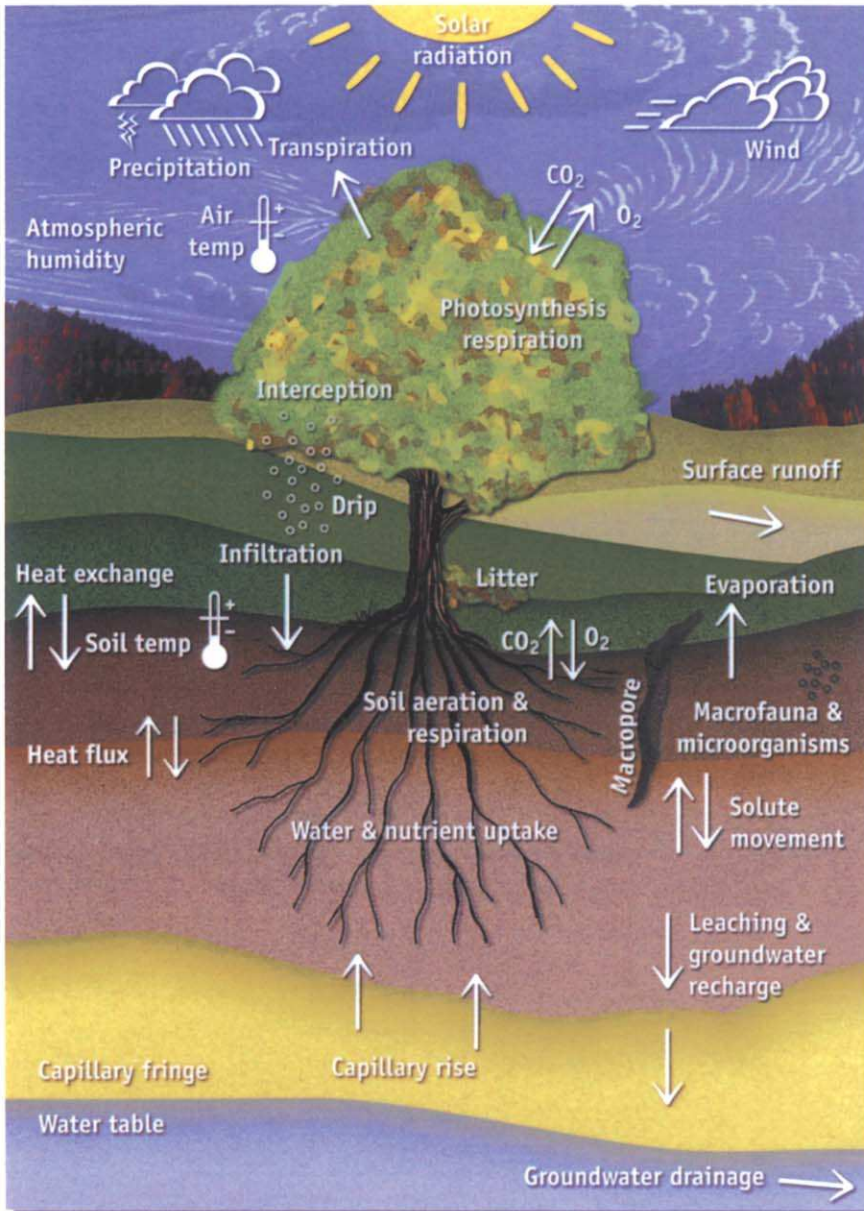


Environmental Soil Physics



DANIEL HILLEL

ENVIRONMENTAL SOIL PHYSICS

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ENVIRONMENTAL SOIL PHYSICS

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ACADEMIC PRESS

An Imprint of Elsevier

San Diego London Boston New York Sydney Tokyo Toronto

This book is printed on acid-free paper. 

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Academic Press

An Imprint of Elsevier

525 B Street, Suite 1900, San Diego, CA 92101-4495, USA

<http://www.apnet.com>

Academic Press

24–28 Oval Road, London NW1 7DX, UK

<http://www.hbuk.co.uk/ap/>

Library of Congress Cataloging-in-Publication Data

Hillel, Daniel.

Environmental soil physics / Daniel Hillel.

p. cm.

Includes bibliographical references (p.) and index.

ISBN-13: 978-0-12-348525-0 ISBN-10: 0-12-348525-8

1. Soil physics. 2. Soil physics—Environmental aspects.

I. Title.

S592.3.H535 1998

631.4—dc21

98-23679

ISBN-13: 978-0-12-348525-0

CIP

ISBN-10: 0-12-348525-8

Printed in the United States of America

06 07 08 09 IP 9 8 7 6 5 4 3

*I dedicate this book to my wife,
Professor Michal Artzy,
for all she has done, and does, and is.*

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*Then the Lord God fashioned the earthling [ha-adam]
from the soil of the earth [ha-adama],
and breathed into his nostrils the breath of life,
so the earthling became a living soul.*

—Genesis 2:7

FOREWORD

The Biblical depiction of humanity’s advent, cited above, reveals a profound insight that modern civilization is in grave danger of forgetting. Our innate and indissoluble attachment to the soil is manifest in the designation of the first human being, derived from *adama*, a Hebrew noun of feminine gender meaning “earth,” or “soil.” The originally formed (Genesis 2:7) earthling, *ha-adam* (“the adam,” implying “of the soil”), was later (Genesis 2:22) differentiated into a man and a woman, respectively named Adam and Hava, who were said to be the progenitors of all the divergent peoples inhabiting the planet. Adam’s name encapsulates humanity’s inception and destiny: our existence and livelihood derived from the soil, to which we are tethered throughout our lives and to which we are fated to return at the end of our days. The name of Adam’s mate, Hava (rendered Eva or Eve in transliteration), itself means “living,” or “life-giving.” The coupling of Adam and Eve, therefore, signifies quite literally the mutual dependence of soil and life.

The same powerful metaphor is echoed in the Latin name for man—*homo*—derived from *humus*, the living material of the soil. Hence, the adjective “human” also implies “of the soil.” Other ancient cultures evoked equally powerful associations and feelings of reverence toward the earth. To the ancient Greeks, the earth was Gaea, the great maternal goddess who, impregnated by Uranus (god of the sky), gave birth to all the gods of the Greek pantheon. Her name is embedded in such modern terms as *geology*, *geophysics*, and *geoponics* (the science of agriculture), and even in the prevalent name George (derived from *geo+ergon*, meaning “working the soil”). One of Gaea’s descendants was Demeter, the earth goddess whose spirit was believed to