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**“This really is an absolutely superb volume. Many congratulations to Earthscan for publishing it. It is of worldwide significance.”**

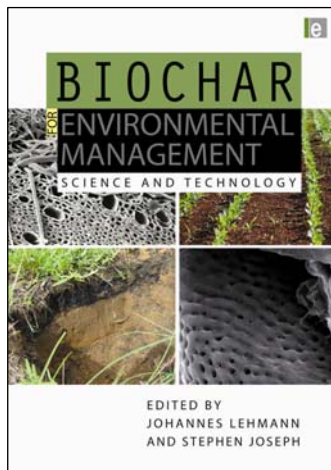
- Chris Goodall, author of the best-selling *How to Live a Low-Carbon Life*

# **BIOCHAR**

## **FOR ENVIRONMENTAL MANAGEMENT**

Science and Technology

Edited by Johannes Lehmann and Stephen Joseph



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- **Author Interviews**
- **Excerpts**
- **Features / Editorial pieces by the authors**

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### **Praise for the book:**

'Climate change seems an impossible problem. Impossible, that is, until one looks at the potential for biochar to permanently sequester atmospheric carbon. This wonderful volume is an invaluable handbook for those interested in the science and economics of soil amendment using biochar. A vital tool for policy-makers and scientists working on climate change mitigation.'

- *Chris Goodall, author of the bestselling How to Live a Low-Carbon Life*

'This book provides comprehensive information and analysis on biochar technology and its implications. It is an essential reference in fostering pro-poor policies on energy efficiency and GHG mitigation based on land and soil improvements that could bring more justice into the climate change agenda.'

- *Luc Gnacadja, Executive Secretary, United Nations Convention to Combat Desertification (UNCCD), Bonn, Germany*

## Biochar in the News:

### One Last Chance to Save Mankind

*Interview with James Lovelock in New Scientist*

<http://www.newscientist.com/article/mg20126921.500-interview-one-last-chance-to-save-mankind.html>

### An Open Letter on Biochar from Professor Tim Flannery

*Posted on the International Biochar Initiative Website*

<http://www.biochar-international.org/timflannery.html>

### Biochar: Carbon Mitigation from the Ground Up

*Article in Environmental Health Perspectives*

<http://www.ehponline.org/docs/2009/117-2/innovations-abs.html>

### Video Presentation on YouTube on the Potential of Biochar

<http://www.youtube.com/watch?v=nzmpWR6JUZO>

### Opposition Supports Biochar Research

*Article on ABC Online Australia*

<http://www.abc.net.au/7.30/content/2008/s2474577.htm>

### Major CO2 Mitigation Methods

*Article on Next Big Future*

<http://nextbigfuture.com/2009/02/major-co2-mitigation-methods-carbon.html>

## From the Preface by Tim Flannery

Throughout 2008, it has felt as if our future is crystallizing before our eyes. Food shortages, escalating oil prices, a melting Arctic ice cap and other climatic changes seem to make the news every week. All are potentially serious threats, and any one could be the harbinger of profound change for our global civilization. It's also become evident that the time we have to address such challenges is limited. For example, just 16 months from now, in December 2009, humanity will face what many argue is its toughest challenge ever - developing a global treaty sufficient to deal with the climate crisis. If we fail to forge an able successor to the Kyoto Protocol at this meeting in Copenhagen, we'll have to wait until 2020 for another chance, and many scientists argue that by then it will be too late.

Scientific studies confirm that our planet is warming at a rate consistent with the worst case scenario developed by the Intergovernmental Panel on Climate Change in 2001, meaning that we must make substantial inroads on our emissions in the next 20 years if we hope to avoid irreversible damage to Earth's climate system. Yet, with economic growth and the thirst for energy in China and India seemingly unstoppable, this is a task of the utmost difficulty. Furthermore, progress cannot be made at the cost of our food or energy security. What is needed in this 21st century of ours, clearly, are solutions that deal with several of our major problems at once. And they must be deliverable quickly, and at a scale able to make a real difference.

This book, I believe, provides the basic information required to implement the single most important initiative for humanity's environmental future. The biochar approach provides a uniquely powerful solution: it allows us to address food security, the fuel crisis and the climate problem, and all in an immensely practical manner. Biochar is both an extremely ancient concept and one very new to our thinking. Amazonian Indians used it to produce the *terra preta* soils of the Amazon Basin, which, 1000 years after their creation, remain more fertile than surrounding lands. Yet, few farmers living today have

heard of biochar. Worse, our political debates about climate change continue in ignorance of it, while industries that could benefit immensely have barely considered it.

The key element in the biochar technologies is charcoal-making, which involves the heating of organic matter in the absence of oxygen. Rather than a single technology, biochar is a common thread running through various technological approaches, which can be varied to emphasize a particular outcome or opportunity. This book therefore describes a series of innovations whose products and outcomes are myriad and beneficial. Yet, it goes much further than that, for this work is essentially a 'how to' manual of biochar, providing expert analyses on biological, technical, economic, political and social aspects of the approach.

There are many important products of the charcoal-making processes, including a synthetic gas that can be used to generate electricity; a substitute for diesel fuel and the charcoal itself, which has the potential to sequester giga-tonnes of atmospheric carbon per annum, making it the most potent engine of atmospheric cleansing we possess. Among the most valuable outcomes of the application of the biochar technologies are greatly increased economic efficiency in agriculture, enhanced crop yields, and slowing the return to the atmosphere of carbon captured by plants. The result is diverse and clean energy supplies, more food per unit of input and climate security. In simple terms, this is what the biochar revolution offers us.

The biochar technologies described in this volume are potentially worldwide in their applicability. Grain production and many other forms of agriculture, livestock production, forestry and even the disposal of human waste will, I'm convinced, be profoundly transformed by the processes described in these pages, and the impact will be both swift and radical. The driver, at least initially, is likely to be the climate crisis. Approximately 8 per cent of all atmospheric CO<sub>2</sub> is absorbed by plants each year. If just a small proportion of the carbon captured by plants can be pyrolysed and transformed into charcoal, humanity's prospects will be much brighter, for this will buy us time as we struggle to make the transition to a low emissions economy.

With its careful evaluation of every aspect of biochar, this book represents a cornerstone of our future global sustainability. I'm convinced that its message is every bit as important as that of Rachel Carson's *Silent Spring*, and potentially every bit as politically powerful as Al Gore's *An Inconvenient Truth*. If it finds a wide enough readership, it will change our world forever, and very much for the better.

*Tim Flannery*  
*August 2008*

## Bibliographic details

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## About the Editors

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