much needed by most national committees. We suggest to keep this activity, not limited to LCA, and **also to consider developing activities on social, human and economic impacts** of I&D systems.
- (d) Other ICID WGs or Task Forces (TF) that have a related scope of work are: WG-SDG, WG-PQW, WG-DROUGHT, WG-CLIMATE, WG-ON-FARM. The new WG has taken good note of the activities of these Workbodies when preparing this Scoping Document.

4.3 State of knowledge on the topic

4.3.1 Other International Organisations that are working on the subject

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

- (a) Organisations of the United Nations (FAO, UNEP);
- (b) Most of the 15 research institutes that are organised within the CGIAR Consortium, especially IWMI;
- (c) International Fund for Agricultural Development (IFAD);
- (d) Several of the 11 professional water associations, especially: ICOLD and IHA;
- (e) Multilateral development banks: ADB, AFDB, IADB, WB, IFAD;
- (f) International partnerships, associations and NGOs: IWA, IWRA, WWC, WWF
- (g) Universities and institutes for international education: AIT, McGill University, UNESCO-IHE

beyond the scheme level (strictly the irrigation and drainage system), i.e. catchment, rural local region, waterscape and landscape, watershed, basin, rural territory.

- (h) International research and cooperation organizations: Cirad, GIZ, USDA, AUS-AID, SIDA, CIDA, IRD.

4.3.3 The niche that ICID is expected to fill in this area

4.3.4 The specific niche that this WG can fill in this area can be formulated as follows:

- (a) **Exchange of information and networking on the topic** in order to be up to date with new developments, concepts, methods and approaches. This can be the basis to present policy recommendations and if mature, a position paper on key issues on environmental, social and economic impacts of irrigation and drainage systems, and the ecosystem goods and services they provide;
- (b) **Review and prepare a condensed overview** of existing key books, manuals, guidelines and other relevant publications on the topic;
- (c) **Prepare and present reports** and/or case studies on recent development in the countries that are represented in the WG;
- (d) **Collect and review manuals, guidelines, codes of practice and standards** on characterizing, quantifying all sorts of positive and negative impacts of irrigation and drainage systems in the countries that are represented in the WG;
- (e) **Organise international workshops**, seminars or symposia on the topic;
- (f) **Prepare overview papers and ICID position papers** on the state of the art on ecosystem services and multifunctionality, and on methodologies for assessing the multiple impacts of irrigation and drainage systems, for publication in Irrigation and Drainage or other international journals.

4.3.5 How is the Working Group expected to collaborate with the other international organisations?

- (a) International organisations can contribute to the activities of the WG by nominating Permanent Observers (PO). Also, presentations of the work and achievements of the WG can be made at the occasion of events organized by the international organisations. Finally, key experts may be invited to present crucial advances or new material to WG meetings, for the benefit of members.

4.4 Work Plan

4.4.1 Scope

- (a) The WG is expected to investigate, analyse and disseminate information on new developments and to formulate recommendations with respect to:
 - (i) **The positive amenities, services, goods**, etc. provided by irrigation and drainage systems; the existing concepts, tools, approaches to characterize multiple uses, ecosystem services, and the multifunctionality related to irrigation systems, their valuation and quantification; also, the use of such concepts in policy making, and in agricultural and rural development planning ought to be addressed;
 - (ii) **The negative environmental impacts of irrigation and drainage systems**, the existing frameworks available to quantify such impacts, the final consequences of resource use and pollutions to air, soil and water compartments in terms of human health, ecosystems' health, and resource conservation; also, the use of such concepts in policy making (including the need for trade-offs, prioritization, and key choices), and in agricultural and rural development planning ought to be addressed;
 - (iii) **The social and economic impacts of irrigation and drainage systems**, the existing frameworks and approaches available to quantify such impacts;
 - (iv) **The management of irrigation and drainage 'territories'**, as waterscapes where many economic and social agents co-exist and interact, where private interests collide and interact with common-pool resources, collective action features, public action and policy making; at this level, collective action and trade-offs are required for sustainable development and policy making; also, the institutions necessary to minimize negative impacts, and to maximize positive ones are to be set up at that level and thus require WG-ENV attention.
- (b) These four domains refer mostly to information collection, compilation, sorting-out and dissemination. Many further activities will be spelled out in more details at a later stage (work plan development) and will be developed based upon individual and team work by all WG members.
- (c) The renewed mandate is suggested as follows (alterations from previous mandate have been highlighted):
- (d) "To provide guidance to policy makers, planners, designers, and managers in the irrigation and drainage sector on the environmental aspects of drainage and irrigation systems. The environmental aspects are physical, chemical, ecological, socio-economic and cultural, **as well as concerns to the effects on local, regional and global common goods, such as climate, biodiversity and human health**. By looking at environmental aspects, the working group will aim for the management of a sustainable environment, **through adapted practices, adequate policies and institutions**, maximizing positive and minimizing adverse effects of irrigation and drainage systems".

4.5 Target audience

- (a) The target audience for this WG and its outputs will be designers and managers of irrigation and drainage systems, water management officers at basin or regional level, water quality management officers, environment conservation agents, development and socio-economic facilitators, researchers and the academia, students, consultants, government officials, farmer representatives and staff of international organisations.

4.6 Outputs

- (a) The following outputs can be expected from this WG:
- (i) 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;
 - (ii) **Condensed overview of existing key books**, manuals, guidelines and other relevant publications on the topic;
 - (iii) The WG is expected to organise at least one **workshop, seminar or symposium** in three years at occasion of an international ICID meeting;
 - (iv) **ICID codes of practice** and standards for the assessment of environmental, social and economic impacts of irrigation and drainage systems.

4.7 Timelines

- 4.7.1 The impacts and interactions of irrigation and drainage systems onto their multifaceted environment form a permanent and crucial topic. They involve long term processes and far-reaching consequences at different levels and scale of societies.
- 4.7.2 It is recommended that the initial term of this WG 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.

4.8 Collaborators and dissemination strategy

- 4.8.1 The WG would have to base its activities on an open platform, with a clear scope for invitation of outsiders that are interested in the topic on a PO or ad-hoc basis.
- 4.8.2 The dissemination strategy would have to be based on 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. Case studies and comparative analyses based upon the promoted methodologies may be carried out in various countries, on voluntary basis of willing and motivated members.

5. Core Group

- 5.1 This draft has been circulated among the National Committees with the request to nominate members. Comments received from the members of the Core Group have been included in this scoping document. The Core Group consists of:

Convenor: Sylvain Perret (France; may not become the chairman of the proposed WG; applications and ideas are welcome)

Members: M. Van der Laan (South Africa); N. Hachō (Japan); C. De Fraiture (Netherlands) ; T. Fuqiang (China); M. B. Chaudhry (Pakistan); V.C. Ballard (Australia); A. Fayrap (Turkey); M.A. Ismail (Malaysia); A.M. Aziz (Iraq); A. Tedeschi (Italy); J-D Choi or (Korea); O. Purhonen (Finland); M.K. Siahi (Iran); T Yih Chi (Taiwan)

National committees and/or members themselves may decide ultimately to continue or discontinue (then nominate) individual memberships to WG-ENV, based upon the renewed scope and mandate.

ⁱ Annex 2 [66th IEC Agenda, Appendix XXII, page 206]