

Research challenges for the new decade: Application of hydrological science in practice

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ABSTRACT

During the Nanjing discussions about the science plan for the new IAHS Decade there were three target areas identified; understanding, estimation and implementation (or applying science in practice). All three of these are essential if hydrological science is likely to make an impact in terms of addressing societal needs, policy making and the implementation of appropriate strategies to address changes in the future. This is true whether those changes are associated with different environmental, climate or population dynamics. The assumption is that we are likely to be dealing with increasingly complex systems which need to be understood and that the complexities need to be part of the future generation of estimation methods. However, we also need to recognise that the scientific understanding of the complexities and how we deal with them should be adequately communicated to water resources engineers, managers and decision makers. These are the groups that are expected to routinely generate and use the information that will be required to make decisions about how to adapt to future changes. They therefore need appropriate methods and tools to be able to achieve these objectives. The PUB decade (as well as other hydrological science developments) has indicated that there is typically a long lag time between the development of new science approaches and their use in practice. For example, uncertainty assessment has been part of hydrological modelling science for many years, but has yet to filter down into water resources assessment practice. Is this because it is impractical to apply, because practitioners do not understand the concepts and how they should be applied, or because the scientists have not adequately packaged the methods for practical use? Uncertainty is one of the critical issues of the future, largely because many of the possible changes are difficult to define with certainty. While this is an interesting scientific problem it also introduces additional risk in water resources management decision making; already a somewhat risky business in many data scarce areas of the world. This paper therefore argues that the science plan for the new Decade should emphasise the practical applications right from the beginning to try and ensure that new developments in hydrological understanding and estimation filter down to the practitioners as soon as possible.