

BOOK REVIEW

Rathore MS Partap T and Rathore LS, Desert Ecosystems: Rescripting Development Paradigms, Springer Switzerland Jointly with Capital Publishing Company, 2026. 381 Pages.

This book is an outcome of the papers presented in a conference on Desert Ecosystems: Status, Emerging Challenges and Perspectives jointly organized by the Centre for Environment and Development Studies Jaipur and the Indian Society of Agricultural Economics, Mumbai on November 15-16, 200. The conference brought together eminent scholars from different fields who have made significant contributions in exploring the hitherto unknown and least understood aspects of desert eco-systems including livelihoods of people inhabiting these ecosystems. The efforts of the host institution in organizing the conference successfully have been appreciated by the President of the Indian Society of Agricultural Economics in his foreword to the book. The book addresses the socio-ecological transitions of desert ecosystem over time and space and the need to reassess the established parameters. The book covers inter disciplinary aspects related to climate change, desert ecology, sustainable livelihoods and adaptation strategies through technological interventions. India has hot deserts of Thar on its western border adjacent to Pakistan, coastal deserts and cold deserts of Ladakh. The traditional knowledge of human societies inhabiting these deserts has passed down through generations on how to adapt and survive in extreme conditions. The central theme of the book is to create a deeper understanding and awareness about the desert ecosystems, challenges to their biodiversity and people.

The book is divided into three parts. Parts I on hot desert ecosystem includes ten chapters covering various aspects of the desert economy.

The first paper in this section is by Dr. Amal Kar titled “Agricultural Land Use and Land Degradation in Thar Desert: Observations, Monitoring Methods and Emerging Trends for Future Strategies”. Author has highlighted the specific features of Rajasthan's desert area with his long experience of living, travelling and conducting studies on different aspects of Thar Desert. The land surface in Thar Desert being mostly covered with aeolian sand sheets and sand dunes, the rainfall being meagre and the wind during summer month being strong, the landscape here is highly vulnerable to wind erosion. Rainfed agriculture, livestock and agro-pastoralism systems remain the main sources of food, incomes and employment for the poor populations. The author highlighted three major environmental issues of the Thar Desert that need serious attention of the stakeholders and those are water management, land quality and dust emission.

The second paper listed in this section is titled “Transforming Drylands: Systems-Based Sustainable Agriculture in Arid Western Rajasthan” contributed by

Shalander Kumar, Abhishek Das, Anthony Whitbread and M.L. Jat. The paper highlights the major determinants to shaping the configuration of agricultural production systems across western Rajasthan. Along the West-East rainfall gradient there is availability of water and moisture. With the advent of canal water and as groundwater extraction intensified, there has been a noticeable shift from the system of cultivating traditional millets and legume crops along with livestock (cattle and sheep) towards a system of cultivating commercial crops such as cumin (*Cuminum cyminum* L.) and Isabgol (*Plantago ovata*), horticultural crops like pomegranate and fig or raising livestock such as buffalo and goats. The third paper in this section is contributed by Robert N. Truelove, Stephen C. Lelleyet and Abul K.S. Huda titled “Australian Desert Ecosystems: Perspectives and Challenges for Agriculture”. The authors have attempted review of literature about Australian desert ecosystems and the social and economic systems there in, with a focus on the perspectives and challenges for agriculture based sustainable livelihoods. The fourth paper titled “Phylodiversity of Thar Desert: Traditional Knowledge, Sustainable Utilization and Conservation” by Narpal Singh Shekhawat, et al highlights the status and threats to plant resources in the Thar Desert.

The fifth paper in this section is by S.S. Burark, M.S. Rathore and G.L. Meena titled “Status of Temporal Changes in Agriculture in Western Rajasthan”. The western region of Rajasthan characterized by changing prospects of agriculture due to high variability in rainfall, shrinking agricultural land and diversification towards plantation and other commercial crops. The factors that directly and indirectly affect the growth of agriculture such as declining size of land holding, change in cropping pattern especially towards horticulture and cash crops, depletion of ground water for irrigation, changing composition and population of livestock, etc, have been discussed. The authors cautioned that the problems of desert regions are likely to be further aggravated by human activities such as unsustainable farm practices (overgrazing, excessive use of chemicals in agriculture and mechanization), heavy industry and mining, deforestation, over exploitation and contamination of water and other natural resources, urbanization and increase in artificial surfaces. All these activities are leading to desertification. This section also has a paper from Africa by Boubie Vincent Bado and, Andre Bationo titled “Sustainable Management of Dry Lands of Africa: A Framework of the Holistic Participatory Approach”. This paper analyses the main achievements of integrated approaches, including the role and participation of rural communities for sustainable management of land resources in dry lands. The aim is to suggest new participatory approaches of sustainable management of dry lands for the resilience of farming systems. The seventh paper in this section is by Rajendra Prasad Pandey titled “Challenges of Drought and Water Resources Management for Resilient Ecosystem”. This paper presents current level of understanding of occurrence of drought in different climatic regions of India and the challenges in drought mitigation. Various drought indicators and indices suitable for drought monitoring and assessment have been conversed including region specific suitability of mitigation options. The relationship

of regional climatic parameters with frequency, severity, and persistence of drought have been discussed in detail.

The eighth paper titled "Challenges and Opportunities for Livelihoods and Environmental Security in Desert Ecosystems of Rajasthan, India" is by V.P. Singh; highlighting the complex problems of Thar or western region of Rajasthan. The author suggests designing the required vegetation combinations for Livelihoods (food, nutrition, fuel, fodder, timber, and other purposes) and Environmental Security, and developing technologies for growing them on the farm and landscape level, on lands owned by the small holders. The sequential restoration of vegetation and ecological services would be a multiplier benefit of this suggestion. The ninth paper is by Dr. Purnendu Kavoori titled "Mapping Ecological Concepts on to the Landscape of Rural Economy: What Makes for Resilience in Agropastoral Western Rajasthan?" The paper highlights the issues pertaining to uncertainty and dry land adaptation in the context of western Rajasthan. There is, an increasing apprehension that we are probably entering a long-term phase of uncertainty/unpredictability in our ecological and social environment. Desert ecosystems have a wide range of landscapes, temperatures, altitudes and aridity. These landscapes have however one feature in common, namely the presence of a high degree of variability. Arid and semi-arid landscapes invariably have considerable fluctuation in temperature, rainfall, and local bio-physical gradients. The last paper of this section, by P.M. Chauhan and V.P. Joshi, titled "Towards Achieving Sustainable Development in Agriculture with Rainfed Ecosystem" of semi-arid area of Gujarat. Kachchh in Gujarat is the second largest district of India, accounting for 25% of the state's area. Positioned in a semi-arid zone, it experiences severe weather extremes. Introduced in 2014, Dragon fruit (kalamam) has quickly become a favour crop among Kachchh farmers due to its resilience to extreme temperatures. Today, over 200 farmers across the Kutch area of Gujarat have embraced dragon fruit farming, covering an area of approximately 700-800 acres.

II Part of the book deals with cold deserts of India. This part includes four chapters covering cold arid zones of Himachal Pradesh and cold desert of Ladakh.

The first paper is by Tej Pratap titled "Himalayan Cold Desert Environment, People and Change Process". Observations and analysis presented in this paper, are based on the published accounts and more often on the first-hand knowledge and information gathered by the author, over a period of three decades (1990-2022) presenting a situation analysis and a perspective of the dynamics of change process of the land, environment and people of this cold desert zone. Signs of climate change impact in cold arid zone are visible and these can be both positive and negative. Looking at the negative signs, glaciers are receding faster than expected, snow fall is declining in terms of annual snow fall quantity as well as widening cycle of years when heavy snowfall is experienced. These events may become severe. In Himachal Pradesh, warming of local weather has been not only observed but strategies to benefit from it in farming have already been put in place. The success story of vegetable and fruit

(Apple) farming in cold and dry zone of Himachal highlights the fact that with sincere institutional efforts, farm economy of cold arid zone can be turned into a profitable proposition.

The second paper in this section is by Anurag Saxena, et al. titled “Climate Change, Farmers Adaptation Strategies and Technological Interventions Led Agricultural Development Process in the Himalayan Cold Desert”. A number of invasive pest species have arrived in the High Himalayas in recent years. Climate change may be one of the reasons for it. The third paper in this section is by M.S. Raghuvnshi titled “Indicators of Changing Climate, Natural Landscape and Agriculture Dependent Livelihoods in the Desert Region of Ladakh”. Ladakh, the cold desert area of Indian Himalayan region is primarily an agropastoral economy. It is topographically mountainous with martian landscapes, which has significant bearing on the climate processes. Soil here is shallow to very shallow. It makes the region vulnerable to natural degradation processes, caused by varied climatic, edaphic and anthropogenic activities. The fourth paper in this section is by Mahesh K. Gaur titled “Land Resources and Agricultural Economy of Leh district of Ladakh: A Case Study”. The author argues that there is a major challenge to understanding the relationship between various land attributes, land degradation, agricultural productivity and food security in the cold arid region of Ladakh. This research paper highlights the underlying issues.

III part of the book has two chapters on the coastal desert ecosystem.

The coastal desert ecosystem of India is less known and under researched. There are two contributions in this section. The first paper addressing coastal desert in India is by Dr. V. Geethalakshmi titled “Management of Desert Ecosystems in Coastal Tamil Nadu”. Although, the state of Tamil Nadu gets precipitation from south-west as well as north-east monsoons, some places in Tuticorin district and adjoining areas receive less precipitation, hence being dry and arid, resulting in desert. Locally called Theriands, coastal desert area spreads over south coastal districts of Tamil Nadu, Thoothukudi and Tirunelveli. It has active and stabilized sand dunes. Coastal desert area of Tamil Nadu is characterized by low and inconsistent precipitation, high evaporation, and invariable occurrence of drought stress. It is characteristic of deserts owing to moisture scarcity. The paper by Nabansu Chattopadhyay, K. Malathi and Laxman Singh Rathore, titled “Climate Dynamics and Agriculture System in Deserts” summarizes the characteristics of all the three types of desert ecosystems, i.e., Hot, Cold and Coastal deserts. Global climate change is having a pronounced impact on desert regions, affecting them more significantly than many other areas. Deserts are experiencing higher temperature increases compared to other regions. This intensifies evapo-transpiration rates, further drying out already arid areas. While deserts typically receive minimal rainfall, climate change is causing more erratic and extreme precipitation events leading to lash flooding and increased erosion, disrupting the fragile desert ecosystems.

The book is written in an approachable language with clarity and scientific depth. The book has been organized in clear and concise manner making it engaging and to the point. Chapters are based on rigorous research and provide factual information covering climate conditions, soil characteristics, land use, agronomical and entomological challenges and human interactions. The chapters are supported with diagrams, graphs and tables that make the material easier to grasp. On the whole, the book is a welcome addition to the available literature on desert ecosystems and, as mentioned in the foreword, “the comprehensive and detailed treatment of the complex issues provides an indispensable road map for researcher, managers, and policy makers working in desert ecosystems”.

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