



ICID•CIID

INTERNATIONAL COMMISSION ON IRRIGATION AND DRAINAGE

Vision 2030

[WORK IN PROGRESS]

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(To be completed)

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Foreword

By President

(To be inserted after the document finalized)

Preface

By Secretary General

(To be completed)

President Dr Saeed Nairizi, in his very first meeting with the Secretary General in Marseilles, decided to establish a Consultative Group (CG) to prepare an ICID Vision 2030 in view of the fast changing development scenario and the role that ICID could play as a network of agriculture water management professionals.

The CG Chaired by Dr Huseyin Gundogdu, Chairman of the PCSO with VPH Dr Wilhem Vlotman (Australia), Dr Sylvain Perret (France), Mr Ian Makin (UK), Dr Prof Charlotte de Fraiture (Netherland), as its members and Secretary General was established in 2015. CG organized two web-meetings where it was decided as a first step to get inputs from the National Committees and voluntary experts participating in the activities of the ICID network. A questionnaire was prepared and circulated among the NCs and the voluntary experts involved in ICID activities. Feedback received on behalf of 8 NCs and from 59 experts was considered by CG while formulating the strategy.

The Document, being inspired by the imperatives of post 2015 global development agenda takes into account the political process underway to arrive at the globally acceptable Sustainable Development Goals yet to be adopted by the UN General Assembly later in September 2015. The document also takes into account various reports and documents prepared in the field of agriculture, food security, climate and water by various international organizations.

The document also includes the inputs provided to the President and Secretary General during their discussions with various NC experts and policy makers in the countries that were visited by them during earlier half of this year which include among others the NCs of Korea, Russia, Turkey, Tajikistan and China. In addition President had discussions with the Ministers of Tajikistan, Russia and China wherein he gathered feedback on what is expected by the policy makers from ICID as an organization. The document also reflects the views and suggestions made by various office bearers and experts during the 21st and 22nd Congresses of ICID and the First World Irrigation Forum and other ICID events and the informal studies taken on strength and weaknesses of the organization.

The document in its present form is intended to serve as a starting point for discussions among ICID constituents and its partner and is expected to be finalized after incorporating the views of all stakeholders.

1. INTRODUCTION

1.1. Background

1. *Water is the key resource. It is fundamental to all development processes and nurtures the three pillars of sustainable development – economic, social and environmental. Water resources management, and the essential services water delivers, constitute the key ingredients essential for achieving poverty reduction; maintain inclusive growth, public health, food security; providing livelihoods for a life of dignity for all and sustaining long-lasting harmony with Earth's essential ecosystems.*

2. *International Commission on Irrigation and Drainage (ICID) established in 1950 is the only global professional irrigation and drainage network, which strives to bring together various stakeholders in the irrigation and drainage sector to promote sustainable management of water for agriculture worldwide. It provides a unique platform for the exchange of knowledge and information related to irrigation, drainage and flood management and promotes its objectives through its network of professionals that constitute National Committees in member countries, like-minded international organizations, private companies, and institutional and individual members. ICID has actively contributed to the first Green Revolution and helped make it successful by promoting research, development, and technology transfer to developing countries of Asia and Africa to a limited extent.*

3. *Given the global changes taking place within the overall development scenario through demographics, climate change and limiting natural resources, agriculture water management has to adapt to be sustainable in future in order to ensure water security, food security and sustainable rural development.*

1.2. Purpose of the document

4. *This document presents the shared vision of the ICID network and sets out the mission of the international network of irrigation and drainage professionals. The document summarizes what the network represents and whom it intends to serve through the sustainable development paradigm over the 15 years to 2030. The document presents and reviews the role that the network is playing and is intended to trigger discussions toward an agreement among the constituents on the future role of ICID and its members.*

5. *This draft vision document is intended to generate debate and discussions that ensure the end product will be owned by all the network members and they contribute their best efforts to fulfil the vision outlines. This document will be discussed in the PCSO, the OBC and the IEC meetings. The document would then be shared with ICID international partners. Based on the various inputs, it would be revised and presented to the MB.*

1.3. Scope of the document

6. *The members of ICID have given themselves a Constitution that binds them together and sets out the mandate and area of activities of the network. Having been in existence for more than 65 years, it has followed certain traditions and practices. Although the mandate of ICID has evolved over the years, starting from a purely engineering perspective of canal irrigation to now embrace the technical, agronomic, socio-economic and environmental complexities of irrigation, drainage and flood management issues within the Integrated Water Resources Management approach. To date the Commission has adapted to developing situations rather than setting forward looking goals. The Commission now presents a vision for the next 15 years that will help address the new sustainable development regime adopted by the United Nations, General Assembly by setting Sustainable Development Goals (SDGs).*

7. *As an institution that is largely dependent on the voluntary cooperative contribution of experts from around the world who are engaged in different aspects of irrigation and drainage, its activities are essentially an extension of the interests of the institutions where the experts work. It*

is the first time that an effort is being made to give forward looking direction to the activities of ICID in order to focus the voluntary efforts towards common goals.

8. The Vision is expected to support the National Committees, the building blocks of the network, and enable them to play a, much needed, wider role within the development community in their respective countries and regions and a more prominent role at international level.

9. The CG reviewed the terms of reference for the group and decided to undertake the assignment in two stages: (i) developing a consensus on the Vision for 2030 in the first stage and; (ii) taking a conscious decision not to present an action plan (or suggestions of the possible organisational and management re-orientation implied) but to leave development of an action plan to the second stage. Therefore this document does not present a new business plan for the network or recommendation for changes in the management that would need to be undertaken once the vision is adopted by ICID

10. This document sets out the framework of the vision of ICID with reference to present development scenarios and the emerging challenges for humanity. It summarizes changes taking place in the development environment and the growing concerns about water security, environment and food security that may emerge within the next 15 years. It takes cognition of the post 2015 sustainable development scenarios. In section 3, the document sets out the vision and identifies the ICID stakeholders and identifies their requirements.

11. The vision of

A water secure world free of poverty and hunger through sustainable rural development,

Along with the proposed new mission and goals through which the vision would be realized are described in chapter 4.

12. The new vision and goals is likely to have some impacts on the ICID Constitution including ICID Rules and regulations that guide its functioning. It may also require re-orientation of the way the National Committees are organized. Chapter 5 introduces how the Commission could proceed to adopt the vision and then work towards setting/ reviewing the mechanism and articulating activities under various goals *through an Action Plan*.

2. WATER MANAGEMENT IN A CHANGING DEVELOPMENT ENVIRONMENT

This chapter presents the post-2015 sustainable development agenda which needs to be factored in setting out the vision. Agriculture water management has to factor the water-food-energy-environment to achieve the objectives of sustainable development agenda, which is discussed briefly. The chapter also discusses briefly agriculture water management issues in various regions of the world. In the end the chapter reviews the approach that has been taken by the ICID network during the last 65 years and reasons out the need for setting a new vision for 2030.

2.1 Sustainable Development Agenda

13. *Member States of the United Nations launched a process to develop a set of sustainable development goals (SDGs) based on their agreed perspective on the “Future We Want” (1). Of particular importance for ICID, the SDGs as being negotiated (2) recognize water to be at the core of sustainable development. The SDGs highlight that water is closely linked to a number of key global challenges. The leaders have reaffirmed their commitment to the right of everyone to have access to safe, sufficient and nutritious food, consistent with the right to adequate food and the fundamental right of everyone to be free from hunger.*

14. *Interlinkages between water and sustainable development reach far beyond its social, economic and environmental dimensions. Human health, food and energy security, urbanization and industrial growth, as well as climate change, are critical challenges where policies and actions at the core of sustainable development can be strengthened (or weakened) through water. Seven out of seventeen SDGs directly influenced by Agriculture Water Management are:*

1. *End poverty in all its forms everywhere (Goal 1),*
2. *End hunger, achieve food security and improved nutrition and promote sustainable agriculture (Goal 2),*
3. *Ensure healthy lives and promote well-being for all at all ages (Goal 3),*
4. *Ensure availability and sustainable management of water and sanitation for all (Goal 6),*
5. *Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all (Goal 8),*
6. *Take urgent action to combat climate change and its impacts (Goal 13), and*
7. *Strengthen the means of implementation and revitalize the global partnership for sustainable development (Goal 17).*

15. *Post 2015 Sustainable Development Agenda stresses the importance of access by all countries to environmentally sound technologies, new knowledge, know-how and expertise and stresses the importance of co-operative action on technology innovation, research and development.*

16. *It is well recognized that there is a need to facilitate informed policy-making and decisions on sustainable development issues. In this regard, there is need to strengthen the science-policy interface. Particular emphasis is being given to the need for: (i) technology transfer to developing countries; (ii) sound governance practices; and (iii) enhanced capacity-building for sustainable development. This recognition has given rise to the call for the strengthening of institutional, technical and scientific cooperation, including North-South, South-South and triangular cooperation.*

2.2 Water, Energy and Food Interlinkages

17. *Freshwater is essential in the production of food and generation of energy. It also plays vital roles in achieving progress in all aspects of development. Demands for freshwater, food and energy will continue to increase over the coming decades to meet the needs of growing populations and economies, changing lifestyles and evolving consumption patterns. These trends will greatly amplify existing pressures on limited natural resources and on ecosystems and the services they provide. The resulting challenges will be most acute in countries undergoing accelerated transformation and rapid economic growth, or those in which a large segment of the population currently lacks access to modern services.*

18. *Major regional and global crises – of climate, poverty, hunger, health and finance – that threaten the livelihood of many, are interconnected through water and energy. These crisis have substantial impact for the three billion people living on less than US\$2.50 per day. As a result, worldwide, an estimated 768 million people remain without access to an improved source of water, 2.5 billion remain without access to improved sanitation, more than 1.3 billion people still lack access to electricity and more than 800 million people suffer from hunger and malnutrition (3). These headline figures hide the fact that it is often the same people that face multiple challenges due to lack of access to water. For example, there is evidence of a close association between diarrhoea and related waterborne diseases caused by a lack of safe drinking water and sanitation and that malnutrition and hunger increases their vulnerability.*

19. *Water is a renewable but finite resource. It is an essential ingredient in food production. However, global water demand (in terms of water withdrawals) is projected to increase by some 55% by 2050, mainly because of growing demands from manufacturing (400%), thermal electricity generation (140%) and domestic use (130%) (4). Current climate change projections show that critical changes in the temporal and spatial distribution of water resources, and the frequency and intensity of water-related disasters, rise significantly with rise in global temperatures. The temporal variability of precipitation, that forms the source of fresh water, makes any economic activity dependent on availability of freshwater more fragile and risky. As a result, freshwater availability will be increasingly strained. More than 40% of the global population is projected to be living in areas of severe water stress by 2050. With agriculture being the largest user of freshwater, it is recognized that an inability to use water wisely in agriculture will endanger water security. At the same time deterioration of wetlands worldwide is reducing the capacity of ecosystems to purify water. Adoption of adaptive management strategies in agriculture would help respond effectively to these changing and uncertain conditions.*

20. *Global energy demand is expected to grow by more than one-third by 2035. Electricity demand is expected to grow by approximately 70% by 2035 (4). Energy production is generally water-intensive. Meeting ever-growing demands for energy will place increasing stress on freshwater resources. Since food production and delivery of water services also require energy, there is room to create synergies.*

21. *At the same time, more than half of the area of irrigated agriculture is dependent on groundwater which requires energy for pumping. Groundwater irrigation, with energy as an essential ingredient, has many advantages for farmers. These include availability of water on demand; the absence of institutional constraints and systems; and minimal variability of supply. Groundwater has contributed substantially to total irrigated agriculture, including: about 39 million ha (63 % of irrigated area) in India, 19 million ha (32 %) in China, and 17 million ha (68 %) in the USA. However, there is clear evidence that groundwater availability is diminishing, with an estimated 20% of the world's aquifers being over-exploited, some critically so. With the lowering of the groundwater tables the irrigation systems dependent on groundwater are consuming more energy. In a number of countries energy pricing policies are considered to be a major cause of this situation. Irrigation is a primary consumer of energy on farms and, despite the water saving*

benefits due to the increased efficiency of pressurised irrigation systems, conversion from surface irrigation to pressurised systems will change the pattern of on-farm energy consumption.

22. Further, increasing energy demand presents increased stress on agriculture production for bio-energy, and in turn on the land and water resources, as countries commit themselves to reduce their carbon footprints under Climate Change regimes. The food-water-energy *nexus approach*¹ recognizes these interconnectedness and the potential consequences of one sector on another (5).

2.3 Agriculture water management

23. The challenge is clear. In order to feed 9 billion people in 2050, under current market, institutional and economic features, the world must produce 40 per cent more food by 2050 and 100% more in developing countries (6). These challenges must be met with limited land and water, using less energy, fertilizer and pesticide while coping with rapid changes in many spheres. Increasing food production through sustainable use of water will, among others, require large investments in infrastructures, research and development, that are compatible with the preservation of ecosystems and are resilient to climate change. Globally, the current growth rates of agricultural water withdrawals are unsustainable. Therefore, the sector must increase its water use efficiency by reducing non-beneficial water losses and, most importantly, increase crop productivity with respect to water. Agricultural water pollution, which can worsen with increased intensification of agriculture, will need to be managed well.

24. Climate change is expected to result in increased frequency of droughts due to decreasing trends in precipitation in some areas, while others will see an increasing incidence of floods and other extreme events due to increasing trends in precipitation intensity and variability (1). This increasing variability of climate exacerbates risk and unpredictability for farmers, especially those who depend on the rain-fed agriculture and are the most vulnerable and the least able to adapt. *Large fertile lands get flooded resulting in destruction of standing crops, although productivity of such flooded lands often improves.* In order to make agriculture sector sustainable as well as profitable, it is imperative to increase the climate resilience of agriculture *through soft measures such as floods and drought warnings judiciously supplemented by structural measures*, including increasing the irrigated area without increasing water withdrawals. The conceptual and practical framework of climate-smart agriculture (7) recognizes the need for adaptation and innovation in irrigated agriculture.

25. With water being the critical resource the area of irrigated agriculture has doubled, to 300 million ha, since 1960 and has played a major role in growth of agricultural production and building resilience against food insecurity and climate change. However, these advances have eluded large parts of Africa. Irrigation, supported by drainage, is expected to play a stronger role in future. With the potential for further expansion expected to be limited to an increase of only 20 million ha by 2050 (4) greater emphasis must be given to modernization of the existing irrigation infrastructure and improved services including optimal utilization of every drop of water made available at the farm level minimizing environmental and social negative impacts of irrigation systems, and maximizing positive amenities, goods and services to societies. *Salinization of soil due to irrigation, accentuated by waterlogging caused by excess irrigation has effected large areas and affecting land productivity is a major environmental concern.*

26. The challenges at the interface of water and sustainable development vary from one region to another. Increasing resource use efficiency, reducing waste and pollution, influencing consumption patterns and choosing appropriate technologies are the main challenges facing **Europe and North America**. Maintenance of old drainage systems in the reclaimed agriculture

¹ The Nexus approach considers the different dimensions of water, energy and food equally and recognizes the interdependencies of different resource uses to develop sustainably (5A)

lands are also presenting new challenges in some of the countries. Although the region does not suffer from large precipitation variability, incidents of droughts are on the increase. Reconciling different water uses at the basin level and improving policy coherence nationally and across borders will be priorities for many years to come. Monitoring of the climate events, particularly the extremes and adoption of high-tech precision agriculture systems are some of the issues that are required to be addressed.

27. Sustainability of irrigation and drainage services in the **Asia and the Pacific** region to support high density of population is essential to meet the basic need for access to food and safe water. The climate in Asia and the Pacific region is varied. *Large parts of the region in west and south Asia experiences arid and semi-arid climate while parts of east and south-east Asia and the Pacific islands experience tropical humid climate. Despite the fact that the region is home to the Himalayas, known as the water tower of Asia, its water resources are largely dependent on the monsoon. The region is subjected to frequent climate extremes, droughts and flood events. In many parts of the region, seasonal water scarcity is increasing and monsoon shows changing patterns. The region has seen development of large irrigation infrastructure in the last fifty years which has helped create food security and fuelled growth. However the farm sizes in the region are small and the majority of farmers engage in subsistence farming. Water managers in the region are facing the challenge of providing water and sanitation for the burgeoning population; meeting water demands across multiple uses; mitigating increasing pollution loads; poor irrigation services provided through aging irrigation and drainage infrastructure; and depleting groundwater resources. Many countries in the region are faced with an aging population of irrigation farmers; the young being more attracted by urban lifestyle and industrial or commercial work opportunities. The priorities for the region lie in improving overall water governance, including groundwater management; pollution control; modernization of existing irrigation systems; improving livelihoods and attractiveness in irrigation farming; improving efficiency in water use and increasing resilience to water-related disasters*

28. Water scarcity is at the forefront of consideration of water-related challenges impeding sustainable development in the **Arab** regions. The region is characterized by unsustainable consumption and over-abstraction of surface and groundwater resources. Water and soil salinization is a chief concern, which must be addressed through innovative and adapted water abstraction and use practices. Options being adopted to enhance water supplies include water harvesting, wastewater reuse and solar energy desalination which need to be combined with micro-irrigation technologies to make efficient use of costly water and make agriculture economically viable.

29. A major priority for the **Latin America and the Caribbean** region is to build the formal institutional capacity to manage water resources and bring sustainable integration of water resources management and use into socio-economic development and poverty reduction. Further priority is required to ensure the full realization of the human right to water and sanitation in the context of the post-2015 development agenda. Possible solutions lie in making agriculture systems resilient against droughts and modernising large irrigation systems where they exist.

30. In **Africa**, which missed the benefits of the first green revolution, the aim should be to make agriculture a sustainable and vibrant driver of national economies and create the right capacities to usher in the 2nd Green Revolution. Currently only 5% of the Africa's potential water resources are developed and average per capita storage is 200 m³ (compared to 6,000 m³ in North America). Only 5% of Africa's cultivated land is irrigated and less than 10% of hydropower potential is utilized for electricity generation. Smallholders with land holdings of less than 1 ha have no guaranteed access to water or to support services and training. In sub-Saharan Africa, the irrigation sector is largely based on, informally developed schemes, which are scattered over vast areas of land and around urban centres. There is need for both infrastructure as well as human capacity development. Modernization and improved governance in existing schemes are

also required in most countries. Especially, land and water institutions and access regulations need be reviewed, revised, strengthened, and/or clarified, depending on national context.

2.4 ICID and Agriculture Water Management

31. The **Mission** of the International Commission on Irrigation and Drainage (8) is to stimulate and promote the development of the arts, sciences and techniques of engineering, agriculture, economics, ecology and social science in managing water and land resources for irrigation, drainage, flood management and river training applications, including research and development and capacity building, adopting comprehensive approaches and up-to-date techniques for sustainable agriculture in the world.

32. This mission as outlined in ICID Constitution(8) is pursued by fulfilling the following objectives:

- (a) Planning, financing, socio-economic and environmental aspects of irrigation, drainage, and undertakings for the reclamation and improvement of lands as well as the design, construction and operation of appurtenant engineering works including dams, reservoirs, canals, drains and other related infrastructure for storage, conveyance, distribution, collection and disposal of water.
- (b) Planning, financing, socio-economic and environmental aspects of schemes for river training and behaviour, flood management and protection against sea water intrusion of agricultural lands as well as the design, construction and operation of appurtenant works, except such matters as relate to the design and construction of large dams, navigation works and basic hydrology;
- (c) Research and development, training and capacity building in areas related to basic and applied science, technology, management, design, operation and maintenance of irrigation, drainage, flood management, river training improvement and land reclamation works.
- (d) Facilitation of international inputs required by the developing countries, particularly the low income countries lagging in the development of irrigation and drainage;
- (e) Promotion of the development and systematic management of sustainable irrigation and drainage systems;
- (f) Pooling of international knowledge on topics related to irrigation, drainage and flood management and making this knowledge available worldwide;
- (g) Addressing international problems and challenges posed by irrigation, drainage and flood management works and promoting evolution of suitable remedial measures;
- (h) Promoting savings in use of water for agriculture;
- (i) Promoting equity including gender equity between users and beneficiaries of irrigation, drainage and flood management systems; and
- (j) Promotion, preservation and improvement of soil and water quality of irrigated lands.

33. ICID believes that food security at various levels: household, local, regional, national and global, requires assured and stable agriculture production. ICID is committed to enhance the world wide supply of food and fibre which can come mainly from irrigated agriculture. ICID is dedicated to enhancing the food production worldwide by improving the productivity of production factors in irrigated lands, i.e. water, labour, land, equipment, agrochemicals etc. through better water and land management. ICID believes that food production should be enhanced in ways that do not compromise the environment, now and for generations to come.

34. Irrigation water systems, at the local and national levels, are designed to fill the gap between supply and demand for water at various spatial and temporal scales. They ensure availability of water in rural areas for agriculture and other uses. These systems make agriculture more resilient to the vagaries of climate. The more assured production that results from irrigated agriculture encourages re-investment in the sector and generates surpluses.

35. *Irrigation is often a multifaceted endeavour that requires interaction among various sectors, institutions and users. Sustainable use and efficient management of irrigation systems requires understanding and cooperation among these multiple actors. ICID works towards creating a synergy between agricultural and water policies, improvement of publicly operated irrigation schemes, advocating for increased investment both from public and private sources for expansion of irrigated area, and the modernization of existing infrastructure. It supports knowledge sharing concerning all aspects of agriculture water management including collation of irrigation statistics; data and information exchange; sharing of successful management strategies, best practices and knowledge. It supports and encourages multiple-use and the promotion of amenities, good and services provided by irrigation systems.*

36. *The cooperation mechanisms used by ICID network range from simple exchange of information through its annual meetings where practitioners, researchers and planners from both developed and developing countries participate, to collating latest research and innovations through its Journal on Irrigation and Drainage, developing guidance material and their dissemination through various channels. ICID organizes triennial World Irrigation and Drainage Congresses, annual Regional Conferences, and international drainage workshop and micro irrigation conference to address and discuss issues of global or regional importance. ICID at its triennial Congress deliberates on certain specific questions relating to irrigation and drainage.*

37. *Irrigation systems and professionals play an increasingly crucial role in eradication of rural poverty by creating sustainable livelihoods for the majority of rural population, particularly in developing countries, and by supporting healthy living environments. Irrigation and drainage is an important contributor to sustainable rural development. It is therefore appropriate for ICID, to realign its vision and dedicate itself to a mission that supports **UN Sustainable Development Agenda 2030**.*

38. *The ICID vision for 2030 is of **“A water secure world free of poverty and hunger through sustainable rural development”**.*

3 STAKEHOLDERS AND USERS

For a network to be relevant and effective, it has to clearly recognize the constituency it intends to serve, their needs, strengths and weaknesses and at the same recognize the partners with whom it has to work with and develop synergy to achieve the desired objectives. This chapter briefly discusses all such stakeholders that influence agriculture water management, can be partners in achieving objectives and direct and indirect users of the services provided by ICID.

39 Irrigation water delivery is a service to users and its quality and reliability an essential input for stable production and the adoption of advanced farm practices. Expansion and modernisation of infrastructure and adoption of technological innovations have to be accompanied by informed policies, prudent financial management, appropriate institutional reorientation and transparent governance (6). ICID recognizes the close nexus of water-energy-food and that engaging the respective stakeholders and users from these sectors is a pre-requisite for understanding their needs when articulating a vision for agriculture water management.

40 A number of disparate stakeholders have an interest in the way agriculture water management (AWM) policies are formulated and implemented. They include the members of the ICID network, the users they serve, and the groups that provide variety of services to support AWM. Various development partners at the regional and international levels that have similar goals and objectives also influence the way AWM goals are set and achieved.

41 The main stakeholders of ICID may be categorised as: primary stakeholders – the national committees, irrigation and drainage professionals and farmers that constitute the core stakeholders; secondary stakeholders – policy makers and the industry who have the responsibility to facilitate and also influence the activities in agriculture water sector; and the tertiary or peripheral stakeholders - the society at large.

National Committees

42 National Committees are the core stakeholders of ICID. They represent various stakeholders, in their respective countries, engaged in different facets of agriculture water management. Ideally, they include experts from water resources, irrigation, agriculture, rural development, hydro-power, environment, and flood management sectors and theme of finance and economics. In the majority of countries the National Committees (NCs) are hosted within one of the related government departments dealing with the above subjects and include representatives from research institutions, universities, private sector companies, and in some cases farmers' groups.

43 The new vision is expected to boost the role of NCs in implementing the sustainable development agenda within their countries. Particularly with respect to meeting the goals of poverty alleviation, food security and sustainable water management and other related SDGs in the context of Climate Change. NCs need to be strengthened and supported to serve as the common platform for various AWM stakeholders. They would have to be supported through sharing of international experiences and best practices, knowledge and tool acquisition to enable them to fulfil their obligations towards the country. Particularly, they would have to be supported with tools that are the products of multi-disciplinary efforts and strengthening of their capacities to facilitate interdisciplinary collaboration. These tools would have to be adapted by the NCs to suite the given socio-economic situation and address the required inputs for formulating and implementing agriculture and water policy issues in the country. The NCs would be supported through institutional and individual capacity development and information sharing specific to their needs.

Irrigation and Drainage Professionals

44 As the only international network in irrigation and drainage sector professionals, ICID has the responsibility to satisfy the professional and intellectual needs of the members directly engaged in irrigation and drainage activities. The large public sector irrigation and drainage departments in Asian countries and also in Africa, often suffer from ill-maintained infrastructure along with demoralised irrigation and drainage cadres and outdated professional skills. The sector also suffers from the lack of penetration of latest science and technology tools due to variety of reasons. Also, in many countries, irrigation and drainage approaches are still confined to engineering and technical aspects, while existing and emerging challenges call for a more open, integrated, multidisciplinary approach. The sector as a result is lacking in new research and innovation ideas as well as resources. Given the complexity of development process, irrigation and drainage professionals need exposure to the economic, social, environmental and other disciplines that influence agricultural water management.

45 At the same time the sector is challenged by the lack of interest from the young professionals as they find the career in the sector uninteresting with little growth potential. This lack of interest in the sector among the young generation has resulted in the closure of irrigation and drainage departments in academic institutions around the world. There is need to make careers in irrigation and drainage sector interesting and challenging. Information has to reach them at their finger press, which they are used to in the era of social media.

Farmers

46 Farmers are the most important user of services that the network provides through its National Committees, and as such constitute important stakeholders. They range from a subsistence farmer typically holding 0.5 ha of land to a commercial farmer holding up to 100 of ha of farms with varying needs and requirements. Small-scale family farming remains the predominant form of farming worldwide (88% of all farms; 40% of global labour force; 80% in West Africa), and the reality is that such farming systems are currently feeding the world, and are likely to continue doing so, provided appropriate technological, policy and financial measures are taken.

47 Like any other enterprise, commercial farms are driven by financial results. The services provided by irrigation systems should reduce the financial risks and increase profitability for farmers. Driven by practices rooted in tradition, introduction of new tools and processes are likely to find resistance, if not adequately articulated and demonstrated. Introduction of new techniques, need to be governed by the perspective and interests of farmers. Larger societal and global sustainability discourse, therefore, has to pass through the prism of the economics of their enterprise.

48 Small-scale family farming are not only driven by profit, but also by food security concerns, the quality of living standards, the benefits of social capital (solidarity, trust, low transaction costs, collective action in irrigation management), the attractiveness of rural life style. They are the main suppliers of most of the world's food markets, and have many other virtues: knowledge of ecosystems, sustainable management practices, contribution to local food security and regional development, and capacity to provide local employment. They are also typically using water and irrigation infrastructure in multiple ways, for multiple purposes (sanitation, bathing, drinking and other agro-based activities). In irrigation systems, such traits are crucial and must be considered when promoting new sustainable technologies or practices. In addition to providing water for multiple uses medium to large irrigation systems also serve as the means of communication and thereby serve as vehicle for overall rural development.

Policy Makers

49 Policy makers, i.e., the political leadership, planners, and bureaucrats have the responsibility to ensure the provision of the basic necessities to its citizens within the framework of given natural, financial and human resources and institutional framework (legislation, organisations, and regulations). Despite the recognition of the close linkages between different development sectors the policy making often remains compartmentalized. Experts who understand the consequences of these linkages have the duty to create awareness among and convince policy makers of multi-disciplinary interlinkages so as to facilitate factoring of these interdependencies in the decision making process.

50 In order to support policy makers in taking right and most appropriate decisions it is essential that the professionals are able to develop and present different development scenarios, explaining the socio-economic impacts of alternate choices. At the same time the practitioners need to translate the results of such studies from the technical terminology to the language of development and human impacts which is easily understood by non-technical professionals as well as common man. As such the ICID Vision 2030 has to respond to the requirements of policy makers at the national, regional and international level which constitute an important target audience for the outputs of the ICID network.

Irrigation and drainage industry

51 The irrigation industry includes public sector agencies, private consultancy companies, individual consultants, contractors, manufacturers, and service providers. The industry in today's global marketplace plays an important role in the transfer of technology. They have to be sensitized to look beyond the short term goals of project implementation while recommending technologies, particularly when working in the developing countries. While selecting and implementing new technologies the solutions adopted need to be sustainable and will, in general, need to include capacity development component.

52 The rural development workers have to cater to a plethora of complex rural development issues that relate to different disciplines. These complexities have to be brought to the knowledge of common stakeholders in their own language. As these development workers act as true interlocutors and facilitators at the ground level it would be appropriate to target them for delivering the message effectively. Institutions engaged in agriculture as well as water related research have the onus of targeting the needs of small holders and subsistence farmers.

Research and the academia

53 Multidisciplinary research has a special role to play in understanding the complexity of issues in the agricultural water management sector. In all countries, ICID at large, and country committee members specifically must play a linking role in promoting back and forth communication between practitioners and farmers on one hand, and researchers on the other hand. Indeed, orienting national and international research efforts towards addressing immediate burning issues, understanding on-going transition processes, and solving problems must be a priority. Similarly, readily available research results and state-of-the-art diagnoses, methodologies and solutions must be made known and available to practitioners and policy-makers. ICID is committed to promote, foster and support such two-way communication.

Society at large

54 Being the ultimate consumer of agriculture produce, and as a competing water consumer in various forms, society at large is impacted by the way the network serves farmers to produce more nutritious food and fibre with minimum water and without adversely impacting the environment. Under the growing water scarcity, in many parts of the world, water saving in

agriculture sector, which withdraws 70-80 percent of water, could go a long way in meeting the growing demands in other sectors. Other stakeholders in development process such as professionals and policy makers in energy, urban development, and environmental management sectors that influence consumption patterns and the quality of water that is made available for the AWM have also to be included as ICID secondary stakeholders. ICID recognizes the growing awareness of society at large on environmental and social issues related to production worldwide, and the capacity of consumers for discerning products resulting from sustainable production practices, should proper labelling or information exist. Although a challenging task with multiple stakeholders, the promotion of sustainably-produced (in social, economic and environmental terms), cheap, accessible, healthy and nutritious goods needs to be considered. ICID commits to play its role in information sharing towards larger audiences, and the general public, whenever and wherever possible.

4. THE VISION

55 *The new challenges that the world faces today and will face in the coming years call for a renewed vision for ICID. In order to fulfil ICID's obligations towards its stakeholders and users of its outputs, described in its current mission, there is need to review the ICID vision and its mission. The current review aims to identify a set of goals that would help ICID network to fulfil its mandate. The new proposed vision, mission, the core values and the goals are described in this section.*

4.1 Vision

56 *Vision of ICID is proposed as a:*

“Water secure world free of poverty and hunger through sustainable rural development.”

57 *We believe that through prudent agriculture water management agriculture production can be made more resilient resulting in reducing the incidence of hunger, ensuring food security, improving rural livelihoods and maintaining ecosystem services. Irrigation and drainage infrastructure, while ensuring availability of water for agriculture, also serve multiple roles such as ensuring the provision of safe drinking water and sanitation thereby improving the health and productivity of the rural population. At the same time irrigation infrastructures also serve as means of communication and help farmers' in easy access to markets for inputs and selling agriculture produce. As such irrigation and drainage infrastructure serves the overall rural development directly contributing to five of the seventeen SDGs and indirectly influencing another seven SDGs (1, 2, 3, 6, 8, 13 and 17).*

4.2 Mission

58 *The proposed mission of ICID is to:*

“Facilitate prudent agriculture water management by encouraging interdisciplinary approaches to irrigation and drainage management.”

59 *The vision of ICID will be achieved by generating new knowledge, compiling and collating information, sharing experiences and good practices and disseminating the new knowledge to the relevant stakeholders. Prudent AWM is not confined to the efficient use of water in agriculture, but is concerned with making optimal use of water diverted for agriculture for the overall benefit of the rural community and preserving the quality of return flows to receiving water bodies.*

4.3 Core Values

60 *The core values of ICID are defined by the:*

- *non-profit objectives of the network;*
- *voluntary contribution of time and monetary resources by its members and experts;*
and
- *sharing of knowledge and experiences among stakeholders.*

61 *These Core values are underscored by the empathy of the networks members towards those suffering hunger and poverty.*

4.4 Goals

62 *In order to realize the vision ICID will set clear organisational goals for the network. **The organisational goals of the international network will enable the national committees to re-confirm or re-orient their national goals or will help establish specific goals at the national level, addressing the specific national needs.** ICID Central Office will continue to play a pivotal role in coordination and management of the network and will facilitate the network in realisation of organizational as well as national level goals. The organizational level goals would be*

1. *Enable more crop per drop*

2. *Be a catalyst for change in policies and practices*
3. *Facilitate technology exchange*
4. *Enable cross disciplinary dialogue*
5. *Support development of tools to convert research and innovation into field implementation*
6. *Facilitate capacity development*

Goal 1: *Enable more crop per drop*

63 *It is well recognized that agriculture is the sector where the potential for water productivity gains is highest. All sources of water (rain, surface water, groundwater and wastewater) are important to achieve food security. As regional water-supply pressures intensify, agriculture will rely increasingly on improved water management to sustain productivity and increase the economic value of irrigation water. Efficient irrigation systems and water management practices can help maintain farm profitability. Efficient water management also reduces the impact of irrigated production on offsite water quantity and quality.*

64 *The technical solutions to enable production of 'more crop per drop' exist². Measures to increase water-use efficiency may not be compatible with environmental goals such as maintaining minimum environmental flows. Meanwhile, opportunities for improved water management have expanded with advances in irrigation equipment and practices, lower technology costs, and expanded information resources. Reduction in consumptive use of water in agriculture has to be prioritized to respond to the needs in other sectors. Resource conserving technologies have demonstrated potential to increase productivity of land, labour, capital and inputs.*

65 *Additional investments are needed to increase irrigation efficiency at the field, farm and irrigation-area scales to fill the supply and demand gap and enable adaptation to increasing climate variability and change. But investments and political will are often lacking to improve rain fed production and modernize irrigation systems.*

66 *ICID network would advocate with the national governments and funding agencies to make strategic choices that favour production of more crop per drop contributing to sustainable agricultural water management.*

Goal 2: *Be a catalyst for a change in policies and practices*

67 *Water policy is inherently difficult as it involves trade-offs between the benefits and costs of: alternative uses, different sectors, equitable distribution of resources and required institutional arrangements. Governing policies need regular revision in view of changing demand patterns and technological advances, and as social experience with water management arrangements progresses. Developing policies for managing water systems for human needs in such a complex environment is difficult, slow and very costly. At the same time the correct policy, institutions and market incentives are essential to increase water-use productivity in agriculture. For example, water policy instruments such as energy pricing, water entitlements and transfer provisions, and eco-conservation programs provide incentives for improved management of water supplies at the farm level.*

68 *It must be acknowledged that the benefits of changes in water-resource management are difficult to measure because of the common property nature of water resources. These are*

² Some of the areas which need to be considered in this direction are adoption of improved agronomical, agricultural and water management practices; institutional and organisational reforms; participatory approach- PIM, IMT **for equitable and efficient distribution of water**; use of modern irrigation techniques and technology etc.

particularly important in the case of competing inter-sectoral demands, or in large river basins that cross jurisdictions.

69 *Decision-makers need planning tools to secure water allocation and distribution among various uses, users and regions. It is important that the policy makers are provided the appropriate tools that are developed on sound scientific principles which are also suitable for the given socio-economic conditions. They need the right tools to evaluate various alternative AWM strategies.*

70 *Models can now establish multiple policy scenarios with alternative assumptions about future developments based on a variety of economic, demographic, hydrological, and technological trends. This enables a broad range of "what if" questions to be carried out using modelling approaches and procedures. Mathematical models for simulation and optimization are proven examples of such tools. The outputs from such studies can be used for negotiations and as the basis for agreements among administrations and sectors for access to water resources.*

71 *The network would provide guidance to water policy analysts on experiences with the latest tools and modelling principals for simulating development scenarios to generate knowledge which can serve as catalyst for policy changes.*

Goal 3: Facilitate technology exchange

72 *Current irrigation systems and services are generally characterised by low water use efficiencies. Irrigated agriculture is under considerable pressure to adopt practices and methods to increase efficiency of water use. New irrigation technologies that are becoming popular result in either increased productivity or increased water availability for alternative uses (e.g. environmental flows to maintain ecosystem services) or both. Pressurized irrigation technologies are slowly penetrating the North-South technology divide. They have helped to increase water use efficiencies and yields and reducing labour requirements in irrigation.*

73 *Despite the fact that irrigation has served as one of the pillars of the technology oriented Green Revolution during the 70-90s, irrigated agriculture is one area where the latest developments in science and technology have not penetrated adequately, particularly in developing countries. Use of remote sensing and precision application of water and fertilizers, supervisory control and data acquisition (SCADA) system application, extended weather predictions for assessing seasonal water availability, drought monitoring and predictions and their use in water releases from reservoirs for optimum utilization have failed to find widespread application in developing countries although these are in use in more advanced economies for some time now.*

74 *One reason for the lack of technology uptake lies in the fact that most of farmland holdings especially in Asia and Africa are very small and the farmers neither have the economic incentives or capacity and motivation to use these technologies. In some situations these technologies are not available due to lack of institutional or financial capacity. Some of these new irrigation technologies will change the patterns of on-farm energy consumption and may potentially increase greenhouse gas emissions with environmental consequences. A life cycle assessment approach to the positive and negative impacts of a given approach needs to be undertaken. The initial capital costs limits the rate of adoption of new technologies, while operating costs can mean that the overall financial position of farmers is compromised.*

75 *ICID would work towards exchange of new technologies for sustainable AWM, facilitate analysis of trade-offs to maintain the economic efficiency of agricultural production and minimising the adverse environmental impacts.*

Goal 4: Enable cross disciplinary dialogue

76 Global climate change is no longer a 'what if' exercise and no investment can ignore information regarding the predicted dimensions of climate change risks and their potential societal impacts. At the same time the economic evaluation of various options for achieving sustainable agriculture water management strongly depends on how the saved water will be used. Will the water be used to: (i) increase the crop area, (ii) increase the intensity of growing high value cash crops, (iii) trade the saved water temporarily or permanently through a water market, (iv) or sold to other users. These evaluations and final decision require assessment of industry-wide trade-offs between water savings, energy consumption and economic returns associated with irrigation technology transformation.

77 At the same time, concerns regarding equity in development, demands for greater rural producer empowerment, developments in biotechnology and biosafety, the growing importance of agro-food chains, and the changes in information and communication technologies combine to make the decision making more complex and involved.

78 For sustainable development analysis of a number of options is required from various perspectives that calls for contribution of experts from different disciplines speaking different technical languages with their own terminology. Ultimately the decision making process has to be based on science based information and knowledge from different disciplines and a dialogue between various interest groups – users and uses. To be able to appreciate each-others' viewpoint, they have to be familiar with the simplified terminologies. At the same time the final decision on the trade-offs has to be taken by politicians, planners, bureaucrats and stakeholders: not only by the farmers but the society at large.

79 **ICID network would make available the required information in respect of irrigation, drainage and flood management to all the relevant stakeholders in the language suitable for their appreciation. Where required, platform for inter-disciplinary networking would be facilitated for dialogues between various groups.**

Goal 5: Support development of tools to extend research and innovation into field implementation

80 Success of application of research and innovations in agricultural and rural development depends on individual actions of millions of rural families, whose decisions are shaped by the information, knowledge and technologies available to them. An important question to ask is how do farmers get information? Surveys indicate that a key general source of information for farmers is other farmers. However for more complicated technical matters farmers have a preference for first hand, or specialised sources of information such as extension experts or farmer call centres. Agricultural and rural extension services have to support farmers through policy advice, technical support, information on projects/programmes, studies and workshops. Among the different methods of extension that have been tested, the farmers' field school model has been accepted as a good methodology due to its participatory features.

81 In many countries either extension services have been weakened, and often no longer exist or face many challenges. Several analyses and assessments have revealed serious limitations in planning and financial management of agricultural research including in the organization and management of the research institutions and in technology transfer strategies. There is wide dissatisfaction among stakeholders especially farmers with the public systems which is perceived to be too outdated to respond to contemporary changes like globalization, decentralization and revolutions in information technology. Similarly, extension systems are often under-resourced and use outdated service provision approaches and extension methods. Success is hampered by inappropriate material, declining budgets for field activities, and inadequately skilled and poorly

motivated staff. It is important that skill development of extension services workers is given a top priority if the gains of research and innovations are to reach field application.

82 ICID network would provide technical support on the latest innovations available in the agriculture water domain to the many non-governmental entities that are engaged in providing various kinds of services in the rural areas and are increasingly occupying the vacant space to provide excellent opportunities for covering the last mile and help in the outreach into rural communities.

Goal 6: Facilitate capacity development

83 *The second green revolution will likely be centered on the farmers in Africa including introduction of high yield variety seeds, expansion of irrigation systems and services, and improved access to markets. A widespread lack of capacity is identified as a common binding constraint to the development of productive and viable irrigated systems. Africa will need to create a large contingent of agricultural scientists, irrigation engineers, and extension service workers to support this effort. Capacity development must be linked to the overall goal of the sector and serve the purpose of the ultimate beneficiaries – the irrigated-agriculture community. There is need for systematic capacity development of institutions and individual in terms of developing enabling environment, and supporting policy formulation.*

84 *Finding solutions for smallholder farmers means finding solutions that engage one-third of humanity in addressing food security, climate, biodiversity conservation and rural employment challenges. These smallholder farmers in Africa and parts of Asia need training, better seeds, improved tools and access to markets and financial resources. Responding to these needs will have a measurable output in the form of increased yields.*

85 *Given the rapidly changing development scenario, climatic scenario and the exponential growth in technology, coping with these fast changes is a tough proposition. The in-service professionals have to be kept updated with the rapid technological developments. There is need for greater sharing of experiences and tools particularly related to agricultural, social, economic and environmental aspects. Since irrigation and drainage are not being favoured as academic topics in many educational organizations due to lack of interest from young generation so there is need to promote agricultural water management, irrigation and drainage, flood control, and integrated water resource management in general, as topics of interest and prospect in all academic institution. Efforts shall be to cover all dimensions of AWM, including engineering, agriculture, economic, social and environmental sciences. Indeed, a generational gap in trained experts in those disciplines would lead to major issues in managing water resources in close future, as well as in solving many current challenges. ICID will need to take this challenge of training and fostering young professionals and promoting irrigation and drainage, AWM and IWRM as relevant academic topics. Also, capacity building, academic curricula, and continuous training of professionals are essential elements of current and future sound agricultural water management.*

86 ICID would work towards training and fostering young professionals, continuous training of professionals, promoting irrigation and drainage as relevant academic topics in education and training within the context of IWRM, and will try and foster closer connections with various stakeholders including farmers through national committees.

5. REALISING THE VISION

87 *Key to realising the vision in any network organization lies in conveying the vision among all the network members, identifying the user and stakeholders' needs, identifying various tools and means to achieve the network's goals. The challenge of implementing Vision 2030 is to communicate the Vision among all the stakeholders. This will be done starting from the IEC meeting in 2015 and presentations of Vision 2030 will be scheduled at all work body meetings.*

88 *Implementing Vision 2030 will depend on voluntary contribution from the experts and member countries. ICID will make volunteerism attractive by offering incentives and awards for assistance to the implementation of Vision 2030.*

89 *In order to realize the vision the network needs to have a transparent structure of the organisation. The second challenge is therefore to stimulate the work bodies to align their mandates with the goals of Vision 2030. Once the vision and mission is adopted, the present structure and organisation will have to be re-visited. **An Action Plan should be developed and at the IEC 2016 ways and means for implementing Vision 2030 would be presented. This action plan should have specific indices so that the performance could be evaluated in a defined period.***

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