



INSTITUTIONAL SKILLS DEVELOPMENT

FULL PROJECT PROPOSAL (Please complete all sections)

Section I – Project details	
Training Programme Title	Supporting Effective Drought Risk Management in Vulnerable Catchments of Chile
Objective <i>This must be NO MORE than five sentences (150 words)</i>	The objective of the project is to generate the necessary tools for drought monitoring and assessment of drought vulnerability, with the aim to strengthen drought management and policy to move from crisis management towards drought risk management.
Lead Institution in Chile <i>The institution that will lead the planning and implementation of the training programme</i>	Unit for Climate Risk Management and Agricultural Emergency (UNEA), Ministry of Agriculture.
Project Leader in Chile <i>Must come from the lead institution. Please provide job title, email and telephone number</i>	Antonio Yaksic (Chief of Section), Teatinos 40, Santiago, antonio.yaksic@minagri.gob.cl , http://agroclimatico.minagri.gob.cl , (+56-2) 2393 5169.
Beneficiary Institution(s) in Chile <i>If there are other Chilean institutions involved in the project, whose staff will receive training</i>	The members of the Steering Committee of the Agroclimatic Observatory and associated institutes: <ul style="list-style-type: none"> - Dirección General de Aguas (DGA), Sección de Hidrometeorología, Javier Narbona Naranjo (Chief of Section), javier.narbona@mop.gov.cl, http://www.dga.cl/ - Instituto Nacional de Investigación Agropecuaria (INIA), Claudio Pérez Castillo Ph.D.(Director Regional), cperez@inia.cl, http://www.inia.cl/ - Dirección Meteorológica de Chile (DMC), Agroclimatic Section, Juan Quintana Naranjo (Chief of Section), juaquin@meteochile.cl, www.meteochile.cl - Comisión Nacional de Riego (CNR), Monica Rodríguez, monica.rodriguez@cnr.gob.cl, http://www.cnr.cl/ - Instituto de Desarrollo Agropecuario (INDAP), Maria Pia Alfaro Martinez, palfaro@indap.cl, http://indap.gob.cl/ - Delegado Presidencial de Recursos Hídricos, Reinaldo Ruiz (Delegado Presidencial), r Ruiz@interior.gov.cl

	<ul style="list-style-type: none"> - Centro del Agua para Zonas Áridas (CAZALAC), Gabriel Mancilla (Director), gmancilla@cazalac.org, www.cazalac.org - Centro de Estudios Avanzados (CEAZA), Claudio Vásquez (General Manager), claudio.vasquez@ceaza.cl , www.ceaza.cl - Corporación Nacional Forestal (CONAF), Wilfredo Alfaro, wilfredo.alfaro@conaf.cl, www.conaf.cl - United Nations Education and Science and Cultural Organization (UNESCO), International Hydrological Programme, Dr. Koen Verbist (Programme Specialist), k.verbist@unesco.org, www.unesco.org/water
UK Lead Partner Institution(s) <i>Principal counterpart institution in the UK</i>	School of Geography, Earth and Environmental Sciences; University of Birmingham
Project Leader in UK <i>Must come from the lead institution in UK. Provide job title, email and telephone number</i>	Dr. Anne Van Loon; Edgbaston, Birmingham, B15 2TT, UK; + 44 (0)121 414 2243; a.f.vanloon@bham.ac.uk ; http://www.birmingham.ac.uk/schools/gees/people/profile.aspx?Referenceld=88172&Name=dr-anne-van-loon
Other UK Partner Institution(s) <i>If other institutions are involved in the project</i>	Dr. Wouter Buytaert, Civil and Environmental Engineering and Grantham Institute for Climate Change and the Environment, Imperial College London, London, UK, w.buytaert@imperial.ac.uk , http://www.ic.ac.uk/people/w.buytaert
<i>Where there are multiple beneficiary institutions and/or UK partner institutions please include separate rows for each.</i>	
Section II – Description of project	
<i>Describe the training programme addressing the following criteria:</i>	
<p>Need for training programme: <i>In no more than <u>600 words</u>, please describe the skill deficit the training programme is addressing, within an institutional context as well as a national/regional context by setting out which new skills the trained staff will gain and how these will contribute to achieving/enhancing the overall goals of the institutions involved.</i></p> <p><i>(Please also refer to the more detailed guidance in the Guidelines Annex.)</i></p>	<p>Climate variability can have serious social impacts in Chileans drylands, especially for farmers who depend on rain-fed agriculture and on livestock production based on natural vegetation. Over the last 7 years, rainfall amounts have dropped considerably in the central-northern Chile, resulting in a crisis situation for society and a weakening of the economic and social welfare of its population.</p> <p>To mitigate the impact over 30 million US Dollars was spent during the severe drought of 2007 alone to support affected families and farmers in the more than 250 affected communes, in order to repair damage, to recover degraded soils and to increase irrigation programs. Although these measures reduced the negative effects of the 2007 drought, they did not address all affected families due to budget limitations, nor did they increase preparedness and resilience to the droughts following after. Of the 16 307 rural families in Chile seeking monetary aid to overcome the negative aspects of the 2007 drought, more than 75% indicated suffering a lack of sufficient water for irrigation, for domestic use, and they experienced harvest losses for the crops grown for their own consumption. A typical problem here is the lack of preparedness prior to these natural events, making any governmental action afterwards less cost effective.</p> <p>In order to move away from crisis management, the Ministry of Agriculture created the Unit for Climate Risk</p>

	<p>Management and Agricultural Emergency (UNEA) to oversee these efforts. In 2014, a multidisciplinary Steering Committee was launched to strengthen collaboration between different governmental agencies, research institutes and universities to build the necessary tools for effective monitoring and early warning of drought hazards. As a result, an Agroclimatic Observatory is currently being developed, to enable integrated drought management based on objective indicators, looking at aspects of meteorological, hydrological and agricultural drought, that have socio-economic impacts in society. By providing early insights on developing drought conditions, governmental spending to alleviate its impacts can be brought forward, increasing the options to strengthen the resilience of communities to cope with droughts, instead of providing only drought compensation after crop failure.</p> <p>The proposed project links directly with this initiative and aims at strengthening the public and institutional capacity to deal with drought risks, involving a range of experts from the UK to develop additional capacities and tools to address these hazards and to enable the public sector in Chile to provide the necessary services to the drought prone areas.</p> <p>During the last Steering Committee, held on the 8th of June 2015, the current capabilities of the Agroclimatic Observatory were presented and a clear gap was identified related to monitoring and early warning of groundwater scarcity, vulnerability to hydrogeological drought and associated drought impacts. Given the limited capabilities of the partners involved regarding this particular aspect, a clear need was identified to involve foreign experts to strengthen the capacities on groundwater monitoring and early warning with respect to drought hazards. Based on the very strong expertise the UK has developed over the last decades on groundwater monitoring, and the scientific expert role of the universities of Birmingham and Imperial College London in drought and water resources, UK institutes are best placed to provide such training to the Chilean institutes involved in the Agroclimatic Observatory.</p>
<p>Objectives of the training programme <i>In no more than 500 words, please describe the objectives to be pursued by the training programme and the specific impacts it is looking to achieve, and the details of the methodology it will use to achieve these.</i></p> <p><i>This should relate to, but not repeat, the information given in the project summary and activity plan below.</i></p> <p><i>(Please also refer to the more detailed guidance in the Guidelines Annex.)</i></p>	<p>The objective of the training is to enable a set of multidisciplinary governmental institutes to quantify drought hazards and their impacts on subsurface water resources, to identify current vulnerabilities of affected communities and economic sectors, as well as to contribute to the improvement of current drought policies, that require additional objective (groundwater) indicators for integrated drought management.</p> <p>Specifically, the training programme will work along three axes. The first axis aims at strengthening the monitoring and early warning capacities of the Chilean government to identify the impact of droughts on subterranean water resources. While current drought monitoring efforts have focussed on surface water resources, the dramatic decrease in aquifer storage in the central-northern region of Chile urges the development of monitoring components for groundwater drought impact assessment, which are currently lacking. Given the extensive expertise of the UK partners on this topic, part of the training will be used for enhancing those capabilities, specifically with support from Dr. Van Loon, Prof. Hannah and Dr. Cuthbert. The second axis involves the identification of drought vulnerabilities nationwide, which is essential to identify</p>

	<p>those areas that need additional support from the government to enhance their resilience to national disasters, as well as to identify priority areas for drought mitigation measures. This axis will be implemented with support from Dr. Buytaert, Dr. Van Loon and Dr. Clark.</p> <p>And finally, the third axis of the training aims at strengthening the public institutional framework of Integrated Drought Risk Management, by developing the capacities to create effective policies that take advantage of improved monitoring and early warning (axis 1), as well as the identification of the communities' vulnerabilities to drought (axis2), in order to provide better public services to its population, with support from Dr. Clark and Dr. Buytaert. As the training connects to an already established framework, ownership of the project is guaranteed, and it is expected that the training will have long term impact on drought management in Chile, strengthening the capacities of multiple sectors and governmental agencies simultaneously.</p>
<p>Value added by the UK partner <i>In no more than 400 words, please justify the value added by the particular UK partner chosen within the context of the training programme.</i></p> <p><i>This should focus on the expertise of the UK partner in the area, the level of their contribution to the project, and why their participation is fundamental to the training programme's success.</i></p> <p><i>(Please also refer to the more detailed guidance in the Guidelines Annex.)</i></p>	<p>The UK partners involved are identified as world renowned experts on drought related issues, who already fulfil a crucial supporting role in the European drought management programmes, through the UNESCO FRIEND programme, as well as in European funded drought research, management and policy projects (e.g. DROUGHT-R&SPI).</p> <p>Prof. Hannah and Dr. Van Loon (Birmingham) are hydrological drought experts with knowledge of the relationship between climate and groundwater systems and many years of experience in European drought projects, the European Drought Centre, and the UNESCO FRIEND Low Flow and Drought group. Dr. Cuthbert (Birmingham) is a hydrogeologist investigating groundwater sustainability in drylands, up to now focused on Australia and Africa. Dr. Buytaert (London) is expert in modelling hydrology and water resources, focusing on citizen science. Dr. Clark (Birmingham) is a human geographer researching the governance of natural resources, and especially water, with the aim to assist policy evaluation, formulation and implementation. Given the gaps identified by the Steering Committee of the Chilean Agroclimatic Observatory, the proposed team of British researchers provides the expertise to deliver the tools needed to address groundwater challenges in Chile and to shape effective policy measures to manage water scarcity and its socio-economical impacts.</p> <p>Through this training, the UK partners will also gain additional benefits along two different lines. First, this training experience enables them to put academic expertise into an operational drought management context, which will further strengthen their capacities to deliver effective tools to decision makers. And secondly, they will gain access to extensive, tailored Chilean datasets for further research on drought management, as well as to engage with local actors that could be involved in future policy-based research programmes. Given the very diverse group of governmental agencies that participate in the Agroclimatic Observatory, this provides a strong expansion of the network of the UK institutes involved.</p>

Developmental reference

In no more than 700 words, please describe how the training programme will have a positive and meaningful impact on economic development and social welfare in Chile, by working in areas of demonstrable relevance to local development challenges.

This description should set out a plausible pathway along which the training programme will contribute to the economic development and social welfare of Chile, providing benefits to poorer and vulnerable communities within a short to medium-term timeframe (3-5 years).

(Please also refer to the more detailed guidance in the Guidelines Annex.)

Chile is facing severe challenges in the coming decades to safeguard its water resources for its population and economical sectors, specifically for those communities that are already vulnerable to water scarcity. A water availability assessment performed by the Chilean Water Authority in collaboration with the World Bank (2011) has identified the **increasing water demand by 2025 in combination with reducing water supply, due to climate change**. Particularly in the central-northern areas of the country, water deficits between 25% and 85% are expected by 2025. Groundwater resources play a crucial role in the provision of water for human consumption, agricultural and industrial activities, but also to provide ecological services through wetlands and highland marshes. The current understanding of the water balance is insufficient, due to a lack of adequate groundwater monitoring tools, endangering the sustainable usage of this (limited) renewable water resource.

Due to the current and expected stress on water resources, it is crucial to identify the vulnerable communities to (ground)water scarcity as a first step to develop a pathway to increase the resilience of the population.

The proposed training addresses these challenges by strengthening the governmental agencies in charge of monitoring water scarcity, by providing the necessary tools to identify conditions of groundwater stress more effectively (axis 1). This enables the identification of those areas that suffer most from drought stress that at the same time are identified as the communities that are most vulnerable to drought (axis 2). By shaping the drought management policies that take both objective (ground)water indicators into account, as well as the most vulnerable areas (axis 3), **the training programme will effectively address the unequal impact of drought on the poorer, more vulnerable communities and contribute to a reduction in poverty traps that are often associated to climatic hazards**. Although drought policies are not expected to be already implemented within the timeframe of the project, the deliverables from axis 1 and 2 will provide crucial input to develop them on the medium term (2-3 years). It should be noted that current legislation efforts as part of the adaptation of the Water Code (Código del Agua), already explicitly establishes the duty of the government to safeguard the groundwater resources from unsustainable usages that could lead to degradation of aquifers. The tools developed through this proposed training will already provide important steps forward to implement these obligations and to ensure adequate groundwater monitoring capacities.

Taking into account that water resources are likely to reduce, while water demand is expected to increase, the training programme will enable also to plan economic development in a sustainable manner. Insufficient monitoring tools, combined with inadequate identification of the population's vulnerabilities, as well as a lack of drought management and policy instruments have created shocks for society and have increased the likelihood for conflicts within and across economic sectors. Objective drought monitoring has shown to be an effective tool to reduce such stress on society, as demonstrated in the well monitored Huasco watershed in the Atacama region, and allows for longer term planning of economic activities. In this sense, it is expected that the training programme will contribute to the sustainable development of regions in the central-northern part of Chile, even under water scarcity conditions.

<p>Long term collaboration with UK partner <i>In no more than <u>300 words</u>, please describe how the training programme will seed/strengthen a long-term collaboration with the UK partner institution. An important criterion by which projects will be assessed is their capacity to support longer term relationships between the participant institutions.</i></p> <p><i>(Please also refer to the more detailed guidance in the Guidelines Annex.)</i></p>	<p>This project is expected to lead to continued collaboration between the UK and Chilean institutions in further development and implementation of the Agroclimatic Observatory. Two pathways are envisioned for the cooperation to extend beyond the duration of the project. First, as the development of the Agroclimatic Observatory is a modular process, a continuous follow-up of challenges, gaps and opportunities by the Steering Committee will identify further training needs to further fulfil its objectives. As the training will bring in British know-how in this process, it is expected that future needs will be identified that can be addressed by British institutes with those qualifications. Initiating this interaction between the steering committee members and the British research institutes is therefore a crucial first step.</p> <p>A second pathway is through the involvement of international agencies, such as UNESCO (and FAO to a lesser extent) that participate in the project and provide co-funding. As similar challenges exist and need to be addressed in other countries of Latin America, the experiences gained from the capacity building in Chile can be further replicated in other countries in the region, such as Peru, Uruguay and Honduras, that are engaged in similar efforts to build national drought observatories. Both the agencies that received the training, as well as the UK institutes involved in its development will be closely involved in such replication effort.</p>
Section III – Project outline	
Provide a summary of the training programme and a detailed activity plan	
<p>Summary <i>In no more than <u>500 words</u>, please provide a general introductory summary of the training programme, as context for the activity plan below and the Gantt Chart to be attached (detailing the chronological sequencing of project activities).</i></p>	<p>(An introduction to the training programme’s methodology and plan of action, which justifies the different parts of the activity plan set out afterwards, and explains how they relate to each other. This summary should refer to the Gantt chart as well.)</p> <p>The training programme is designed along the three pillars of drought management (World Bank, 2014). A first axis focusses on groundwater monitoring and early warning capacities, that are currently inexistent. As longstanding expertise is available at UK institutes, a technology transfer is proposed through a workshop held in Chile. As it is expected that effective uptake of these techniques requires extensive pre- and post-processing of local Chilean datasets in order to build effective groundwater indicators, a temporary assistant will be hired to ensure that the deliverables can be developed within the project timeline (Sep2014-Jan2015).</p> <p>The second axis addresses drought vulnerabilities, which requires a multidisciplinary approach. Therefore, it is proposed to organize a training in the UK with representatives from multiple agencies dealing with drought impact assessment and mitigation in Chile to develop an effective drought vulnerability assessment methodology, applicable for the specific conditions of Chile.</p> <p>The final axis aims at integrating the first two axes in a process of policy making on drought management. This requires a dialogue with the different national actors involved. Therefore, a set of national meetings are planned to complement the training held by the UK institutes in Chile, as well as a high level meeting on drought policies to bring in the political sector into the dialogue. It is expected that this will initiate a preparatory process to policy</p>

	<p>making, that will go beyond the timeframe of this project, providing an opportunity to achieve longer term collaboration between Chilean and UK partners of this project.</p> <p>The fourth pillar of this project is a crosscutting activity of reporting and outreach of project results through social media, the Agroclimatic Observatory and capacity building of national stakeholders in the 15 regions of the country.</p>
<p>Activity plan <i>Please detail the principal activities to be undertaken within this training programme, outlining their proposed 'training impact' (the specific outcome of the activity in terms of new skills developed by participants) and how this will be achieved (with a description of each of the specific elements of the activity)</i></p>	
<p>1. Activity 1 – title: Drought impact indicators for groundwater resources</p>	
<p>Training Impact – outcome of activity: The capacity is built to develop drought impact indicators for groundwater resources for Chile and the tools and information is validated with local actors.</p>	
<p>Elements of Activity 1 (detailed description)</p>	<p>1.1 Training on drought indicators for groundwater impact monitoring and early warning Based on the prior experience of Dr. Van Loon on the development of indicators for groundwater monitoring, a technology transfer will be organized in Santiago de Chile to the 25 technical experts of the different governmental agencies that participate in the Steering Committee of the Agroclimatic Observatory. This workshop will review the current knowledge of drought impacts on groundwater storage and train the participants in methods to develop effective groundwater stress indicators.</p> <p>1.2 Development of Effective Groundwater Monitoring Indicators A temporary assistant will be hired to support the organization of the training and to support the development of the groundwater monitoring indicators following the capacity building. As data sources need to be processed and set-up, this involves a 5 month period which will be partly co-funded by the Ministry of Agriculture. It is expected that this assistant, although stationed in Chile, will be recruited from a pool of ex-students of the UK partner institutes, to strengthen linkages, and to provide a basis for further collaboration beyond the timeframe of the project.</p> <p>1.3 Validation of Monitoring and Early Warning Indicators in pilot areas An important aspect of implementation of the newly developed indicators and monitoring tools is the validation of the information with local stakeholders. Through a set of three meetings in pilot areas of Chile (Arica and Parinacota Region, Atacama Region and Bio Bio Region) the information provided through the newly developed tools will be validated with the local actors. Simultaneously, those locations will be identified that lack adequate groundwater monitoring infrastructure and new monitoring stations will be added in collaboration with the Water Authority, to improve the coverage of the developed groundwater indicators.</p>
<p>2. Activity 2 - title: Drought vulnerability assessment methodologies</p>	

Training Impact – outcome of activity: Through capacity building drought vulnerability assessment methodologies are reviewed and implemented in pilot regions	
Elements of Activity 1 (detailed description)	<p>2.1 Training on drought vulnerability assessment methodologies A second training component will be held in the UK during February 2016. The objective of the training is to identify the drought vulnerability assessment strategy applicable for the conditions of Chile. The Chilean participants to the training will be identified by the Steering Committee, but are involved in drought impact assessment of farmers (UNEA), both concerning large scale irrigated operations (CNR) and small-scale family farming systems (INDAP, SAG), as well as forestry systems (CONAF), involving more physical indicators (DGA, DMC) and socio-economical aspects (ODEPA). At least 6 persons from different institutes will participate in the training, that will be given by Dr. Buytaert (Imperial College), Dr. Van Loon and Dr. Clark (Birmingham). The training will be partly organized at the lead UK institute, the University of Birmingham, and partly at the Imperial College of London. This allows the group to get acquainted with the two UK institutes and facilitates further collaboration beyond the timeframe of the project.</p> <p>2.2 Development of drought vulnerability assessment in pilot areas of Chile A short-term temporary assistant will be hired to prepare the training and to follow-up after the training, bringing all required datasets together to develop the drought vulnerability assessment for Chile. It is expected that this assistant, although stationed in Chile, will be recruited from a pool of ex-students of the UK partner institutes, to strengthen linkages, and to provide a basis for further collaboration beyond the timeframe of the project. The preliminary vulnerability assessment will be developed for three pilot areas of Chile (Arica and Parinacota Region, Atacama Region and Bio Bio Region), and the information provided will be discussed with the local actors during a meeting held at the Ministry of Agriculture in Santiago in March 2016.</p>
3. Activity 3 - title: Drought management policies	
Training Impact – outcome of activity: Best practices in drought management are reviewed and proposals for adjustments of current drought policies identified	
Elements of Activity 1 (detailed description)	<p>3.1 Training on Integrated Drought Management Policies A training will be held in April 2016 on drought management policies by Dr. Clark and Dr. Buytaert in Santiago, to identify the different aspects that need to be developed to move from drought crisis management towards risk management. This will allow to invite a broader group of actors than the actual Steering Committee, providing feedback from additional sectors.</p> <p>3.2 Revision of current policies and development of proposals for policy adjustments</p>
4. Activity 4 - title: Communication and Outreach	
Training Impact – outcome of activity: The enhanced capacity is effectively communicated through web pages and social media and the developed tools are available for the end-users.	

Elements of Activity 1 (detailed description)	<p>4.1 Incorporation of subsurface water resources indicators in the Chilean Agroclimatic Observatory As a follow-up of Activity 1, the developed groundwater management indicators need to be included into existing portals, for which a temporary support will be hired for a period of 3 months.</p> <p>4.2 Capacity building of local stakeholders with the new tools Outreach to the local stakeholders is essential to make sure the developed tools are effectively communicated and used. Through a tailored capacity building, the Ministry of Agriculture will organize a training session to the technical personal of the Ministerial Delegate of Agriculture (SEREMI) from each of the 15 Regions of Chile.</p> <p>4.3 Project management During this activity the development of the different components will be followed-up, and reporting provided on the advances (in January 2016) and at the end of the project.</p>
<i>If there are more activities planned please repeat the same format as above (copy and paste).</i>	
Gantt Chart	Please attach the Gantt Chart of the training programme (you will find the Excel file, with the Gantt chart on <u>sheet 1</u> , attached to this application form). <u>Proposals without a Gantt chart will not be considered.</u>
Planned start date: 1 September 2015	Planned completion date: 31 May 2016
<p>Section IV – Project budget</p> <p><i>Using the Activity Based Budget template, please describe the financial and non-financial cost of all activities that will take place within the implementation of the training programme.</i></p>	
Activity Based Budget	Please attach a completed activity based budget (you will find the Excel file, with the budget on <u>sheet 2</u> , attached to this application form). <u>Proposals without an Activity Based Budget will not be considered.</u>
<p>Section V – Support letters</p> <p><i>Please include letters of support from the Lead Partner Institution in Chile and the UK Lead Partner Institution</i></p>	
Support Letters	Please attach two letters of support, one from the Lead Partner Institution in Chile, and one from the UK Lead Partner Institution, according to the templates attached to this application form. <u>Letters not completed according to this template will not be considered, and proposals without letters of support will not be accepted.</u>
End of Application Form	

