

**AGENDA FOR THE 3RD MEETING OF THE
WORKING GROUP ON CAPACITY DEVELOPMENT, TRAINING AND EDUCATION (WG-CDTE)**

15 August 2018, 09.00-10.30 hours (Session I)
15 August 2018, 11.00-12.30 hours (Session II)
Saskatoon, Saskatchewan, Canada

Strategy Theme: Knowledge

Presented by the Chairman

Year of Establishment: 2015

Completion of the Mandate: 2021

Mandate: (i) Coordinate and guide the knowledge management activities of the Commission and the capacity development activities by various WGs; (ii) Compile the status of training and educational programmes offered in different regions; (iii) Compile the Educational Programs being offered in irrigation and drainage in different regions; (iv) Identify the training and education requirements, and identify gaps in available training programs, explore the feasibility of developing e-learning program and prepare guidelines for their development to support education and training programmes; (v) Explore the scope of use of IT in capacity development including distant learning, and implement where feasible; (vi) Make available various tools required for sustainable development; (vii) Oversee the establishment and functioning of a Technical Support Unit for supporting NCs; and (viii) Facilitate the process of balancing education and training requirements, and provision of training services.

Website: http://www.icid.org/wg_cdte.html

WG-CDTE Agenda Item 1: Action Taken Report by Chair¹

1. The Chair will present report on the actions taken on the decisions and proposals of the working group from its last meeting held at Mexico City in October 2017.
2. ICID CO vide e-mail dated 8 December 2017 to all Chairs/ Vice Chairs/ Secretaries suggested workbodies to make full use of web-ex platform for virtual meeting so as to ensure regular contribution from the WG members as well as discuss and initiate follow-up actions emerging from the minutes of the previous WG meeting and review the progress of the action points. In this connection PCTA in its meeting in Mexico in October 2017 accepted the recommendation of the Sub-committee to investigate the structure, scheduling of meetings and membership of working groups (SC-SSMWG) that WG Chairs make the WG meetings technically more attractive by taking preparatory steps through virtual meetings of the WGs before preparing the agenda for the meetings. No virtual meeting of the WG could be organised since last meeting of the WG in Mexico in October 2017.
3. Egyptian National Committee on Irrigation and Drainage (ENCID) and Japanese National Committee on Irrigation and Drainage (JNC-ICID) have nominated VPH Dr. Mohamed Wahba (Egypt) and Dr. Shinji Fukuda (Japan) for the membership of WG. Chairman in consultation with Vice Chair, Secretary of the WG and the Central Office have updated the membership of the WG as given at **Annex 1** (*refer electronic version for latest list*). New nominations, if any, for the membership received will be processed suitably after the meeting. The Chair may provide further updates at the meeting.

WG-CDTE Agenda Item 2: Road Map to ICID Vision 2030 – Status of Activities on capacity development, training and education

4. At Mexico meeting, the WG reviewed the Action Plan 2030 for Working Group on Capacity Development, Training and Education (WG-CDTE) keeping in view the revised mandate and availability of resources for achieving various activities (refer **Annex 2**). During Mexico meeting in 2017, a need was felt for collecting and compiling information and generating list of training institutes and their capacities to offer training in specific areas. WG also noted that there is need to enhance membership of the WG in order to take up new programme such as creation of database of training institutes and experts and training needs assessment and so on. In order to increase the number of members in the working Group, the ICID CO has requested the NCs to nominate their experts/professionals for the membership in the WG for supporting the capacity development activities. In February, 2018, ICID CO requested the WG Chair Prof. Abdelhafid Debbarh to share the updated action points of Road Map to ICID Vision 2030 of the WG with the members of the group through email or virtual meeting. WG Chair may apprise the members of the latest updates at the meeting.

¹ This will also include details of membership of WG as **Annex**

5. At the 68th International Executive Council (IEC) encouraged WGs to monitor the progress of 'Activities identified under Various Strategies for Action Plan 2017-21' appended to 'A Road Map to ICID Vision 2030' and report to their respective Permanent Committees. ICID CO has followed-up with the members and requested them to take actions to achieve milestones decided by the WG. WG was also requested to consult with other working groups so as to avoid duplication of the activities and getting their support to achieve intended outcome/ outputs of the WG. The members may like to discuss the Action Plan during the meeting for any update in the Annex 2 as per the latest developments.

6. As per decision of 68th IEC, the Central Office requested the Chairs of the Work bodies in January 2018 to monitor the progress of achieving milestones as indicated in the Action Plan and report status to the concerned Permanent Committee to enable the Theme Leaders to take stock of the progress of the Work body in achieving the Action Plan in their synthesis report. Chair will provide further updates at the meeting and WG members will deliberate on evolving monitoring mechanism of achieving milestones in the action plan.

WG-CDTE Agenda Item 3: Promoting capacity development, training and education

WG-CDTE Agenda Item 3.1: Updates on activities of Technical Support Unit (TSU)

7. During the 66th meeting held on 12 October 2015 at Montpellier (France) the International Executive Council (IEC) approved the establishment of a Technical Support Unit (TSU)² at the ICID Central Office with the overall objective to "undertake capacity development activities in the field of agricultural water management (AWM) in support of rural development" for the national stakeholders.

8. In accordance with Resolution IEC-2/68, NCs were requested to (i) take full advantage of the establishment of the Technical Support Programme (TSP), and (ii) to contribute towards the Fund created for undertaking activities of TSP. National Committees were also requested to volunteer and nominate expert/ professional both for long-term (initially 6 months) as well as short-term (upto 10 days at a time) to support the activities of TSP. Korean National Committee of ICID (KCID) has indicated interest and full support in the activities of the technical support program and supported TSP activities through services of a long-term expert in the ICID Central Office. WG appreciated the KCID for support to TSP.

9. ICID's 68th IEC meeting held on 14 October 2017 at Mexico City, Mexico, approved (*Resolution IEC-2/68*), a comprehensive Technical Support Programme (TSP) to be implemented by the TSU, giving details of the aims and scope, consultation of Core Group, mechanism to implementation TSP along with Terms of Reference (ToR) for Engaging Experts for TSU, which was shared with the NCs in January 2018. In response, Iranian National Committee of ICID (IRNCID) submitted request (proposal) for support under TSP for capacity development program i.e. Workshop on 'National Water Accounting' through IRPID in December 2018. This proposal from IRNCID will be considered by the Core Group³. WG may like to discuss nomination of short term and long term experts to implement TSP through TSU.

WG-CDTE Agenda Item 3.2: Training Programme for YPs, 2-4 May 2018 at Kathmandu, Nepal

10. The 8th Asian Regional Conference (ARC) on the theme "Irrigation in Support of an Evergreen Revolution" was organized from 2-4 May 2018 in Kathmandu, Nepal. The Nepal National Committee of ICID (NENCID) hosted the event in collaboration with Department of Irrigation (DoI), the Government of Nepal and other international and national partners. Just preceding conference, one day training programme for YPs was also organized by NENCID on 1 May 2018 with the aim of (i) capacitating the young engineers in the area of irrigation and drainage sector and motivate them to work for the national development; (ii) sharing innovative ideas of irrigation and drainage and recent technology from different parts of the world (learning from resource persons, sharing of ideas among the participants and providing opportunity for networking with the international delegates); and (iii) providing young engineers an opportunity to participate in the Conference. The opening session of the training was graced by Er. Saroj Pandit, Director General, DoI (President NENCID) Ms. Karlene Maywald, Chair National Water Commission Australia, Secretary General Pandya, VPH Dr. Ding Kunlun, VP Madhav Belbase and Arnaud Cauchois, Principal Water Resources Specialist, ADB.

11. The training programme covered two key areas: (i) Water Footprint and Virtual Water Approach as a tool for improved Water Use Efficiency, in addition to the Micro Irrigation for improved land and water productivity, and (ii) Basin planning, its implementation, and introduction on the basin planning tool: Basin Futures. Technical Session on "Water Footprint and Virtual Water Approach as a tool for improved Water Use Efficiency" was conducted by VP Dr. K. Yella Reddy, Director, WALAMTARI, Hyderabad, India.

² TSU was established vide notification no.1 of 2016 dated 04 January 2016.

³ Core Group is headed by the President, ICID and Chair PCTA, PCSO, AFRWG, ASRWG, WG-CDTE as Members and Secretary General, ICID as Convener which was set up as per ICID notification no. 1/2016 to finalise and prioritize work programme, review and monitor programme, administrative and financial decisions in respect of TSU activities etc.

WG-CDTE Agenda Item 3.3: Training Programme for YPs, 9-13 April 2018 at Beijing, China

12. ICID in association with the Chinese National Committee on Irrigation and Drainage (CNCID) and support from the Korean National Committee on Irrigation and Drainage (KCID) organized five-day Young Professional training program to hone the skills of the budding young professionals on the theme “*Performance Assessment of Irrigation Systems*” from 9-13 April 2018 at China Hall of Science and Technology in Beijing, China. The training program mainly focused on the physical, institutional, organizational and participatory management aspects of the irrigation systems and was attended by 19 participants from 14 countries viz., Australia, DPRK, India, Indonesia, Iran, Iraq, Korea, Myanmar, Nepal, Pakistan, Sri Lanka, Tajikistan, Thailand and Uzbekistan.

13. During the inaugural Session Er. A.B. Pandya, Secretary General of ICID gave a brief introduction about ICID and its endeavour to promote capacity development program to attract young minds to AWM sector by organizing training programs for YPs, regionally. The program covered topics such as need for and framework of performance assessment of irrigation and drainage systems; modernization approach and overview; techniques and tools for performance assessment; Rapid appraisal procedure, MASSCOTE and MASSMUS approach; strategies of rehabilitation and modernisation of irrigation systems including structural, non-structural and management interventions in modernization of irrigation systems; and measurement devices, canal lining, and water management practices.

14. On 13 April 2018, a joint field visit of trainees and workshop participants was organized to Dayu Group of Companies to see their plant manufacturing drip and sprinkler irrigation equipment and later to physical modelling and experimental station of Institute of Water and Hydropower Research (IWHR), China. YPs got an opportunity to broaden their understanding on various topics by international speakers, who shared their experiences on the subject such as the need for a framework, performance indicators, techniques and tools for performance assessment, modernization, and management of irrigation systems. Mr. Amit Parashar, Principal Research Consultant, CSIRO Land and Water gave a presentation to the participants on ‘Basin Futures: Supporting water planning in data sparse basins-Australia.’ In their feedback, participants from various countries appreciated the exposure they received during the training as it armed them with the latest techniques and gave them the insight and skills to further improvise. All presentations related to YP training programme and workshop are available at <http://www.icid.org/cdtraining.html>.

15. In addition, CNCID organised a two-day workshop entitled “Innovations of Irrigation Technology” from 14-15 April 2018 where YPs also participated and shared experiences from their countries. President Hon. Dr. Gao Zhanyi (China) in his opening remarks gave an introduction to the participants about the role of innovation of irrigation as water conservation is a growing concern throughout the world and that new developments in technology are helping to make this process much easier than ever before. ICID President Dr. Felix B. Reinders (South Africa), Secretary General Er. A.B. Pandya, Dr. Marco Arcieri (Italy), VPH Bong Hoon Lee (Korea) and others shared their respective country experiences for innovations in irrigation technology and its impact on agricultural production.

WG-CDTE Agenda Item 3.4: Training programme for YPs in 2019 & 2020

16. During the Mexico meeting, the WG noted that the new building and infrastructure for KRC's Rural Community-International Education and Exchange Center (RC-IEEC) was likely to be fully operational in 2017 so that it can be used for capacity development activities of ICID. It was also noted that KCID further offered to organise training programmes for Young Professionals (YPs) at RC-IEEC in 2018. In February 2018, ICID CO requested Dr. Young D. Kim (Korea), Vice-Chairman of the WG to share the latest status of operationalisation of RC-IEEC for organising training programme for YPs on topics related to agricultural water management (AWM) at IEEC during 2018. Response from Dr. Kim is still awaited. However, during the 8th ARC held in May 2018 in Nepal, a meeting was held between Korean delegation headed by Mr. Kyu Sung Choi, KRC CEO and KCID President and ICID delegation headed by President Felix B. Reinders. Other participants of the meeting include VPH Bong Hoon Lee, VP Naoki Hayashida, VPH Ding Kunlun and Secretary General Er. A.B. Pandya. During meeting it was agreed to organise an international training program for YPs in April 2019 at RC-IEEC, KRC, Korea. Dr. Young D. Kim will provide the latest updates in the meeting of the WG.

17. First African Young Water Professional's Forum (Af-YPF) will be held during the 1st Cairo Water Week from 14-18 October 2018 at Cairo, Egypt. The theme of the 1st Cairo Water Week is “Water Conservation for Sustainable Development”. ICID Central Office has provided support of US\$10,000 towards organization of 1st Af-YPF while GWP has also agreed to sponsor two YPs from Mauritania as well conduct one technical session. VPH Dr. Mohamed Wahba (Egypt) will provide further updates at the meeting.

18. The 5th African Regional Conference (5AfRC) on Irrigation and Drainage will be organised by ANAFIDE in collaboration with ICID and IAV Hassan II in Morocco from 16-18 March 2020 at Rabat, Morocco. During meeting of the WG in Mexico, it was agreed that a training programme for YPs from African region will also be organised preceding 5AfRC. WG Chair Prof. Dr. Abdelhafid DEBBARH and representative of ANAFIDE will provide further updates at the meeting.

WG-CDTE Agenda Item 4: Knowledge Management Strategy

19. While so far, a fragmented, static method of information organization has worked well within ICID network, it makes information dissemination outside ICID network somewhat difficult due to diverse background and knowledge needs of AWM stakeholders. The inherent rigidity of current information structure requires significant search time for a specific piece of information and it is also vulnerable to fluctuating nature of constantly changing content providers and users. The new knowledge base framework, briefly described in this note, will help develop a comprehensive, flexible, user-friendly, and subject matter-oriented multimedia knowledge base on water resources development and management with primary emphasis on ICID network productions and mandates as well as those of its members and partners. Public-domain knowledge objects of ICID members and other organizations or networks will be listed in the metadata directory of keywords and hyperlinked for ease of access. It is proposed that the available ICID knowledge be:

- (a) **re-structured** (in the form of an irrigation and drainage subject matter),
- (b) **expanded** (by adding new information and content or hyperlinks to it), and
- (c) **presented** as a flexible source to suit varying requirements of a diverse audience.

20. Available information first needs to be organized as a collection of ICID's knowledge objects. Some examples of a knowledge object are water cycle, irrigation/drainage structures, and crops. A knowledge object will have sub-objects such as components of water cycle, types of structures, and crop-specific irrigation requirements, and so on. An object, whether main or sub, will have certain attributes, which are ICID and other productions describing that object. ICID productions such as textual descriptions (special publications, position papers, abstracts of publications, technical articles, theses and dissertations), tables, drawings, computer programs, images, and audio/video clips for all the knowledge objects, sub-objects, and sub-sub-objects should be stored in a database with multiple entry points.

21. In addition to the knowledge material provided by ICID, its national committees and partner institutions, the ICID knowledge portal would provide avenues to the user to submit their articles/ research papers/ dissertations/ these and other relevant material. These contributors can be categorized as experts/ professionals/ researchers; students; decision-makers and so on. Furthermore, ICID with the help of National Committees can scan the available international and national materials for incorporating the same in the knowledge base for use of the community. We can also maintain IPR of the materials being registered in the knowledge base.

22. This way, the knowledge base would consist of two databases: temporary and permanent. The temporary database would store the incoming material from contributors and would be invisible. The material from this temporary database would move to permanent database upon approval. Experts in the relevant field from different national committees can be chosen as the moderator who can review and approve the materials for quality control of the knowledge base. Accordingly, a hierarchical user structure and workflow process will be developed.

23. Once the knowledge portal is established, the users from the LinkedIn Group can be directed to the website and portal can serve as a forum for e-discussions.

24. Overall, the knowledge portal would contain different sections for knowledge sharing:

- (a). Resource Information (properly organized detailed information about irrigation, drainage, agricultural water management and other relevant topics)
- (b). ILMS - repository of the documents available on the ICID website (abstract available on the website and pdf attached) - advanced search enabled
- (c). To submit potential material (to be approved by the moderator)
- (d). Identifier Keywords from MTD and other databases
- (e). Forum for e-discussions (directed from the LinkedIn group)
- (f). Detailed Record of Awards + Submission for Awards (WatSave, HIS, and WSH)
- (g). Technical news articles (separate section? or news items should be included in the ILMS)
- (h). Webinars (Experts and YP's)
- (i). A section dedicated to the software tools available (such as BasinFutures and DOMIS)
- (j). Experience gained and case studies of project implementations of various type pertaining to the core areas of ICID. MTD can be further developed in the form of an Irrigation Wiki where generally consumable information of common interest can be hosted.
- (k). Directories of products and services in a classified form for enabling business-to-business (B2B) and (business-customer) B2C/ C2B type of networking to facilitate the individuals and communities in remote areas.
- (l). Multilateral financing agencies to be approached for putting in their projects and experience documents on the portal for distributing in a wide manner.

25. ICID Knowledge portal details are available at **Annex 3**. A presentation on KM portal will be made by Director (KM) of ICID CO. WG will deliberate on the KM activities and provide their suggestions for finalization of structure and content of KM portal.

WG-CDTE Agenda Item 4.1: Dissemination of Knowledge

26. During the Mexico meeting, the group noted that the website of the WG http://www.icid.org/wg_cdte.html was updated with new membership list, agenda, minutes, paper presentations, publications etc. In February 2018, the members were requested to provide interesting articles/papers/presentations/documents related to the scope of the group for uploading on the ICID website. Members may like to discuss and evolve methodology for sharing of information and updation of WG website.

WG-CDTE Agenda Item 4.2: Sharing of Knowledge

27. During the Mexico meeting, the WG discussed about organization of webinar to share vast knowledge available with ICID fraternity among members of the NCs with the support of WG experts. In February 2018, the ICID CO has followed-up with the members and requested to participate in the Webinar/ Web-based seminar and also to suggest topics along with name of experts who can be consulted to deliver webinar. Response is awaited. WG will discuss the matter and provide list of topics along with name of the experts to deliver webinar.

28. This year, ICID organised series of webinars for Young professionals (YPs). So far, two webinars have been organised on the topics (i) Save Irrigation Water Using the Innovative Machine of Soil and Water Management for Rice Crop Cultivation (SWMR) by Mr. Mohamed El Hagarey (Egypt); and (ii) Using System Rice International to increase water productivity, in Nile Delta Egypt by Dr. Arnulfo Gonzals / M.s Sabah Khalifa (Egypt). Further, the third webinar will be held on 11 July 2018 on the topic 'Water use efficiency and water productivity, experience from Afghanistan' by Mr. Najum Udin (Afghanistan). Live recording of webinars is available at ICID website http://www.icid.org/icid_webinar.html. Under the profession series of webinar, two webinars have been planned in July 2018.

WG-CDTE Agenda Item 4.3: E-learning programmes as a capacity development tool

29. At Mexico meeting (2017), the WG supported the idea of development of e-learning programmes as a part of capacity development mandate and agreed to make effort to gather information on existing e-learning models on subjects related to agricultural water management (AWM) as well as identify the gaps and compile inventory of national institutes and education and training centres through the WG members and the NCs. In February 2018, the ICID CO followed-up with the members of the group to provide any information available with them on various e-learning modules and details of training institutes in their country directly to WG Chair Prof. Abdelhafid Debbarh, with a copy to ICID Central Office. WG may like to discuss how the existing capacities in the NCs could be used to establish a regular e-learning programme in ICID.

WG-CDTE Agenda Item 5: Any other business



A. Members and their attendance at 2016 and 2017 Meetings

Sl. No.	Members	Member from (Year)	2016		2017		Remarks
			Self	Contributed by mail	Self	Contributed by mail	
1.	Prof. Dr. Abdelhafid DEBBARH (Morocco), Chairman	2015	•				
2.	Dr. Young D. Kim (Korea), Vice-Chairman	2015	•			# ¹	
3.	Mr. Mirza Asif Baig (Pakistan)	2016					Provisional Member. No contribution.
4.	Dr. Nader Heydari (Iran)	2016					Provisional Member. No contribution.
5.	Eng. Abu Obieda Babiker Ahmed Hassan (Sudan)	2016					Provisional Member. No contribution.
6.	Mr. Ramesh Kumar (India)	2016					Provisional Member. No contribution.
7.	Mr. Hasan Basri Yuksel (Turkey)	2016			•	#	Contributed his paper in WG-IOA workshop in 2018
8.	Ms. Dahile Abdulquader Abdulhammed (YP) [Iraq]	2016					Provisional Member. No contribution.
9.	Mr. Raad F. Amein Taha (Iraq)	2016					Provisional Member. No contribution.
10.	Secretary General, ICID					#	

B. New Nominations received from the National Committees

Sl. No.	Name	Country	Remarks
1.	VPH Dr. Mohamed Wahba	Egypt	Recommended as member, subject to his presence else provisional member
2.	Dr. Shinji Fukuda	Japan	Recommended as member, subject to his presence else provisional member

¹ Through representation



ROAD MAP TO ICID VISION 2030 – ACTIVITIES OF WG-CDTE

	Activity	Outcomes/ Outputs	Milestone for Year 2017	Milestone for Year 2018	Milestone for Year 2019	Milestone for Year 2020	Milestone for Year 2021
Goal C: Facilitate exchange of information, knowledge and technology							
C5. Strategy: Dissemination of Data, Information, Tools, Knowledge and Know How	5.1 Guide and support organization of seminar/ workshops etc. by WGs and NCs	Networking and exchange of knowledge	Regular	Regular	Regular	Regular	Regular
	5.2 Report on role of ICT in capacity development	Study report	Discussion, collection and analysis of information Draft report	Finalisation and release of report	Collection of additional data and information	Updation of report	Collection of additional data and information
Goal E: Encourage research and support development of tools to extend innovation into field practices							
E1. Strategy: Support Improving Research Prioritization in the Countries	1.3 Overseeing activities of Technical Support Unit (TSU)	Capacity development and technical support to NC	Regular	Regular	Regular	Regular	Regular
Goal F: Facilitate capacity development							
F1. Strategy: Enhancing Institutional Capacity Development of Member Countries	1.1 Provide technical support of National Committees, member and non-member of ICID (TSU)						
	1.2 Assisting to find capacity gaps in NC (TSU)						
	1.7 Contribute in the process of reorganization of NCs (TSU)						
F2. Strategy: Support Capacity Development Activities of Member Countries	2.1 Facilitate donor NCs supports joint research, invitations training, YP support program, or membership subscription in certain period (TSU)	Technical Report	Finalisation and dissemination of technical report				
	2.2 Report on capacity development needs, available training courses, gaps, institutes which can provide training to fill gaps etc.	Study report	Discussion, collection and analysis of information Draft report	Finalisation and release of report	Collection of additional data and information	Updation of report	
	2.3 Organizer Webinar	Online meeting	Identification of topics and	Support development	Support development	Support developme	Support developmen

	Activity	Outcomes/ Outputs	Milestone for Year 2017	Milestone for Year 2018	Milestone for Year 2019	Milestone for Year 2020	Milestone for Year 2021
			resource persons/ institutes	of webinar material and its wider dissemination	of webinar material and its wider dissemination	nt of webinar material and its wider dissemination	t of webinar material and its wider dissemination
F3. Strategy: Technical Training of Young Professionals from Member countries	3.1 Develop on-line training and extension material to be used in support of improving irrigation practices and increasing water productivity						
	3.3 Establishment of a distance learning mechanism	e-learning modules	Identification of topics and resource person/institutes for development of e-learning modules	Development of e-learning modules and its wider dissemination	Development of e-learning modules and its wider dissemination Identification of additional topic etc.	Development of e-learning modules and its wider dissemination	Development of e-learning modules and its wider dissemination
	3.4 Capacity development/training program on request from NCs	Training of professionals	Organisation of regional training program one every year	Organisation of regional training program one every year	Organisation of regional training program one every year	Organisation of regional training program one every year	Organisation of regional training program one every year
	3.5 An online directory of institutes providing formal degree in Irrigation and Drainage	Online course	Collection and analysis of information and its wider dissemination	Updation of information	Updation of information	Updation of information	Updation of information
F5. Strategy: Providing Technical Support to NC's (TSU)							

(Source: Consultative Group (CG) Report: A Water Secure World Free of Poverty & Hunger: A Road Map to ICID Vision 2030)



ICID KNOWLEDGE MANAGEMENT STRATEGY (KMS) AND WORK PLAN

CONCEPT NOTE

1. Introduction

It is needless to say that the basic aim of knowledge is to empower human society against a number of survival challenges under a highly dynamic environment, and that there is no clear distinction between knowledge creator and knowledge user. We are all participating in a knowledge process or part of a knowledge cycle, and we all contribute to it based on our capacity as well as draw from it based on our unique needs. From this perspective, for *International Commission on Irrigation and Drainage (ICID)*, a professional network that deals in scientific and technical domains, managing its knowledge cycle/process is a key activity in order to fulfil its overall mission of sustainable development of agricultural water resources through an international platform of a very diverse group of stakeholders. ICID plays a critical role in the field of irrigation, drainage and flood management by facilitating strategic communication and collaboration among scientific, engineering, policy making and water manager/user communities, all striving to find sustainable solutions for agricultural water management (AWM). We all realize that better communication precedes better collaboration and collaboration leads to better synergy of limited resources, both physical and human. The keyword here is “better,” building upon what has proven good.

2. Knowledge Management Strategy (KMS)

Based on the recommendations of a series of consultations of ICID Working Group on Knowledge Theme and those emanating from various ICID partners, the ICID Central Office has deployed a small dedicated team of professionals to manage knowledge processes within ICID network. The first task of the team is to review the existing KM processes in water management circles and then suggest a possible future strategy keeping in view the requirements of ICID members, partners and other stakeholders with due consideration of resources available and under existing institutional framework.

A brief review of KM practices of other similar international networks such as FAO and CGIAR was also considered essential as part of this KMS development. FAO, being an international extension agency, puts greater focus on information or knowledge dissemination rather than knowledge creation. However, CGIAR system generates knowledge through research and therefore its main objective is to make research output easily available to all stakeholders. The first lesson learned by all is that KM should not be technology-centric but should make best possible use of technology in various stages of the knowledge process. Another general observation is that most organizations arrange their knowledge around their thematic units, which may not be the best way of holistic knowledge dissemination or for issue-based global knowledge integration. A neutral hub or knowledgebase approach in which all multi-disciplinary stakeholders participate freely and with ease would be an ideal platform for sustainable knowledge-based solutions. Thriving virtual social networks serve as a good example of this phenomenon.

3. Conceptual Framework

Knowledge management encompasses creation, generation, extraction, consolidation, compilation, synthesis, storage, packaging, and dissemination of data, information, knowledge and know-how to the end users as well as impact assessment of knowledge use through a feedback mechanism that completes the knowledge cycle. In other words, this feedback mechanism could also act as an external knowledge contribution or knowledge validation feature.

As a professional network ICID is not mandated to conduct original research and build a knowledge base of its own, its primary role in knowledge processes of its members and partners is to facilitate communication, collaboration and wider dissemination of knowledge produced. From time to time, ICID has also strategically produced special publications whenever it realized that a certain agricultural water management (AWM) issue did not receive the attention it deserved or from ICID's vantage point it was better placed to add more value to the knowledge process on a particular AWM issue.

Scientific knowledge creation and generation process falls within the purview of the research and development institutions of the ICID member and non-member countries as well as ICID partner institutions and networks. ICID's Irrigation and Drainage Journal captures such scientific knowledge from innumerable global sources. The various technical Working Groups of ICID, through their activities, also help validate, extract, compile, and synthesize this knowledge to make it useful for AWM policy makers and practitioners. It is assimilated through various application and development processes, sectors and/or disciplines. The effort is to appropriately synthesize both scientific and non-scientific interactions among technology, techniques, and people for greater good. For sharing this knowledge or know-how across a wide spectrum of users the ICID Central Office is assigned the responsibility of facilitating dissemination by making optimal use of the advances in the information technology and other communication channels. Over the years ICID has continuously taken initiatives to upgrade its capacity and facilities to provide a

user-friendly access to the latest data, information and knowledge products for AWM. Some of such services by the Central Office include:

- (a) Peer-reviewed Irrigation and Drainage Journal
- (b) Continuously Updated ICID Website
- (c) Integrated Library Management System (ILMS)
- (d) Text Delivery System (TDS)
- (e) Multilingual Technical Dictionary (MTD) on Irrigation and Drainage
- (f) Electronic Bulletins, Newsletters and Special Publications
- (g) Distance Learning and Training Tools
- (h) Virtual Communication Tools: Web-conferencing and Tele-conferencing
- (i) Research Database: IrriReSearch
- (j) Products and Services Directory: Irrigation and Drainage Yellow Pages

Using contemporary approaches and technology, for more than six decades ICID has been continuously managing knowledge on various aspects of irrigation and drainage through its membership activities, interactions in various fora, and diverse partnerships. All the data and information collected thus far and documented in ICID productions are currently stored and maintained under varying formats and at several locations. In recent years efforts have been made to organize the available data, information and knowledge in a consistent manner; for example, ICID website (www.icid.org) is evolving as the primary interface to the knowledge base or source of ICID knowledge objects. With general improvements in internet connectivity across the world, website-based interface is preferred choice of most knowledge organizations for expanding their reach.

Information flows of NC's research and outreach activities and that of ICID partners are yet to be mapped in a definitive form that makes them seamlessly integrated with ICID knowledge base and thus easily searchable and retrievable through ICID web site. ILMS, MTD and IrriReSearch initiatives are significant efforts in that direction. The idea is not to duplicate or replicate what is provided by others, but to improve access to knowledge objects wherever they exist in public domain. In this regard, a good metadata directory service assumes important significance.

Knowledge is also a dialogue process; therefore, it must flow in all possible directions. Another on-going ICID effort is to allow two-way knowledge interaction using virtual communication tools and e-Learning methodologies. A series of "webinars" on emerging AWM topics/issues has become a regular feature with satisfactory participation from across the globe despite time-zone limitations of a synchronous seminar session in such conditions. ICID also facilitates a young professionals' e-Discussion forum (YPeF) for knowledge sharing. Along the similar lines, relevant e-Learning courses are being planned for a diverse group of learners. Content and target audience for these are being worked out. ICID participates in irrigation and drainage related e-Discussions and other fora of its members, partners and other groups and shares its own learnings.

In summary, the core principle of this ICID KMS is to facilitate better knowledge creation through better knowledge flows by being a synergetic player in global, national and local knowledge processes of its members, partners, users and peripheral stakeholders. This concept note outlines a framework for a distributed yet virtually integrated irrigation and drainage knowledge base for all AWM stakeholders.

4. I&D Information/Knowledge Content Providers and Users

A typical ICID information provider and/or user may belong to one or more of the following categories:

- (a) ICID Members and Partners, and their Libraries
- (b) Practicing AWM Engineers and professionals
- (c) College/University Faculty and Students, and Field/University Researchers
- (d) Community Development Workers/Planners/Managers
- (e) Private Sector involved in agricultural water business
- (f) Farmers, Extension Workers and Water Activists/Enthusiasts
- (g) ICID supporters and other institutions

5. Irrigation and Drainage Knowledge Base and Portal

While so far, a fragmented, static method of information organization has worked well within ICID, it makes information dissemination outside ICID network somewhat difficult due to diverse background and knowledge needs of AWM stakeholders. The inherent rigidity of current information structure requires significant search time for a specific piece of information and it is also vulnerable to fluctuating nature of constantly changing content providers and users. The new knowledge base framework, briefly described in this note, will help develop a comprehensive, flexible, user-friendly, and subject matter-oriented multimedia knowledge base on water resources

development and management with primary emphasis on ICID network productions and mandates as well as those of its members and partners. Public-domain knowledge objects of ICID members and other organizations or networks will be listed in the metadata directory of keywords and hyperlinked for ease of access. It is proposed that the available ICID knowledge be:

- (a) re-structured (in the form of an irrigation and drainage subject matter),
- (b) expanded (by adding new information and content or hyperlinks to it), and
- (c) presented as a flexible source to suit varying requirements of a diverse audience.

Available information first needs to be organized as a collection of ICID's knowledge objects as shown in Table 1. Some examples of a knowledge object are water cycle, irrigation/drainage structures, and crops. A knowledge object will have sub-objects such as components of water cycle, types of structures, and crop-specific irrigation requirements, and so on (refer Table 1). An object, whether main or sub, will have certain attributes, which are ICID and other productions describing that object. ICID productions such as textual descriptions (special publications, position papers, abstracts of publications, technical articles, theses and dissertations, *etc.*), tables, drawings, computer programs, images, audio/video clips, *etc.* for all the knowledge objects, sub-objects, and sub-sub-objects should be stored in a database with multiple entry points.

In addition to the knowledge material provided by ICID, its national committees and partner institutions, the ICID knowledge portal would provide avenues to the user to submit their articles/ research papers/ dissertations/ theses and other relevant material. These contributors can be categorized as experts/ professionals/ researchers; students; decision-makers and so on. Furthermore, ICID with the help of National Committees can scan the available international and national materials for incorporating the same in the knowledge base for use of the community. We can also maintain IPR of the materials being registered in the knowledge base.

This way, the knowledge base would consist of two databases: temporary and permanent. The temporary database would store the incoming material from contributors and would be invisible. The material from this temporary database would move to permanent database upon approval. Experts in the relevant field from different national committees can be chosen as the moderator who can review and approve the materials for quality control of the knowledge base. Accordingly, a hierarchical user structure and workflow process will be developed.

Once the knowledge portal is established, the users from the LinkedIn Group can be directed to the website and portal can serve as a forum for e-discussions.

Overall, the knowledge portal would contain different sections for knowledge sharing:

- (a) Resource Information (properly organized detailed information about irrigation, drainage, agricultural water management and other relevant topics)
- (b) ILMS - repository of the documents available on the ICID website (abstract available on the website and pdf attached) - advanced search enabled
- (c) To submit potential material (to be approved by the moderator)
- (d) Identifier Keywords from MTD and other sets
- (e) Forum for e-discussions (directed from the LinkedIn group)
- (f) Detailed Record of Awards + Submission for Awards (WatSave, WHIS, WSH)
- (g) Technical news articles (separate section and/or news items should be included in the ILMS)
- (h) Webinars (Experts and YPs)
- (i) A section dedicated to all the software's available (ex: Basin Futures and DOMIS)
- (j) Experience gained and case studies of project implementations of various type pertaining to the core areas of ICID. MTD can be further developed in form of an Irrigation Wiki where generally consumable information of common interest can be hosted.
- (k) Directories of products and services in a classified form for enabling B2B and B2C/ C2B type of networking to facilitate the individuals and communities in remote areas.
- (l) Multilateral financing agencies to be approached for putting in their projects and experience documents on the portal for distributing in a wide manner.

6. User Interface for Knowledge Base and Portal

The main feature of this new framework is its flexibility, which is in direct contrast to the rigidity of the current information structure. In this new framework users will have greater control over what is displayed to them about a particular object or keyword. In other words, there will not be a single set of information presented to all users, rather a user will virtually build a knowledge base on his/her own by selecting appropriate knowledge objects or keywords. This will be useful when a user becomes familiar with the knowledge base and explores it for different purposes on subsequent visits.

The new interface will be able to handle instruction-related and exploration-related requests from a user. Based on user preference (instruction or exploration), the new interface will retrieve relevant knowledge objects from the knowledge base and dynamically create one of the following three different views of the information:

- (a) Multilevel Subject Matter View for instruction-oriented users,
- (b) Query-Based View for specific information seeker, or
- (c) Activity-Based View for use of AWM tools, techniques/methods by user.

Table 1. Irrigation and Drainage Knowledge Base

<p>SOURCES OF IRRIGATION</p> <ul style="list-style-type: none"> • Irrigation History • Sources of Irrigation • Improving soil moisture • Ponds • Tanks • Diversion weirs • Large Reservoirs • Groundwater • Conjunctive water use • Wastewater • Poor quality water 	<p>APPLICATION OF IRRIGATION WATER</p> <ul style="list-style-type: none"> • Canal Irrigation • Flood Irrigation • Deficit Irrigation • Supplemental Irrigation • Sprinkler Irrigation • Drip Irrigation • Lift Irrigation • Centre Pivot Irrigation • Tidal Irrigation • Micro-Irrigation Technologies for Small Holders • Automatic Irrigation Systems • Pressurized Irrigation • Irrigation in Viticulture 	<p>PURPOSE OF IRRIGATION</p> <ul style="list-style-type: none"> • Kitchen Garden • Landscape • Agriculture • Horticulture • Floriculture • Forestry
<p>INSTRUMENTS AND IMPLEMENTS OF IRRIGATION</p> <ul style="list-style-type: none"> • Pumps • Centrifugal Pumps • Submersible Pumps • Turbine and Jet Pumps • Conveying pipes • Sprinklers • Drippers • Canal automation systems 	<p>IRRIGATION MANAGEMENT</p> <ul style="list-style-type: none"> • Economics of Irrigation System • I&D System Types • I&D Investment Functions • I&D Management Issues • Participatory I&D Management • Equity in irrigation • Irrigation services 	<p>IRRIGATION AND ENVIRONMENT</p> <ul style="list-style-type: none"> • Pollution and Irrigation • Irrigation and Climate Resilience • Environmental aspects of Irrigation • Environmental Impacts of Irrigation • Green Lawn Irrigation • Safe Use of Wastewater in Irrigation • Organic Agriculture • Soil Health • Soil Health Management • Quality of Irrigation Water
<p>CAPACITY DEVELOPMENT</p> <ul style="list-style-type: none"> • Irrigation Services Certification • ISO Certified Irrigation Equipment • ISO Standards on Irrigation Equipment • Levels of Capacity Development • Capacity Development Framework • Tools for Integrated Water Resources Management • Irrigation Services 	<p>DRAINAGE TYPES AND SYSTEMS</p> <ul style="list-style-type: none"> • Agricultural Drainage • Canal Irrigation and Drainage • Field Drainage systems • Surface drainage • Sub-surface Drainage • Mole Drainage • Bio-Drainage • Regional Bio-Drainage 	<p>DRAINAGE ISSUES</p> <ul style="list-style-type: none"> • Waterlogging and Soil Salinity • Conjunctive use of Surface and Groundwater • Drainage and Water Quality • Environmental & Economic Benefits of Drainage • Environmental Impact Assessment • Management of Drainage Water • Sustainable Urban Drainage
<p>ICID DATABASES</p> <ul style="list-style-type: none"> • Integrated Library Management System • ICID Databases • ICID Publications • ICID News and Articles 	<ul style="list-style-type: none"> • ICID Members and Partners • Irrigation and Drainage Dictionary • Directory of Irrigation and Drainage Products and Services 	<p>ANALYTICAL TOOLS/MODELS</p> <ul style="list-style-type: none"> • BHIWA • PODIUM • WEAP • SALTMED • IrriSearch

Advanced script programming techniques and database management systems will be used to provide this dynamism in the knowledgebase. This knowledge base will also have the potential of being published as a web site (scaled-down version for preview purposes) as well as a DVD-based product (full-scale multimedia database). Individual topics can also be printed in PDF format if desired by a user. Specific queries will result in ICID products and hyperlinks to outside sources. The knowledge base will also act as an online calculator for standard irrigation and drainage design and water management tools.

7. Multilevel Subject-Matter View

This view will be in response to an instruction-related request from the user. It will be useful mainly for students, teachers, and those who would like to learn about irrigation and drainage or find subject matter information in a structured way. A tentative organization of this view is represented in Figure 1 using a water pond as the basic object or keyword.

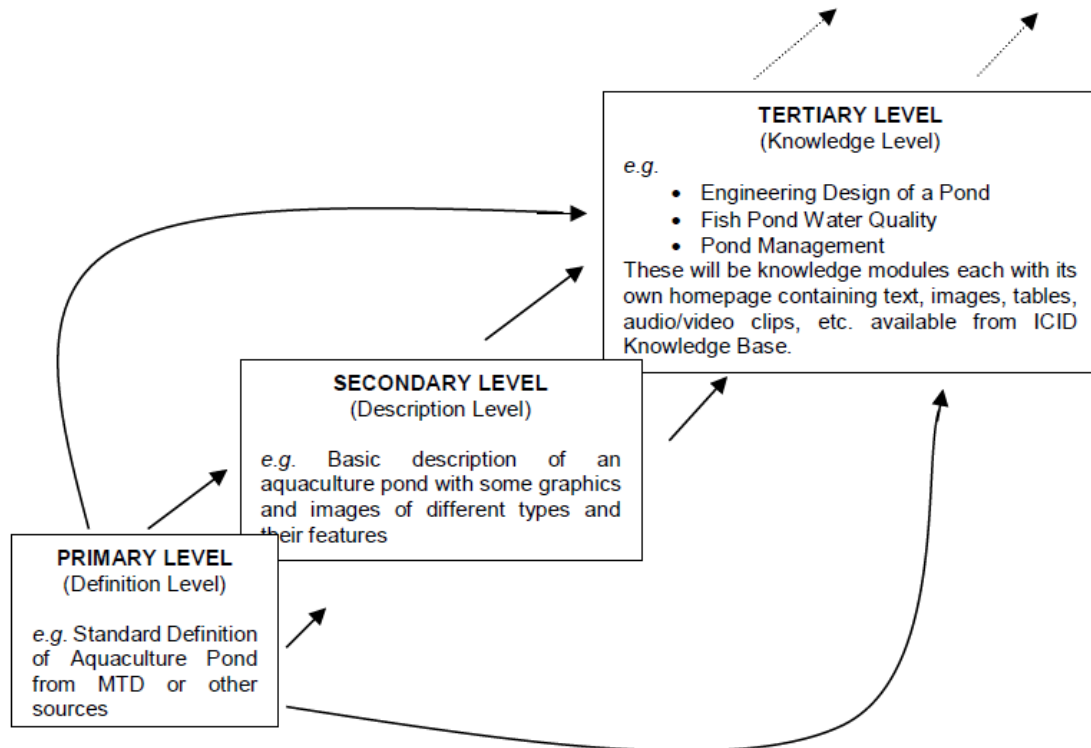


Figure 1. Multilevel Subject Matter View of "Pond" Object

All the Primary Level objects (or keywords) may be contained in an "Overview of Irrigation and Drainage," which will serve as the first interface for Multilevel Subject Matter View and currently exists on ICID web site. For each object there will be two different menu sets – one for Secondary Level information and the other for Tertiary Level information. These menu sets will be designed specifically for the type of object, e.g., all irrigation systems will have the same menu sets and so will drainage systems.

8. Query-Based View

In this exploration-related view the user will type a query about irrigation or related subject. Using the knowledge object(s) or keyword(s) appearing in the typed query, the new interface will provide appropriate menu sets associated with each object of the query. The sub-objects associated with the knowledge object will also be displayed along with their menu sets. Knowledge objects and sub-objects have been described previously in this note. An example menu set and brief descriptions of various menu choices are shown in Figure 2. By clicking on a choice in the menu set, user will be able to retrieve information from irrigation and drainage knowledge base. Retrieved information will be displayed in a separate pop-up window.

This view will be useful for researchers, extension workers, and those looking for some specific information about irrigation and drainage. This view will greatly reduce the navigation time to retrieve a particular piece of information. If the user is satisfied with the displayed information, he/she will have an option to print some or all of it.

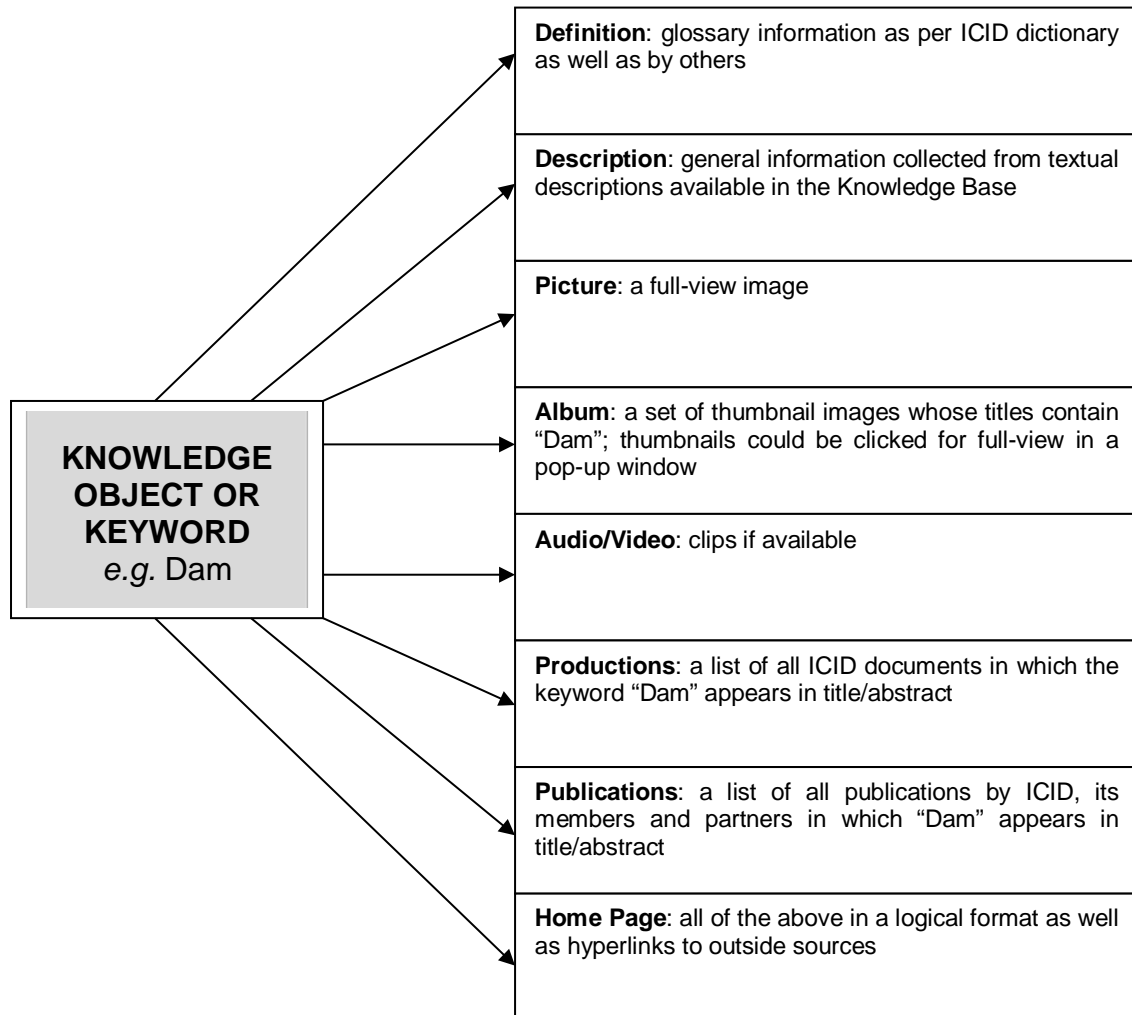


Figure 2. Query-Based View of Irrigation and Drainage Knowledge Base

9. Activity-Based View

Activity-Based View, a response to exploration-related request from a user, will employ a problem-solving approach of information dissemination. User will select an online tool or case study from a collection covering all the important aspects of irrigation and drainage. This first interface will be similar to the "Overview of Irrigation and Drainage" interface used for Multilevel Subject Matter View.

The tool or case study will provide stimuli (knowledge objects or keywords and their associated menu sets) to explore the knowledge base. The case study will include a description of a situation and an associated set of problems that need to be solved by the user. These tools and case studies can either be real or hypothetical designed specifically to highlight a particular aspect of irrigation or drainage. The user will solve the problems using information available from the knowledge base. The solution(s), representing user's own knowledge base, will contain all the information derived from the knowledge base. Figure 3 depicts this interaction between the user and the knowledge base.

This view will be useful for practitioners, field workers, designers, self-learners or trainees. Teachers and professional trainers can also use this as a learning tool. While standard AWM tools are easy to incorporate, it will require significant input in the form of real and hypothetical case studies from subject-matter specialists within ICID members and partners.

A hypothetical case study could be designing a tilapia grow-out pond facility as described here. The user will be able to create his/her own knowledge base on a template by picking (cut-and-paste) ICID productions of knowledge objects (from the Knowledge Base) required to design such a pond and arranging them in a manner suggested in the problem statement.

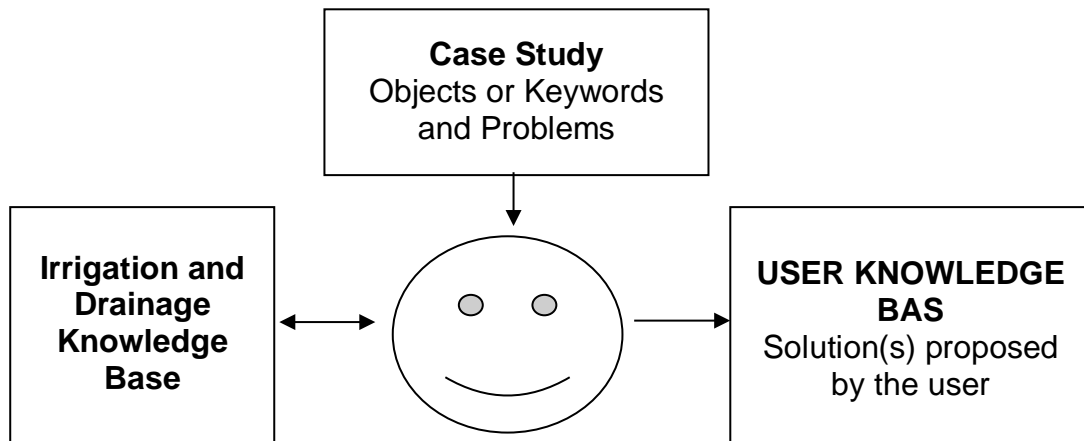


Figure 3. Activity-Based View of Irrigation and Drainage Knowledge Base

10. Example for Activity-based View: Pond Design Problem

Problem Statement

Design a series of ponds as a 100 T/year tilapia production facility. Assume the source of water to be a well near the pond site with a maximum flow capacity of 200 L/min. Use a nearby ditch (klong) as a discharge destination. The proposed design should include the followings:

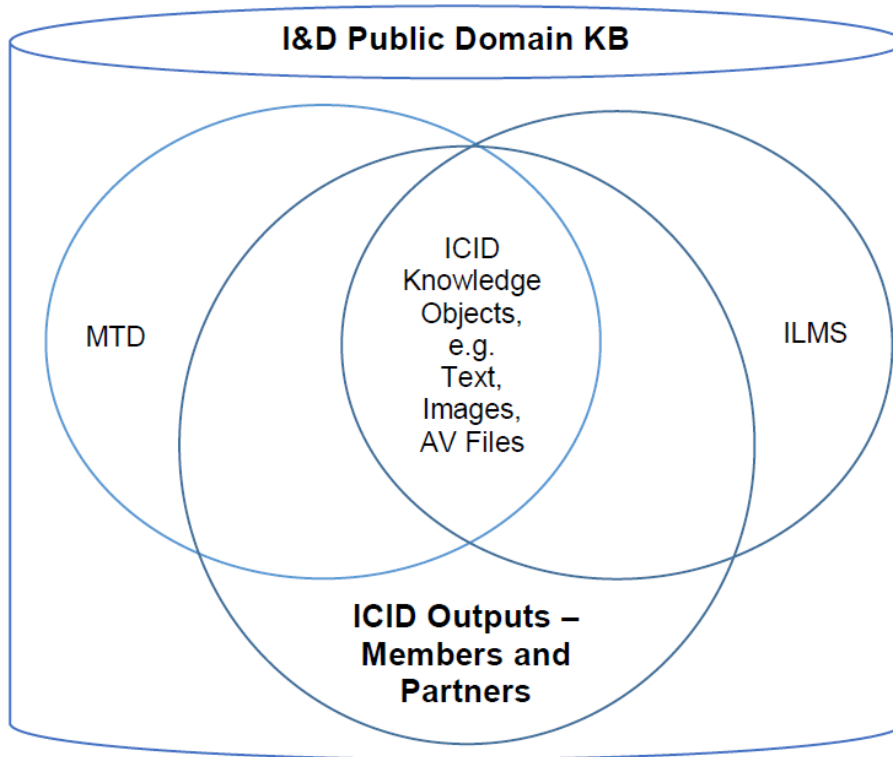
- (a) Site-selection (choices are Northeast Thailand, Southern Vietnam, and Northern Vietnam)
- (b) Background information such as environmental (water quality) requirements of tilapia, tilapia growth cycle, etc.
- (c) Required feeding rates and oxygen requirements at different stages of tilapia growth
- (d) Pond type and layout (including number and size of ponds and their location with respect to each other -- drawings please)
- (e) Inlet and outlet structures for each pond and water flow rates
- (f) Pumps (location, number and capacity of each)
- (g) Aerators (location, number and capacity of each)
- (h) Tilapia stocking rates of different ponds assuming that 50-g size fingerlings are available and market size is 500-g/fish.

You can make certain assumptions about this problem, but they should be supported by valid references. Most of the knowledge objects (or keywords) are underlined in the problem statement to help you search for information from irrigation and drainage knowledge base.

11. Basic Requirements/Skills for I&D Knowledge Base/Hub

- (a) Formal and informal need assessment of potential participants of Irrigation and Drainage Knowledge Cycle/Base (identification of not so obvious groups)
- (b) ICID information/knowledge flow mapping and further conceptual development of the KM framework (how ICID acquires knowledge, not necessarily information/data)
- (c) Consultations with primary content providers to develop a super list of knowledge objects, classification scheme for knowledge objects, and contents of user interface
- (d) Interface layout design, color schemes and intuitive user-friendly features
- (e) Technical aspects of database design and associated tools
- (f) Conversion of audio/video and other data into digital form
- (g) ICID Information Database setup (any open source program)
- (h) Script programs for database search and view display/print
- (i) Typing/Database Entry (all the technical topics/write-ups that ICID publishes are knowledge objects and thus they need to be structured accordingly)

- (j) Scanning of old documents and pictures
- (k) Knowledge Object Organization System (Refer Set Diagram below):



12. ICID Knowledge Management Progress and Work Plan

(Convergence of Distributed Knowledge Resources and User-specific Interfaces)

The 68th IEC approved, in principle, the proposed ICID Knowledge Management Strategy (KMS), which is largely based on the changing landscape of knowledge management area in most scientific domains. AWM is no exception and hence it is timely that ICID establishes a future-ready digital platform for its stakeholders and users.

As explained in the KMS document, there are two major aspects of ICID knowledge dissemination – the backend where the knowledge is organized in the form of efficiently integrated databases (convergence of asymmetrical, distributed, fragmented data/information resources) and the user-friendly frontend which provides user-specific access to the integrated knowledge base. The skillsets required for this work plan to achieve its objectives were mentioned in the KMS document. Broadly speaking, we need a group of water sector professionals who conceptualize the backend and an IT professional who develops the integrated database structure according to the conceptualization and provides the user interfaces for a range of needs such as regular information dissemination, interactive e-Learning, and online modeling/simulation.

In-house efforts have been made to successfully develop a sort of prototype content management system (CMS) using the existing ICID IT platform (MySQL + PHP) along with a simple database of ICID's special publications. However, the prototype is more for gaining an understanding of feasibility of using the existing platform rather than being the first version of an envisaged advanced knowledge management system.

To overcome the obvious limited IT capacity in ICID as it is not our area of expertise, it is suggested that either we hire an IT professional to work fulltime with responsibility of developing the IT platform and maintaining it or outsource the IT part of the KM project to a private agency specializing in such domains. In the former case, as discussed earlier, it may be difficult to find the right person, but it will add capacity to the Central Office in medium to long term. In the later scenario, we may get a very professional end product, but with limited technical support after the final payment is made to the vendor.

Discussions are being held with the IT vendor, who coded the ILMS, MTD and the ICID website, to explain our specifications and requirements, and now their proposals/quotations are awaited for further consideration. The search for a dedicated IT professional to work on this project is also underway using our own networks.