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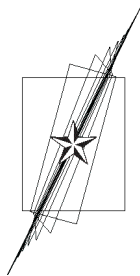
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## From the Editor

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In recent volumes of the *DLSU Business & Economics Review (DLSU B&ER)*, special issues on current topics of interest in the fields of economics and commercial sciences have been released. The production of special issues is a commitment on the part of our editorial board to pursue our goal to be a leading forum of intellectual discourse on key contemporary issues in the region. In carrying out this task we want to make the DLSU B&ER a major source of information on current empirical research on these significant issues. In this *special issue*, we are focusing on selected papers on water management in the Philippines.

Water is a major resource not only for the development of the agricultural sector but also for other sectors including industry, energy, and urban development. With a limited supply further constrained by climate change, it is imperative to have a second look at how water resources are being managed in the country and to clarify the appropriate government policy on pricing water.

For this challenge, we are pleased to have Dr. Randolph Barker, Professor Emeritus of Agricultural Economics at Cornell University and Emeritus Researcher at the International Rice Research Institute (IRRI), as our guest editor. More than being the leading agricultural economist in the field of water management in Asia with his numerous books and journal publications that have been cited globally, Prof. Barker is dearly appreciated for having mentored generations of professors and researchers in agricultural economics in Asia in the last five decades.

On behalf of the editorial board of the DLSU B&ER, I would like to thank Prof. Barker for agreeing to assemble a number of articles on the topic of water management and for graciously accepting to be the guest editor of this special issue. This volume of our journal will indeed be a major source of information for our researchers and policymakers on how to manage resources, particularly water.

**Tereso S. Tullao, Jr.**  
*Editor-in-Chief*





# From the Guest Editor

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“Of all the natural resources water has become the most precious.”

– Rachel Carson, 1961, *The Silent Spring*

There are two significant reasons that convinced the editors of the *DLSU Business & Economics Review (DLSU B&ER)* Journal to come out with this special issue. First, the demand for water for both agricultural and non-agricultural purposes is increasing. Second, climate change poses a threat to food security. There is useful information in this volume not just for academics, but also for water management practitioners and policy makers.

As we review the situation with respect to the development of water resources in the Philippines, we can conclude as follows. The rapid expansion of irrigated area through either construction of surface irrigation systems or exploitation of groundwater has, for the most part, come to an end. That is to say, developing more of the utilizable water resources is costly. In short, the key issues now facing the Philippines are: (1) given water scarcity, how to increase the productivity of existing water resources and (2) how to respond to climate change.

This special issue is composed of three parts. The first is an overview article focusing on the development of irrigation, government-managed stems, smaller communal irrigation systems, and pumps. The second is a series of four case studies offering specific solutions to existing problems in irrigation development and management. The third part consists of four articles dealing with climate change and food security.

## Overview

The article by **Inocencio** and **Barker** sets the stage for the articles to follow in what some have called a “water crisis.” It documents the problems encountered in irrigation development and management currently being exacerbated by climate change.

## Existing Problems and Solutions in Managing Water Resources

**Inocencio, Yoshinaga, Tiongco, and Manalang** offer a solution (public-private partnership or PPP) to an age-old problem of poor operation and management of existing irrigation systems. The paper explores the potential of establishing a PPP with four financial options for the irrigators associations—irrigation service management company to become more independent from public subsidies.

**Tabios III** deals with multipurpose dams analyzing the optimum allocation of water to meet multiple demands. This study assesses the reliability of Angat Reservoir operations to deliver water under future reservoir sedimentation. The author concludes that future reservoir sedimentation can significantly compromise the ability of the reservoir to meet the demands for domestic use and irrigation. Deliberate watershed protection and sediment yield control measures have to be employed. Given the competing water uses, the study suggests that alternative sources should be found especially for domestic use.

The second study by **Tabios III** compares the benefits—costs of alternative dam projects designed to deliver water to the Balog-Balog irrigation system. The author concludes that on the basis of reliability to deliver irrigation water, generate hydropower, reservoir life, flood control benefits, and economic analysis, the single high dam is better compared to the multiple dam system.

**Kajisa, Moya, Garcia, Valencia, and San Valentin** discuss volumetric pricing of water irrigation water as a replacement for inefficient area pricing. They surveyed two irrigation systems in Northern Luzon, Philippines. They conclude that collective management will be more successful in small systems and farmer groups, but that will require more investment in infrastructure.

### **Climate Change and Food Security**

**Cororaton, Tiongco, Inocencio, Manalang, and Lamberte** analyze the negative impacts of wide swings in weather conditions on rice production, especially in rainfed areas, price, and household consumption. Expansion of irrigated area will mitigate or reduce the negative impacts. However, increasing investment in irrigation development can be costly while simply increasing rice imports would offset the negative impacts of climate change and achieve food security.

**Arceo, Cruz, Tiburan, Balatibat, and Alibuyog** gathered data from three sites in the Philippines, and using SWAT modeling, showed how hydrological behavior changes in response to changes in land cover and climate. Thus, appropriate interventions are needed to maintain water security and sustainability in the watersheds.

**Moya** examines the resilience of the Philippine irrigation systems to climate change. He emphasized that the overoptimistic technical and economic assumptions used in the planning and design phase imperiled the intrinsic resilience of existing irrigation systems to climate variability and change. Further, the low maintenance level and inadequate rehabilitation works result in continuing inability of irrigation systems to serve the designed area with adequate water and weaken intrinsic system resilience. The irrigation agency, and the farmer community in particular, are undertaking varied adaptation measures to increase and strengthen irrigation system's resiliency to disturbance like climate change.

**Perez, Rosegrant, and Inocencio** identify three broad strategies in the agricultural water sector that can be used to address the challenge posed by climate change: (1) invest in infrastructure, (2) improve efficiency of water use in existing system, and (3) improve crop productivity over unit of water and land. Their paper analyzes in detail the first strategy for the Philippines. The authors conclude that investing in infrastructure would increase the potential returns for the second and third options.

**Randolph Barker**

*Professor Emeritus, Cornell University*

*Guest Editor*