



2nd Scientific
Conference
UNCCD

*Economic assessment of desertification,
sustainable land management and
resilience of arid, semi-arid and dry
sub-humid areas*

9-12 April 2013 – Bonn, Germany

WHITE PAPER II

Costs and Benefits of Policies and Practices Addressing Land Degradation and Drought in the Drylands



United Nations Convention
to Combat Desertification



We would like to extend our sincere appreciation to, in particular, the Governments of Germany, Finland, the Republic of Korea, Spain, Sweden and Switzerland for their contributions and generous support. Voluntary financial contributions have helped in the preparation and organization of the United Nations Convention to Combat Desertification (UNCCD) 2nd Scientific Conference and are strengthening our scientific understanding of the social and economic drivers and consequences of desertification, land degradation and drought. By investing in science and ensuring the participation of scientists in the decision-making processes, these voluntary contributions have significantly advanced the implementation of the Convention.

The preparation of this publication has been facilitated by

The Global Risk Forum GRF Davos on behalf of the UNCCD

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ISBN Number

ISBN 978-92-95043-67-1

Cover photographs: ©2009 UNCCD Photo Contest

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Citation: Poulsen, Lene, "*Costs and Benefits of Policies and Practices Addressing Land Degradation and Drought in the Drylands*". White Paper II. UNCCD 2nd Scientific Conference. UNCCD Secretariat, Bonn. Available at <http://2sc.unccd.int> . Available from <http://2sc.unccd.int> (accessed 26 March 2013).

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ABBREVIATIONS

CST	Committee on Science and Technology (of the UNCCD)
ELD	Economics of Land Degradation (initiative)
FAO	Food and Agriculture Organisation
GDP	Gross Domestic Product
OECD	Organization of Economic Cooperation and Development
SEEA	System of Environmental-Economic Accounts
SNA	System of National Accounts
TEEB	The Economics of Ecosystems and Biodiversity (study)
UN	United Nations
UNCCD	United Nations Convention to Combat Desertification (in Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa)
UNDP	United Nations Development Programme
UNEP	United Nations Environmental Programme

ABSTRACT

- Drylands are complex social-ecological systems, characterized by non-linearity of causation, complex feedback loops within and between the many different social, ecological, and economic entities, and potential of regime shifts to alternative stable states as a result of thresholds. As such, dryland management faces a high level of uncertainty and unpredictability.
- To strengthen the scientific foundation for sustainable dryland and drought risk management, there is a need for a system approach based on transdisciplinarity with emphasis on participatory research and involvement of practitioners as well as scholars from different scientific disciplines to address problems in an integrated manner.
- A critical means to achieve sustainable dryland and drought risk management is to strengthen resilience through capacity development of individuals, communities, and systems to survive, adapt, and follow a positive trajectory in the face of external and/or internal changes, even catastrophic incidents, and rebound strengthened and more resourceful while retaining essentially the same functions.
- Another critical means is the application of an ecosystem services approach to ensure proper attention to the dynamic and interlinked provisioning, regulating, supporting, and cultural dryland ecosystem services. The ecosystem services approach has proven particularly useful and challenging for economic valuation of sustainable dryland and drought risk management as a basic tool for direct management purposes as well as policy decision-making.
- Based on a comprehensive literature review of recent peer-reviewed scientific journals complemented with grey literature, this White Paper provides an introduction to current thinking about economic valuation techniques related to different aspects of dryland management and policy-making. The paper highlights the challenges that exist, the different opinions about the best way to address environmental economic valuations, and the many assumptions that need to be clearly identified for each exercise in order to communicate the results efficiently to decision-makers at all levels.

PREAMBLE

The term 'drylands' invokes different associations for different people: beautiful deserts, poor people desperately trying to make a living in a hostile environment, cowboys roaming on the prairies, proud Maasai people claiming their rights to continue their 1,000-year old pastoralist way of living, irrigated tomato fields, oases in the middle of endless miles of scorched soils, to name a few. That there are many different aspects associated with the dryland concept is not surprising, considering that drylands cover more than 40% of the Earth's land mass and are distributed on all continents. Drylands therefore cover an endless number of cultures, traditions, and livelihoods as well as a great variety of dryland ecosystems. What unites those different areas is of course the dryness or the aridity and with that the constant need to adapt to actual and potential water scarcity whether it is a natural ecosystem or a social-ecological system. With the aridity comes the management of scarce resources and hence the importance of sound economic management to ensure sustainable use of the drylands.

Unfortunately, what also unites many drylands is the ongoing degradation and challenges in maintaining the important outputs that the drylands provide humanity, such as agricultural productivity, carbon sequestration, global biodiversity, and spiritual and recreational services. Over the last decades, the international community has therefore given increasing attention to ensuring sustainable land use management with emphasis on integrating social, economic, and environmental aspects. The need for a holistic approach to ensure sustainability in the drylands was highlighted at the Rio Earth Summit in 1992 and it is a key principle in the UN Convention to Combat Desertification and Mitigate the Impact from Droughts (UNCCD) from 1994.

The recognition that the Earth is one system with strong interrelationships and dependency among the economic, social, and ecological subsystems is also the basis for the broader concept of 'green economy'. Over the last years, the importance of 'green economy' has gained increasing recognition and it was highlighted in the 2012 outcome document of the Rio+20 Summit: "The Future We Want."¹ The document, furthermore, underlines that the green economy should be based on holistic approaches integrating sustained economic growth, improved human welfare, employment opportunities, social inclusion, and poverty eradication, while sustaining ecosystem services.

To foster sustainable dryland and drought risk management we need true interdisciplinary and multi-stakeholder involvement, i.e. a transdisciplinary approach in the development of a green dryland economy. Each discipline and each stakeholder group will have their own traditions for research, development, and communication and there will be many different approaches to address the dryland development issues. The challenge will be to ensure that the different stakeholders work together and that their input will be complementary and end up in a green dryland economy that makes sense for everybody and that will secure and improve dryland-based livelihoods throughout the world.

¹ United Nations (2012) "The Future We Want" United Nations, New York
uncsd2012.org/content/documents/727The%20Future%20We%20Want%2019%20June%201230pm.pdf

In March 2012, the organizers of the 2nd UNCCD Scientific Conference convened a working group for the preparation of two White Papers on Economic Assessment of Desertification, Sustainable Land Management, and Resilience of Drylands. In line with the principles of the new green economy, the working group consisted of scientists different biological, physical, and socio-economic disciplines as well as dryland development practitioners from around the world. Together they agreed on a set of critical issues that should be addressed in White Papers on the economics of sustainable dryland development. As a result, we now have two White Papers presenting the current thinking of how to assess the economics of land degradation and sustainable dryland and drought risk management. This White Paper specifically addresses the costs and benefits of policies and practices for sustainable land and drought risk management, including resilience management based on an integrated system approach to social-ecological systems.

The subject is vast and there will be a number of omissions and probably also wrong interpretations of the discipline specific findings that form the basis of this White Paper. Your inputs and comments are therefore needed and very welcome.

Many Thanks,

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PART 1: TECHNICAL DISCUSSION

1. BACKGROUND

1. The 1994 UN Convention to Combat Desertification (UNCCD)² is a remarkable international agreement. Through the UNCCD, more than 190 ratifying countries as well as the European Union have committed to effectively address land degradation in the drylands³, i.e. desertification, and reduce the risks of severe drought impacts. The UNCCD has definitely increased international attention to dryland degradation and related socio-economic predicaments such as marginalization, poverty, and food insecurity. Still, sustainable dryland and drought risk management remains a far-fetched goal. A critical challenge is the limited knowledge and understanding of the complex processes in dryland ecosystems. For instance, in a 2011 review⁴ of the implementation of the follow-up to the 1992 Rio Earth Summit⁵, UNEP explains that the review did not cover land degradation because of lack of information that met the data criteria for the review⁶. Likewise, the UNDP Disaster Risk Index⁷ from 2004 did not include country specific information on drought risk because of methodological challenges.

2. The 2011 UN Global Assessment Report on Disaster Risk Reduction⁸ asserts that the fact that there is still no credible drought risk model is partly a result of the complexity of drought risks with many different social, biological, and climatic drivers. Moreover, droughts are slow-onset events that typically require a minimum of two to three months to become established. While droughts can continue for years socio-economic impacts are normally deferred over time⁹ making assessments more complicated and controversial. Consequently, drought is often left out of disaster risk management assessments and impact models. So in spite of improved methods to assess the biophysical aspects of land degradation and drought risks, there are still limited reliable socio-economic data on the costs and benefits of sustainable dryland and drought risk management. The methodological challenges are enormous. E.g., how to deal with indirect impacts, how to value environmental processes and stocks where market values do not exist, and what should be the space and time limits for the assessments? These challenges are even more pronounced when dealing with countries and regions with weak statistical systems, which is the

² The full name of the UNCCD is “United Nations Convention to Combat Desertification in Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa.” The objective of the UNCCD is to “...combat desertification and mitigate the effects of drought in countries experiencing serious drought and/or desertification...” As such, the UNCCD addresses both desertification and drought. unccd.int/Lists/SiteDocumentLibrary/conventionText/conv-eng.pdf

³ We use the term ‘drylands’ for arid, semi-arid, and dry sub-humid areas, i.e. areas classified according to their aridity and where the potential amount of water that is transferred from the land to the atmosphere is at least 1.5 times greater than the precipitation according to the definitions of the UNCCD. The UNCCD does not use the term ‘drylands’ but it is common practice to refer to ‘drylands’ in the context of desertification discussions. It should be noted, that in some contexts ‘drylands’ also include hyper-arids; i.e. deserts, which account for around 8% of the total land mass of the Earth, while arid, semi-arid, and dry sub-humids cover around 40%. The UNCCD does not include hyper-arids in the desertification definition.

⁴ UNEP (2011) “Keeping Track of Our Changing Environment – From Rio to Rio+20 (1992 – 2012)” United Nations Environmental Programme, Nairobi unep.org/GEO/pdfs/Keeping_track.pdf

⁵ In 1992, the first UN Conference on Sustainable Development, known as the Rio Earth Summit, was convened in Rio de Janeiro, Brazil to address the state of the environment and sustainable development. The Earth Summit developed the framework for a new generation of global environmental treaties, including the UNCCD.

⁶ The three data criteria were: 20-year temporal data, coverage of most countries, and reliable sources.

⁷ UNDP (2004) “Reducing Disaster Risk – A Challenge for Development” United Nations Development Programme, Bureau for Crisis Prevention and Recovery, Geneva.

⁸ UNISDR (2011) “Global Assessment Report on Disaster Risk Reduction” United Nations International Strategy for Disaster Reduction, Geneva preventionweb.net/english/hyogo/gar/2011/en/home/download.html

⁹ Cardona, O.D. (2007) “Indicators of Disaster Risk and Risk Management” National University of Columbia – Manizales & Inter-American Development Bank, Washington D.C.