IRRIGATION AND DRAINAGE
Irrig. and Drain. **57**: 245–247 (2008)
Published online in Wiley InterScience (www.interscience.wiley.com) **DOI**: 10.1002/ird.422

COMMENT: EFFICIENT IRRIGATION; INEFFICIENT COMMUNICATION; FLAWED RECOMMENDATIONS

C. PERRY (2007) *IRRIGATION AND DRAINAGE* **56**: 367–378

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1. OBJECTIVES

It seems that the paper (essentially an irrigation paper) has the following basic objectives:

a) Evidence based demonstration of the inadequacy of efficiency to promote flawless recommendations and, as such, the need to abandon ''efficiency'' altogether.
b) Conceptual based demonstration of ''fractions'' and their adoption by ICID for further use.

2. STRUCTURE

The general structure of the paper does not focus on the objectives mentioned above. For example one section entitled ''The Irrigation Approach to Accounting'' deals with a vast array of issues such as: Classical Efficiency (CE, also irrigation efficiency), Effective Efficiency (EE), basin efficiency, water saving, fractions, European Water Framework Directive (WFD), water productivity, evidences, etc. Consequently, the treatment of these issues is cursory at best. A few of these points are discussed below:

A. The paper puts CE into spotlight by making it clear through various evidences that it does not work and gives flawed recommendations. This is indeed true (for a formal rejection of CE, both through equations and through examples, one can refer to the upcoming paper by Haie and Keller). However because of the fallacy of one type of efficiency, the paper is making a generalization for all types of efficiencies. Also, except for CE, the paper does not make the definition of the efficiencies clear, such as ''basin efficiency'' or the efficiency that ''frequently exceeds 100%''. It is generally assumed that the evidences put forth by the paper as problematic have indeed used CE.
B. The paper mentions two weaknesses about EE but without any evidence, contrary to the objective of the paper. These are:

   a) ''nature of the pollutant'': since this is an irrigation paper and salt is a major quality problem, EE is well posed to solve it with the current knowledge (as acknowledged by the paper). This by itself, and the fact that EE includes in its formulation irrigation return flow, makes this type of efficiency an indicator that promotes sustainability and worthy of serious consideration.

      For a combination of quality problems, an index (such as chemical status in WFD, water quality index in Kaurish and Younos, 2007, etc.) should be used for EE calculations.

      On the other hand, if quality is to be analyzed separately, a point that the paper insists, a quantity only version of EE (Haie and Keller) that includes return flow will solve all the problems brought about in the

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paper as evidences for rejecting efficiency. Including recycled water, as mentioned above, is one of the advantages of EE over the problematic CE.

Finally it should be noted that even if one uses fractions - valid and important in various analysis - no management decision can be made without somehow integrating quality and fractions (quantity). How this gets done in order to promote flawless recommendations is not clear from the paper. So comparing an index such as EE to fractions seems not justified.

b) ''nature of the downstream use'': This issue is also important whether one uses fractions or efficiencies and should not be mentioned as an exclusive weakness of one or the other. However, as mentioned before, EE incorporates reused water and can correctly explain the impact of interventions on the downstream users - a rather important aspect of EE in relation to say CE.

C. WFD is a European wide policy for water adopted in a process of co-decision by both the European Union (EU) Parliament and the Council. The paper should have mentioned that the provision of improving efficiencies referred to in that policy is coupled with securing sustainability, for example it states that ''measures to promote an efficient and sustainable water use in order to avoid compromising the achievement of the [environmental] objectives'' should be adopted. So the real and practical question is how to develop a sustainable and efficient water system rather than simply rejecting the whole idea of efficiency.

3. EVIDENCES

A. Some of the evidences mentioned in the paper (for example on page 373) do not have references and hence it is not possible to verify the validity of their conclusions. This is rather important, particularly for an evidence based paper. Note number 4 about WFD and efficiencies is not relevant: not only does it not have a date but more importantly it is a personal view of an individual about an institutional policy (please also see 2C above).

B. The first evidence explained is the example given by Peter Gleick. We are familiar with this example and do not agree with the following statement of the paper: ''However, claims implying the most obvious ''saving'' – of physical, wet, useful water – are misleading, indeed wrong.'' The example was referring (as mentioned in the paper) to a type of saving which can be designated as ''diversion saving'' (other type being ''depletion saving'' – more in Haie and Keller). Consequently, this particular evidence of Peter Gleick gave a proper recommendation (diversion saving).

C. Finally, in order to formally demonstrate through evidence that the use of efficiency brings about ''Inefficient Communication'' and ''Flawed Recommendations'', one needs to develop a sample population of evidences, make a hypothesis and test its significance by an appropriate statistical test. This, of course, was not done in the paper, and although the conclusions taken by Chris Perry are correct as to the validity of the use of hydrological fractions, we feel that the paper should not form the basis for ICID rejection of all types of efficiency.

4. TERMINOLOGY

A. Although the terms ''adopted'' in the ''Conclusions and Recommendations'' section of the paper are individually valid and useful, they may not add to clarifications sought by the paper. In other words, there is no methodology recommended for the use of the fractions, nor are examples set forth to clarify their practical usage. Consequently, one can easily fall into the same trap that the paper is trying to unravel. For example, one can use the ''Beneficial Consumption Fraction'' which is ''Beneficial consumption'' defined in item ''3.b.i'' divided by Withdrawal, item ''2''. However the use of this fraction under the disguise of new terminology is as harmful as before since it is actually CE, which the paper is trying to reject. It should also be noted that this fraction is value-laden (Molden and Sakthivadivel, 1999) contrary to the implications of the paper.

DOI: 10.1002/ird

B. The paper proposes a framework that is the totality of the fractions themselves, i.e., items 2 and 3 of the Conclusions section. It tries to give validity to this framework by stating that ''it meets the criterion of continuity of mass.'' However, this should be completed by including other sources of water besides Withdrawal that enter the system of analysis and have to be considered to satisfy mass continuity. Besides, the fractions themselves may be partially defined, for example, a ''beneficial consumption'' has been defined as ''Water evaporated or transpired for the intended purpose''. However, it can also include those that are not part of the ''intended purpose'' (Molden and Sakthivadivel, 1999).
C. ''Withdrawal'' as one of the ''water use'' types provokes ''change in storage'' (item 3.a) of the source of water. Part of it can become ''recoverable fraction'' and goes back to the source and makes a ''change in storage''. This is a rather typical situation which causes quality degradation of the ''storage''. However the paper in its conclusions mentions that ''The key characteristic of storage is that the water entering and leaving is essentially of the same quality.''

ACKNOWLEDGEMENTS

The author would like to express appreciation for review of these comments by Dr. Andrew A. Keller and Dr. David Seckler.

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DOI: 10.1002/ird