animals provide dung and urine to nourish the soil, milk and meat for income generation, while the forage and crop residues in turn form the feed for the animals. However, the point made by the authors about producing and feeding improved forages to enhance the quality of beef production, and the potential to increase the economic welfare of small farmer households is unlikely to hold good for other developing countries. In a 'mixed farming system' in small holdings (~1.0 ha), raising cattle exclusively for beef is unlikely to be sustainable in the long run, especially in India. Conversion of plant proteins and carbohydrates into animal proteins is physiologically and economically inefficient.

In chapter 5, Wise and Cacho examine the impact of crop–tree (intercropping) system on mitigating the climate change by sequestering carbon, which is also an alternative for arresting the land degradation emanating from shifting cultivation and continuous cropping systems. The idea of developed countries investing in greenhouse gas mitigation, including carbon sinks such as small-scale forestry and agro-forestry in the developing countries is laudable, but is far from implementation. Developing a tree–crop system depends on several factors such as carbon content of the soil, economic aspects of planting trees for cycles lasting 20 to 100 years and then returning 80% of pruned biomass to the soil to replenish soil nutrients. This has, therefore, implications for livelihood as well as food security of the resource-poor farmers. Besides, it also goes against the traditional farming of food crops. Intercrop systems involving trees and agricultural crops should be so chosen as to promote complementation and not competition with respect to exhaustion and enrichment of soil nutrients. Alternatively, a landscape approach whereby trees are planted to restore degraded areas, while crops are planted in better land for food and income is likely more acceptable.

Kajisa describes in chapter 6, the vicious spiral between the deterioration of tank irrigation systems and accentuating poverty in India. His analyses of village and household datasets collected in Tamil Nadu where the community-centred tank irrigation system has been traditionally managed for rice cultivation reveal that modern irrigation systems which include private wells with pumps are not only unsustainable, but also fraught with serious economic problems to both the well-owning farmers as well as no-well-access farmers. The proliferation and dissemination of private wells lead to double tragedies; not only does it result in the collapse of collective management of tank irrigation among the no-well-access farmers, but also in the over-exploitation and profit reduction among well-access farmers. The traditional wisdom is that rainwater collected in the tanks recharges all the wells in the neighbourhood, and therefore collective maintenance of the tanks is prudent.

The lessons drawn from this study must reach the planners, politicians and administrators in Tamil Nadu. Indiscriminate exploitation of groundwater as private property will lead to desertification.

In chapter 7, Otsuka *et al.* examine the impacts of the 'green revolution' technology on income and schooling of children in three ricegrowing villages in the Philippines.

The authors describe an informal land market called 'SANGLA', which is a credit contract system in which the farmer temporarily transfers his cultivation rights in a farmland to a pawnee in exchange for cash, with an agreement to redeem it upon loan repayment without interest charges. With increase in land productivity due to adoption of modern agriculture technology over time, pawning fees under SANGLA contract has increased. This system has emerged as an important source of schooling investment over time by decreasing the household's credit constraints. Consequently, parents invest in the education of their children, who then become equipped for non-farm-sector livelihoods. Such a migration from the agriculture sector is required to a certain extent, but it should not amount to abandoning the farming sector.

In chapter 8, Praneetvatakul and Waibel discuss a model for the assessment of Farmer Field Schools (FFS) in Thailand. They show that farmers who have participated in the FFS practice improved integrated pest management that reduces uneconomical use of chemical pesticides for rice farming. The FFS becomes important in view of the fact that farmers not trained in such schools continue to use chemical pesticides indiscriminately. They spend more money unnecessarily and leave more toxic residue in the soil and water.

This book suggests possible solutions to various problems in sustaining productive agriculture in many of the developing countries. Several high expectations such as that agriculture be eco-friendly, be remunerative, generate livelihood, and also produce food at costs affordable by urban middle class are by no means easy to fulfil. The data and case studies compiled and edited by Otsuka and Kalirajan are a step towards achieving the goals of sustainable agriculture and livelihoods for millions of small farmers in the developing countries. The ultimate purpose of these varied approaches is to achieve productivity in perpetuity without ecological harm.

Today agriculture in developing countries is also under increasing stress of climate change and a free but not fair trade in globalization. Hence, the ecotechnologies for on-farm and non-farm enterprises by the self-help groups in the rural areas of developing countries should also enhance the coping mechanisms of resource-poor farming, fishing and landless families against climate and/or market-related setbacks.

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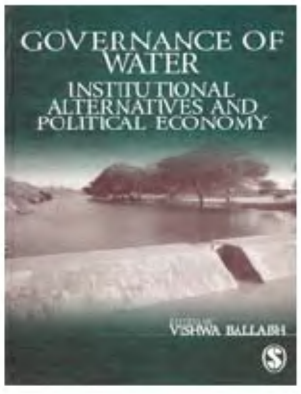

Governance of Water: Institutional Alternatives and Political Economy. Vishwa Ballabh (ed.). SAGE Publications India Pvt. Ltd, B-1/I-1, Mohan Cooperative Industrial Estate, Mathura Road, Post Bag 7, New Delhi 110 044. 2008. 386 pp. Price: Rs 950.

Water governance is defined by the United Nations Development Programme as 'the range of political, social, economical, and administrative systems that are in

place to regulate the development and management of water resources and delivery of water services at different levels of society'. Governance issues have important implications on the management of water resources at all administrative levels – national, regional and local – and are a prerequisite for successful implementation of any integrated water resources management scheme.

This book examines the various issues related to the governance of water. It has been divided into four sections containing a total of seventeen chapters. Section I is introductory and contains four chapters. Chapter 1 by the editor himself, identifies the various issues and challenges in governance of water in India. In Chapter 2, the author while mentioning the major concerns in the water sector, has provided the agenda for action in relation to water. He has stressed on the need for action at multiple levels to achieve this agenda. According to the author, there is a need to change the thinking towards water resources and mere change in administrative, institutional and legal system will not result in the desired success. The next chapter (Chapter 3) is on the topic of mismanagement of droughts in India. In Chapter 4, the authors have discussed various gender issues in water governance. They have reviewed the approaches to address gender equality in the water sector. The authors have stressed the need for restructuring the water sector on sustainable, participative and equitable lines, which would provide more space for addressing gender equity.

Section II entitled 'Pricing, subsidies and governance of surface water' contains six chapters and mainly deals with the issues and challenges in the governance of surface water, including interstate water issues. In chapter 5, the authors have discussed the concept of irrigation subsidy and its impact on the irrigation sector. They have discussed different approaches to quantify irrigation subsides and have compared the estimates using different methods. They have spelt out the agenda for reforming the regime of irrigation subsides with a hope that it would lead to a sustainable, financially sound and effective use of canal water. They are of the view that many farmers will be ready to pay for the irrigation water charges if there is improvement in the quality of irrigation service. In Chapter 6, the authors have argued that increasing of water charges is unlikely to have any beneficial impact either on the efficiency or the viability of the canal system, because only a portion of the irrigation-cess is collected every year. They have corroborated their results by presenting a case study of Mahi Right Bank Canal. They have also discussed the new approaches and paradigms like participatory irrigation management, privatization, private–public participation and decentralization for better management of canal irrigation. Chapter 7 discusses various issues in the pricing of irrigation water. In chapter 8, the author has tried to capture the dynamics of building a civil society by understanding the interplay between the structuring influence of ecology and technology and farmer's agencies. In chapter 9, the authors while reviewing the lessons learnt in India in participatory irrigation management, have stressed on the need for research on water user associations (WUAs) in the wider context of an agrarian structure. According to the authors, the mere establishment of WUAs is not necessarily the answer to the ills of irrigation sector. For the WUAs to be effective there is a need to reorient the irrigation bureaucracy and reforms at the main system level. Chapter 10 explores the factors responsible for inter-state water disputes and outlines major challenges to governance for resolving such disputes. While providing the detailed chronology of the Ravi–Beas dispute, the author has given an overview of inter-state water disputes in India.

Section III entitled 'Groundwater governance' contains three chapters (11–13). In chapter 11, the authors have looked into the development of groundwater in the eastern region of India and have analysed the role played by the states, civil society and markets in reviving the agrarian dynamism in the region. They have also identified policies and strategies for the governance of groundwater in the eastern region. Chapter 12, while giving the history of groundwater development and management in Gujarat, shows how water scarcity is historically rooted in the social ecology and political economy of the state. The chapter also discusses the possible changes brought about in the groundwater ecology of Gujarat through the Sardar Sarovar Project. The author has stressed the need for alternative forms of groundwater governance. In Chapter 13, a comparison has been made of institutions and policies for groundwater management in South Asia, China and Mexico. According to the author, the nature and strategy of governing groundwater depends on a variety of factors which differ widely across regions and countries. While summarizing the chapter, the author has concluded that South Asia is far behind in addressing the problem of over-exploitation of groundwater resources.

The final section discusses the ways forward for meeting the challenges of water governance. Chapter 14 is on the topic of multi-state holder participation and water governance. The authors have provided the history of multi-state holder processes in India. They have discussed the aspects that need attention for the multi-stakeholder's process to be effective in water governance. In Chapter 15 the authors, while giving the socio-economic implications of over-exploitation of groundwater, have presented a case study of the Palar river basin in Tamil Nadu. They have shown the usefulness of multi-stakeholder's participation in resolving water disputes by bringing the disputing parties on a common platform. In Chapter 16, the author has analysed India's experience in institutional interventions in the water sector in recent decades. Chapter 17, while sketching the present knowledge on the dynamics of the Indian water resources sector, provides research themes for better understanding of the politics of Indian water resources policy.

The overall message of the book is that the challenges being faced by the water sector in India cannot be addressed in the current policy and political framework. The sustainable management of water resources requires reorientation of these frameworks along with restructuring of institutional framework. The book rightly identifies and discusses issues, challenges and strategies in water governance. Inclusion of more chapters on the issue of governance of groundwater would have been beneficial to the readers. This is a must read book for all people concerned with the development and management of water resources of the country.

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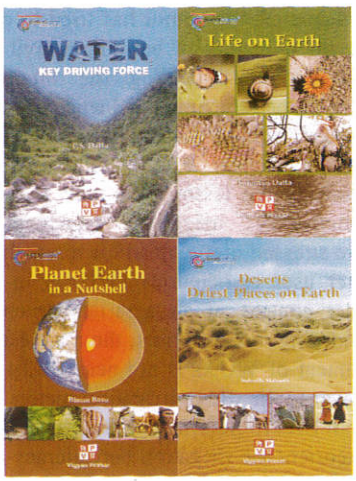
The International Collective in support of Fishworkers, Chennai has brought out a set of five monographs titled: *The social dimensions of marine protected areas: A case study of the Mafia Island Marine Park in Tanzania* by Rosemarie Nyigulila Mwaipopo; *Marine conservation and coastal communities: Who carries the costs? A study of marine protected areas and their impact on traditional small-scale fishing communities in South Africa* by Jackie Sunde and Moenieba Isaacs; *Marine protected areas and artisanal fisheries in Brazil* by Antonio Carlos Diegues; *Marine protected areas in India* by Ramya Rajagopalan, and *Coastal and marine protected areas in Mexico* by Julia Fraga and Ana Jesus.

These collectively constitute the Samudra Monographs. These booklets are an attempt towards conservation of marine resources which is becoming a growing global priority while the concept of marine protected areas (MPAs) is being widely propagated. An MPA is considered to be any coastal or marine area in which certain uses are regulated to conserve natural resources, biodiversity, and historical and cultural features. They are seen as tools to address abuse and destruction of the environment.

On the basis of documentary surveys and interviews with residents of the island's villagers, national government officials, and the parks' managements, these studies put forth several proposals through which traditional, small-scale and artisanal coastal communities can engage better in protecting marine ecosystems and their rights.



On the occasion of the International Year of Planet Earth – 2008, Vigyan Prasar, Noida has published the following ten wonderful books titled *Water, Key Driving Force* by P. S. Datta; *Life on Earth* by Sukanya Datta; *Planet Earth in a Nutshell* by Biman Basu; *The Weather Riddle* by Biman Basu; *Deserts – Driest Places on Earth* by Subodh Mahanti; *Snakes* by Sukanya Datta; *Mangroves – The Tidal Forest* by R. Paneerselvam; *Mountains Under Siege* by Hasan Jawaid Khan; *Earth's Changing Climate* by Biman Basu; and *The Violent Earth – Earthquakes, Volcanoes and Tsunamis* by Subodh Mahanti.

The Earth is the only planet we know of our solar system that is capable of sustaining life and home to a myriad of life forms. Even a cursory glance around us shows that the Earth is a complex and dynamic system. No one denies the need to understand the interactions of air, soil, water and living elements – Earth's atmosphere, land, oceans, ice, and life – as a single, connected system. We need to do this to really study the Earth as a single connected system. And to be able to do so, we need to appreciate the beauty and importance of every denizen on Earth, including the most humble and the most insignificant. However, despite our incredible advances, in both science and philosophy we are yet to understand the intricacies of these interactions.

These ten books are reasonably priced; all of them within Rs 100. The website of the publisher is www.vigyanprasar.gov.in.

These books are by well-known popularizers of science, some of whom have been awarded prestigious awards for their outstanding work. These books are intended to inform the lay reader and they undoubtedly achieve their goal.

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SECOND SCHOOL IN NEUROSCIENCES

The Department of Science and Technology, Govt. of India, New Delhi, sponsored SECOND SERC SCHOOL IN NEUROSCIENCES will be conducted at The Center for Neuroscience, Indian Institute of Science from February 1st to February 16th, 2009. The School aims at imparting intense training (courses as well as lab work) in Neuroscience specifically on the physiology of nerve cells. The School will provide a unique opportunity to receive hands-on training on electrophysiological recordings (extra-cellular and intracellular) and on the interpretation of the results. In addition to some of the most renowned workers from India, outstanding scientists from abroad like Prof. John Nicholls FRS of SISSA, Italy; Prof. Ken Muller of Miami Florida; Prof. Jan M. Ramirez, University of Chicago, USA, will serve as faculty at the School. Young researchers, Ph.D. students, and faculty members in the universities and colleges who are keen to participate in the School should write to Prof. M. K. Mathew, School Director on the e-mail: mathew@ncbs.res.in with a copy to Prof. N. K. Subhedar (past director) on the following e-mail: nksubhedar@hotmail.com. Some of the students who have participated in the first course may also apply.

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