

well written. It is evident that this method has higher specific energy consumption than MED. In such a situation, methods to reach MED levels should have also been mentioned. After many chapters in technologies, the focus in the next chapter shifts to nanocomposite membranes. It is purely based on the chemistry and details of nanocomposite membranes. It would have been more useful in the context of this book to also relate the energy requirement for instance, if these composites are used for RO. Content looks open ended. The final aim, if any, of optimization/better performance/low energy requirement needed elaboration. The cost increase, if any, by using such membranes needed elaboration.

Thus far, the book attempts to bring out some emerging technologies. However, many new technologies have not been covered and those are still being studied like ion exchange, electro dialysis, multi-effect humidification and low temperature ocean thermal desalination which have been successfully demonstrated in India. There are also newer technologies like air water generation which is the making of fresh water from atmospheric humidity. Too much emphasis is laid on MD and the chapters are randomly selected without any thread of the types of technologies that need to be studied.

The next section is about recent trends and applications. Under this, the first chapter gives a qualitative analysis of the efficacy of CNTs. Neither experimental nor theoretical results/data are provided to show that CNTs really have advantages over the conventional materials. This chapter is a bit simplistic and not in line with the thrust of the book. The next topic is important and brine from RO systems needs more studies. The chapter brings out several uses of brine. However it is all qualitative. A quantitative assessment for different applications with costing scenario would be more beneficial. The chapter finally touches emerging technologies like FO & MD which seems out of place as their utility or connection for brine treatment is hardly explained. The next chapter appears contrived and it is difficult to understand some aspects. On the one hand, ZLD for the shale gas waste water is emphasized. Then how can MSF be useful? Thermal systems do not create brine; that is their advantage. Membrane systems create brine and only

those can be considered for a ZLD scenario. More than ZLD, the idea of shale gas waste water desalination itself and how to achieve it in a viable manner should have been addressed. The reader is left confused as to whether the chapter is on shale gas desalination or ZLD because they are two different entities. An interesting concept is presented in the next chapter where FO is used for irrigation with soluble fertilizing solution used as a draw solution. The chapter claims that diluted fertilizer DS after water permeation can be directly used for fertigation. Now the efficacy of this has not been demonstrated well and some proper examples would have helped for better understanding of this topic as it is important from the agricultural point of view. The chapter on desalinated seawater for agriculture is very qualitative. First, no mention of the desalination process is made. Desalination itself is expensive today so how can it be viable for agriculture? Today treated waste water may be a better option for irrigation. The chapter gives figures and numbers which do not reveal much and it appears just a fictitious idea since the farms will have to necessarily be on the coast. This chapter is very vague and lacks any technical details. Solar stills make very low quantities of fresh water. The chapter makes it appear that large solar stills may be possible as large sources of fresh water, which is not the reality. This chapter needs to have technical calculations to substantiate the possibility.

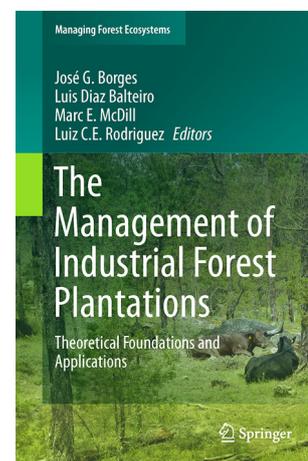
The structure of the book into two parts, one for emerging technologies and the other for trends and applications, is not consistent with the chapters populating those sections. The chapters in the first section are vague with no numbers to substantiate. The topics are good and relevant but contents are a bit lacking. It appears there were a few more chapters available and hence they have been grouped under trends and applications. None of the chapters in this section is either well thought of, or accurate. This section could be in fact removed entirely. Many chapters try to include a cost component but the facts and assessments are lacking. Most of the chapters start off well with an intent to address the topic but they seem to stray into areas not relevant to the topic at hand.

This book could have been useful had it been put together in the following

order – new technologies and their descriptions, components for optimization in each of these methods, energy optimization for these technologies, use of renewable energies and finally some specially described applications of the recently developed technologies. A consistent costing methodology for all the desalination methods would put all the methods on a common platform and costing more realistic.

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The Management of Industrial Forest Plantations: Theoretical Foundations and Applications. José G. Borges, Luis Diaz-Balteiro, Marc E. McDill and Luiz C. E. Rodriguez (eds). Springer, Dordrecht. 2014. xiii + 543 pages. Price: 119.99€. Volume 33, Series title: Managing Forest Ecosystems. ISSN 1568-1319; ISSN 2352-3956 (electronic); ISBN 978-94-017-8898-4 and ISBN 978-94-017-8899-1 (eBook).

With the necessity to meet the growing wood demand, plantations are raised on a large scale. The means to manage such large-scale industrial plantation is the key theme of the book under review. The editors have made such a valuable work in production forestry by compiling the information from more the 35 contributors. This book is the 33rd volume in the series – *Managing Forest Ecosystems*, published by Springer.

BOOK REVIEWS

The book encompasses all latest topics from supply chain management, modelling techniques with detailing and description of usual plantation forestry aspect in a new perspective with current examples. The contents are carefully chosen to address the issues pertaining to industrial plantations establishment, development and management. The book provides a centralized albeit expansive explanation and reference for the content. There are few works¹⁻³ that are referred for plantation forestry, but they do not detail the theoretical and practical approaches in plantation forestry. Although the book provides a comprehensive picture similar to that of Evans and Turnbull⁴, it also includes the latest developments.

The book is divided into three parts. The first part begins with the chapter that attempts to provide an introduction to industrial forest plantation by defining the term 'Industrial forest plantation' which covered the importance of industrial forest plantations by highlighting their aim and objectives. It includes a wide array of statistics to showcase the increase in area under plantation from 1990 to 2010, globally. It also attempts to portray the future demand and describe the need to develop management tools for the plantations. Like a natural forest, plantations are also complex in their own way. Managing such plantations needs planning at many levels and also needs linkage between different stakeholders for an effective management plan. This forms chapter two which describes the different levels of planning with some planning models that can aid in the formulation of management plans. Modelling not only aids in better planning by predicting and calculating the yield potential at stand level but also at individual tree level. The author of this chapter, Aaron Robert Weiskittel also describes the need for the development of models to understand the impact of different silvicultural treatments

like thinning, pruning, etc. Personally, I would also recommend in developing such models for the formulation of stand management practice, as a real-time experiment may take more than one decade to finish a trial. Among the many chapters, chapter 4 is much relevant to the present status of industrial plantations which portrays the various activities that are carried out in the industrial plantation. As thinning was my theme of research in my master's programme, the content and references of this chapter helped during my research work. The success of industrial plantation depends upon the economics and strategic planning in all operations such as felling and transportation.

The second part presents the latest development in the field of the management and also highlights the significance of incorporating such latest technologies for better management. Information and technology support is indispensable for enhancing the efficiency of any system, it holds well in the plantation sector too. When, why and how to integrate the decision support systems with the management of stands for better results are purely based on experience (chapter nine). Any planning has its impacts after a long time and outcomes highly depend upon the perfection in planning and any plan will have its own uncertainty and risk. Chapter ten details about the way to address the uncertainty by two means, i.e. mathematical and heuristic techniques. Management design to improve the efficiency and to attain sustainability in plantation are focused in chapters 12 and 13, which are more advanced concepts for which authors should have used some more case studies and some examples.

Any activity has its own impact with climate change at our doorsteps. Part III addresses the emergent topics that can turn over the plantation sector such as carbon sequestration and marketing

(chapter 14), need for and the benefit due to forest certification in chapter 15. The chapters also compare the different certification schemes across the world and point out the difficulty in the certification of plantations. Supply chain management is an integral part of any venture, plantations do have supply chain management that is explained in chapters 16 and 17. The latter speaks on the supply chain management issue faced by the pulp and paper industry whereas the former provides a general view. The book concludes with a chapter on environmental impact assessment of forest operations with lifecycle assessment methodology as a suitable tool.

On the whole, the book provides a comprehensive outlook of matters related to a plantation in this 21st century. A book of this sort is most handy for the plantation managers, forest department officers as well as graduate and undergraduate students of forestry.

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 2. Brockerhoff, E. G., Jactel, H., Parrotta, J. A., Quine, C. P., Sayer, J. and Hawksworth, D. L. (eds), *Plantation Forests and Biodiversity: Oxymoron or Opportunity?*, Springer, The Netherlands, 2009, p. 288.
 3. Evans, J., *Planted Forests: Uses, Impacts and Sustainability*, CABI, 2009, p. 224.
 4. Evans, J. and Turnbull, J. W., *Plantation Forestry in the Tropics: The Role, Silviculture, and use of Planted Forests for Industrial, Social, Environmental, and Agroforestry Purposes*, Oxford University Press, 2004, p. 480.
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