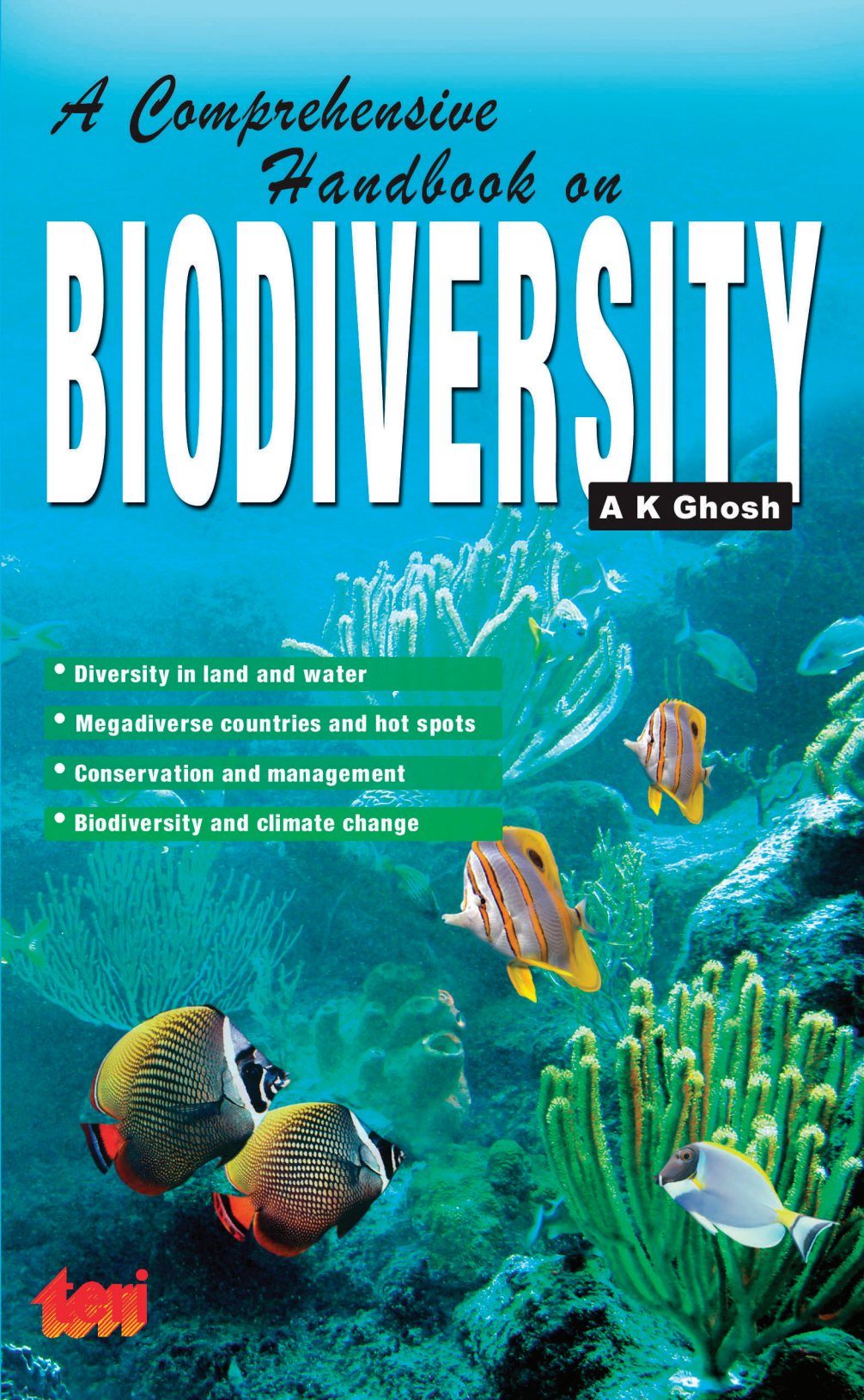
A Comprehensive Handbook on BIODIVERSITY

A K Ghosh

- Diversity in land and water
- Megadiverse countries and hot spots
- Conservation and management
- Biodiversity and climate change



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A comprehensive handbook on biodiversity

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Preface

The conservation of biological diversity has become a global issue since the UN Conference on Environment and Development held in Brazil in 1992 focused the need for urgent action, through its historic 'Convention on Biological Diversity'. Since then, nearly 200 countries around the world pledged to save these vital resources sustaining the human society and the intricate matrix of life around us. India, as one of the megadiverse countries, possesses nearly 9% of global biodiversity in 2.4% of global space; with almost every ecosystem in India, a rich assemblage of species could be located including many new, rare or exotic ones. The dependency of human society on material of biological origin is hardly appreciated but in reality, food, fuel, medicine, textile, paper, beverages, and spices sustaining our life system, either entirely or significantly, depend on these resources. However, the impacts of unplanned development or lack of perception has taken significant toll of this vast resource base. The present publication has attempted to focus on the aspects that we ought to know for our own benefit and for the coming generations to ensure a better quality of life.

1 BIODIVERSITY AND ITS ORIGIN

Diversity of life

The origin of life remains one of the most phenomenal events in the universe. Nearly three and a half billion years ago, the planet witnessed pulsating life in shallow, warm seas. Since then, the amazing process of evolution enabled living forms to segregate into an array of what is now called species.[1] Some remained single cells, while others changed into distinct multicellular plants and animals. Thus, today's world is teeming with life forms of all shapes and sizes—from those that are invisible to naked eyes (such as virus and bacteria) to huge elephants and banyan trees.

Biodiversity comprises these millions of diverse biological species, living together under a common habitat.

Evolution of man

The earliest recorded human or the 'man-ape' is scientifically known as *Australopithecus afriensis*. Scientists believe they lived in the savannas and woodlands of Africa, three to five million years ago. The adult man-ape walked on his two legs and made use of his

[1] A species is a population whose members are able to interbreed freely under natural conditions.

arms and hands for hunting and gathering food. The ancient man-ape finally split into three distinct species—*Australopithecus boisei*, *A. robusta*, and *Homo habilis*. The modern human species is called *H. sapiens*, which implies that the earliest ancestors of man could be *H. habilis*. The earliest known *H. habilis* was hardly 1.5 m tall and weighed around 45 kg, with a brain half the size of that of modern human beings.

The *Homo habilis* began shaping weapons out of bones

Grapling with the threat of extinction

Living organisms have evolved considerably over the three and a half billion years of life on the earth, but many became extinct at different geological times. Some of the geological eras are Ordovician, Devonian, Permian, Triassic, and Cretaceous. The first wave of extinction came 439 million years ago, during the Ordovician period, when 85% of the marine animal species died out (this was the period when no animals lived on land). During the Devonian extinction, 367 million years ago, the calamity was just as severe. But it was during the Permian extinction, about 245 million years ago, that 95% of animal species disappeared. The next wave of extinction during the Triassic era, about 208 million years ago, was less severe. The most recent large-scale mass extinction occurred during the Cretaceous–Tertiary period, which led to the end of dinosaurs. David Jablonski, a paleontologist at the University of Chicago, carefully presented proof for the occurrence of such events. New life forms also evolved after every mass extinction, which did not necessarily have characteristics and features similar to the extinct organisms.

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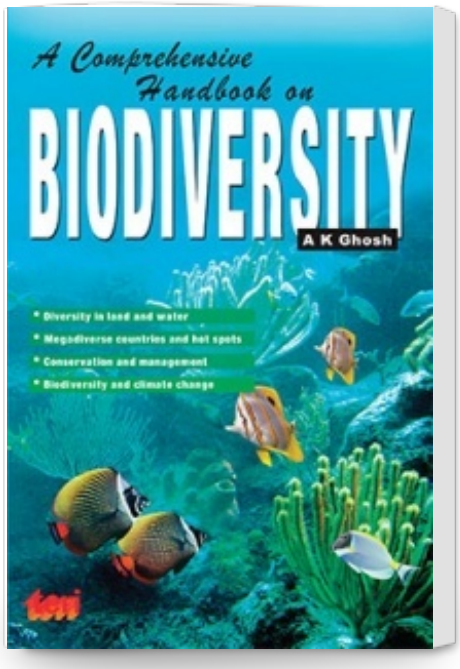

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