

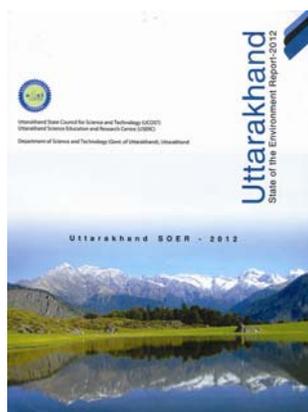
in systems biology, which many biologists consider to be a compilation of systems as they under qualitatively understand (mitochondria, chloroplast, genome, etc.) and not a series of input–output dynamics that needs to be modelled mathematically.

While reading the book, a clear view emerged in my own mind, the need for experimentation first hand, to keep ones wit around in nebulous areas like thermodynamics. All except the naïve know that thermodynamics does not yield a mechanism for a process and only affords a logical validation tool such that no proposed mechanism violates it. Today, bioenergetics in the country is nearly dead as a dodo. One major problem that arises is that the sales of machines for oxygen measurement such as Hansatech and Licor have become low, while Gilson has stopped the manufacture of both the manometers and polarographic instruments indispensable in these areas. Consequently, competent service has become virtually absent as I have seen in the laboratories of some younger colleagues.

Given functional laboratories, we did find that growth and drought tolerance can be defined in explicit physical terms, phenotypes defined and predicted with a direct thermodynamic basis. The scope for physical approaches in plant sciences is convincingly large. But it cannot be visualized unless one examines the existing dogma and proceeds empirically checking plausible hypotheses. This book does not share that conviction.

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Uttarakhand: State of the Environment Report – 2012. Rajendra Dobhal (ed.). M/s Bishen Singh Mahendra Pal Singh, 23-A, New Connaught Place, Dehra Dun, India and Uttarakhand State Council for Science and Technology, Dehra Dun, India. 2012. 357 pp. Price: Not mentioned. ISBN: 978-81-211-0845-4.

This book is a good attempt at capturing the baseline information on the status of the environment in Uttarakhand. Such reports are extremely useful in understanding the existing status of the ecosystem and track their responses to developmental activities in the future.

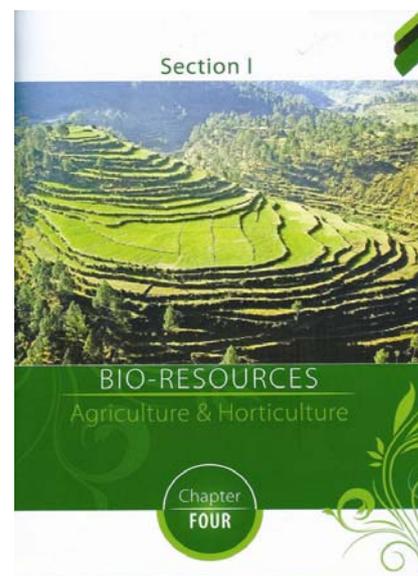
Uttarakhand is the 27th newly carved out state from the erstwhile Uttar Pradesh. Ever since its formation in 2000, constant and continuous development activities are taking place. As Uttarakhand is located in the fragile Himalayan ecosystem, it is extremely important to balance the development activities with sustainability in the ecosystem. The book therefore is a good attempt at capturing the existing status of natural resources for carefully implementing the developmental programmes, without harming the natural resources and at the same time utilize some of the natural resources for the benefit of the state. While offering a panoramic view of the environment of the state, the book covers in depth seven broad areas – bio-resources, geo-resources, climate change, disaster scenario and management, health, industry and tourism.

The book is a rich source of data presented through several tables, giving an overview of the status of bio-resources. In the section on bio-resources, the book covers the status of biodiversity, provides detailed account of important flora and fauna, and efforts on conservation of biodiversity, policies covering biodiversity conservation and on the institutions

working in the field of biodiversity. It also touches upon the natural endowment with regard to medicinal and aromatic plants, forests and wetlands. Agriculture and horticulture are the critical sectors of economy due to topography and prevailing climatic conditions. A section is therefore dedicated to agriculture and horticulture. It has also included an extensive list of references for further detailed reading and understanding.

In the section on geo-resources, the book gives an overview of potential mineral reserves that are available and could be exploited with care. The section on water resources explains the hydrology and water scenario of the state. Rainfall information along with the surface and groundwater resource potential and water quality status of selected rivers are provided. In the same section in a chapter on energy resources, the book provides an overview of energy needs, energy generation capabilities from different sources, viz. hydro, wind, solar, etc. Considering that the state is in the Himalayan zone, the report proposes small decentralized hydro power projects to avoid forest clearance and other associated hurdles. Potential of wind and solar power seems rather low due to the terrain and extensive forest cover. Solar and biomass as potentially capable sources of energy are recognized.

Glaciers form the major component of Uttarakhand. Here again the book gives the extent and nature of the glaciers and their status as of today. Further, it also indicates necessary research to be undertaken to understand the glacial dynamics.





The book covers an exclusive section on the Gangotri glacier and documents the changes in the glacial extent. There is a general account of glacial hazard, but it is not with reference to Uttarakhand.

Being in the fragile Himalayan ecosystem, the state is most vulnerable to variability in the climate in the prevailing global climate change scenario. The book has used the reports and datasets available to trace the temperature and rainfall variability of the state over 50 years. This chapter has also dealt with the glacier contribution to the river flow, effect of climate change on biodiversity, shifting of vegetation, phonological changes in tree species, variation of

nutrients in the river water and agricultural production. The chapter has also attempted to forecast the effects of climate change on tourism, health and industry.

The section on disaster scenario and management concentrates on landslides and earthquakes and provides detailed account of them. It also gives an overview of the forecasts and preparedness that require to be taken with regard to mitigation of natural disasters and touches upon the policies and institutional and legal arrangements for disaster mitigation and management.

In the section on health, the book indicates the overall status of the health of the community and has identified that maternal mortality ratio is higher than the national average. A detailed account of the available health infrastructure and the achievements of national health missions like NHRI, RNTCP, NVBDCP, NPCB, etc. is provided. Key challenges in providing good health facility have been enlisted.

Along with the natural endowments the book has also dealt with tourism and industrial scenario in the state. Due to favourable policies coupled with good connectivity, locational advantage, highly educated human resource and abundant power, the state has witnessed rapid industrial development and has risen from a 'zero industry region'. The book

has tried to document the changes in the industrial scenario of the state in the heavy and MSME segments and has documented its policy interventions.

The state by virtue of its location has a variety of tourism destinations and is endowed with several hill stations. Eco-tourism, wildlife tourism, religious tourism, health tourism and cultural tourism are predominant and the book covers each one of them in detail. Further, the economic and environmental impacts of tourism are also discussed.

On the whole, the book provides a picture of the resources of Uttarakhand. It serves as a good document for policy makers to take appropriate developmental strategies to improve the environment, health and economy of the state with due concern to its natural ecosystem. Such books are welcome for every state in order to understand the status of the environment and generate awareness amongst the general public with useful information as well as support the decision of the Government and policy makers for better planning and implementation of developmental activities.

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