COST 4166/11

Brussels, 8 December 2011

MEMORANDUM OF UNDERSTANDING
Subject: Memorandum of Understanding for the implementation of a European Concerted Research Action designated as COST Action ES1104: Arid Lands Restoration and Combat of Desertification: Setting Up a Drylands and Desert Restoration Hub

Delegations will find attached the Memorandum of Understanding for COST Action as approved by the COST Committee of Senior Officials (CSO) at its 183rd meeting on 30 November 2011.

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MEMORANDUM OF UNDERSTANDING
For the implementation of a European Concerted Research Action designated as

COST Action ES1104
ARID LANDS RESTORATION AND COMBAT OF DESERTIFICATION: SETTING UP A DRYLANDS AND DESERT RESTORATION HUB

The Parties to this Memorandum of Understanding, declaring their common intention to participate in the concerted Action referred to above and described in the technical Annex to the Memorandum, have reached the following understanding:

1. The Action will be carried out in accordance with the provisions of document COST 4154/11 “Rules and Procedures for Implementing COST Actions”, or in any new document amending or replacing it, the contents of which the Parties are fully aware of.

2. The main objective of the Action is to create an Arid Lands Restoration Hub which will assemble a multidisciplinary network of European and world experts concentrating on arid lands restoration and combat of desertification through the establishment and management of vegetation.

3. The economic dimension of the activities carried out under the Action has been estimated, on the basis of information available during the planning of the Action, at EUR 60 million in 2011 prices.

4. The Memorandum of Understanding will take effect on being accepted by at least five Parties.

5. The Memorandum of Understanding will remain in force for a period of 4 years, calculated from the date of the first meeting of the Management Committee, unless the duration of the Action is modified according to the provisions of Chapter V of the document referred to in Point 1 above.

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A. ABSTRACT AND KEYWORDS

There is great need to restore existing despoiled drylands and to combat increasing desertification. Restoring habitats improves biodiversity, increases carbon sequestration, enhancing the quality of life for people. An essential measure is the planting of and reestablishment of vegetation. The successful establishment of vegetation in arid areas is complex requiring the multi-disciplinary skills of arid land experts with various capabilities (soils, hydrology, ecology etc.) However, vegetation restoration techniques in arid areas require review and development. This Action is required as access to information is acutely limited, disjointed and new techniques are available and not universally tested. This Action aims to create an ‘Arid Lands Restoration Hub’ to provide the science and practical guidance for dryland restoration and combat of desertification through a dynamic and productive international network of initially 29 participants from 15 COST countries and 2 partners from outside Europe. The Action will deliver an integrated database within a harmonized information hub of current and new methods and techniques of restoration, trials and field studies, assessment indicators, academic and practical publications, and tools to identify and support practical restoration projects and decision makers in planning and restoring drylands and the combat of desertification. The Action promotes open knowledge, innovation in procedures and methods for improved restoration in dry lands.

Keywords: Arid lands restoration, combat of desertification through planting, restoration techniques, arid lands restoration hub, dryland vegetation establishment.

B. BACKGROUND

B.1 General background

Nearly 25% of Europe, and over 40% of the world consists of drylands (UNDP.org/drylands). Desertification, the increase in drylands and the deterioration in vegetative quantity and quality is a global problem and in Europe, 30% of semiarid Mediterranean drylands are affected by desertification (Rubio and Recatala, 2006) and 31% of the region’s population suffer from severe degradation (Safriel, 2009). The Intergovernmental Panel on Climate Change (IPCC) predicts that deserts will expand 10% worldwide by the year 2100. But this could be much worse and as much as 35%. The loss of land and vegetation creates poor quality living environments manifesting in poor biodiversity, poverty, poor health and even starvation and death in developing countries.
This impact is highly relevant to Europe not only due to Europe’s ‘land-loss’, but poverty driven migration of people to the EU caused by dryland degradation in Africa. The losses in vegetation created by drought and poor land management such as overgrazing and deforestation exacerbated by erosion diminishes soil character and quality, which in turn affects people's ability to live on and with the land. Environmental values diminish over time and the situation worsens.

There are a number of organizations in the EU and around the world that are engaged with arid lands and desert/desertification issues. These organizations exist at international, national, regional and local levels. The over arching bodies include the Global Environmental Facility (GEF), UNEP, UNCCD Secretariat – United Nations Convention to Combat Desertification, the Global Mechanism of the UNCCD and FAO (Food and Agricultural organization of the UN). National governments provide funds for arid lands research and remediation, which often include local partners, e.g. Denmark / Burkina Faso, Norway / Eritrea, Ethiopia and Germany / Namibia etc. Other bodies include NGO’s such as ‘Desert*Net International’ which provides a forum with a world body of members and tasks including knowledge dissemination and exchange of ideas. However, the knowledge and experience that exists is diffuse, very difficult to find and extract by users.

The task of combating desertification and reclaiming lands through restoration is extremely great and cannot be accomplished without international will and multinational cooperation. But just as important or even more important are the actions that are and will be taken at ‘grass-roots’ level. Therefore, the most significant task that is required is the physical restoration, protection and management of local native vegetation. This COST Action is thus about turning this situation around. Whilst other groups have a broad spectrum focus on arid land issues, this Action focuses on the ‘hands-on’, practical side of arid land restoration and the combat of desertification with a special emphasis on engaging and involving local experts (practitioners) that possess local and traditional experience and knowledge and to provide users with access to existing knowledge which is at present difficult to find and extract. As many more people are affected by desertification and dry land issues, the time is now ripe to ‘grasp the nettle’ and to create a network, an ‘Arid Lands Restoration Hub’, which will provide the core European and worldwide armature for arid lands restoration and knowledge from now on and that will carry on its mission into the future.
Vegetation, its establishment, protection and management are the key components to this issue. To reach this end the skills and knowledge from many different scientific disciplines are needed including soil science, geomorphology, hydrology, botany, ecology, agronomy, landscape, micro-climate and the bringing together of experts in all these fields from both the institutional, public and private sectors is the key to success in gaining control and making a difference in these difficult dry environments. A COST Action is the most appropriate and vital way of achieving a breakthrough in the field, as it will:

1. Identify, be in contact with and synchronize those people and institutions undertaking arid landscapes / desert restoration work and related projects including those based in Europe and Worldwide;
2. Streamline and harmonise current research methodologies so that studies across the world can be compared and contrasted;
3. Identify repositories of restoration related data, papers and organize means to make available to users;
4. Bring together researchers and practitioners to develop and coordinate new research;
5. Bring together all researchers and research projects from across Europe and around the World, by means of the activities in this Action and thus avoid duplication of work and improve the efficiency of scarce funding opportunities;
6. Encourage and facilitate multi-sectoral collaboration, allowing practitioners and policy makers to benefit too, which is a crucial facet for restoration to be achieved and work;
7. Allow for greater cross-fertilisation of ideas and procedures and the development of new ideas (methods and techniques) for restoration and vegetation establishment, protection and management and the development of new projects and financing;
8. Engage in involving local experts (practitioners) that hold local / indigenous / traditional knowledge;
9. Through its workshops and conferences create a greater awareness of the issues and attract others to be involved and partake in the Action, and encourage others toward funding of research projects;
10. Additionally the Action opens up opportunities for early researchers and young scientists and practitioners to participate and to benefit from transfers and involvement in research in different institutions in Europe and around the world, opening doors to knowledge and experience and thereby creating new ideas and techniques which can be tested and taken forward;

11. Allow for the interdisciplinary and trans-disciplinary work, which is required in tackling such a large-scale problem. It is improbable that that this work would be financed by single national or international research funding agencies; and

12. Ensure through publication that all stakeholders can access existing and new information on arid lands restoration.

13. The project thus will provide a ‘harmonized information’ hub, where data can readily be stored and accessed and where core group and sub groups of scientists will drive forward methodologies towards better vegetation establishment, and management. The Action itself will attract investment, increase the character and value of despoiled lands, benefitting wildlife and increasing native biodiversity and enhance the quality of life for local people through knowledge transfer, and new restoration and combating measures. This Action provides unique opportunities to integrate scientists across Europe, to promote new research and trials in restoration, with robust links to international activities, thus creating added value for policy-making and European societies. It leads to more integrated coordinated research and it places Europe at the forefront of science in this crucial field. Although this Action has defined goals, post Action funding will be sought to continue the ‘Arid lands restoration hub’ well into the future.

Although it is agreed by many within Europe and around the world that re-vegetation and restoration of dryland areas is very important, it is notable that there is still a gap in research funding at the EU level; the current FP7 calls on ‘Environment’ has its focus on the sustainable management of natural resources but this is mainly on the interface between natural resources and ecosystem services not on the restoration or combating of desertification. Due to the need for networking and the multidisciplinary nature of the field COST offers the appropriate framework for the Action.
B.2 Current state of knowledge

The importance of the arid lands restoration has been recognised by governmental organisations and national funding bodies in Europe. Numerous EU funded and other projects have taken place over the last two decades. (Refer to select list below and in Section E.) The current state of knowledge is diffuse and spread around rather insular groups. Some knowledge is available on the World Wide Web and transferred through conferences such as ‘The 3rd International Conference on Drylands & Desertification’ (November 2010) but even here the number of papers on restoration itself is very limited. Some papers are deposited by members of Desert*Net International, but its remit is not focused on restoration and the papers are not accessible. The forthcoming ‘4th World Conference on Ecological Restoration’ to be held in August 2011 does not have any special sessions or workshops focusing on arid lands restoration. Much restoration research/activity occurs outside of Europe, mainly in China and the USA. The PRACTICE project (Prevention and Restoration Actions to Combat Desertification.) is funded by the EU under the FP7 protocol. Its remit however, is dissimilar to this Action as its focus is on the ‘integrated evaluation of practices to combat desertification ... and knowledge on the cost-effectiveness of actions’, whilst this Action focuses on the practical side of vegetation restoration. It is important that these sources are linked in.

It is apparent that systematic international co-ordination and multidisciplinary cooperation is urgently needed in this field. It is important and timely to create an open ‘one-stop-shop’ for arid lands restoration, which will facilitate the sharing and learning of new research findings and best practice and enable further multidisciplinary research development in this area. The proposed Action is unique in bringing together academic experts from a variety of fields as well as experts/consultants working in this field that are not part of the research/academic community, and will provide further opportunities through facilitated networking of designing, creating and originating new methods of restoration that can then be tested in the field. The Action’s dedicated focus on physical restoration and establishment of vegetation makes this different to any other project and remit of any other organization.
The Action will forge cohesive relationships with Desert*Net International and WOCAT (World Overview of Conservation Approaches and Technologies) and the Society for Ecological International’s ‘Global Restoration Network’ (SER). Both Desert*Net International and WOCAT endorse this Action. The Action will also forge relationships with NGO’s working in desert areas, including: ‘Drylands Coordination Group’ - DCG (Norway), CARI (France), Forum Umwelt und Entwicklung (Germany), ‘International Federation of Agricultural Producers - IFAP (International) DRYNET, Both ENDS (Netherlands), and ‘Ricerca e Cooperazione’ – RC (Italy). Data, information and links will be made to the previous and current projects as listed alphabetically immediately below. (Refer to Part II, Section E for greater detail on projects, including aims and funding agencies): AID-CCD, ARID, BIOTA AFRICA, CLEMDES, CLIMED, COST 634, DeSurvey, DESERTLINKS, Desert*Net International, DESERTSTOP, DESIRE, DISMED, ECO-SLOPES, GEORANGE, INDEX, ILTER, JEFFARA, LADA, LADAMER, LUCC, LUCINDA, MEDACTION, MEDAFOR, MEDALUS I-III, MEDCOASTLAND, MEDRAP. MEDRATE, PESERA, PRACTICE, REACTION, RECONDES, REDMED, ROSELT, SCAPE, SENSOR, TERON, VULCAN and WOCAT.

B.3 Reasons for the Action

Soundings for this Action from various eminent researchers indicates that this Action is a timely and necessary component in the fight against desertification and a crucial step in furthering arid lands restoration and restoration research. Arid lands restoration and combat of desertification through planting is an extremely inter- and trans-disciplinary field. Therefore it's important to enable efficient exchange of scientific information as the usual channels for exchange of information are rather unlikely to be effective. In many instances research is done individually by experts in their own fields, but multi-disciplinary research is not usually carried out.
The Action is unique as it will bridge these gaps and will draw together scientific experts in a host of fields as well as in private practice and, will act as a source of knowledge and knowledge transfer, benefit existing research and promote new research. The Action is also urgently needed to co-ordinate efforts of research and practice in this field in terms of the scientific/technological advance and European environmental and economic needs. The benefits of this Action are technical / scientific, societal / environmental and economic. The existing technological and scientific knowhow will be assessed and acknowledged but most importantly there will be a ‘paradigm shift’ in investigating and driving new techniques and the ‘science of restoration’. This change in methods will eventually benefit the environments, society and the economies of those areas in southern Europe and the rest of the world that are affected by dry land degradation and desertification.

**B.4 Complementarity with other research programmes**

There are a number of projects and organizations that have synergy with this Action. These have been contacted and they have agreed in principle to coordinate so as to complement each others work and not to duplicate it. These include the DESIRE (http://www.desire-project.eu), PRACTICE (http://80.24.165.149/drupal), both EU funded projects (refer to the end of the appendix for more information) and WOCAT (http://www.wocat.net). Coordination will also occur with other projects / organizations including: LEDDRA (http://leddra.aegean.gr/index.htm), the French Scientific Committee on Desertification (CSFD), Global Network of Dryland Research Institutes (GNDRI), International Long Term Ecological Research (ILTER), Society for Ecological Restoration International (SER), Euro-Mediterranean Information System on know-how in the Water sector (SEMIDE), Survey of Economic Plants for Arid and Semi-Arid Lands (SEPASAL), BIOTA AFRICA and the European Soil Bureau Network (ESBN).

The Action does not repeat but complements current European research programmes and organisations in its dedicated focus on physical restoration and establishment of vegetation. This makes it different to any other project and remit of any other organization. Furthermore, it bridges the gaps, brings academic experts, local knowledge and field experts together, and facilitates multi-disciplinary research as well as sharing knowledge on best practice and new techniques in this field through the networking.
C. OBJECTIVES AND BENEFITS

C.1 Aim

The main objective of this action is to provide the science and practical guidance on the particular issue of arid lands restoration and combat of desertification through the establishment and management of vegetation. To this end, an Arid Lands Restoration Hub, which will assemble a multidisciplinary network of European and world experts, will be created. This endeavor, which has a unique remit, will identify current state of the art methods of restoration as well as tried and tested indigenous and traditional knowledge and methods from around the world. It will establish new research determining original and innovative restoration and planting methods and techniques, relative to local conditions and provide an open body of information that is not currently and readily available. The Action also aims at addressing all the impacts of Arid Land Restoration on ecosystems, on eco-hydrology and on the cycles of matter proactively. These impacts will be investigated a priori making arid lands restoration an instrument for the management of water, nutrient and carbon cycles.

C.2 Objectives

Detailed objectives of the ‘Arid Lands and Desert Restoration Hub’ and their scientific impacts include:

1. Identifying Problem Typologies and Indicators:

Identify and breakdown desertification and restoration types/situations/scenarios caused by nature (including water and wind) as well as trends relative to decision making/policy, cultural scenarios and ad-hoc events. This broader-scale macro breakdown will inform the micro-scale restoration and combat of desertification measures.
2. Learning from the Past - Designing the Future:

Cultivate and advance past, current and emerging restoration and management techniques breaking down component parts and issues regarding soils, hydrology, biology, botany, biota, microclimate, culture etc. to determine new and novel approaches to restoration. Design new approaches and formulate new methods and techniques.

3. Knowledge and Exchange:

Review and exchange technical know-how on an international/interdisciplinary basis including indigenous and traditional knowledge as well as advances in vegetation establishment with mycorrhizae, soil make-up, water harvesting and retention, plant types and production, ecological opportunities, economic opportunities (food), land/cultural identities, microclimate manipulation through micro-engineering and symbiotic planting.

4. Repository and Knowledge Hub and On-Line Knowledge Bank:

Gather and maintain a repository of open source material focused on restoration and the various sub-fields. This database will be an invaluable resource for scientists and students across Europe and a world source of knowledge for all which will be especially useful for NGO’s and particularly local initiatives. This includes an open (with registration) on-line electronic forum or knowledge bank that will allow anyone to ask questions, discuss issues, participate in discussions on the topic(s). If funding is available the website could be translated into a number of major European languages (French and Spanish).

5. Tools, Guidelines and Indicators:

Provide practical electronic and hard print guidance and tools for the assessment and design of planting measures – including issues relating to soils, hydrology, biodiversity, people etc., for practitioners, planners and policy makers.
6. Training and Outreach:

Provide and facilitate training for early-stage researchers and practitioners, especially in the field and create and strengthen links between them and established experts. Create awareness and promote communication concerning restoration and combat of desertification amongst the general public in key regions and locale’s and with stakeholders and policy makers.

C.3 How networking within the Action will yield the objectives?

The objectives will be achieved through the following:

1. Themed workshops and think-tanks;
2. Separate Conference(s) and/or tie in with the proposed ‘4th and 5th International Conferences on Drylands Deserts & Desertification’ planned for 2012 and 2014 and other conference special sessions;
3. Training schools for early-stage researchers with think-tanks;
4. Exchange visits for Short-Term Scientific Missions (STSMs). These could also be used to link up closely with practitioners and land users with local knowledge;
5. Awareness days for dissemination;
6. Regular face-to-face and e-meetings (using web conferencing) are planned for the Management Committee (MC), Steering Group (SG), as well as for the Working Groups (WG’s);
7. The results will be disseminated to a wide audience range including researchers, stakeholders, policy makers, practitioners, and general public, through various means (see Section H, for a full list);
8. Open restoration hub database with readily retrievable data accessible to all stakeholders;
9. Working papers/report generated from workshops/conferences, training schools;
10. Booklet(s) with desertification typologies and scenarios with restoration guidelines*;
11. Booklet(s) promoting local awareness of issues and possibilities for local restoration projects – with particular reference to farming*;
12. E-forum and On-Line Knowledge Bank*;
13. Media coverage;
14. Scientific publications, including conference and journal papers, books; and
15. Web site*.

(* - Note if funding is available part will be used to translate key documents and the website into the key languages like French, Spanish, Arabic.)

COST funding will be used to support:

- The above scientific meetings and events, including attendees within EU and invited experts from outside the EU;
- Exchange visits for STSMs;
- MC and WG meetings (combined with scientific meetings and events/conferences wherever possible);
- Large-scale dissemination of information and recommendations;
- Publications including brochures and book;
- Establishment, management and maintenance of (if possible, multi-language) web site, arid lands restoration hub, e-meetings platform and e-knowledge forum; and
- Network/project management.

C.4 Potential impact of the Action

The Action aims to 1) place Europe at the forefront of arid lands restoration and combat of desertification, to make restoration techniques more available to all stakeholders as well as to contribute significantly to the understanding, tools for decision making and development of the scientific / technological practical methods for restoration and combat of desertification. Particular emphasis will be placed on affected regions in Europe and their particular circumstances including environmental, agronomic, economic and societal needs. The scientific (methodological and technological) impacts of this Action are ‘natural’ as well as ‘cultural’ and include 2) the Health and Wellbeing of the Environment and the concomitant beneficial effects this will have on 3) the Health and Wellbeing, Culture and the Economy of Local People.
1. A Centre for Understanding Desertification and for Practical Restoration:

- Part of this Action will focus on understanding the issues that have lead to the loss of land quality and desertification, to identify the layers of causality for this degradation, tools for understanding these often complex and layered issues and the indicators of various desertification types. (Refer to Table 2, at the end of Section E.) The concentrated focus on this single issue of arid lands restoration will lead to a major push in the advancement of restoration and combat of desertification through planting and allied interventions, which can only be achieved through coordinated international and multidisciplinary efforts. The Action will thus kick-start a new and open mindset in restoration, (whilst recognizing the benefits of indigenous and traditional knowledge), opening up dialogue to significantly enhance the research environment. Capabilities will be expanded in Europe, placing the COST countries at the centre as well as at the leading edge of arid lands restoration and combat of desertification in the world. The provision of training for early-stage scientists will ensure the maintenance of the leadership in the longer term.

- The Action will create an open field (if possible, multi-language) “hub” that is readily accessible to all stakeholders and participants, including local people, practitioners and consultants. In contrast to the present day, information which is hard to locate and access, knowledge will be made readily available to all stakeholders.

- The intense focus on this single issue will raise the profile of this important agenda at national, regional and local levels. The local level is extremely important as a knowledge source as well as for knowledge input. It is here that the ‘battle’ is won or lost. The Action will provide impetus and knowledge to implement local restoration projects.

2. Benefitting the Natural Environment - Nature:

- The enhanced establishment and management of vegetation brought about through the Action (knowledge transfer and new techniques) will enhance local lands and soils creating soil stability and less erosion, improving micro-landscape conditions and water percolation which will improve habitat conditions and enhance and increase biodiversity.
3. Benefitting the Cultural Environment – People:

- The facilitation of synergies of scientific and local knowledge and the enhancement of the natural environment will have a concomitant beneficial impact on local people, including farming communities. (The Action aims to include local people as part of STSMs especially as part of knowledge transfer between scientists and vice versa with local knowledge and traditions.) Improving diminished local habitats provides resources and also protects existing local habitats that are essential to the health and economic well-being of local peoples in Europe and around the world. Products from these areas include native herbs, honey and other forestry products. Agricultural areas are also improved through the creation of natural shelterbelts, which diminish soil and wind erosion and increase biodiversity, which can e.g. help in the pollination of crops. Cultural identity can be maintained through the continued interaction of the people with nature as this connection in part, often strongly defines cultural identity.

- Furthermore, tourism to local areas can be maintained or enhanced as tourists (especially eco-tourists) prefer ‘natural’ and well-managed landscapes and appreciate the natural and cultural aesthetics of quality landscapes even if they are in dry areas.

C.5 Target groups/end users

The Action has the potential to have wide ranging benefits for arid and dry environments as well as the people that live within and next to them. Particular beneficiaries of the Action thus include the dry lands and peoples of the northern Mediterranean, (the UNCCD Annex IV countries Portugal, Spain, Italy, Greece, Cyprus, Turkey and Israel) and local peoples living in arid and dry lands (in rural, semi-rural and urban fringe areas) around the world. The transfer of understanding, technologies, and local knowledge from one part of the world to another will benefit the land and local peoples. Capability building is an important part of the Action and STSMs and other workshops will increase local capabilities.
D. SCIENTIFIC PROGRAMME

D.1 Scientific focus

The strategy for the network is based on fulfilling the objectives noted in Section C3 and particularly on vegetation establishment and the long-term management of these lands to maintain and enhance environmental quality and quality of life for local people. The Action will focus on five Themes, with associated Working Groups (WGs). These working groups which will have core members but will be open to the whole scientific community and interested stakeholders, will be interlinked and report back to one another and merge in the final stages of the Action as noted below and illustrated in Figure1. WG members will be chosen specifically due to their specialist skills. The final product for WGs 1-4 is to provide a ‘Specification of Knowledge’ of what works ‘where, what, why and how’.

1. WG1 – Understanding Land Degradation and Causality: The Bigger Picture and Focus on Europe - An Analytical and Remedial Think-Tank: Because information is so dispersed, diffuse and largely unavailable to users, WG 1’s tasks will centre on understanding the big picture and gathering the dispersed knowledge of past and present research, programmes and Actions and formulating a ‘baseline’ or ‘terminus a quo’ especially with regard to the dryland areas of Europe, namely the UNCCD’s Annex IV Northern Mediterranean countries (Portugal, Spain, Italy, Greece, Malta, Cyprus, Turkey, Israel) and Annex V countries (Western Balkans and South East Europe). The group will also review the many ‘direct’ and often ‘indirect’ factors that create land degradation in arid lands with regards to man’s interventions such as policy, land speculation, land classifications, land use and changes, economics, population pressures, climate change etc. particularly with respect to the research and studies that have taken place in Europe. The focus of the WG will thus be to consolidate and concretise existing knowledge and look towards understanding and expediting new and missing knowledge. The group’s remit will also include ‘international consultation’, in order to locate and highlight projects, practice scenarios and methods, (highlighting best practice), and bring forward the ‘missing’ specifications relating to ‘what works where and why’ in restoration methods and techniques:
2. **WG2 – Traditional and Innovative Systems: Focus on Soils and Hydrology - A Creating and Designing Think-Tank: Understanding the issues and problems through European, international and interdisciplinary exchange and technical knowhow particularly on vegetation establishment relating to soils and hydrology and allied issues. This includes the appropriate use of existing soil information at national and European levels to support land use planning and the efficient and appropriate use of water;**

3. **WG3 – Traditional and Innovative Systems: Focus on plants, ecology, plant physiology, mycorrhizal fungi etc. – A Creating and Designing Think-Tank: Understanding the issues and problems through European, international and interdisciplinary exchange and technical knowhow particularly on vegetation establishment relating to the plants themselves, native plants, agronomic and allied issues;**

4. **WG4 – Focus on Land Management - Creating and Designing Think-tank: The issues tackled by this working group focuses on management and maintaining land quality for the benefit of the environment and local people post the initial vegetation establishment period including traditional and innovative technological and land management practices to ensure vegetation establishment is perennial and sustainable. WG4 will also focus on the integrated assessment and monitoring of restoration and land management and will consider increasing concerns related to food security. The group will examine how these lands can be used for ‘agriculture’, examining the levels of need, opportunities and constraints;**

5. **WG5 - Knowledge Transfer, Outreach and Training: The working group will be responsible for setting up systems and actual documenting of data and case studies, creating databases and making these available for upload to the “hub”. WG5 will liaise with the Joint Liaison Group and the Global Soil Partnership (following the recommendations of the Millennium Development Goals) to provide them with the deliverables of the WG’s and Action, with the aim to ensure the harmonization and interoperability of environmental information (Annexes II and III of the INSPIRE Directive 2/2007).**
The WG will also focus on capability building at local level through training and STSMs, awareness, dissemination and training of early-stage researchers. While the works in WG5 is what would normally be done by the Management Committee (MC), in this Action this will be dealt with by a focus group (WG5), ensuring effective dissemination and training. Nevertheless, close coordination will be made with the MC and the WG5 and MC meetings will be normally held together, to minimise costs (see Section E).

The scope of the WG’s in more detail are as follows:

WG1 - Focus Understanding Land Degradation and Causality - The Bigger Picture Think-Tank:

Whilst the MC provides the ‘brain’ of the Action, WG1 provides the skeleton / framework for the Action. WG1’s remit is overarching and looking at the bigger picture of restoration, particularly in Europe. Although the central focus of this Action is the practical side of restoration and vegetation establishment in arid areas, there is a particular need to understand the background and causality of land degradation in these areas. Many projects have been undertaken in and around this subject area but much of it remains hidden and difficult to access. WG1 will thus bring together existing research data and information through ‘international consultation’ from a variety of existing sources including research reports, programme documents etc., so that this data and information, and most importantly the results, can surface and be made readily available to users. WG 1’s major tasks then will be to summarise as the basis and framework for restoration the background, causes indicators of land degradation and the results of restoration and mitigation in dry and arid areas. Furthermore it will search for and identify gaps in the knowledge regarding causality and land degradation processes be they ‘natural’ (such as water and wind erosion) or ‘cultural’ (e.g. relating to policy and patterns of development and processes.) Examples of this include lands affected by the Common Agricultural Policy with abandoned lands, marginal lands, urbanised lands and ‘over-farmed’ lands. The overarching processes and structures for successful remediation will be identified, and made accessible to users.
WG2 - Focus on Global Restoration and Combat of Desertification Techniques – Soils and Hydrology and Microclimate Manipulation for Enhanced Vegetation Establishment Think-Tank:

The main focus of this WG centres on soils and hydrology. In the first instance land degradation occurs when the soils become degraded (by various man-made and/or natural actions). The most common forms of soil degradation in the drylands include erosion, salinisation, and soil organic matter depletion associated with loss of biodiversity. The WG will identify the various ranges of soil typologies, their physiognomy, physical and chemical makeup and particular reactions with water. Issues of albedo, soil colour, solar absorption, and reflectivity will be assessed. Current and new advanced microclimatic manipulation of soils, soil structures and water which are important for enhanced vegetation establishment will be advanced. Core and subsidiary indicators mainly relative to soil / hydrology / microclimate will be identified as part of a toolkit for categorisation, understanding the layers of causality and identifying European and world-wide situations and solutions. The analysis of typologies will link into the other part of the WG’s programme which concentrates on identifying tried and tested local technologies and methods for arid lands restoration as well as allied restoration relative to soils and hydrology in other biomes which may have particular resonance. Although all WG’s will link together with a continuous and specific flows of information the greatest need for exchange is between WG2 and WG3 as they are dealing with the fundamentals of restoration using plants.

WG3 – Traditional and Innovative Systems: Plants, Ecology and Microclimate Manipulation for Enhanced Vegetation Establishment Think-Tank:

Working Group 3’s main focus is on ecosystems, habitat, autochthonous and other vegetation, plant species, plant survival adaptations, planting and seeding methods, plant selection, nursery growing, methods to facilitate plant establishing and growth as factors affecting restoration success as well as plant establishment methods and the complex interaction between these issues. Work will include the identification of functional groups of species and the functional traits within different genotypes within key species based on their plasticity in response to the environment and assessment of the interrelations between biodiversity, responsiveness and the heterogeneity relative to site. This WG will also take on board the synergies of invertebrates and other organisms that improve environmental growing conditions of plants as well as those organisms including mycorrhizal fungi, which help to deliver water and nutrients to plant roots.
The WG will also look at the issues relating to seed gathering, production, storage and handling in the Mediterranean and other areas as most of this knowledge relates to climates. The WG will look at the causality of vegetation loss and measures to facilitate vegetation recovery in Europe and the rest of the world in arid land areas. The group will identify common themes and analyse the various threats for plant diversity and plant cover for all the countries included in the COST Action. These threats will be identified, analysed and where possible quantified. Core and subsidiary indicators will be identified as part of a toolkit for categorisation, understanding the layers of causality and identifying European and world-wide situations. The group will push forward ideas and proposals for passive as well as active restoration scenarios, evaluate the benefits and challenges of native versus the potential need for the use of hardier exotic species including halophytic species which are saline tolerant. Apart from establishing current knowledge, practice and methods regarding the above and pushing forward the range of possible interventions regarding enhanced vegetation establishment and microclimate, WG3 will link together with the other WGs with a continuous and specific flow of information. The greatest need for exchange is between WG2 and WG3 as they are dealing with the fundamentals of restoration using plants.

**WG4 – Focus on Land Management - Creating and Designing Think-Tank:**

A focus on the management of drylands is crucial to this Action. Both restoration and land management practices must be suited to the land and ecosystem qualities and constraints, in accordance with the land evaluation principles. Once vegetation has been established (or is already established) strategies are required to maintain and enhance the long-term provision of ecosystem goods and services and to find a balance with the activities of people whether this be agriculture (such as grazing) or tourism.

The remit of WG4 is to look at existing drylands restoration and management strategies and practice in Europe and around the world and to identify suitable approaches (concepts, methods, indicators) to assess and monitor their effectiveness in an integrated way (by considering both bio-physical and socio-economic factors) to recommend best practice scenarios. This activity will strongly contribute to the development of the harmonised restoration indicators (milestone 3; see in Section E). To achieve that, the working group will build on the outcomes of the related on-going projects, such as PRACTICE and DESIRE, and others. Both traditional and innovative technological practices will be taken into account.
Current best practice relative to identified criteria can then be transferred to a wide range of stakeholders and policy makers. Finally, the remit of the group is also to ‘move the goal posts’ in land management strategy and practice and to facilitate and identify new potentials and possibilities. Increasing concerns related to food security will be considered, along with the analysis of how (with regard to opportunities and constraints) restored lands can be used for ‘agriculture’.

WG5 - Knowledge Transfer, Outreach and Training:

WG5 is made up of individual members and also cross WG members from groups 1, 2, 3 and 4. Its main remit centres on the gathering of assimilation and transfer of knowledge. (Wherever possible this will be multi-lingual.) Furthermore its responsibility incorporates outreach in its broadest sense and training of early career scientists, organising STSMs and training camps. Past, present and newly generated knowledge will be used to create guidance and guidelines to advise other groups, stakeholders and policy makers regarding desert restoration and combat of desertification. This information will be hosted on the ‘desert restoration hub’* and key data and findings will be made available in print as well. Key recipients will be national and regional policy advisors, land managers and regional / local farm advisors etc. The final outreach will be an exhibition that will travel and/or be set up in various locations in arid and dry lands areas to educate people of what has been achieved, where and how and what can be achieved through planting. The exhibition itself will be used as a motivator and means for gathering local knowledge and ideas for how other stakeholders identify ways and means of achieving better physical and socio-economic results. The exhibition will be linked into a final international conference, which will focus directly on restoration and the issues involved with presentations on the work of the Action and related projects and with invited guest speakers from around the world. The WG will also be responsible for harmonising information and knowledge transfer across the WG’s and organise the various STSM exchange visits where young scientists will be taken into the field. These visits will be integrated with local practitioners and stakeholders that have local knowledge so that there is a multidirectional flow of experience, techniques and methods.

*As part of the dissemination of knowledge strategy it is suggested that the usual COST Action web site should be expanded to facilitate knowledge exchange and greater use by stakeholders including local users. This website should continue as the focus of arid lands restoration knowledge post the Action. (Funding post COST will not be from COST but will be sought from other sources.)
D.2 Scientific work plan methods and means

The Action aims to provide a structured, but not too detailed work plan flexible enough to permit adjustments, and also inclusion, at later stages, of other ideas, perspectives and activities not foreseen during the preparation of this proposal. Workshops and e-meetings are a key part of the Action strategy as illustrated in Table 1 below. The Action also includes training camps and STSMs. The location and output of this will be designed to maximize knowledge gain and transfer. At present options include an STSM to Portugal to assess a 20 year long revegetation scheme of a quarry. Additionally STSMs and/or training sessions can be held in Morocco (Ouled Dlim site, Marrakech), to assess 15 years of rangeland restoration based on fodder shrubs plantations and in Italy (Pula site, Sardinia) to assess 50 years of reforestation program. Other potential training sessions may occur in Greece, Israel, North Africa and South Africa / Namibia (Gobabeb Training and Research Centre.)

Table 1

<table>
<thead>
<tr>
<th>WG * TASK NO.</th>
<th>ACTIVITY TYPE</th>
<th>ACTIVITIES</th>
<th>THEMES / OBJECTIVES</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEETINGS</td>
<td>WORKSHOP</td>
<td>E-CONFERENCE</td>
<td>EXCHANGE</td>
</tr>
<tr>
<td>WG1 - Focus Understanding Land Degradation and Causality - The Bigger Picture - Europe</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WG1.1</td>
<td>X</td>
<td>Understanding the European picture - identifying the basics</td>
<td>X</td>
</tr>
<tr>
<td>WG1.2</td>
<td>X</td>
<td>Data collection – from numerous previous /current studies</td>
<td>X</td>
</tr>
<tr>
<td>WG1.3</td>
<td>X</td>
<td>Understanding causes, effects and remedies</td>
<td>X</td>
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<tr>
<td>WG1.4</td>
<td>X</td>
<td>Country by country scenarios – Annex IV</td>
<td></td>
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<tr>
<td>WG1.5</td>
<td>X</td>
<td>Country by country scenarios – Annex V</td>
<td></td>
</tr>
<tr>
<td>WG1.6</td>
<td>X</td>
<td>Finalising the European Picture – Specification ‘where, what, how and why’</td>
<td>X</td>
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<tr>
<td>WG2 – Traditional and Innovative Systems: Focus on Soils and Hydrology</td>
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<tr>
<td>WG2.1</td>
<td>X</td>
<td>Understanding current practice and scenarios</td>
<td>X</td>
</tr>
<tr>
<td>WG2.2</td>
<td>X</td>
<td>Data collection - multidisciplinary</td>
<td>X</td>
</tr>
<tr>
<td>WG2.3</td>
<td>X</td>
<td>Assess and brainstorm existing systems</td>
<td>X</td>
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<tr>
<td>WG2.4</td>
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<td>Assess and brainstorm new methods</td>
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<td>Exchanges of early stage researchers</td>
<td>X</td>
</tr>
<tr>
<td>WG2.6</td>
<td>X</td>
<td>Finalising outcomes – Specification ‘where, what, how and why’</td>
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<tr>
<td>WG3 – Traditional and Innovative Systems: Focus on plants, ecology, plant physiology, etc.</td>
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<td></td>
<td></td>
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<tr>
<td>WG3.3 X</td>
<td>Assess and brainstorm existing systems X</td>
<td></td>
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<tr>
<td>WG3.4 X</td>
<td>Assess and brainstorm new methods X X</td>
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<td>WG3.5 X X</td>
<td>Exchanges of early stage researchers X</td>
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<tr>
<td>WG3.6 X X</td>
<td>Finalising outcomes – Specification ‘where, what, how and why’ X X</td>
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<tr>
<th>WG5 – Knowledge Transfer, Outreach and Training</th>
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<td>WG5.1 X</td>
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<td>WG5.2 X X</td>
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<td>WG5.4 X</td>
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<td>WG5.5 X X</td>
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<td>WG5.6 X</td>
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<tr>
<td>WG5.7 X X</td>
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</table>
E. ORGANISATION

E.1 Coordination and organisation

PARTICIPANTS AND OPEN DOOR POLICY
This Action will foster cross-breeding in an interdisciplinary and international community of research and practice, initially with participants from 15 COST countries and 1 reciprocal agreement partner outside Europe, namely South Africa, (it is hoped that Australia and Argentina will join post application) and 7 other non-COST countries including Namibia, Syria, Tunisia, Lebanon, Egypt, China and the USA. The initial participants involved in the development of this proposal, represent a wide range of disciplines and sectors including researchers from universities and national R&D institutions, consultants, policy makers, and project managers. It is considered important that the Action also includes consultants who are working on project work in many arid areas around the world. In addition, the research participants will bring with them a cohort of end users including planners/designers and policy makers at EU, national and regional levels. This Action will provide a flexible framework open to any country and participants. It permits the inclusion, at the implementation stage, of ideas and activities not foreseen during the preparation of the proposal. The Action will encourage participation from unrepresented sectors and disciplines and early-career researchers in particular.

MANAGEMENT COMMITTEE AND WORKING GROUPS

The Management Committee (MC) will consist of up to 2 representatives from each participating COST country, including early-stage researchers. The MC will meet once or twice a year (see Timetable in Section F). A Steering Group (SG) within the MC will be formed, consisting of the MC Coordinator (Chair) and the WG leaders. The SG will meet once a year, ensuring there is close communication between WGs. The Short-Term Scientific Mission (STSM) co-ordinator and the web-manager will also attend some SG meetings. Five Working Groups (WG) will be formed (see Section D), each with a Leader, assisted by a WG Committee consisting of 4-8 MC members. Typically at least one early-stage researcher will sit in each WG Committee. The activities (e.g. workshops) will normally be organized by the WG Committee, but designated experts could also be used if appropriate, therefore WG Committees could have short-term members/advisers.
The WG’s will meet twice or more per annum, at least one will be a physical meeting. It is intended that one of these meetings will be tied into a conference that is planned and organized by another body/organization that is holding a conference. This should assist in saving funds. WG5 is a special focus group. While the set-up of this designated group will ensure effective dissemination and training, WG5 Committee meetings will normally be held together with MC meetings (day before/after), given that WG5 work is normally dealt with by MC. In other words, no extra meeting budget will be needed from WG5. Within WG5, a STSM co-ordinator will be appointed, responsible for the proposed exchange visits, and a web-manager will also be included. The MC, SG, and WG meetings will be held preferably in COST Office premises in Brussels, but whenever possible, the meetings will be held before or after an Action activity (e.g. workshop), to use the budget effectively. MC and WG meetings will also be attached to, where possible to planned Arid Lands conferences. In order to facilitate greater dialogue and progress in meeting objectives, additional web based meetings using web conference facilities / software will be implemented.

EVALUATION AND MONITORING

The MC will be responsible for coordinating the Action, with particular attention in choosing the topics of various activities and on COST country balance when drawing up lists of participants entitled for reimbursement and when distributing activities. The MC will make the scientific and budgetary assessment and decision of the application, and the MC will formally delegate relevant tasks to WG Leaders. On the agenda of each MC, SG and WG meeting, the evaluation and monitoring of the planned, ongoing and completed activities will be a standard item. Several key facets, including the relevance of topics, scientific quality, attendance, output, impact, and cost-effectiveness, will be taken into account in considering the applications of activities and in evaluating the final reports. The evaluation and monitoring will normally be made by the relevant WG, with standard forms, and overseen by the whole MC.
ORGANISATION OF ACTIVITIES

Workshops / Think-Tanks

The organization of workshops and Think-Tanks will be dealt with by the relevant WGs. Most will be held at the COST Office premises in Brussels if possible/appropriate or else linked into planned conferences as ‘Conference Special Sessions’ where others can contribute. In other cases the hosts are expected to fund the venue. While university venues will normally be used, other venues will also be considered, such as city halls for the awareness days. Where appropriate, experts in non-COST countries will be involved as invited speakers.

Conference Special Sessions

Given the interdisciplinary features of the Action, the participants are involved in a range of conferences, including common conferences for most participants, such as the biennial, International Conference on Drylands and Desertification to be held 2012 and 2014. Special sessions will be organised and attended by the participants of this Action, to enhance the interdisciplinary cross-breeding of innovative and emerging scientific ideas, and to disseminate the results to a wider audience.

Exchange Visits - STSMs

A number of STSMs are and will be planned through exchange visits, mainly for early-stage researchers. Whilst some STSM with specific aims/tasks have been mooted such a ‘summer school in Portugal where the topic would be ‘Ecological revegetation of quarry sites in semi-arid areas’ and revegetation has been studied for more than 20 years. A demonstration/training session is proposed in Morocco (Ouled Dlim site of PRACTICE project, Marrakech), to assess 15 years of rangeland restoration based on fodder shrubs plantations and in Italy (Pula site, Sardinia), to assess 50 years of reforestation program. Good opportunities for STSMs also exist with regard to Israel and Namibia.
Additional STSMs will evolve, either independently or associated with other activities such as themed workshops. Since the situation of early-stage researchers may vary in the project duration, the Action would provide a framework rather than set up some specific topics at this stage. The Action also plans to have a small number of STSMs from a home institution in a COST participating country to a host Institution in a non-COST country. To evaluate the success of the exchange visits, the researchers will be asked to write a report upon return, to the WG5 Committee. Most participants of this Action play a key role in major national research projects relating to this field, and some participants are also leaders or participants with national and international networks. The Action will encourage integrating the planned activities with other relevant activities in the host country. For example, one of the MC meetings and/or workshops could be held jointly with the meetings of WOCAT, DESIRE and Desert*Net International.

MILESTONES

Whilst the success of the Action will be marked by the appropriate completion and delivery of activities (e.g. Table 1 in Section D2), the major milestones will be:

1. Working reports/publications from the WG1 workshops/conferences (Year 2-3)
2. Establishment of the information hub database and easy links to existing databases (Year 1-4 and continuing post COST)
3. Harmonised restoration indicators (Year 3)
4. Development of design guidelines (Year 4)
5. Conference and Exhibition(s) (Year 4)
6. Post Action continuation of ‘Arid lands restoration hub’ with funding from alternative non COST sources.
WEBSITE

An Action specific website will be set up, with links to the COST website for general information. An early-stage researcher, associated with the Action coordinator or the WG5 Leader, will be appointed as web-manager at 1 day/week to maintain the web site. The web site will contain two functions. It will mainly aim at dissemination/exploitation of the Action results and data. There will be a Members only area for management issues. Additionally the website, (or a link depending on COST protocols), will be used as part of the outreach programme, to disseminate knowledge to all stakeholders / users. (This would be funded from the outreach and publications budget.) In order for the website to be effective, links would be pursued to all other allied programmes and continuous notification to international, national and regional bodies.

E.2 Working Groups

The organization of WG’s is described in detail in Section D1. The WG’s have been devised to concentrate experience and skills regarding various aspects of restoration, but in order to be successful the data and information from the WG’s will be cross-coordinated where the WG’s will come together at the end of sessions. The WG leaders will be established from those members that have a track record in the area of expertise and project management. Although the remit of the WG’s and a range of WG activities have been initially proposed, the Action will be sufficiently flexible in terms of scope, memberships and activities.

E.3 Liaison and interaction with other research programmes

The participants of this Action have been, and are involved in a range of relevant European and other research programmes. The Action will actively seek collaboration with other projects and this will be enhanced by the fact that some participants of this Action are also involved in the network in other projects (and indeed this proposal has been reviewed by some of those participants). Other projects where this Action will seek liaison include:
• ‘Catastrophic shifts in drylands: how can we prevent ecosystem degradation?’ €7.5 million. Partners - Portugal. Spain, France, Italy, Greece, Cyprus, Switzerland and the U.K. 2011-2016.
• WAHARA - ‘Water harvesting for rainfed Africa: Investing in dryland agriculture for growth and resilience’. €2.7 million – Stichting Dienst Landbouwkundig Onderzoek, University of Leeds (U.K.), MetaMeta (Netherlands), IRA (Tunisia), INERA (Burkina Faso), Mekelle University (Ethiopia), and GART (Zambia). 2011-2016.
• DIVERSITAS – An International programme of biodiversity science. http://www.diversitas-international.org

E.4 Gender balance and involvement of early-stage researchers

The Action will also be committed to considerably involve early-stage researchers. This item will also be placed as a standard item on all MC agendas. Considerable involvement of early-stage researchers will be attained through specifically planned activities for them (and led by them) including STSM exchange visits, training schools, and think-tanks. They will also be strongly encouraged to organise/lead other workshops and conference sessions. They will sit in each WG Committee and also in MC. The gender balance and the involvement of early-stage researchers will be continuously enhanced, and the MC will place this as a standard item on all its agendas.

Gender balance has been an important driver in the initial choice of experts from various fields and at the outset, potential female participants have been included above and before male participants. Parity between males and females will be pursued throughout the Action.
F. TIMETABLE

The duration of the Action will be four years. The timescale is shown in Table 2 below. Within each WG, the activities are generally evenly distributed, over a 4-year period, reflecting progression of the activities and also reducing management load.

Table 2. Timetable of Activities and Committee Meetings.

<table>
<thead>
<tr>
<th>TASKS</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Year 1</td>
</tr>
<tr>
<td><strong>WG1 - Focus Understanding Land Degradation and Causality - The Bigger Picture - Europe</strong></td>
<td></td>
</tr>
<tr>
<td>WG1.1 Understanding the European picture - identifying the basics</td>
<td>X</td>
</tr>
<tr>
<td>WG1.2 Data collection – from numerous previous/current studies</td>
<td>X</td>
</tr>
<tr>
<td>WG1.3 Understanding causes, effects and remedies</td>
<td>X</td>
</tr>
<tr>
<td>WG1.4 Country by country scenarios – Annex IV</td>
<td>X</td>
</tr>
<tr>
<td>WG1.5 Country by country scenarios – Annex V</td>
<td>X</td>
</tr>
<tr>
<td>WG1.6 Finalising the European Picture – Specification ‘where, what, how and why’</td>
<td>X</td>
</tr>
<tr>
<td><strong>WG2 – Traditional and Innovative Systems: Focus on Soils and Hydrology</strong></td>
<td></td>
</tr>
<tr>
<td>WG2.1 Understanding current practice and scenarios</td>
<td>X</td>
</tr>
<tr>
<td>WG2.2 Data collection - multidisciplinary</td>
<td>X</td>
</tr>
<tr>
<td>WG2.3 Assess and brainstorm existing systems</td>
<td>X</td>
</tr>
<tr>
<td>WG2.4 Assess and brainstorm new methods</td>
<td></td>
</tr>
<tr>
<td>WG2.5 Exchanges of early stage researchers</td>
<td>X</td>
</tr>
<tr>
<td>WG2.6 Finalising outcomes outcomes – Specification ‘where, what, how and why’</td>
<td>X</td>
</tr>
<tr>
<td><strong>WG3 – Traditional and Innovative Systems: Focus on plants, ecology, plant physiology, etc.</strong></td>
<td></td>
</tr>
<tr>
<td>WG3.1 Understanding current practice and scenarios</td>
<td>X</td>
</tr>
<tr>
<td>WG3.2 Data collection - multidisciplinary</td>
<td>X</td>
</tr>
<tr>
<td>WG3.3 Assess and brainstorm existing systems</td>
<td>X</td>
</tr>
<tr>
<td>WG3.4 Assess and brainstorm new methods</td>
<td></td>
</tr>
<tr>
<td>WG3.5 Exchanges of early stage researchers</td>
<td>X</td>
</tr>
<tr>
<td>WG3.6 Finalising outcomes outcomes – Specification ‘where, what, how and why’</td>
<td>X</td>
</tr>
<tr>
<td><strong>WG4 – Focus on Land Management</strong></td>
<td></td>
</tr>
<tr>
<td>WG4.1 Understanding current practice/best practice and scenarios, acquiring key concepts and approaches</td>
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</tr>
<tr>
<td>WG4.2 Data collection - multidisciplinary</td>
<td>X</td>
</tr>
<tr>
<td>WG4.3 Assess and brainstorm past and current strategies (case studies)</td>
<td>X</td>
</tr>
<tr>
<td>WG4.4 Assess and brainstorm new methods/strategies</td>
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</tr>
<tr>
<td>WG4.5 Exchanges of early stage researchers</td>
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</tr>
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<td>WG4.6 Finalising outcomes outcomes – Specification ‘where, what, how and why’</td>
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<table>
<thead>
<tr>
<th>WG5 - Knowledge Transfer, Outreach and Training</th>
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</thead>
<tbody>
<tr>
<td>WG5.1 Web site and Arid-lands Restoration Hub –data</td>
</tr>
<tr>
<td>WG5.2 Training schools for early stage researchers</td>
</tr>
<tr>
<td>WG5.3 STSMs exchange across WGs managed by WG5</td>
</tr>
<tr>
<td>WG5.4 Publications: brochures, articles, books, journals</td>
</tr>
<tr>
<td>WG5.5 Exhibition(s) at conferences and/or local areas</td>
</tr>
<tr>
<td>WG5.6 Arid-lands restoration guidelines book</td>
</tr>
<tr>
<td>WG5.7 Arid-lands restoration conference</td>
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<table>
<thead>
<tr>
<th>Management</th>
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<tbody>
<tr>
<td>MC Meetings (combined with workshops etc. whenever possible)</td>
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<tr>
<td>WG Meetings (combined with workshops etc. whenever possible)</td>
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<tr>
<td>Steering Group Meetings (combined with workshops etc. whenever possible)</td>
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<tr>
<td>Reports</td>
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</tbody>
</table>

G. ECONOMIC DIMENSION

The following COST countries have actively participated in the preparation of the Action or otherwise indicated their interest: BE, BG, CH, DE, EL, ES, FR, HU, IL, IT, NL, PT, RO, TR, UK. On the basis of national estimates, the economic dimension of the activities to be carried out under the Action has been estimated at 60 Million € for the total duration of the Action. This estimate is valid under the assumption that all the countries mentioned above but no other countries will participate in the Action. Any departure from this will change the total cost accordingly.

H. DISSEMINATION PLAN

H.1 Who?

The target audiences for the dissemination of the results of the Action, in particular findings and recommendations include:

1. The COST network participants;
2. Other researchers working in the field (outside the COST Action);
3. Other research networks and frameworks, nationally and internationally including ‘Desert*Net International’, WOCAT (World Overview of Conservation approaches and Technologies), the DESIRE project, the PRACTICE project network, CSFD (Comité scientifique français de la désertification), the European Society for Soil Conservation (ESSC), SER (Society for Restoration Ecology), ICARDA (International Centre for Agricultural Research in the Dry Areas);

4. Universities and university departments in dryland areas in Europe and around the world with interests in arid lands and dealing with restoration ecology, biology landscape, soils, geography;

5. Professional bodies across disciplines and sectors including professional institutes;

6. Planners, consultants and their journals in the wide range of fields dealing with deserts-including ecologists, engineers, soil scientists, environmental managers, environmental officers, service providers, hydrologists;

7. European and other national and international bodies such as national environment agencies including: European Commission on Environment ‘Nature and Biodiversity’, UNCCD (United Nations Convention to Combat Desertification), FAO (Food and Agricultural Organisation of the UN),

8. European national environmental protection agencies – particularly in Mediterranean region such as DMCSEE (Drought Management Centre for Southern Europe) and all the allied national environmental agencies;

9. NGO’s dealing with environment in arid and dryland areas such as ‘The Africa Desertification Control Initiative (ADCI)’, ‘African Conservation Foundation and numerous others – many listed on GEF-NGO network (http://www.gefngo.org/formmaster.cfm?&action=in&menuid);

10. Policy makers at International, European, national government, and regional levels; and

11. General public and libraries especially in COST Mediterranean areas.
H.2 What?

The dissemination methods and materials relate directly to the intended audience and receptors as follows:

1. The Action will be accessible in outline under the ‘Domains and Actions’ tab in the main menu of the COST.org website with links to the main Action website;

2. The Action like all other COST Actions will have its own website that will follow best practice examples of COST Actions predecessors. The website will provide the general information on the Action (homepage, objectives, scientific programme, working groups, management committee, steering group, meetings, outputs, short term scientific missions, pictures etc.) but will also include the start of the database collection of restoration data, publications etc. and evolve new web pages on new ideas and techniques. The website will also be synergistically linked to a range of other websites, including national and international networks and project websites. External websites with linked themes will be asked to have a link to the Action website, so that the audience realm and size is enhanced and so that knowledge transfer is greatly increased. Targeted e-mails will be sent to organizations, institutes, international, national and regional government departments and individuals to create awareness of the website and to enhance knowledge transfer and participation of all interested stakeholders;

3. The database of information will be made available on the web but also as a CD-Rom/DVD or as a book / set of booklets which can be distributed. This will include Tools to support design and decision making and the ‘what, how, when, where’ of existing knowledge of best practice restoration solutions (potentially devising European and international standards of approach and methodologies) and all the parameters that define the issue as well as new solutions. This may require split volumes with the initial knowledge being delivered at the end of year 2 and the final volume of new ideas at the end of year 4. A separate volume will be required for arid-lands management;
4. The Action will also produce papers and posters and exhibitions for events, and include themed workshops and Special Sessions at forthcoming international and national conferences. Special events may also be programmed and include training schools, and awareness days involving practitioners and the general public;

5. Workshop proceedings, working reports and workshop outputs on for example the current state of knowledge and new directions and case studies will be developed into books, or articles for publication in scientific journals;

6. Similarly, Special Session proceedings from selected conference sessions will be further developed into books or special journal articles in scientific journals;

7. Spin-off articles in peer-reviewed scientific and technical journals, and special issues;

8. Non-technical publications e.g. brochures flyers, especially for educational institutions and policy makers;

9. Targeted pamphlets and short briefing notes for EU policy advisors and to UNCCD, (NAP) National Action Programme, Sub-Regional Action Programmes (SRAP) and Thematic Programme Networks (TPNs) authorities in all the affiliated countries;

10. Working documents for the Action, for the key researchers and users in the fields, on the part of the website that is password protected;

11. An e-mail network for all the participants in the Action;

12. Collection and display on the website and at exhibitions/conferences of visual materials, project photographs, plant photographs, soils etc. diagrams of methods and systems that will be available on the Action website for download to stakeholders; and

13. Publication of interim reports and final results.

H.3 How?

It is well understood that the dissemination and transfer of knowledge is of crucial importance to COST Actions and the use of results by stakeholders, including practitioners, planners, policy-makers and society at the local level is fundamental. This is particularly pertinent to the ‘Arid Lands Restoration Hub’ Action as this is part of the issue that the Action needs to address.
The collection of existing data and state of the art knowledge and best practice is ripe for transfer as are the results of new knowledge and research. The Action will use all the methods as summarised above in Section H2, to communicate the findings to the research and practice community within and beyond Europe. The Action will also encourage public discussion about the work, through exhibitions and conferences, to ensure that the results of the research work reach the European Society and policy-makers. A Working Group, WG5, will be set up, targeting specifically on outreaching, training, and dissemination. This Working Group will work closely with the Management Committee (MC), and also have frequently communication with other WGs. The MC will regularly review the research output of the Action and evaluate the planned dissemination. The dissemination is enhanced by the strong international and national networks of the participants who are already on board, e.g. WOCAT, the DESIRE and PRACTICE projects and the above mentioned scientific societies. Special report articles are planned in high impact journals. Special sessions will be organised in conjunction with conventional arid lands and related conferences including:

- The 4th and 5th International Conferences on Desertification planned for 2012 and 2014;
- FAO, 18th Session African Forestry and Wildlife Commission, 31 January 2012 - 4 February 2012;
- FAO, 21st Session Committee on Forestry, 24 September 2012 - 28 September 2012, Rome, Italy;
- "Forests for Economic Development." The tenth session of the UN Forum on Forests (UNFF 10), 1 January 2013 [tentative]

The Action also encourages the consideration of other conferences not identified at the application stage. The Action, in the planned activities, will invite selected international experts from outside Europe, including those already identified, from North Africa, Southern Africa, Australia, Argentina, the USA, the Middle East, India, Pakistan China. This will further enhance the global transfer of knowledge and the dissemination of the Action’s data and results.