ICID INITIATIVE FOR A GLOBAL INVENTORY OF IRRIGATION AND DRAINAGE SCHEMES

1.0   Need for a Global View

Irrigated agriculture forms the kingpin of the food and water security of the country and the region. Systematic irrigation is practiced through the irrigation schemes of various sizes. Schemes of various types provide the assured source for a sustainable and timely water supply. Thus, an irrigation scheme forms the atomic unit of irrigation and water resources development. Across the world, the irrigation has to be practiced under a varying agro-climatic conditions and topography and area appropriate solutions for the same determine the features of individual irrigation schemes.

A global view of the irrigation and drainage schemes provide great insights into various development approaches followed across the world, their success and performance. It is observed that the topographic, hydrologic, agronomic and social conditions form a unique combination in which an irrigation scheme gets planned and implemented. Hence, there is a need to have a global view of the developments which show us the measures adopted and their contexts under a multi-dimensional environment. Attempts are made by various researchers and practitioners to examine specific issues but examination of a scheme as a whole in global context require a repository of information through which the individual schemes of interest can be visualised and approached for lessons.

ICID is the only major international scientific and technical organisation which- through its membership network spans across more than 90% of the irrigated areas of the world. The necessity for having a global view of schemes devoted to irrigation and drainage is greatly felt by the member countries and also across the world by various agencies. ICID has therefore, taken initiative to collect and provide a community knowledge base of irrigation and drainage schemes which can work as a common pool resource for understanding the status of development and approaches used for the development and management scheme under varying conditions.

2.0   Setting up of a Register

A register is an official record of names or items. Various registers exist in the field of engineering structures and other entities, the most notable from water resources angle being the World Register of Dams[1] being maintained by International Commission on Large Dams (ICOLD). ICID is also maintaining a World Register of Heritage Irrigation Structures and awards recognition to the structures meeting the eligibility criteria.

Most of registers examined are pertaining to structures and individual components of a system. No register recording the features of an irrigation and/or drainage scheme exist on a world-wide scale. It is, therefore, felt that such a register should be established for irrigation schemes and ICID being a key player in the fields of irrigation and drainage is the most suitable agency for establishment a **Register on** "**World Irrigation Schemes**".

The register will have to be authentic and should carry a seal of approval from a competent source for it to be useful for serious research and development purposes. Through our national committees, ICID have the necessary network where the needs of authentication can be met with.

3.0   Development Approach

As against the databases describing the individual structures, an irrigation scheme spans across multiple technological, scientific and socio-economic fields. In order to generate a full view of the scheme, the relevant parameters for all such fields will have to be brought in the register. The approach has been to capture the relevant values of such parameters, which are likely to be readily available and collate them in a single database which can act as the register at national and international level.

Selection of parameters is a great challenge. A balance has to be struck between ready availability of information versus the underlying details of the same. While subject matter experts would like to have the details fully explaining the status, the data originator may not have enough energy or time to undertake lengthy exercises for fulfilling such requirements. Any community based and sourced database suffers from these two conflicting demands. The present register is also no exception. The database contains the pointers to various facilities and management approaches that the scheme may be following. These pointers will help in categorizing the schemes and identify schemes of interest for further work.

Availability of modern cloud-based databases provide us with the facility to set up and expand the database at a future date with relative ease. Keeping the difficulties faced by the data originators at the field level, the preference has been given to such parameters which are primarily pointers to the underlying situation and simultaneously are not difficult to extract from the available information at the scheme or owner department level. For the front end, a web application is developed which provides all the necessary security, authentication and post processing support.

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[1] https://www.icold-cigb.org/GB/world_register/world_register_of_dams.asp

4.0   Information Content

Determining information content for the register is a challenging task. In order to make the register rich in information content, it is planned to collect information regarding the following aspects of a scheme

- ▣ Geographical and administrative location of the scheme
- ▣ Water sources, consumption footprint and availability
- ▣ Intervention and distribution networks- features, materials and technologies employed
- ▣ Agricultural water management aspects- cropping patterns, calendars, application methods
- ▣ Social management and community involvement
- ▣ Financial investments, time-lines and status
- ▣ Amorphous searchable information about the scheme
- ▣ Points of contact for additional information and detailing.

Information about each aspect can have large descriptive and statistical content which are influenced by the individual scheme and owner orgainsations points of view. At present, it is considered that the key information in form of statistics or choices will be collected and stored. Since there are possibilities of contacting the individual scheme authorities for further detailing, it will always be possible for the individual interested user to find ways of contacting and eliciting required information as own initiative.

While generating the information content, the user is incentivized by issue of a certificate mentioning the inclusion of the scheme into the register. The nicely designed certificate will bear the logo of ICID and can be displayed as a mark of acknowledgement. Such certificates will be produced centrally and will be handed over to the concerned national committee for distribution within the country. Sample certificate is given at Annex 1.

5.0   Building the Database

In order to build the database, the SQL-SERVER® database which is capable of storing large amounts of data in industry standard form. The database also allows search and analysis facilities which are approached through the dedicated web site. Various classes of information is divided into multiple related tables and all are connected through the scheme identifier. The required information for the database is presented in the Annexure I with this document. Necessary disambiguation information with relation to specific data items is also provided for explaining the context and content of the data to be supplied.

The database being industry standard, has the capabilities to be manipulated through the T-SQL. However, as all the users may not be comfortable with the utilities, the front-end interface takes care of data integrity, storage, and inquiries from the database.

It is critical to ensure that the data being supplied to the database is authentic. The authenticity is proposed to be ensured through a three-layer user hierarchy where the individual scheme managers will be responsible for the data entry and upkeep for the schemes entered by them. The national committees may manage and authorize the users enabling them to enter the data and also keep a watch over the quality and progress being made regarding the inclusion of the information of the schemes in their area of operation. The world areas not covered by any national committee, will be handled by the central office. The centralized master control will be exercised by ICID central office for administering and managing the entire facility in respect of software and hardware.

The facility is presently located at **www.icidevents.org/WorldIrrPrjs/Default.aspx** and is in the development phase. At appropriate time, once a critical mass of data is available, the same will be migrated to a dedicated domain duly registered.

6.0   Details of Data Capture Plan

Irrigation schemes come in all sizes and shapes. A criteria is required to capture the data regarding the schemes which can be of critical interest from the scale of activities present with them. There are country specific classifications regarding sizing and magnitude of irrigation schemes. Keeping the engineering and agricultural importance and impact in view, at this stage, it is proposed that we may allow schemes having at least 5000 Hectares of Gross Command Area. There are various countries in the world who are at widely varying level of irrigation development. The relative low value of the command area will enable the least developed countries also to participate in the database and thereby having better integration of their agricultural water management sector with the global field. Moreover, this will help developmental agencies to better appreciate the levels of development and initiatives required for a region/ country.

This being a world register, it is necessary to cater to even the non-member countries also so as to cover the widest possible information base. The central office will attempt to approach these countries and will attempt to identify a nodal agency who can look after input of data in the register. This will have future benefits of such countries formally joining the ICID network as members.

To seed the register, a subset of data will be classified as required and the rest can be skipped at initial stage and can be entered later on when such information become available with the owner/ manager of the scheme.
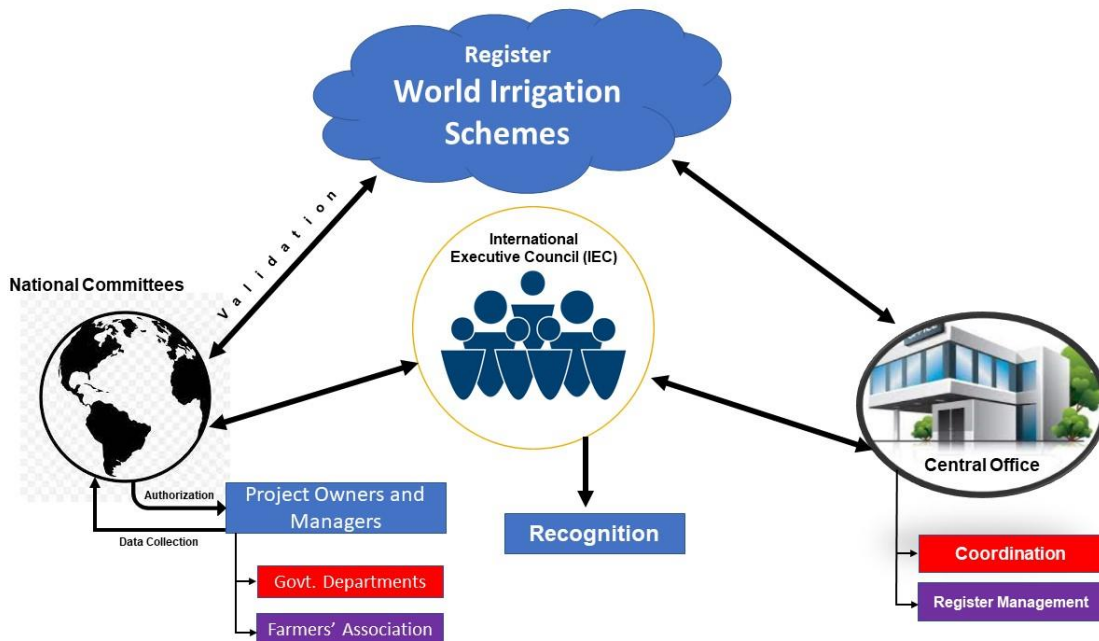
For making an effort to provide the data voluntarily, the individual scheme should also perceive some value against the efforts being put in by them. ICID can consider issuing a certificate of registration with a unique ID which can be provided in a soft form and the individual scheme can display the same in their premises on the lines of plaque being provided by us in other schemes like WHIS. In this case, there will be no significant financial implication as the process of plaque provision can be automated. As another incentive, we can carry the brief registration details as a part of our news bulletins or updates on a quarterly basis.

7.0   Way Forward- Role of National Committees

The role of national committees for making the establishment of the register is vital. At the nation level, the individual scheme owners and managers will have to be persuaded to provide their information for the register. It will be a good idea that the national committee can consider a publication of national register of irrigation schemes
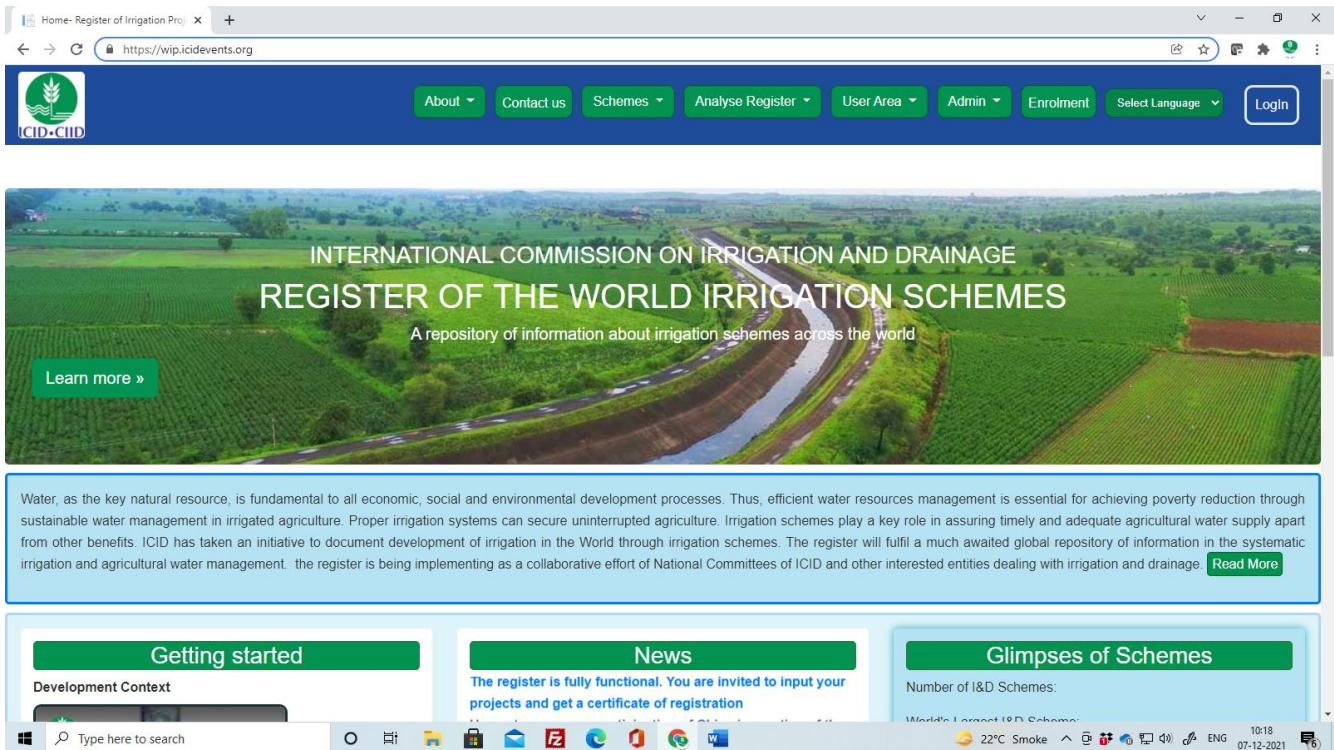
based on the entries in the register. The document will have great value at the country level planning and development officers who will have authentic and consolidated data readily available

To facilitate the authentication of the data as well as to reach the target groups in the country, a role based user authorization scheme is employed in the package. At the default level is the owner organization/ authorized individual who will have the rights to enter the data in the register for inclusion in the register. The default level will also be able to analyse the data in the register through the portal and produce reports for later use. The next higher level will be located at the National Committee level who will have the authority to invite other users in the country for getting the schemes information included in the register. Any information entered by a default user will undergo check at the National Committee level who will ensure that inconsistent information is not included in the register. National Committee will have to clear a scheme for its inclusion in the register or ask the default user to settle the inconsistencies noticed in the data. Normally, a desirous user will make a request online to the National Committee who will authorize the user for joining the portal. Individual national committees will be authorized by the super user at ICID central office. For users at any hierarchical level, the lower authorization level activities will be automatically available. Thus, it is evident that the National Committee will have to play a core role in making the register a success. The National Committee bringing in maximum number of schemes into the register will be recognized at the IEC meetings. This may enable the national committee to have better recognition within the country of operation.

As a first step, a pilot version of the data entry module is being made available at **https://wip.icidevents.org/** and response of the national committees is being sought for making any specific additions/ modifications to the database structure. We can deliberate the suggestions collectively at suitable forums and arrive at the final version. To make the access to the data entry module simple, the user authorization and management modules and also the saving of the data is also not enabled to prevent cluttering of the database with trial information.

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