

Presentation on the Strategy Theme “R&D”

K. Sanmuganathan¹

RESEARCH AND DEVELOPMENT IN IRRIGATION AND DRAINAGE: A POTENTIAL ROLE FOR ICID

Introduction

Irrigation is a trillion (10¹²) dollar industry with an annual investment of around 10 billion dollars but investing only around 150 million dollars in research. Any reasonable analysis of such an investment profile, particularly with the accepted inadequate performance of the industry, would conclude that the investment on innovation and change is totally inadequate. Irrigation professionals have been highlighting this serious deficiency for quite some time but on the whole the results, by way of increased investment in research and development, have been disappointing.

We could continue to quote statistics, if necessary expressing the figures in alternate forms to make a better impact, such as that the investment research amounts to only :

- \$0.1 to \$1.5 per irrigated hectare, or
- 1% of the total annual investment-on irrigation

Alternatively, we could reassess the situation and steer our efforts in other directions. I would like to explore this avenue a little further.

The Existing Irrigation Research System

- Some 72% of irrigated land lies in developing countries but only around half the research resources are being used in developing, country institutions.
- Although some institutional developments (IIMI, IPTRID) at the international front have taken place during the past ten years, there has not been anything near the same amount on national fronts.
- Studies of bibliographic databases of literature that are often used by researchers show that only around 25% of the material is from national developing country institutions.

- There is nothing akin to a grand design for global irrigation research system. Research has developed in a piece meal fashion in response to immediate needs.
- The number of journals widely read among the irrigation community is very small.
- No professional association of researchers and practitioners exists. ICID is the closest to such an association but it does not include or reach all the potential contributors.
- No association of research institutes specialising in this subject area exists.
- Much of the research results are not in the public domain as a result of client contractor relationships.
- The weakness in the structure of the research system is thus evident; very few centres of excellence in countries with large irrigated areas, little communication or facilities for communication among researchers, and between researchers & practitioners, etc. **The existing worldwide research effort does not constitute an integrated community by any means.**

This weakness in structure is further exacerbated by two other features; a lack of direction for the research efforts and the current system of funding research which is often project oriented as distinct from a thematic orientation.

Developments in most fields are frequently brought about initially through empirical innovations. Subsequently however, with repeated application and wider usage, a clear understanding of the processes involved develops resulting often in a theoretical framework that helps to define the behavior of the system with confidence. This in turn enables improvements in the performance of the system to be brought about through improved design, construction, maintenance, and operation.

In the case of Irrigation, it appears that we have had the steam engine for over a thousand years, but we are still looking for the second law of thermodynamics. The analogy of a fundamental physical law may not be appropriate for a system like irrigation, the performance of which is inextricably linked to technology, people & institutions. However, the point is made that a general framework that embraces the different facets of the system is yet to be defined. In the absence of such a framework, research efforts tend to be fragmented, shifting from one aspect of the problem to another; on farm efficiency, farmer participation, water user associations, performance assessment, turn over, etc.

The system of funding research that is current today is not conducive to the development of any generalised framework. It emphasises correctly the concept of value for money, but unfortunately implements this policy by seeking value for money in every element of a research effort, often sub-divided to fit administrative convenience. Under this system of funding, if a research proposal is to be successful, the results of the research needs to be known well in advance. Clearly development of truly new concepts is impossible under this system and prudent researchers do not even attempt it.

A Role for ICID

The global irrigation research system appears to suffer from three major impediments :

- lack of adequate resources,
- absence of an integrated structure, and
- lack of a sense of direction.

ICID does not have resources of its own to fund research. Can it help crystallise a structure and give irrigation research a direction, thereby help find the much needed resources? It is argued that ICID is in a unique position to pursue such an initiative. While ICID has achieved much to raise the profile of research and build an awareness among its members, it has its own limitations.

ICID is an effective network involving professionals from over 80 countries, Due to a variety of reasons, participation in its activities by professionals from developing countries, particularly those from Africa and Latin America, is limited. Participation by researchers is also limited and so is the representation in its activities by social scientists actively involved with irrigation.

The ICID Journal has come a long way as a respected quality periodical and has the potential to provide effective communication among professionals. However, only around 2000 copies are being printed and distributed at present. There are a variety of reasons for the limited distribution, chief among which is the cost of the journal.

The IPTRID Network to which ICID contributes is fast becoming an effective network service. The service is in its infancy and has a long way to go before it attracts the attention of the professionals and gets used effectively.

The library at the ICID Central Office is a valuable repository of an extensive collection of literature. It has to be admitted that both the IPTRID Network and the library are not utilised to their full potential at present. There is the real danger that with the present level of usage, any serious expenditure review will recommend closing down of these services.

While valiant efforts are being made to rectify these deficiencies, other issues of a substantive nature are clamoring for attention. The inadequate performance of irrigation systems has initiated the downward spiral of decreasing investment leading to both insufficient maintenance of existing systems and decrease in investment in new systems. Competition for water in a large number of regions from financially more attractive sectors is exacerbating the shortage of water resources that many countries already face. Sustainability of irrigation systems are questionable primarily due to insufficient attention to operation and maintenance. From the stand point of the three key yardsticks used today in planning investment namely :

- cost effectiveness,
- sustainability, and
- effective use of natural resources,
- irrigation appears to come very low down in the scale.

It appears that if ICID is to make an impact on irrigation/drainage research at this critical juncture, it has to make contributions in four specific areas:

1. Outward focus

It is unfortunate that people who have control over the financial resources are not active members of the ICID. They have to be made aware of the need for more resources and convinced that investing in irrigation research can be cost effective.

The implications for the ICID are that we should start to communicate with the outside world. It is no more sufficient to organise workshops and seminars that only ICID members attend during the ICIE) Council meetings. It is vital that we convince senior policy makers that investment in irrigation research can yield tangible benefits.

2. General paradigm

Irrigation research at present is of a component nature following traditional disciplinary lines. While the need for holistic and multi-disciplinary research is accepted and even- attempted, the different disciplinary lenses are still in tact.

ICID is the unique forum from which the need for a compound irrigation lens, a unified theory, a general framework, can be articulated and researchers all over the world mobilised in the search for this much needed paradigm.

Since in most countries agriculture is the dominant user of water resources and in many of these countries, with increasing population, water is in short supply, it is no more feasible to think in terms of irrigation, drainage and flood control only.

The focus of the general framework referred to above needs to be on a wider front of effective utilisation of water resources.

3. National research capabilities

Up until around the 1960s, the focus of development in Irrigation was on construction of new structures and systems and countries like India, Pakistan, Egypt, China, Indonesia etc developed well equipped and well endowed laboratories to carry out model tests on structures In order to assist In the design and construction of the structures. Since then the focus of activities has shifted to performance, management, operation and maintenance. But the research system has not changed with this change In need. In most instances the approach, facilities, staffing, training, etc has stayed frozen In time. Even in the 1990s attempts are being made by countries that did not develop such facilities in the early part of the century to replicate similar laboratories with the support of lending Institutions and guided by International experts. The result Is that very few national Institutions exist In developing countries that are capable of carrying out research In Irrigation and drainage.

The role for the ICID in this context is to help define the needed structure. Again a general framework needs to be evolved as to what will be needed in the 21 st century and how best it can be achieved. It is in such a context that the training of staff, institutional arrangements, recognition of merit etc. can be structured.

4. Research Networks

The need for an effective network among researchers and also linking researchers with practitioners is self evident. This need cannot be satisfied simply by the provision of an effective network service or the publication of another quality journal. Such services have to be used and without use, the quality of the service deteriorates and the initiative dies away eventually.

Reference was made earlier to the inadequate use of the IPTRID Network and the Central Office library. It is true that this limited use is partly due to professionals being not aware of the existence of these facilities. It is, I think, also due to the absence of the pressure on the professionals for quality outputs. The profession has not yet developed a quality culture and yardsticks to measure quality of professional endeavor. Reasonable explanations like the lack of resources, shortage of time, unavailability or inaccessibility of appropriate literature, etc. always exist to justify low quality performance. Unfortunately, In most instances these explanations are acceptable and frequently accepted.

ICID has in this context a role to develop this quality culture. It can do this by bringing to the public arena good practices and notable achievements. Through its network, which Is a very effective one, and through Its activities, ICID needs

to develop among irrigation professionals a quality awareness and this In turn it is hoped will encourage professionals to seek out for better techniques and appropriate material. ICID's role in this is seen as a dual one :

- to develop a quality culture among professionals and thus a demand for literature and other related material, and
- to continue support of and liaison with groups such as the IPTRID Network and develop similar initiatives with other Institutions such as IIMI.