

BOOK REVIEWS

Water Management, Food Security and Sustainable Agriculture in Developing Economies, edited by M. Dinesh Kumar, M.V.K. Sivamohan, and Nitin Bassi (Eds)
London, Routledge-Earthscan, 2013, xix + 233 pp.

Water management, sustainable agriculture, and food security are the key issues that dominate current policy debates in most developing countries of Asia and Africa. The book under review is an edited volume that deals not only with the intricate linkages among these critical issues but also with the key factors mediating these linkages such as investment, technologies, institutions and policies. Most of the book is based on empirical research conducted in the field in various parts of India. While the book is focused mainly on India, it has a significant international appeal because considerable attention is given to the discussion of the relevance of Indian experience to other developing countries, particularly those in Sub-Saharan Africa and South Asia.

After the introductory chapter setting the context and scope of the volume, there are 10 chapters, each written individually or jointly by 9 authors, including the editors. Chapter 2 evaluates the scientific and empirical validity of some of the claims related to Indian irrigation. Challenging the claim that surface irrigation is declining fast and, hence, that groundwater irrigation is the future for India, the authors argue that surface water has the advantage of physical transferability across regions and also has the ability to recharge depleted aquifers within regions. Current evaluation of the performance of surface irrigation is based on defective concepts that treat water in excess of crop requirements as waste, though the return flows have variable economic and ecological benefits from a basin perspective. Chapter 3 treats the issue of food security empirically using an analytical framework that classifies Indian states into water-rich but agriculturally backward and water-scarce but agriculturally prosperous regions. Although researchers often suggest targeting the former regions for enhancing food production, the constraining factor there is the scarcity of arable land. At the same time, groundwater depletion in the latter regions continues to remain a major threat for agricultural sustainability and food supply. In such a situation, a credible and durable solution to food security lies in inter-basin water transfers from the water-rich but land-scarce regions to the land-rich but water-scarce regions.

The issue of large dams versus small dams is addressed in Chapter 4 based on a statistical analysis of data pertaining to 13,621 dams around the world. The results show that the height of the dam does not have any systematic relation either with to the volume of water stored or with to the area of land submerged. There is a positive relation between the area submerged and the number of people displaced. However, such a positive relation certainly does not support the grossly overestimated figures of dam displacement reported in many cases. It is argued that the cost-benefit analysis of many large multi-purpose storage projects is defective, because positive externalities such as food security, aquifer recharge, and clean energy are grossly underestimated. Chapter 5 evaluates the impact of irrigation management transfer in the empirical context of three Indian states that followed distinctly different strategies for irrigation reform. In all cases, there has been a substantial improvement in terms of timely delivery, access equity, cost recovery, and system

operation and maintenance. Because canal irrigation mostly leads to the cultivation of food crops, all these improvements have indirectly contributed to food security. Further gains are possible if the irrigation management transfer process is also accompanied by corresponding renovations in water delivery networks and additional reforms in water governance structures.

Chapter 6 provides an empirical analysis of the food and livelihood benefits generated by traditional water-harvesting systems based on data collected from the arid regions of Western Rajasthan. The hydrological impacts of these water-harvesting structures are first evaluated by comparing water-table changes between pre- and post-monsoon periods in areas both with and without these structures. The physical changes are then translated into economic values using corresponding changes in agricultural output and income, which are, in turn, used within the benefit-cost framework to quantify the net economic benefits of these water-harvesting structures. Adopting a farming-system approach, Chapter 7 attempts a quantitative assessment of the impacts of water demand management interventions (the introduction of water-efficient crops and micro-irrigation technologies) in the context of agriculture in Northern Gujarat which is facing a severe problem of aquifer depletion. Since the unit of analysis is not the plot but the region as a whole, the assessment is able to capture the effects of increased irrigated area and reduced groundwater depletion made possible through water savings generated by the demand management interventions.

Based on a detailed case study from the south-western parts of Odisha, Chapter 8 investigates the roles of technologies and institutions in improving the economic, food, and livelihood benefits of multiple-use tanks. Although these tanks were originally meant for irrigation, they tend to be used for multiple purposes over time by the adjoining communities. Since there are limits to enhancement of the economic value of water when it is used for a single purpose, the promotion of multiple uses of water services is a sure way to enhance the economic value of water several-fold. However, converting single-use systems to multiple uses requires significant investment in technologies, infrastructures and institutions. Chapter 9 not only highlights the inherent limitations of the present strategy of water management but also outlines the focus of the future strategy. Currently, there is an overemphasis on groundwater recharge through water harvesting and watershed development at the cost of large-scale irrigation development through surface-water projects. Although water harvesting and watershed development provide local solutions, they lead to regional problems because water harvested or conserved upstream leads to less water downstream. Given the land shortage in water-rich regions the water shortage in land-abundant regions, the future strategy should consider inter-basin water transfers as a durable solution to water management problems.

Using data from selected countries of Asia, Chapter 10 examines the investment strategies and technology options for water management, sustainable agriculture, and food security in the Asian continent, where issues of land fragmentation, low productivity, demographic growth and urban expansion are adding to the already serious challenges. A notable feature of this chapter is the table that provides blueprints for specific strategies for sustainable development, water management, sustainable agriculture, and reducing the impact of climate change. For each of these strategies, the table also indicates potential sources of investment, intended outcomes, and expected challenges. The concluding chapter considers the implications for current policy and future research. This chapter also devotes considerable attention to the water, agriculture, and food challenges of Sub-Saharan Africa and indicates how Indian experiences can provide a way out in relevant contexts.

The book is notable for its contributions to a number of policy debates both in India and at the global level. A few of these contributions deserve special notice. First, the authors expose with conviction the limitations of some of the popular policy options such as water harvesting, watershed development and artificial groundwater recharge. These policy options face a major challenge because two-thirds of India is covered with hard-rock regions known for poor rainfall and low storage capacity of groundwater aquifers. In such a situation, run-off harvesting and artificial groundwater recharge do not add much to the net water supply in regions with natural water scarcity, poor primary porosity, and aquifer storage capacity, especially from a basin perspective and during drought years. Since harvesting of runoff upstream does have negative hydrological impacts downstream, an intensive water-harvesting policy is likely to lead to negative welfare outcomes through high intra-basin externalities at higher stages of water development. As a result, most water-harvesting structures and artificial-recharge schemes are physically inefficient and economically non-viable.

Second, the book argues that, instead of the misplaced emphasis on groundwater recharge through water harvesting and watershed development, policy makers should promote large-scale development of irrigation through surface-water projects so as to achieve the much-needed net addition to prevailing water supply. In particular, there is an urgent need for the implementation of inter-regional water transfers from the water-rich but land-scarce regions to the land-rich but water-scarce regions as a credible and durable strategy for addressing the present and future water problems in India. In this sense, this book provides some indirect support for the implementation of the National River Linking Project, which will transfer some 220 billion cubic metres of water from the Ganges and Brahmaputra to the water-deficit regions in central and southern India through 30 river links, 3000 storage dams, and 12,500 km of water conveyance networks. This gigantic water grid, which will cost an estimated USD 100–120 billion, is expected to add 35 million hectares of irrigated area, create 25 giga watts of net power supply, and provide 12 billion cubic metres of drinking water per year. The annual worth of these irrigation, drinking water, and power benefits is estimated at USD 17 billion.

Third, the book also counters the prevailing hydro-schizophrenia that exalts one source of water against another, contrary to the reality of hydrological interdependence and conjunctive use requirements of different sources. Groundwater-based irrigation is often touted as efficient while the same based on surface water is discounted as inefficient. Such an assertion is based on a simplistic evaluation of the relative performance of different irrigation sources. For instance, surface irrigation is evaluated on a narrow concept of efficiency that treats water over and above crop requirements as a loss, ignoring many of the valuable economic and ecological benefits of return flows when seen from a basin perspective. Similarly, there is also an underestimation of the positive externalities of surface-water sources, such as aquifer recharge, food production, and green energy generation. What is worrisome is the fact that this kind of biased analysis is used to advocate policies that favour resource allocation for groundwater development at the cost of many important surface-water projects. The book counters these faulty analyses and policy distortions by establishing the intricate hydrological linkages between the groundwater aquifers and river systems in central and peninsular India and the strong need to conjunctively use both surface and sub-surface water resources in the water-scarce regions of India.

Overall, this book is certainly a major contribution to both literature and policy. It provides a sound empirical analysis of some of the major issues emerging in the interface among water management, agricultural production, and food security. The book is rich not

only in terms of field-level and secondary data but also in terms of bibliographical information pertaining to the subject areas. Because it is well written and organized, with effective language and a lucid presentation, it can be accessible to researchers, policy makers, and general readers alike. From an academic perspective, it can be good supplementary reading for agricultural economics, natural resource and environmental economics, and area studies pertaining to India and Asia.

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<http://dx.doi.org/10.1080/07900627.2013.763331>

Biofuels and rural poverty, by Joy Clancy, Abingdon, UK, Routledge, 2013, ISBN 978-1-84407-719-9

In recent years, biofuels have received a great deal of attention as an alternative source of energy to traditional petroleum-based fuels because of concerns about energy security and climate change. Biofuels have also been touted as a means to spur rural development. It is in this context that *Biofuels and Rural Poverty* contributes to the current literature. The book makes a valuable contribution because it is able to exploit a niche of the biofuel debate that is often mentioned but glossed over, that is, the effects that larger-scale production of biofuels may have on the rural poor. In particular, Clancy focuses on smallholder livelihoods and also includes a discussion on ecological issues pertaining to biofuels. The analysis in the book is qualitative in nature, with examples and statistics stemming from many different countries – India, Mali and Indonesia, to name a few.

The introduction sets up the context of biofuel production in recent years: the feed stocks (first and second generation) that are already in play and are likely to be implemented in the future, and the agendas of the North and the South. (The definitions of North and South follow those of the Brandt Report [1980].) There are six more chapters that follow, the first of which describes what it means to be poor, what conditions may lead to poverty and how participation in the biofuel chain has to be equitable for the poor to benefit. The author notes that equal inclusion in the biofuel production chain is necessary; otherwise, large-scale agribusiness can out-compete the smallholders. Further, biofuels may lead to diversification of income if families are able to participate in more than one aspect of the biofuel chain, but policies to support the poor are needed for this to occur. This chapter also addresses how biofuels may be used as an energy source, not just as a commodity, and thus also contribute to lowering energy poverty (which is a component of overall poverty).

Chapter 3 again speaks to diversification, emphasizing issues of land ownership. Land tenure is important in the context of biofuels because it is one of the major indicators of who benefits from large-scale biofuel production. Often, small-scale farmers without legal ownership of their land are displaced by more powerful, wealthier producers. Although biofuels create employment, is it enough to absorb those who are displaced? It has also been found that working conditions in the newly created jobs are often very poor.

The issues of land ownership and access are further complicated by social disruption as large-scale farmers push out small-scale ones. The author provides the examples of