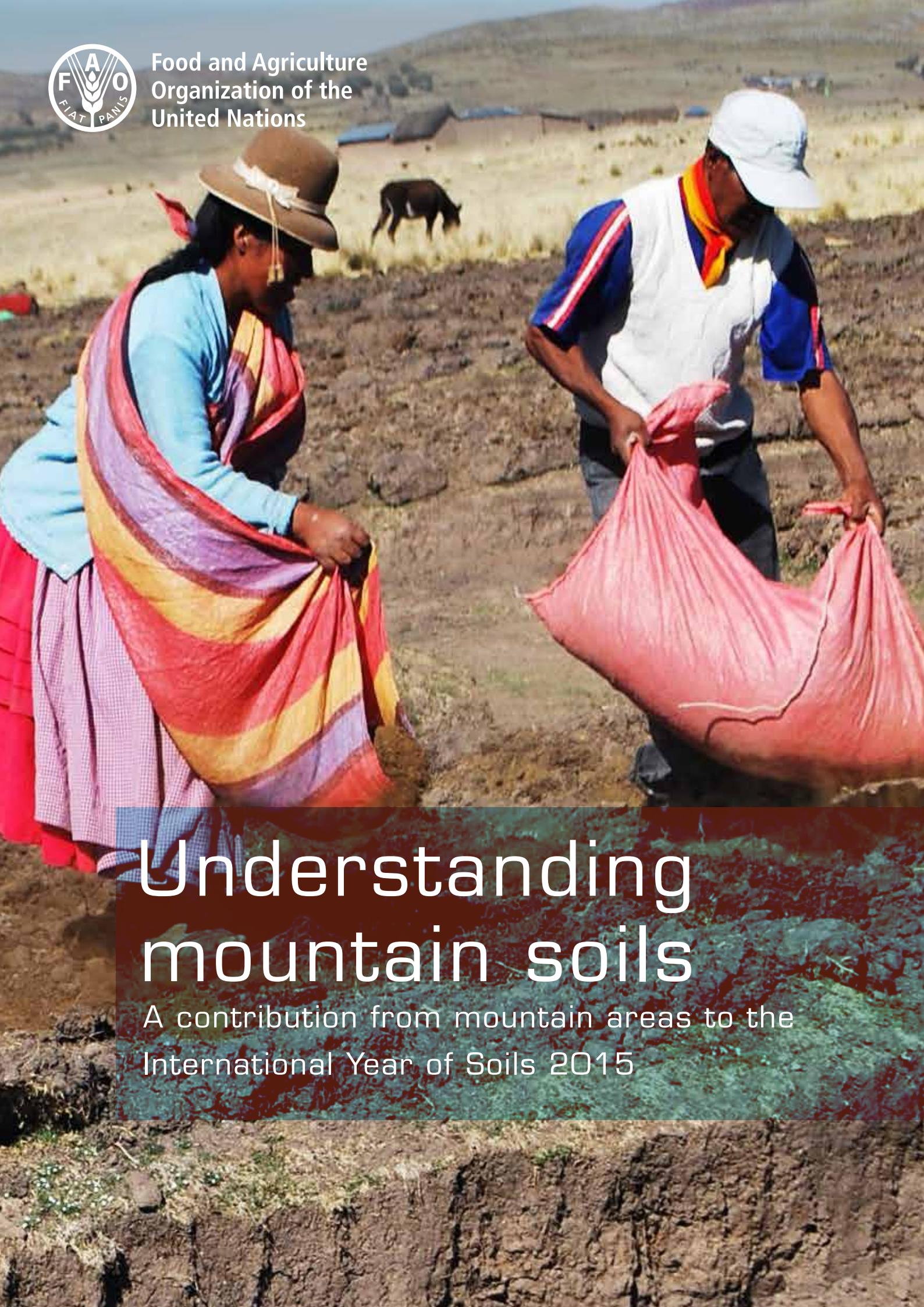




Food and Agriculture
Organization of the
United Nations



Understanding mountain soils

A contribution from mountain areas to the
International Year of Soils 2015

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In collaboration with the Mountain Partnership Secretariat,
the Global Soil Partnership and
the University of Turin

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Cover photo: Community partners of Caritamaya, Pruno, Peru planting and composting potato in rehabilitated Sukaqollos (@FAO/Alipio Canahua)

Contents

Foreword	v
Preface	vi
Acronyms and abbreviations	viii
Introduction	1
Mountain soils and ecosystem services	7
Agroforestry generates multiple ecosystem services on hillsides of Central America	10
Sustainable mountain ecosystem results from participatory community planning: a story from the Syrian Arab Republic	13
Alpine soils and forests: securing ecosystem services in the Pamir mountains of Tajikistan	16
Pedodiversity and ecosystem services of mountain soils in Southwestern Europe	19
Mountain soils and agriculture	23
Pastoralists, mountains and soils	30
Sustainable soil management options in the Nepalese mountains	33
Tackling soil erosion with nuclear techniques in Viet Nam	36
Oak and pine forests soil in the Western Himalayan region of India	38
Addressing the knowledge gap on mountain soils	42
Mountain soils and healthy food production	45
Family coffee farmers improve mountain soils	49
Thyme for Port-au-Prince	51
Beles – from an invasive plant to a blessing	53
Crop-Nu – a phone app to calculate crop nutrient requirements	55
Soil variability in mountain areas	59
Mountain pasture soils and plant species richness in the Austrian Alps	63
Peatlands and organic soils	67
High-elevation soils in the Central Apennines	70
Soil genesis in recently deglaciated areas	72

Mountain soils and human activities	77
Mountain soils and human activities	78
Winter sports: the influence of ski piste construction and management on soil and plant characteristics	81
Heavy metals pollution	84
Mountain soils and threats	87
Rehabilitating red soils in the Nepalese Himalayas	92
Effects of land-use changes on soil properties: volcano watershed in Quito, Ecuador	95
Land reclamation by agave forestry with native species in the mountains of Michoacán state	97
Turning rocks into soils from the Ecuadorian Andes to the Mexican transvolcanic sierra	100
Mountain soils and climate change	105
Carbon stocks in oceanic alpine landscapes	110
Lesotho mountain wetlands potential for carbon storage	113
Forest expansion on grassland affects soil carbon protection	116
Promoting soil health and productivity in Eastern Arc mountain ecosystems through collaboration and networks	119
Mountain soils and cultural heritage	123
Status and potential use of medicinal plants in the Pamir region of Tajik and Afghan Badakhshan	128
Sustainable indigenous hill agriculture practices to conserve mountain soils and improve crop yields in Garhwal	131
Shifting cultivation: soil fertility and food security issues in Chittagong Hill Tracts, Bangladesh	133
Conclusions and way forward	137
Authors	141
Editors	149
References and further reading	150

Foreword

Mountain soils have long performed a host of vital ecosystem services that help to ensure food security and nutrition to 900 million mountain people around the world and benefit billions more living downstream.

Soils are the basis for healthy food production. They help people to mitigate and adapt to climate change by playing a key role in the carbon cycle and in water management, improving resilience to floods and droughts. Mountain soils, which vary greatly and are by their nature fragile, host 25 percent of terrestrial biodiversity including agro-biodiversity, crucial gene pools for locally adapted crops and livestock.

Soil is a fragile resource that needs time to regenerate. Every year, an estimated 12 million ha are lost through soil degradation. Mountain soils are particularly susceptible to climate change, deforestation, unsustainable farming practices and resource extraction methods that affect their fertility and trigger land degradation, desertification and disasters such as floods and landslides.

For mountain peoples this is a harsh reality that they face every day. Many mountain peoples – in ranges including the Himalayas and Andes as well as the Elburz Mountains and the Fouta Djallon Highlands – are family farmers who live by subsistence agriculture and often have poor access to basic infrastructure, health services, roads, transport and markets.

Local communities in mountain areas serve as the custodians of natural resources, including their soil. Over generations, living in their particular high-risk environments, they have developed solutions and techniques, indigenous practices, knowledge and sustainable soil management approaches that shape and protect ecosystems that ultimately provide water for at least half the world's population. Local and more recent knowledge can be successfully integrated, as is shown by terracing for rice production in Asia and agroforestry for cereal production in Latin America.

This publication intends to raise awareness of the global importance of mountain soils in providing critical ecosystem services and the need for their sustainable management. Building sustainable soil management capacity, promoting inclusive policies and governance, and investing in soil research and soil information systems are all necessary to ensure healthy soils for sustainable production systems that can improve the livelihoods of mountain peoples and, indirectly, everyone else as well.

To mark the International Year of Soils 2015, the Food and Agriculture Organization of the United Nations, the Mountain Partnership Secretariat, the Global Soil Partnership and the University of Turin have jointly issued this publication. *Understanding Mountain Soils* has been produced with in-kind contributions by Mountain Partnership members, non-governmental organizations, research institutes and universities in a concerted effort to bring key issues to the fore.

In 2015, the year in which the UN Sustainable Development Goals are being adopted, it is our aspiration to highlight how, through the provision of crucial ecosystem services, mountain soils can contribute to ensure overall sustainable development, reaching far beyond the peaks and deep into the surrounding lowlands.

The following chapters, with specific case studies, showcase the diversity of soil management approaches and the solutions that sustainable mountain management can provide.



José Graziano da Silva,
Director-General, Food and Agriculture
Organization of the United Nations

A handwritten signature in black ink, which appears to read 'J. Graziano da Silva'. The signature is fluid and cursive, written on a white background.

José Graziano da Silva

Preface

The sixty-eighth United Nations General Assembly declared 2015 the International Year of Soils with the aim of increasing awareness and understanding of the importance of soils for food security and essential ecosystem functions.

Since 2002, the Mountain Partnership Secretariat has led global efforts to improve the lives of mountain peoples and protect mountain environments around the world.

The Mountain Partnership is a United Nations voluntary alliance of partners of governments, intergovernmental organizations and civil society, joining forces to implement initiatives at national, regional and global levels and helping mountain communities to overcome development challenges. Through its members, around 250, the Mountain Partnership works on the main pillars of advocacy, capacity development, joint projects on the ground, knowledge management and communications.

As the Mountain Partnership Secretariat is hosted at the Food and Agriculture Organization of the United Nations, it seemed only natural the Mountain Partnership to join forces to support the Food and Agriculture Organization of the United Nations and the Global Soil Partnership which have been mandated to facilitate the implementation of the International Year of Soils. This collaboration also includes the University of Turin, which has worked with the Mountain Partnership Secretariat for many years on the International Programme on Research and Training on Sustainable Management of Mountain Areas. The university – at the scientific forefront in studies of mountain soils, glaciers and erosion control – has brought its knowledge to this publication.

In every mountain region, soils constitute the foundation for agricultural development, supporting essential ecosystem functions and food security, and hence are crucial to sustaining life. Mountain peoples' relationship with their soil is deeply rooted in their heritage and, over the centuries, they have developed solutions and techniques that have proved to be a key to resilience.

The aim of this publication is to describe the main features of mountain soil systems, their environmental, economic and social values, the threats they are facing and their cultural heritage. Case studies provided by Mountain Partnership members and partners around the world showcase challenges and opportunities as well as lessons learned in soil management.

The International Year of Soils 2015 presents a fitting opportunity to raise awareness and promote the sustainable management of mountain soils on behalf of mountain peoples – peoples who are often marginalized, not included in decision-making processes and development programmes, and increasingly affected by soil-related disasters.

We hope this publication will help to trigger change, by increasing understanding of mountain soils' significance and the roles they play in society at large.



Ermanno Zanini, Director, Research Centre on Natural Risks in Mountain and Hilly Environments (NatRisk).

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Thomas Hofer, Coordinator, Mountain Partnership Secretariat, Food and Agriculture Organization of the United Nations

A handwritten signature in black ink, appearing to read 'Ermanno Zanini'.

Ermanno Zanini

A handwritten signature in black ink, appearing to read 'Thomas Hofer'.

Thomas Hofer