# Publishable Executive Summary

**Objectives**

The problem of desertification received worldwide attention with the United Nations Conference on Desertification (UNCOD) and the **United Nations Convention to Combat Desertification (UNCCD)**. The European Union responded to the objectives set forth by the UNCCD and the following declarations with a number of regulations, directives and initiatives, such as the **Natura2000** programme, the **EU Habitat and Birds Directives**, the **Concerted Action to Support the Northern Mediterranean Action Programme to Combat Desertification (MEDRAP)** or the **European Network for Research into Global Change (ENRICH)** and **Global Monitoring for Environment and Security (GMES)** initiatives. Correspondingly, a number or dedicated research projects have been funded, such as MEDACTION, DESERTLINKS, GEORANGE, LADAMER etc.

It is obvious that any measure taken against desertification, or the design of dedicated early warning systems, must take into account the **spatial dimension** of physical conditions and process driving factors, which underlines the essential contribution required from remote sensing and geoinformation processing. Notwithstanding the necessity to account for specific local conditions, a convergence of methods and pathways exist, that allows the use of remote sensing and geomatics approaches in a wider range of degradation- and desertification-related research and application efforts. This fact suggests an **exchange of experience and techniques** on an international level. Since the organisation of a **dedicated expert workshop** on “The use of remote sensing for land degradation and desertification monitoring in the Mediterranean basin. State of the art and future research” (Hill and Peter, 1996), held in Valencia in 1994, considerable resources and efforts have been spent and a distinct progress of conceptual background, methodology and technology developments can be perceived. Hence, there is a high priority to bring together again the scientific community with representatives of affected countries, with the goal to promote an **in-depth exchange and transfer of expertise and knowledge** gained in the past years, leading to the specific support activity “***Remote Sensing and Geoinformation processing in the assessment and monitoring of land degradation and desertification in support of the UNCCD. State of the art and operational perspectives”***. It intends to provide a platform to bring together scientists working in the fields of remote sensing and geoinformatics with a focus on desertification and degradation with potential users from affected countries in the frame of a dedicated conference. Acknowledging the global dimension of the problem as well as Europe’s quest for international excellence and its commitment to give support to the CCD, the conference invites **world-wide attention and participation,** supportedby cooperation with a high-ranking **scientific committee** to ensure high scientific credibility and close cooperation with the UNCCD.

The conference addressed **different thematic fields** within the general framework of desertification- and degradation-related geomatics research and applications. In order to provide for a sound scientific background for the conference, **commissioned studies** by internationally renowned experts were organised in specific target fields and delivered as **keynotes** to the conference sessions.

Besides taking care of a sound **scientific management** and **logistic organisation** of the conference, major efforts were dedicated towards the **international visibility** of the conference and its results by providing for a high-level dissemination following the evaluation of different possible pathways. The goals of the project may hence be summarised under the following major objectives:

* Establishment of high-ranking scientific committee and conference layout
* Announcement of the initiative including conference announcement
* Identification of core study areas and assignment of commissioned studies
* Establishment of web-related presentation, dissemination and interactive elements
* Organisation of conference logistics, including organisation of reviews, travel support etc.
* Editing and preparation of abstract proceedings
* Editing and preparation of high-quality conference proceedings
* Establishment of interface between European Commission, scientific committee and other involved organisations
* Thematic accompaniment of the initiative

The Desertstop SSA was coordinated by the Remote Sensing Department of the University of Trier, headed by Prof. Dr. Joachim Hill. The department has a long-standing experience in the field of remote sensing applications for land degradation and desertification questions. Any questions may be directed to

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| Joachim Hill  | hillj@uni-trier.deTel: +49.651.201.45.92Fax : +49.651.201.38.15 | University of TrierRemote Sensing DepartmentFB VI Geography/GeosciencesCampus II54286 TrierGermany |
| Achim Röder | roeder@uni-trier.deTel: +49.651.201.46.06Fax: +49.651.201.38.15 |

**Expected impact**

It was at the focus of Desertstop to provide for a high-level scientific conference, where renowned experts present recent advances in the fields of remote sensing and geoinformation processing in a land degradation/desertification context. At the same time, major efforts were dedicated to ensuring the participation of young researchers and researchers from countries affected by these processes. For this reason, Desertstop underlines the European Commission’s commitment to ensuring participation of and technology transfer to developing countries. On the other hand, the participation of stakeholders from affected countries and the involvement of the UNCCD are important cornerstones in steering state-of-the-art research to adequately appraise practical demands on their research. Especially young researchers are expected to strongly benefit from this assembly of both high-level scientists and stakeholders with a more applied perspective.

In order to keep up the dialogue initiated by the conference, it is envisaged to review the collected material with the ultimate goal of providing for further educational/training activities, such as European summer schools etc.

Finally, on a scientific level, different dissemination pathways are being followed, such as the publication of full conference proceedings as well as a publication of selected contributions with major international journals, book series etc. This is an important element in communicating scientific progress in the field and documenting the high level of European research.

**Results**

The initial phase of DESERTSTOP was dedicated to the invitation of the scientific committee and conclusion of the conference layout, while at the same time logistic decisions were taken, such as agreement on title, date and venue of the conference. In addition, the project web site was set up at [www.feut.de/rgldd](http://www.feut.de/rgldd) and a php-based interface for online registration, upload of abstracts and papers and download of the review decision was implemented.

Subsequently, flyers and poster were designed and the conference was announced using a variety of publication channels to make the event visible at a global scale. The large interest drawn to the conference was documented by 226 registrations through the online interface and reception of some 150 abstracts for contributions. Under the guidance of the coordination office, these were assigned to the different members of the scientific committee for evaluation, and 110 contributions were selected for oral and poster presentation. These represent a mix of state-of-the-art contributions and application studies, being presented by well-established specialists and ensuring the participation of researchers from affected countries and young researchers, as requested by the Commission. This was particularly supported by the specific budget foreseen for travel support according to the guidelines jointly specified with the Commission.

Further activities during this reporting period focused on a variety of logistical issues, related to the conference as well as additional events, such as selection of locations for the early registration/ice-breaker and the conference dinner, enquiries with catering companies etc. Following the approval of abstracts by the scientific committee, all accepted contributions were compiled and harmonised to prepare an abstract book to be distributed at the conference. The contributions were sorted and assigned to different sessions in order to attain a concise structure for the conference.

During the second reporting period, the focus was set on the actual execution of the conference, which was termed “**1st international conference on remote sensing and geoinformation processing in the assessment and monitoring of land degradation and desertification (RGLDD)**”.

Prior to the event, a large number of organisational issues required particular attention, such as selection of the conference venue and planning of related logistics, such as technical facilities, catering and transport service to and from the venue. Besides this, the attractiveness of the event was promoted by organising a suite of accompanying and side events, such as an Ice-breaker pre-registration hosted in the historic electoral palace (*Kurfürstliches Palais*), a guided city walking tour and whine tasting, and a conference dinner organised within the ancient roman baths of the *Viehmarkt*.

The conference took place between the 7th and 9th of July, 2005, in the Robert-Schuman Haus in Trier, Germany. While the main conference hall hosted the oral presentations, the main aula was made available for the poster presentations. As both locations are directly adjacent, this guaranteed adequate attention for both poster and oral contributions to the conference. Reflecting the high visibility and international announcement of the conference, 120 participants from countries worldwide travelled to Trier to attend the conference. In particular, RGLDD had a specific mandate from the European Commission to support participation of representatives and scientists from affected countries and young researchers.

RGLDD was structured into 5 major headings, each of which was assigned an oral session. The posters were assigned to these topics, and different extensive poster sessions were introduced in the programme to ensure ample time for participants to visit all posters. Prior to the actual scientific sessions, Ambassador Hama Arba Diallo, Executive Secretary to the UNCCD, provided a welcome address to the participants and emphasised the relevance of geosciences in the struggle against desertification and land degradation, while at the same time urging scientists to keep their focus on the human dimension of the problem.

Session 1 **(Remote sensing-based derivation of biophysical indicators**, **session chair: Prof. Ferdinand Bonn, CARTEL, Université de Sherbrooke, Canada)** was concerned with the derivation of enhanced parameters from traditional and novel sensors systems, with a focus on their applicability in a land degradation context. It was introduced by a keynote by **Prof. Susan Ustin (CSTARS, University of Davis, California)**, which provided an overview on the wide range of recent methodological developments. This was followed by 9 talks and 13 posters covering different issues on different scales (compare deliverable 1.6, conference programme, and deliverable 4.8, conference proceedings).

**Prof. Compton James Tucker** **(NASA/Goddard Space Flight Center, USA)** commenced session 2 (**Remote sensing based monitoring of land degradation and desertification, session chair: Dr. Bernard Lacaze, PRODIG, Paris, France**), which focused on coarse-scale monitoring concepts. He introduced the topic of using coarse resolution data with a high image acquisition rate and emphasised the potential of relating these data to hyperspatial imagery in order to differentiate counteracting trends in different vegetation units. In the frame of this session, 6 talks and 13 poster (compare deliverable 1.6, conference programme and deliverable 4.8, conference proceedings) were presented.

Session 3 was set up to provide a frame for approaches that extend beyond remote sensing to accommodate spatial modelling and **geoinformation** processing. The session was introduced with a keynote of **Dr. Mark Mulligan (King’s College, London, UK)** on ‘Integrated environmental modelling to characterise processes of land degradation and desertification’. In this context, he emphasised the need to incorporate socio-economic as well as physical factors as driving forces and adequately consider their mutual dependencies. His theoretical considerations where then complemented by concrete model implementations for desertification-affected areas in Mediterranean Europe. A total of 7 oral presentations were complemented by 9 poster presentations (compare deliverable 1.6, conference programme and deliverable 4.8, conference proceedings).

Session 4 **(Early warning systems for drought and desertification, session chair: Dr. Richard Escadafal, CESBIO, Toulouse, France**) gave particular attention on approaches that show potential to serve as an early warning system with respect to different factors. It was opened with a keynote on ‘Coupled land-surface-atmosphere models to assess resource availability in arid and semi-arid regions’, given by **Dr. Abdelghani Chebouni** **(Institut de Recherche pour le Développement, Mexico City, Mexico)**. Against the background of the SUDMED project, he demonstrated the use of process modelling and multispectral/multiresolution remote sensing data to assess hydro-ecological functioning of a semi-arid basin in central Morocco. Integrating remotely sensed indicators with hydrological parameters and flux estimates was shown to provide important insight to assess the ecological state of arid and semi-arid regions and to offer high potential for integrated early warning concepts. The 6 talks related to session 4 were complemented by 5 posters (compare deliverable 1.6, conference programme and deliverable 4.7, conference proceedings).

The last session of RGLDD, session 5 (**Application aspects and operational perspectives, session chair: Prof. Ulf Helldén, University of Lund, Sweden**) was dedicated to the presentation of applied studies and local or regional implementations of monitoring and assessment schemes. In addition, networks and initiatives working in the field of desertification monitoring were given an opportunity to present their activities. In his keynote on ‘Coupled human-environment system approaches to desertification: linking people to pixels’, **Prof. Eric Lambin (University of Louvain, Belgium)** outlined the various process interactions leading to desertification and land degradation. He particularly stressed the importance of anthropogenic-induced processes that may lead to severe results through feedback loops. As an important conclusion, it was stated that while the physical environment is often excellently treated in monitoring and modelling approaches, this does often not hold true for the socio-economic dimension, which represents a major research issue for the next years. Given the wide range of topics covered by session 5, 9 talks and 26 posters underlined the importance of implementing monitoring and assessment concepts in specific local environments and by considering requirements set forth by the different national action plans.

The conference was concluded with an open discussion round were all participants were given an opportunity to provide feedback on the event. In particular, the session chairs reported on their conclusions from the talks and presentations. It was agreed that large benefit for the struggle against desertification and land degradation is drawn from remote sensing data and techniques, as well as their integration with other spatial and non-spatial data and integration in interpretation and modelling environments. In comparison to a previous workshop with a similar scope (J. Hill & D. Peter: The use of remote sensing for land degradation and desertification monitoring in the Mediterranean basin. State of the Art and Future perspectives, held in Valencia, Spain in 1994), a remarkable progress in data analysis and interpretation techniques was noted, as well as significant insight in the complex physical and socio-economic processes interacting to result in degradation of resources. Notwithstanding, this was found to be largely academic, reflected in sophisticated scientific case studies, whereas applications implemented at local stakeholders frequently remain confined to traditional techniques. Similarly, significant advances in sensor design and data quality are well reflected on an experimental level, leading to innovative information extraction techniques, while operational monitoring and assessment schemes are still widely based on freely available data, which is another limiting factor in designing and implementing state-of-the art concepts for use with stakeholders and institutions.

To that end, it was agreed that RGLDD provided important impetus to communicate recent innovations on all fields of remote sensing to those that have a high need in implementing these techniques, while on the other hand providing scientists with a background and define goals they should strive to achieve.

Furthermore, two major conclusions were drawn. One is the urgent request to space agencies and data providers to ensure maximum availability of desired remote sensing and auxiliary information. This has implications for pricing policy, but on a more fundamental level calls for the continuation of existing data archives and sensor missions as a major prerequisite for any monitoring approach.

Further to the conference execution, the dissemination of results was a major issue throughout the second year of Desertstop. Maximum distribution and visibility were pursued following three major strands. The first was the distribution of an abstract book, in printed form to the participants, and by an electronic version through the project web site at [www.feut.de/rgldd](http://www.feut.de/rgldd). Following the conference, participants were invited to submit full paper versions of the their contributions, which were formatted and compiled in a dedicated, fully interactive e-proceedings version. This was sent to all participants as a CD-Rom and can be requested from the organisers by mail or e-mail. To achieve further distribution, the e-proceedings are also made available online through a dedicated scientific server at

<http://ubt.opus.hbz-nrw.de/volltexte/2006/362/>.

Finally, extensive negotiations were concluded with the International Society of Photogrammetry and Remote Sensing (ISPRS) and Taylor & Francis. As a result, a dedicated book will be published on “Recent Advances in Remote Sensing and Geoinformation Processing in the Assessment of Land Degradation and Desertification”. Authors of the best papers were selected by the scientific committee and subsequently invited to contribute a specific chapter in this book publication, which has been launched in the ISPRS book series. Bibliographical reference to this book is Roeder, A. & Hill, J., eds., 2009,  Advances in Remote Sensing and Geoinformation Processing for Land Degradation Assessment: Isprs Series (ISPRS Book), Taylor & Francis, ISBN-10: 0415397693.

With the highly successful organisation of the conference, the global participation and the high scientific standard maintained throughout, the DESERTSTOP-SSA has achieved its goals and provided a clear step forward towards the goals set forth in the 6th framework programme.