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Item 3 of the provisional agenda

Nairobi work programme on impacts, vulnerability and adaptation to climate change

Information on methods and tools for impact, vulnerability and adaptation assessments

Submissions from Parties

1. The Subsidiary Body for Scientific and Technological Advice (SBSTA), at its twenty-sixth session, invited Parties to submit to the secretariat, by 15 May 2007, information on existing and emerging assessment methodologies and tools; and views on lessons learned from their application; opportunities, gaps, needs, constraints and barriers; possible ways to develop and better disseminate methods and tools; and training opportunities. It requested the secretariat to compile these submissions into a miscellaneous document to be made available to the SBSTA by its twenty-seventh session. (FCCC/SBSTA/2006/11, para. 33).
2. The secretariat has received seven such submissions. In accordance with the procedure for miscellaneous documents, these submissions are attached and reproduced* in the language in which they were received and without formal editing.

* These submissions have been electronically imported in order to make them available on electronic systems, including the World Wide Web. The secretariat has made every effort to ensure the correct reproduction of the texts as submitted.

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PAPER NO. 1: ARGENTINA

**Implementation of the Buenos Aires Programme of Work on Adaptation and Response Measures -
Five-year programme of work on impacts, vulnerability and adaptation to climate change.**

1. Mandate

The COP, by its decision 1/CP.10, requested the SBSTA to develop a structured five-year programme of work for the SBSTA on the scientific, technical and socio-economic aspects of impacts, vulnerability and adaptation to climate change (hereinafter referred to as the programme of work). The COP at its eleventh session adopted a five-year programme of work contained in an annex, requesting SBSTA to start implementation of the programme of work by undertaking the initial activities specified in the SBSTA conclusions and elaborate further additional activities and modalities of the programme of work, *inter alia*. The SBSTA 25 agreed to further implement the programme through the activities contained in its conclusions. Under the activities undertaken in line with the objective in the annex to decision 2/CP.11 to advance subthemes a (i)

“Promoting development and dissemination of methodologies and tools for impact and vulnerability assessments, such as rapid assessments and bottom-up approaches, including as they apply to sustainable development”, and b (i) “Promoting the development and dissemination of methods and tools for assessment and improvement of adaptation planning, measures and actions, and integration with sustainable development”, the SBSTA invited Parties and relevant organizations to submit to the secretariat information on the issues contained in para. 21 of the conclusions.

Argentina welcomes this opportunity to provide information on relevant programmes, activities and views about the matter. This submission contains relevant information about an Argentinian institution working on these issues.

2. Bariloche Foundation (Fundación Bariloche) Report

Within the context of the Second National Communication of Argentina to the UNFCCC, one Component related to the identification of the major Vulnerabilities and the correspondent Adaptation measures to be implemented were included. One of the studies involved in this component was the elaboration of a National and Regional Programme of Adaptation to Climate Change that includes the strategies, policies and measures needed for adapting to expected impacts identified in different regions, ecosystems, social groups and socioeconomic activities involved. For that purpose, from a methodological point of view, Fundación Bariloche has adopted the Adaptation Policy Framework (APF) approach, developed by the United Nations Development Programme (UNDP), that implies at least five steps in the analysis of the adaptation strategies/policies/measures (scope of the project, assessment of the current vulnerability, characterization of the future climate risks, development of an adaptation strategy and monitoring to adaptation process). This approach takes into account not only the degree of participation of each relevant actor but also the improvement in the adaptation within each phase of the analysis. As the actual implementation of the strategies/policies/measures is a political issue that exceeds the scope of the studies developed, most of those strategies/policies/measures are still under consideration and have not been implemented yet. This methodology could be used to make assessments not only at country level, but also at a regional.

In the case of the prospective analysis of the Climate Change Expected Impacts on Energy and Other Relevant Socioeconomic Sectors, as well as those Expected Impacts on Energy and Other

Socioeconomic Sectors originated in the Response Measures to Climate Change adopted by other countries, Fundación Bariloche has used the Long-Range Energy Analysis and Planning (LEAP) Model, developed by the Stockholm Environmental Institute - Boston (SEI-Boston), that also included an Environmental Component, and to which development Fundación Bariloche has played a key role. This model was used for several purposes in different studies like, inter alia, determining the potential penetration of renewable energies, identifying the changes in energy supply caused by changes in hydrological availability, determining the potential of switching energy sources departing from the allocation of energy resources of the country, identifying the global impacts of different options in terms of GHG emissions, and identifying the most feasible and cost effective options. As in the previous item, this methodology could be used to make assessments not only at a country level, but also at a regional level.

PAPER NO. 2: AUSTRALIA

Adaptation methodologies and tools

At its twenty-fifth session, the SBSTA invited Parties and relevant organisations to submit to the secretariat information on existing and emerging assessment methodologies and tools; and views on lessons learned from their application; opportunities, gaps, needs, constraints and barriers; possible ways to develop and better disseminate methods and tools; and training opportunities (FCCC/SBSTA/2006/11, paragraph 33). Australia is pleased to provide the following submission on this matter.

Examples of methods and tools utilised by the Australian Government include:

Risk assessment

Climate Change: Risk and Vulnerability - Promoting an Efficient Adaptation Response in Australia (2005)¹. This high-level strategic report assesses the risk and vulnerability of Australia to the impacts of climate change and provides valuable insight into how early planning could help governments, industries and communities plan for the effects of climate change, adapt to the impacts and exploit any opportunities. The report takes a risk management approach to identifying those sectors and regions that might have the highest priority for adaptation planning.

The report found that a period of awareness raising, development of the necessary science and practical response techniques, and identification of priorities is essential to an effective adaptation strategy. Furthermore, it notes that an analysis of the comparative risks from the impacts of climate change and consideration of how effectively key systems will respond to climate change in the years to come are important to identifying priorities for adaptation action and planning.

Climate Change Impacts and Risk Management: A Guide for Business and Government (2006)².

This guide is intended to assist governments and business to adapt to climate change by showing how routine application of the Australian and New Zealand Standard for Risk Management AS/NZS 4360:2004 can be extended to include the risks generated by climate change.

Climate Change Scenarios for Initial Assessment of Risk in Accordance with Risk Management Guidance (2006)³.

This document accompanies the document above and provides simplified climate change scenarios for the year 2030 for use in the risk assessment process.

Lessons learned include:

- that to be effective, an adaptation strategy must result in climate risk being considered as a normal part of strategic planning and decision-making, allowing governments, businesses and individuals to reflect their risk preferences just as they would for other risk assessments;
- that the allocation of adequate time and resources is necessary for proper risk management; and
- that well developed climate change scenarios for risk identification are also important.

Based around the risk management guidance publication, between May and June 2006 the Australian Government also held free two-hour *Climate Change and Risk Management Guidance Workshops*⁴ in every Australian capital city, aimed at helping business and government plan for the impacts of climate change. The workshops were

¹ Available at: <http://www.greenhouse.gov.au/impacts/publications/risk-vulnerability.html>

² Available at: <http://www.greenhouse.gov.au/impacts/publications/risk-management.html>

³ Available at: <http://www.greenhouse.gov.au/impacts/publications/risk-scenarios.html>

⁴ More information is available at: <http://www.greenhouse.gov.au/impacts/risk-workshops2006.html>

designed to encourage businesses and governments to plan ahead by building climate change responses into their strategic planning.

A key message of these workshops was that effective application of the risk management guide requires users to have a general understanding of the links between climate change and risks to their organisation. However, an initial, qualitative assessment does not require a precise understanding of climate science or impacts - remembering that almost all decisions are made under a degree of uncertainty.

Integrated assessments

Integrated Assessment of Human Settlements. The Australian Government aims to foster partnerships with a range of researchers, stakeholders and regional organisations, in developing a body of knowledge, experience and expertise in the use of integrated assessment methods in Australia's urban environment. Funding has been approved for five integrated assessment projects that will:

- provide information that local decision-makers can use to make informed adaptation decisions; and
- develop a body of lessons, knowledge, methods and experience about integrated assessment of climate change impacts that can be applied to a broad range of Australian settlements.

Climate Change in the Cairns and Great Barrier Reef Region: Scope and Focus for an Integrated Assessment (2004)⁵. This report documents the outcomes of a study undertaken to determine the scope and focus for an integrated assessment of climate impacts on, and adaptation options for, the Cairns and Great Barrier Reef region - the first study of its kind in Australia. With the input of regional stakeholders, it identified the potential impact of climate change on the region's key sectors, possible adaptation strategies and the information needs and research priorities for achieving adaptation. The study also demonstrates a method for integrated assessment which could be used elsewhere.

The first phase of an *integrated assessment of climate change impacts in south-west Western Australia* has also been recently completed (publication of report pending).

Australia's work on integrated assessments aims to assess the social, economic and environmental impacts of climate change in a way that considers the interaction between climate change and other 'change processes'. Lessons learned include that an integrated assessment approach requires a wide understanding of natural and human systems, and consultation with stakeholders so that the priority regional issues can be included.

Economic assessments

Economic Issues Relevant to Costing Climate Change Impacts (2004)⁶. This study examines the conceptual and methodological questions involved in estimating the costs of climate change impacts and the benefits and costs resulting from investment and other actions to reduce impact costs through adaptation. The report explores a range of economic assessment methods as well as a number of key issues relevant to any economic analysis of the impacts of climate change – including risk and uncertainty, distributional effects and non-market environmental values – and methods and tools that can potentially be applied to address these.

Australia's work on costing the impacts of climate change acknowledges that this issue is complex. A significant amount of work needs to be undertaken to develop comprehensive cross-sectoral estimates of the costs of climate change for various climate change scenarios. Future work will also include developing tools to assist decision-makers in estimating the costs and benefits of various climate change adaptation strategies.

⁵ More information is available at: <http://www.greenhouse.gov.au/impacts/publications/gbr.html>.

⁶ More information is available at: <http://www.greenhouse.gov.au/impacts/publications/costing.html>

PAPER NO. 3: CUBA

Existing and emerging assessment methodologies and tools; and views on lessons learned from their application; opportunities, gaps, needs, constraints and barriers; possible ways to develop and better disseminate methods and tools; and training opportunities.

In paragraph 21 of the conclusions relating to the 'five-year programme of work on impacts, vulnerability and adaptation to climate change' (FCCC/SBSTA/2006/L.26), SBSTA invited Parties and relevant organizations to submit to the secretariat, by 15 May 2007, information on existing and emerging assessment methodologies and tools; and views on lessons learned from their application; opportunities, gaps, needs, constraints and barriers; possible ways to develop and better disseminate methods and tools; and training opportunities.

The Republic of Cuba welcomes this opportunity to present views on the above issue. Cuba also would like to express its thanks to SBSTA and to the secretariat for made available the UNFCCC Compendium on methods and tools to evaluate impacts of, and vulnerability and adaptation to, climate change, a very comprehensive compilation on the available methodologies and tools around the world.

1) Existing and emerging assessment methodologies and tools: views and lessons learned from their application.

In the process of preparing first national communication, results on national level vulnerability and adaptation assessments were obtained. After that, a group of different methodologies and tools were used and developed on a continuous basis, maintaining and strengthening the initial technical capacity.

Approaches, methodologies and tools developed in Cuba, experiences and benefit:

- 1) The Model of the Anomaly Climate Variability and Climate Change Impacts on Human Health/Assessment Risk Epidemic and Costs Estimate (MACVAH/AREC) is an approach for the assessment of climate change impacts and adaptation on Human Health. This model, which combines the effects of future climate (including variability) and other socioeconomic and ecological aspects, has been used in Cuba and other Latin America countries with good results. The model approach allows Cuba to develop a comprehensive monitoring system for a group of diseases, as dengue fever, acute respiratory diseases, asthma and others.
- 2) The methodological approach for the use of waves and storm surge models (as the storm surge model, MONSAC, developed by experts of Cuba) in combination with other physical parameters to determine the potential flooded areas for different sea level rise future scenarios. The approach has been very useful not

only for future planning, but also for operational work to prevent the impacts of extreme weather events.

- 3) The conceptual and practical methodology for mapping vulnerabilities to individual and combined effect of extreme climate events. This includes heavy rainfalls, strong winds and coastal flooding among others. High resolution maps considering multiple hazards shown better and more relevant information for decision makers.
- 4) The methodology and tools for both, the assessment of meteorological and agrometeorological drought. The methodology allows the possibility to develop high spatial resolution assessment studies for aridity process or for forest fire favourable conditions. The application of this allows Cuba to develop the Cuban Drought Early Warning System.

Methodologies and tools used in Cuba, experiences and lessons learned

- 1) Climate models for climate change scenario generation of different degree of complexity, has been used in Cuba. Simpler climate models as MAGICC were employed to explore a wide range of climate projections, but with a very low level of temporal and spatial detail. To tackle this problem, Cuban experts are using Regional Climate Model approach to downscale Global Climate projections. However, the use of this kind of tool imposes a big challenge, because it demands a high level of expertise and computer results for information analysis. A very useful experience in this case is to share responsibilities and results among the countries into a region. This is what is happening in the Caribbean with the countries that are using the PRECIS model. Further discussion and training is needed to find the way to combine the advantage of simpler climate model with the outputs of more complex models as PRECIS.
- 2) A recent study developed in Cuba to build capacities for stage II on adaptation made use of the Adaptation Policy Framework approach. In the general sense the use of this approach was very productive, but some adjust were needed to reflect in more appropriate way the socio-economic circumstances of Cuba as well as the particularities of the Cuban society functioning. As an example,
- 3) Crops and hydrological models of different degree of complexity have been used in Cuba. However, a lack of integration has been noted when the results of the studies were analyzed. As in other sector assessment the main lesson in the application of these models is the need for adequate integration assessment tools, which could be used at regional and national levels.

2) Opportunities, gaps, needs, constraints and barriers

Although the recognized effort of UNFCCC secretariat to made available a compendium of methods and tools, a number of needs, gaps, barriers and constraints for the assimilation and application of methodologies and tools has been detected by the Cuban experts. Most of them are related with the availability, quantity and complexity of data used as input to drive the assessment models. This is a barrier for model calibration and a big challenge for the use of model in assessing future changes.

There is a lack of tools and methodologies for integrated and risk analysis, which considers in appropriate manner the social and economic aspects. Other important gap

exists in the area of available tools and methods to generate socioeconomic scenario at national and local level.

South-south cooperation emerges as an opportunity to share experiences, knowledge and expertise on the use of methodologies and tools. Complex methods and tools could be assimilated faster and better through cooperative efforts. Efforts in this area could also facilitate the development of research capacities, strengthening the collaboration amongst academic institutions.

3) Ways to develop and better disseminate methods and tools. Training opportunities.

Methods and tools for impacts and vulnerability assessment have different level of complexity and application. A number of the existing tools could or should be used on regional basis, while other must be applied at national or local level. Dissemination activities should include not only the method and tools, but also the results of the application of tools. It means that the existing results of the application of some methodologies or tools at regional level could be very useful for other within the same region. In this way, the need of detailed documentation is obvious. An example of this is the PRECIS-Caribe, an online internet based tool to disseminate the PRECIS model outputs in the Caribbean region. This tool is only a piece of a very prominent collaboration between Cuba, Jamaica, Barbados and Belize as part of the cooperative framework between the Institute of Meteorology of Cuba and the Caribbean Community Climate Change Center. This kind of effort should be promoted as good practice and is also a mechanism to facilitate training activities.

According with the existing gaps in the area of integrated and risk analysis, there is a strong need for training in this direction, which should include approaches, methods and tools.

Cuba appreciates this opportunity to present its views.

PAPER NO. 4: EL SALVADOR

**Submission by El Salvador
on vulnerability and adaptation methodologies and tools**

Mandate:

1. The SBSTA invited Parties and relevant organizations to submit to the secretariat, by 15 May 2007, information on existing and emerging assessment methodologies and tools; and views on lessons learned from their application; opportunities, gaps, needs, constraints and barriers; possible ways to develop and better disseminate methods and tools; and training opportunities. It requested the secretariat to compile these submissions into a miscellaneous document to be made available to the SBSTA by its twenty-seventh session (FCCC/SBSTA/2006/L.26, paragraph 21).

Framework

2. The research document named *Vulnerability and Adaptation to Climate Change of rural people living in the central coastal plain of El Salvador*¹, was developed within the GEF-regional project, named *Strengthening capacities for Stage II Adaptation to Climate Change in Central America, México and Cuba*². The referred document was a relevant outcome of the process including vulnerability assessments and adaptation actions. The purpose of the document was to explore more appropriate conceptual frameworks and methodologies to assess current and future climate vulnerability. The previous to facilitate the incorporation of adaptation into local endogenous development processes, including actions that influence the policy and decision-making process at the national and municipal level.

Methodologies and tools to assess vulnerability and adaptation to climate change

3. To assess climate vulnerability of the selected territory (further referred to as territory) a systemic approach was adopted, incorporating the central concept of *adaptive complex system*, and applying it through an inter-disciplinary approach. The territory is considered a human system³, and as such, it has a dynamic and non-linear behavior and is able to develop emerging functions (*e.g.*: resilience and adaptive capacity), allowing the system to resist and adapt to change. The territory was identified and characterized through the natural, economic and socio-cultural local environments of human populations that live there. Therefore, its boundaries were set based on criteria related to socio-economic organization and prevailing natural dynamics as well. The territory was also considered a social landscape since it includes human systems in which social actors play a fundamental role, considering inter-linkages between natural and human systems.
4. Vulnerability of a natural or human system to climate exposure is defined as a dependant variable of three first order-explicative variables, namely: *climate exposure*, *resilience* and *adaptive capacity*. Climate exposure is considered as a local threat. Resilience is the attribute allowing the system to absorb, within a coping range, natural or social shocks and to further recover from disturbances or impacts, conserving the same stability domain. Adaptive capacity refers to the potential of the system to progress and adapt to changes without collapsing, through learning processes that increase its coping range and capacity to self-organization.
5. Second order-variables are associated to the first order-explicative variables of vulnerability. Climate exposure is addressed through an index, integrating dry and wet climatic extreme events and

¹ The research paper will be published mid June 2007, and will be uploaded in the website: <http://www.marn.gob.sv> once it is published

² PS 14290-RLA/01/G31 (July 2003-April 2007)

³ Human systems are tightly related to human beings and society, having specialized information processes and structures.

temperature extremes. Resilience is captured through flexibility (degree), mechanisms of control (type and effectiveness) and structural coupling (type and degree). Adaptive capacity is addressed through three variables, namely: potential of resources (type, availability and accessibility), experimentation and innovation (type and degree) and complexity of organization (type and degree).

6. The methodology to assess climate vulnerability and to develop the adaptation strategy includes the following steps: a) identification of the human system to be assessed and whose adaptation strategy is to be developed, b) integrated assessment of current climate vulnerability, considering baseline socioeconomic and climate scenarios, c) integrated assessment of future climate vulnerability including local projected socioeconomic dynamics and climate change, and d) development of an adaptation strategy to address the projected local climate change and to be considered and incorporated within the existing local development plans, and eventually at the national or municipal levels.
7. In order to define by 2004 the socioeconomic and environmental baseline and to project it by 2015, a system of variables and indicators, linked to the respective dimensions of the socio-cultural, natural and economic environments of the territory, was established. The referred system was in turn linked to the appropriate second-order variables of vulnerability, which are associated either to the first-order variable *resilience* or to *adaptive capacity*. A composite vulnerability index (VI) was calculated to estimate the magnitude of current and future climate vulnerability. Climate exposure was integrated to the VI through the calculation of a climatic threat sub-index (CTI), which incorporates different levels of local threat related to temperature and precipitation extremes (extreme wet and dry events).
8. The socio-economic and environmental baseline scenario expresses the territory current state, in terms of strengths and weaknesses contributing to determine the values associated to two of the three explicative variables (resilience and adaptive capacity) of climate vulnerability by 2004. The future socio-economic and environmental scenario expresses the territory projected state by 2015 under climate change conditions, whose values could contribute to maintain, increase or decrease the current vulnerability level. As well, baseline and future climate scenarios were developed by 2004 and 2015 respectively to calculate current and projected values of the 5 climatic indicators integrating the CTI.
9. Current and projected conditions of the socio-cultural, natural and economic local environments by 2004 and 2015 were determined through the calculation of the values for the 69 indicators, and for the associated first and second-order variables of vulnerability. The calculation of the current and future VI of the territory allows to integrate, in a unique mathematical expression, current and future values of the three territory sub-indices, namely: resilience (R), adaptive capacity (A) and climatic threat (CTI), also referred to as climate exposure (E), as follows: $VI = [2E - (R + A) + 2]/4$, with $IV_{max} = 1$, $IV_{min} = 0$.
10. The values of the sub-indices *resilience* and *adaptive capacity* were calculated through the consolidation of the values of those variables for each local environment. For this, baseline and future values were calculated for each indicator and dimension. Among the whole 69-indicator system that characterized current and future territory conditions, 23 refer to the normative, cultural and psycho-social dimensions of the socio-cultural environment; 31 indicators are associated to the natural and socio-natural dimensions of the natural environment; and 15 indicators are linked to the productive, distribution-consumption, and commercial dimensions of the economic environment.

11. Future socio-economic and environmental scenarios were developed considering the linkages between climatic, socio-economic and environmental local effects (bottom-up approach) within the general context of national macro-policies (top-down approach). Future scenarios were developed following a four-step process: a) Analysis of current national macro-policies and key indicators (further referred to as driving forces), b) Integrated analysis of the dynamics generated by the national macro-policies and the driving forces projected by 2015, c) Definition of the local expression of the macro-policies and the driving forces, for each dimension and environment by 2015, d) Definition and local validation of the local socio-economic scenario by 2015, based on the future values of the whole system of indicators.

Lessons learned of their application

12. The definition and adoption, from the beginning of the research process, of a conceptual framework (based on the *adaptive complex system* concept), consistent with the nature of the human system to be assessed, generated the appropriate criteria to address climate vulnerability and adaptation.
13. The inter-disciplinary approach, adopted by the research team⁴, incorporated the inter-actions and couplings between social and natural systems. Therefore, the selected territory was characterized and addressed through the socio-cultural, natural and economic environments.
14. The adopted general methodology was built along with local actors in a transparent and flexible manner and under a participatory process. The previous could facilitate the improvement or replicability of the methodological approach, methods and tools.

Opportunities

15. The adaptation strategy has been adopted by local actors, who participated during the whole process, including the definition of the territory boundaries, the climate vulnerability assessment for current and future conditions and the strategy development.
16. There is a local knowledge either orally transmitted or empirically acquired on climate-related risks, and a good level of local awareness on the causes, impacts and response measures to climate change. The previous, could enrich research on V&A and improve adaptation initiatives.

Constraints and barriers

17. The prevailing rigid and inappropriate administrative framework of entities playing the role of financing mechanisms or implementing agencies of V&A initiatives. Their criteria and procedures do not facilitate research on V&A nor contribute to make feasible adaptation actions.
18. The lack of permanent research programmes linked somehow to V&A issues within the national universities or research centres, and the scarce research culture, required to develop appropriate conceptual frameworks and to guide and effectively support research teams and processes.
19. The lack of knowledge and experience in dealing with inter-disciplinary approaches at the national level, which is a critical issue to appropriately address V&A.

Gaps and needs

20. National climate records are deficient, since they are incomplete in terms of spatial coverage and time series, and the climate observing network is not appropriate to support climate forecasting and research.

⁴ It was established by the Ministry of Environment and Natural Resources of El Salvador.

21. There are limited national capacities related either to local climate modelling or to the functions and dynamics of local natural systems.

Possible ways to develop and better disseminate methods and tools

21. Regional or sub-regional thematic workshops related to V&A methods and tools, co-operative research programmes and postgraduate programmes for young researchers from developing countries.

Training opportunities

22. Learning by doing under co-operative research programmes is an appropriate and effective way to develop and improve innovative methods, approaches and tools for V&A research. Those programmes could be established either for young individual researchers or for public/private experts dedicated to/or interested in V&A research. Guidance and technical assistance or review, that often are included in such initiatives, are appropriate mechanisms to improve research culture, methods and tools in some developing countries.

PAPER NO. 5: GERMANY ON BEHALF OF THE EUROPEAN COMMUNITY
AND ITS MEMBER STATES

**SUBMISSION BY GERMANY ON BEHALF OF THE EUROPEAN
COMMUNITY AND ITS MEMBER STATES**

**Subject: Nairobi Work Programme on impacts, vulnerability, and adaptation to climate
change
Information on existing and emerging assessment methodologies and tools**

1. Introduction

Under para 21 of the Nairobi work programme (document FCCC/SBSTA/2006/L26), the Subsidiary Body for Scientific and Technological Advice (SBSTA) invited Parties and other relevant organizations to submit to the secretariat, by 15 May 2007, information on existing and emerging assessment methodologies and tools:

- views on lessons learned from their application;
- opportunities, gaps needs, constraints and barriers;
- possible ways to develop and better disseminate methods and tools; and
- training opportunities

The EU is taking this opportunity to respond to this request.

2. Methodologies and tools in the European Union

2.1 General remarks

The EU endorses the Nairobi Working Programme to collect information on existing and emerging assessment methodologies and tools for adaptation. As the Fourth Assessment Report of the IPCC shows, both developed and developing countries are affected by climate change. Since the publication of the Third Assessment Report there has been a significant improvement in the understanding of climate impacts and adaptation needs. The European Union anticipates a growing demand for methodologies and tools to make assessments for climate change impacts all over the world.

The EU wants to facilitate access to information on such methodologies and tools. EU Member States (MS) therefore took the opportunity to list their own experience with these issues. The EU suggests to have the informations of the submissions compiled in an updateable and user friendly way. The EU puts emphasis on intensifying existing cooperation and the initiation of new cooperation with developing countries based on this submission.

2.2 Spreadsheet responses by Member States

In preparation for this submission, the German Presidency asked EU MS and relevant EU institutions to provide information about their programmes, activities and views with on climate change related risks and extreme events. In order to allow for a structured submission, a spreadsheet was provided.

Eight MS and two EU institutions responded: Austria, the European Commission, the European Environment Agency, France, Germany, Malta, the Netherlands, Portugal, Spain and the United Kingdom. Their submissions are collected in Annex A.

Further information on national research activities in MS are available in the extended country report prepared under the CIRCLE project.¹

The preparation of information on EU level activities for this submission was supported by the European Environment Agency's Topic Centre for Air and Climate Change.

¹ http://www.circle-era.net/uploads/media/CIRCLE_Del_Ia1_Extended_Country_Report_1stISSUE_Final_DRAF_.pdf

Existing and emerging assessment methodologies and tools submitted by EU Member States

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ACCELERATES

2. General information and brief description

Assessing climate change effects on land use and ecosystems: from regional analysis to the european scale

3. Views / experiences / lessons learned

The proposed project will study the impact of climate change on land use and biological resources in managed ecosystems. The integration of existing impact models of agriculture, forestry, species distribution and habitat fragmentation within a common framework will enable impacts to be synthesised across sectors, disciplines and global change problems. The principal deliverable will be a method for the integrated assessment of ecosystem vulnerability arising from environmental change in Europe.

Vulnerability will be assessed using key physical and economic indicators at both the European and regional scales. Critical stress factors (or thresholds) of climate change will be derived from the integrated models. This will assist in the development of strategies for the sustainable management of land use change and nature conservation. The research will provide information supporting the conventions on climate change and biological diversity

4. opportunities / gaps / needs / constraints / barriers

5. possible ways to develop and better disseminate this method or tool

6. training opportunities

UNIVERSITE CATHOLIQUE DE LOUVAIN, Place L. Pasteur 3 Mercator, 1348 LOUVAIN-LA-NEUVE, BELGIUM

7. References

www.geo.ucl.ac.be/accelerates

ACCROTELM

2. General information and brief description

Abrupt climate changes recorded over the european land mass : multi-proxy records of late-holocene climate variability in europe.

3. Views / experiences / lessons learned

Novel proxy-climate research has shown that mires provide excellent data on abrupt climate change; these can integrate with complementary climate data from lakes to demonstrate the magnitude and rate of Holocene climatic variability, for use in climate modelling. Mires have diverse proxy-climate indicators, with direct coupling to atmosphere ; robust, replicable records with decadal resolution; and circum-North Atlantic distribution. European mires and lakes yield integrated records of hydrological/ temperature changes, directly referable to climate (rather than to 'weather' events). This proposal will produce new high-resolution data; assess evidence for climate variability across Europe during the past 6000 yr; and provide detailed, multi-proxy analyses of abrupt climate changes and their effects. It is defined by development and refinement of proven techniques, innovative development of new biomolecular technologies; and dissemination to end-users. Its new data will inform EU policy.

4. opportunities / gaps / needs / constraints / barriers

5. possible ways to develop and better disseminate this method or tool

6. training opportunities

UNIVERSITY OF GLOUCESTERSHIRE, CENTRE FOR ENVIRONMENTAL CHANGE AND QUATERNARY RESEARCH, GEMRU, Francis Close Hall, Swindon Road, PO Box 220, GL50 4AZ CHELTENHAM, UNITED KINGDOM

7. References

www.glos.ac.uk/accrotelm

Adaptation Actions

2. General information and brief description

An online searchable database that has been developed and is maintained by UKCIP staff. Adaptation Actions contains examples of activities people in the UK have undertaken to exploit the opportunities that climate change might provide or to adapt to the risks of our changing climate. The database only includes examples of activities that have actually been implemented and does not include adaptation activities that are "a good idea". The purpose of the database is that users can search it to see what others have done to adapt and get ideas of how they might adapt to reduce their climate risks or exploit opportunities.

3. Views / experiences / lessons learned

The database is to be launched in mid-March so at present there is limited feedback. General comments from those that have seen it so far is that it will be a very useful tool

4. opportunities / gaps / needs / constraints / barriers

User requests for examples of what others are doing to adapt lead to the creation of this tool or database. It is constrained to examples from the UK (because of the focus of UKCIP). Keeping the database current and populating it with new examples could prove to be resource intensive although mechanisms have been included to allow users to submit their own examples (which will still need to be approved by UKCIP staff). We will also need to ensure this tool is properly integrated within the suite of UKCIP tools and guidance and that stakeholders or potential users are aware of it and make use of it.

5. possible ways to develop and better disseminate this method or tool

At the time of writing the tool is still to be launched. It will be launched at an event to be attended by approximately 150 people (potential users) and UKCIP staff will be encouraged to mention it at all meetings they attend. Additionally, this tool has been mentioned by ministers in speeches on climate change, and it is hoped that this will greatly enhance the profile and use of this tool. It is also to be linked into other UKCIP tools. The need for further dissemination will be evaluated following the launch of the tool.

6. training opportunities

This tool is web based and the user interface means that training to use this tool should not be required. However, this tool could be used as a secondary tool in other UKCIP training activities to provide examples of adaptation activities.

7. References

We can provide the web link for this tool by mid-March. It will be on the UKCIP website (www.ukcip.org.uk)

Adaptation Options

2. General information and brief description

This guidance note explores the nature and characteristics of adaptation in the context of climate risk and provides further background information and examples of adaptation strategies and options. In doing so it provides guidance related to the identification, selection and role of stakeholders, dealing with uncertainty and identifying and selecting adaptation options. This guidance note is aimed at supporting decision and policy makers who are faced with identifying and appraising the effectiveness of adaptation measures that address identified climate risks. It should be used as a companion piece to other UKCIP tools such as the Adaptation Wizard; risk, uncertainty and decision-making framework, Business Areas Climate Impacts Assessment Tool (BACLIAT), Adaptation Actions database and the guidelines on costing the impacts of climate change.

3. Views / experiences / lessons learned

Newly developed guidance that has been just released. It responds to requests from stakeholders for information on, and examples of adaptation options being used.

4. opportunities / gaps / needs / constraints / barriers

The provision of practical examples with web site links for further information is seen as essential. There is a need to provide more examples and to ensure that those available are updated. For some types of adaptation measures, the number of, and information available on specific adaptation measures is limited. The linking of this guidance note with an active adaptation database (e.g., see Adaptation Actions database within this submission) would broaden the examples available.

5. possible ways to develop and better disseminate this method or tool

This guidance is available on the UKCIP web site as its effectiveness is enhanced by including live website links for most of the specific adaptation measures. It now needs to be specifically linked to UKCIP methods which require the identification and assessment of adaptation options. The next step in its development is to link this guidance with Adaptation Actions database (see description within this submission) which will bring in a broader range of adaptation actions in practice and allow for updating of the examples as new ones are added to a single adaptation database.

6. training opportunities

The use of this guidance within related training (e.g., risk management framework) is essential.

7. References

Adaptation Options is available on the UKCIP web site at www.ukcip.org.uk.

Adaptation Wizard

2. General information and brief description

The Adaptation Wizard is a web-based tool that is designed to take users through a process where they may start off having only a basic understanding of climate change, but at the end are able to integrate climate risks into their decision-making using UKCIP's tools and resources. It is a high-level, generic tool that is valuable to newcomers to the climate change issue, as well as those who are preparing to adapt. It is more a decision-support than decision-making tool, and plays a valuable awareness-raising and educational role. The revised version of the Wizard is due later this year.

3. Views / experiences / lessons learned

1. Uptake of the tool appears to have been limited. Active dissemination and training is necessary to encourage uptake of tools. 2. There is a need to manage expectations when delivering a tool. Those that have used it appropriately have found it very valuable. Those that have hoped it would provide them with a ready-made climate adaptation strategy have been disappointed.

It was originally thought the Wizard would be a decision-making tool that would help you develop an adaptation strategy. It is now recognised that the Wizard is a decision-support tool that is best used to help with awareness raising and can support users through the process of identifying climate risks and opportunities and how to manage these.

4. opportunities / gaps / needs / constraints / barriers

Strengths and weaknesses of the Wizard have been identified in an extensive consultation and review exercise conducted in Autumn 2006. Opportunities exist to address weaknesses by enhancing the functionality of the tool as a whole, managing expectations on what it can and can't do, clarifying what the outputs of the process are, improving access to other sources of information, and making better use of case studies.

5. possible ways to develop and better disseminate this method or tool

An action plan for further developing and improving the Wizard is being prepared and will be implemented in the first half of 2007. The revised Wizard will be formally launched and disseminated. Access to the Wizard will be improved in our re-structured website, which should raise the profile of the tool.

6. training opportunities

The Wizard provides a gateway to all UKCIP's tools, so uptake of the Wizard could reveal a demand for training in other UKCIP tools (e.g. climate scenarios, risk framework). The process of moving through the Wizard itself should, however, be intuitive and not require training in its own right.

7. References

The Wizard is located at: <http://www.ukcip.org.uk/resources/tools/adapt.asp>

AICSEX

2. General information and brief description

Arctic ice cover simulation experiment

3. Views / experiences / lessons learned

The aim of AICSEX is to compare the natural variability and trends during the last century, for selected observed climate sensitive variables and coupled global/ nested climate models, in order to assess the model capabilities for prediction of climate changes in the Arctic, Nordic and Baltic Seas in this century. AICSEX's objectives will be achieved through a co-ordinated integrated observational and modelling approach. The models predictions will under different climate scenarios be used to assess the risk for abrupt changes in the ice cover in the Arctic Ocean and Baltic Sea to assess the impact of a melting ice cover on the marine carbon uptake, deep water formation and thermohaline circulation in the Nordic Seas and North Atlantic. The economic impact of a melting Arctic ice cover will be assessed for fisheries, shipping, offshore and hydroelectric energy industries through a project dedicated industrial users reference group.

4. opportunities / gaps / needs / constraints / barriers

5. possible ways to develop and better disseminate this method or tool

6. training opportunities

NANSEN ENVIRONMENTAL AND REMOTE SENSING CENTER, 3A Edvard Griegsvej 3a, 5059 BERGEN, NORWAY

7. References

www.nersc.no/AICSEX

ALP-IMP

2. General information and brief description

Multi-centennial climate variability in the alps based on instrumental data, model simulations and proxy data

3. Views / experiences / lessons learned

ALP-IMP is an integrated research attempt on the unique Alpine instrumental and proxy data potential. It will extend the instrumental period in terms of length and spatial density, introduce new climate elements under strict quality requirements in terms of homogeneity and combine them with the typical Alpine proxy information from tree-ring records, isotopic ice core records and glacier variability records to a consistent picture of at least 1000 years of natural climate variability in the Alpine realm. High resolution regional climate modelling combined with sophisticated statistical analyses is going to study meson-scale internal climate variability patterns within the region as well as the Alpine climate as a whole versus European to global scale variability and change.

4. opportunities / gaps / needs / constraints / barriers

5. possible ways to develop and better disseminate this method or tool

6. training opportunities

CENTRAL INSTITUTE FOR METEOROLOGY AND GEODYNAMICS, 38 Hohe Warte 38, Postfach 342, 1191 WIEN, AUSTRIA

7. References

www.zamg.ac.at/ALP-IMP/main.htm

ASOF-N

2. General information and brief description

Arctic-subarctic ocean flux array for european climate: north

3. Views / experiences / lessons learned

The climate of Northwest Europe is anomalously warm for its latitude and this warmth is maintained by a variety of processes and factors in the Nordic Seas and the Arctic. Possible changes include cooling which may occur both rapid and radical. Arctic warming over the last 50 years was three times stronger than the global increase of surface temperatures. ASOF-N, one part of the ASOF cluster, aims at understanding the controlling processes of climate change in the high latitude North Atlantic. To improve and validate models with a predictive power needed for the assessment of the socio-economic consequences of the potential changes which are already obvious in the Arctic, time series of oceanic parameters are required over time scales of decades. ASOF-N aims to advance the installation of a suitable cost effective component of a global ocean observation system in choke points of the oceanic circulation.

4. opportunities / gaps / needs / constraints / barriers

5. possible ways to develop and better disseminate this method or tool

6. training opportunities

UNIVERSITY OF HAMBURG, Troplowitzstrasse 7, 22529 HAMBURG, GERMANY

7. References

www.awi-bremerhaven.de/Research/IntCoop/Oce/ASOF

ASOF-W

2. General information and brief description

Arctic-subarctic ocean flux-array for european climate: west

3. Views / experiences / lessons learned

This proposal centres on the fact that the climate of NW Europe, the Nordic Seas and Scan-Dina via is already abnormally warm for its latitude, and is correspondingly sensitive to change in the factors that are responsible for it. We expect that the changes of climate in this sector may be both rapid and radical as we move from the most extreme development of the atmosphere driving in the 1990s to what must surely be the most extreme anthropogenic contribution to climate change in the next Century. Learning how to mitigate the socio-economic effects of these changes will require the development of believable predictive models of the main processes at work. A central requirement for model improvement will be the availability of time series measurements of the oceanic heat and freshwater fluxes. We intend to provide these measurements using two adjacent moored arrays on shelf and slope off SE Greenland.

4. opportunities / gaps / needs / constraints / barriers

5. possible ways to develop and better disseminate this method or tool

6. training opportunities

UNIVERSITY OF HAMBURG, Troplowitzstrasse 7, 22529 HAMBURG, GERMANY

7. References

www.ifm.uni-hamburg.de/~wwwro/ASOF

ATEAM

2. General information and brief description

ATEAM (Advanced terrestrial ecosystem analysis and modelling) was a European Union funded Integrated Project focusing on changes in the supply of ecosystem services due to climate and land use change throughout Europe.

We propose to assess the vulnerability of major European ecosystem types and the services they provide, to global environmental change. Based on a definition of services established with stakeholders, a suite of numerical models will be adapted and validated for the European conditions. Multiple scenarios of future environmental change (economic, atmospheric composition, climate, land use and nitrogen deposition) are used to derive a set of scenarios for changing ecosystem services. These changes will be analysed quantitatively and communicated and discussed with stakeholders. A basic result is a set of

"vulnerability maps", depicting, for certain basic assumptions of change, and several time-slices through the 21st century, which regions, ecosystems and services are potentially more vulnerable to change than others

3. Views / experiences / lessons learned

It is now feasible to create consistent climate and land use change scenarios across Europe, and to investigate changes in ecosystem service provision from them.

4. opportunities / gaps / needs / constraints / barriers

In principle, frameworks like ATEAM are suitable for policy support, but communication requires further development of the presentation tools. Evidently, not all potentially interesting services are covered and more work is needed to broaden that base.

5. possible ways to develop and better disseminate this method or tool

Internet and focused stakeholder meetings

6. training opportunities

Training occurs for young scientists developing masters or Ph.D. theses on the basis of the ATEAM framework.

POTSDAM INSTITUTE FOR CLIMATE IMPACT RESEARCH

7. References

www.pik-potsdam.de/ateam

Schröter D, Cramer W, Leemans R, Prentice IC, Araújo MB, Arnell NW, Bondeau A, Bugmann H, Carter TR, Garcia CA, de la Vega-Leinert AC, Erhard M, Ewert F, Glendining M, House JI, Kankaanpää S, Klein RJT, Lavorel S, Lindner M, Metz

ATLANTIS

2. General information and brief description

Atlantic sea level rise : adaptation to imaginable worst case climate change

3. Views / experiences / lessons learned

We will adopt methodologies of risk management to study adaptation to imaginable worst case Climate change. In consultation with local experts and stakeholders, we will develop rich scenarios ("future histories") of the societal implications of a 5-6 metre sea level rise, potentially caused by a collapse of the west-Antarctic Ice Sheet, on the Rhone delta, the Netherlands and the Thames Estuary. We will estimate the amount of land, buildings etc lost, but will focus on initial responses (e.g., dike building, managed retreat), their probabilities of failure, as well as the wider effects (e.g., on the economy, large-scale migration). In addition, we will perform a formal risk assessment, analyse social representations and investigate optimal control of greenhouse gas emissions under catastrophic risk. The project would add substance and seriousness to the debate of potential catastrophes that may be caused by human-induced climate change.

4. opportunities / gaps / needs / constraints / barriers

5. possible ways to develop and better disseminate this method or tool

6. training opportunities

UNIVERSITY OF HAMBURG, Troplowitzstrasse 7, 22529 HAMBURG, GERMANY

7. References

www.uni-hamburg.de/Wiss/FB/15/Sustainability/atlantis

BALANCE

2. General information and brief description

Global change vulnerabilities in the barents region: linking arctic natural resources, climate change and economies

3. Views / experiences / lessons learned

The European North will be subjected to significant changes in climate over the next few decades. The complex but poorly understood interrelationships between components of the arctic system may lead to positive or negative feedback to these resulting in enhanced vulnerability. BALANCE will assess the

vulnerability of the Barents Region to climate change through the description and quantification of major links between essential environmental and societal components and will be based on a common modelling framework for these components. A holistic, interdisciplinary approach to the assessment of climate change vulnerabilities, a close link between the project scientists and the major stakeholders in the region as well as potential key (institutional) users of our project results and the utilisation of existing data and information from earlier and ongoing EU projects. are key characteristics of the project .

4. opportunities / gaps / needs / constraints / barriers

5. possible ways to develop and better disseminate this method or tool

6. training opportunities

WESTFAELISCHE WILHELMS - UNIVERSITAET MUENSTER, 24 Correnstrasse 24, 48149

MUENSTER, GERMANY

7. References

ifgitest.uni-muenster.de/3_projekte/balance/balance_de

Business Area Climate Impacts Assessment Tool (BACLIAT)

2. General information and brief description

The UKCIP Business Areas Climate Impacts Assessment Tool (BACLIAT) provides a simple checklist for organisations to assess the potential impacts of climate change on their business.

It recognises that a changing climate affects all business areas, and not just the more obvious ones of product design or service delivery. The checklist can be used at the level of a single organisation or an entire business sector. It invites consideration of the opportunities as well as the threats from a changing climate.

3. Views / experiences / lessons learned

The tool has successfully been used by many business organisations, both large and small, to scope their exposure to a changing climate. This is often the first time that organisations consider the impact of weather related events on their operations. The tool seeks to identify both opportunities and threats for the organisation.

4. opportunities / gaps / needs / constraints / barriers

Feedback suggests that as an exercise BACLIAT is a simple tool, which works well in a workshop format. No specialist climate change knowledge is required to complete the process. Completion of BACLIAT often leads to further research into climate-related risks.

5. possible ways to develop and better disseminate this method or tool

The tool works well when used in a workshop with an organisation, run by UKCIP. The publication itself however could be improved to enable easier self-facilitation by an organisation.

6. training opportunities

BACLIAT continues to be delivered by UKCIP, as workshops to businesses and organisations.

7. References

UK Climate Impacts Programme, (2005), A changing climate for business, UKCIP, Oxford.

Available online at <http://www.ukcip.org.uk>

CCASHH

2. General information and brief description

Climate change and adaptation strategies for human health in europe

3. Views / experiences / lessons learned

Irrespective of any actions that may soon be taken to reduce or halt climate change, human populations will be exposed to some degree of climate change over the coming decades. There is therefore a need to consider how to enhance the adaptation possibilities of communities to climate-related impacts on human health. A conceptual framework, vulnerability assessments, policy analysis, economic analysis and Integrated Assessment Models, will be used to identify and evaluate adaptation possibilities for human

health with regard to thermal stresses, extreme weather events, Vector-borne diseases and food and waterborne diseases. The deliverables are various from guidelines on cost effective adaptation strategies to tools for environmental health adaptation management.

4. *opportunities / gaps / needs / constraints / barriers*

5. *possible ways to develop and better disseminate this method or tool*

6. *training opportunities*

JAKAB, Zsuzsanna

7. *References*

www.euro.who.int/ccashh

CCGT

2. *General information and brief description*

Climate change policy and global trade

3. *Views / experiences / lessons learned*

Within the project it was analysed, how current and future trade treaties may interfere with climate change policies, hereby reinforcing or weakening the pattern of economic costs and benefits from emission abatement strategies across regions. Modelling exercises were performed to provide consistent quantitative results. Achievements were threefold: 1. Analysis of trade policies and trade liberalisation 2. Analysis of climate change policies 3. Implementation into the model. These three fields were brought together successfully.

4. *opportunities / gaps / needs / constraints / barriers*

5. *possible ways to develop and better disseminate this method or tool*

6. *training opportunities*

CENTRE FOR EUROPEAN ECONOMIC RESEARCH, HL 7-1, Postfach 103443, 68161

MANNHEIM, GERMANY

7. *References*

www.ccgz.zew.de/

CLIMAAT II PROJECT - Climate and Meteorology of the Atlantic Archipelagos: Climate Change impacts and Adaptation Measures on the Madeira Archipelago.

2. *General information and brief description*

Integrated assessment on climate change impacts and adaptation measures for a Portuguese autonomous region: the Madeira Archipelago. It consisted of a smaller scale integrated project, similar to the SIAM Project in its approach and methods/tools used in the impacts evaluation. It covered almost all of the socio-economic sectors considered on the SIAM Project (minus Fisheries) and added the Tourism sector to the analysis.

3. *Views / experiences / lessons learned*

The regional detail level analysis and the possibility to evaluate the models/tools developed in islands with very complex topography.

4. *opportunities / gaps / needs / constraints / barriers*

Like in the SIAM Project, one important barrier identified was the difficulty for the governmental institutions responsible for the various socio-economic sectors to develop an integrated approach to climate change adaptation.

5. *possible ways to develop and better disseminate this method or tool*

The project results were published in a stakeholder-friendly book which can be used in the dissemination of the assessed climate change impacts and the proposed adaptation measures.

6. *training opportunities*

No further training opportunities are planned for this project.

7. References

Santos, F.D. & R. Aguiar (Eds) Impactos e Medidas de Adaptação às Alterações Climáticas no Arquipélago da Madeira: Projecto CLIMAAT II. Direcção Regional do Ambiente da Madeira, Funchal, Portugal, 2006.

CLIMAG-WEST AFRICA

2. *General information and brief description*

A network for: harmonisation of climate prediction for mitigation of global change impact in sudano-sahelian west africa (CLIMAG-WEST AFRICA)

3. *Views / experiences / lessons learned*

Sahel is one of the most fragile of the world. Many efforts have been made by International Agencies, the EU, and the international cooperation, but any increased pressure, such as climate change, puts at risk of seasonal prediction for accelerates natural resource degradation. The use of seasonal prediction for decision-making will contribute to the adaptation to global change. The project aim is to contribute to harmonise the effort done to reduce food insecurity by improved regional capacity to produce and apply seasonal climate prediction. This will be achieved adding value to ongoing activities by networking and organising meetings and trainings for technical personnel. The proposal is directed to request an EU contribution jointly with the self-contribution of the consortium to develop an integrated network of European and African scientists and to build capacity equivalent to those funded by APN in Asia and IAI in South America.

4. *opportunities / gaps / needs / constraints / barriers*

5. *possible ways to develop and better disseminate this method or tool*

6. *training opportunities*

FONDAZIONE PER LA METEOROLOGIA APPLICATA - Italy

7. *References*

www.ibimet.cnr.it/Case/climag

Climate Adaptation: Risk, uncertainty and decision making framework

2. *General information and brief description*

This UKCIP report presents an eight-stage framework to help decision makers take account of the risks and uncertainty associated with climate change. The eight stages are: (1) Identify problems and objectives, (2) establish decision making criteria, (3) assess risk, (4) identify options, (5) appraise options, (6) make decision, (7) implement decision and (8) monitor, evaluate and review. It prescribes a circular process in which feedback and iteration are encouraged.

3. *Views / experiences / lessons learned*

The framework has proved useful for a number of different organisations (of different sizes) and, in particular, a risk-based approach has proved to be a useful means of introducing climate change to decision-makers. Ideally the framework can complement existing risk-based approaches used by an organisation.

4. *opportunities / gaps / needs / constraints / barriers*

In general the feedback for the framework (and the risk-based approach to uncertainty in climate change) has been well received and found to be useful. One possible barrier to greater use is that the framework could benefit from more effective dissemination (both in terms of presentation and training).

5. *possible ways to develop and better disseminate this method or tool*

Although the framework itself is quite simple it is currently presented in a 150 page report which has proved to be off-putting to potential users; there is a lot of information provided, not all of which is used or needed by all users.

The report covers a lot of theory but provides little practical help in application.

6. training opportunities

Since the report was published, a total of six training courses have been run applying the framework through worked examples from the areas of: biodiversity, built environment, an agri-business (water) and Local Authority planning and flooding.

More training in using the framework is planned.

7. References

Willows, R.I. and Connell, R.K. (eds.). 2003. Climate Adaptation: Risk, Uncertainty and Decision-Making. UKCIP Technical Report, UKCIP, Oxford.

Available online at <http://www.ukcip.org.uk>

Climate change consortial scenarios

2. General information and brief description

The climate change consortial scenarios are mainly performed at the German High Performance Computing Centre for Climate- and Earth System Research (DKRZ) under coordination of MPI for Meteorology Hamburg and participation of several institutes mentioned below.

3. Views / experiences / lessons learned

The scientific groups working in the DKRZ environment look back on a long lasting experience in the development and use of complex coupled climate simulations.

4. opportunities / gaps / needs / constraints / barriers

The ongoing development of high performance computer systems leads to a constant demand of hard- and software updates. It is hoped that the prevailing exchange of the computer system offers the opportunity for coupled climate simulations on highest grade.

5. possible ways to develop and better disseminate this method or tool

The institutes working in the field of climate change simulations are part of the international COSMOS initiative - aiming at a standardization of model components thus allowing the flexible use of model components and hardware.

6. training opportunities

The institutes involved offer several opportunities for visiting scientists.

7. References

<http://www.mpimet.mpg.de/>

<http://www.mpch-mainz.mpg.de/>

<http://www.gkss.de/>

<http://www.dkrz.de>

CLIME

2. General information and brief description

Climate and lake impacts in Europe

3. Views / experiences / lessons learned

We have brought together a consortium of scientists and end-users from 10 countries to assess the direct and indirect effects of changes in the weather on the dynamics of lakes in northern, western and central Europe. Particular attention will be paid to water quality variables used as diagnostic elements in the water Framework Directive. The primary objective is to develop a suite of well as past changes in the weather. The models will be validated by historical data and perturbed by simulations of future variations in the weather. These simulations will be based on the output from an ensemble of Regional Climate Models and will be linked to socio-economic analyses of their costs and benefits of the predicted changes. One of the main outputs will be a Decision Support System that can be used to optimise the management of lakes in a warmer world.

4. opportunities / gaps / needs / constraints / barriers

5. possible ways to develop and better disseminate this method or tool

6. training opportunities

NATURAL ENVIRONMENT RESEARCH COUNCIL, Hill of Brathens, AB31 4BW
BANCHORY(KINCARDINSHIRE), UNITED KINGDOM

7. References

www.water.hut.fi/clime; <http://clime.tkk.fi/>

Costing the impacts of climate change in the UK

2. General information and brief description

Method for calculating the costs of climate impacts and to compare these to the costs of adaptation measures. This method, described in a UKCIP report and now available using a web-based spreadsheet approach, is flexible enough to be applied across a wide range of sectors, and at a local, regional and national scale in the UK. The costing methodology has been designed to be used together with the UKCIP risk management framework.

3. Views / experiences / lessons learned

The use of case studies (now also available on the UKCIP web site) and the development of a simplified spreadsheet version are two additions to the method that, based on experience with users, should improve the utility of this methodology.

4. opportunities / gaps / needs / constraints / barriers

The availability of case studies, demonstrating the methodology, has been a constraint noted by users and potential users. The availability of probabilistic climate scenarios and integration of the costings methodology with risk management framework provides an opportunity to address previously identified shortcomings.

5. possible ways to develop and better disseminate this method or tool

Use of case studies and integration within a risk assessment process are deemed to be essential to effective use of this tool. The availability of a spreadsheet version and published case studies will facilitate the training that is seen as key to dissemination.

6. training opportunities

Training currently being reviewed pending launch of online calculation tool. Specific training workshops along with broader training with the UKCIP risk management framework using real-world case studies are essential. Making the results of these workshops available on the UKCIP web site should provide a significant opportunity for further dissemination.

7. References

Metroeconomica (2004). Costing the impacts of climate change in the UK: overview of guidelines. UKCIP Technical Report. UKCIP, Oxford UKCIP web site (www.ukcip.org.uk)

DINAS-COAST

2. General information and brief description

Dynamic and interactive assessment of national, regional and global vulnerability of coastal zones to climate change and sea-level rise (DINAS-COAST)

3. Views / experiences / lessons learned

A consistent evaluation of coastal impacts and adaptation at national, regional and global scales are required to satisfy current information needs for climate policy. DINAS-COAST brings together the best available science and data to help policy to interpret and evaluate coastal vulnerability to climate change. The project will develop the CD-ROM-based assessment tool DIVA (Dynamic Interactive Vulnerability Assessment), which will allow its users to evaluate the effects of mitigation and adaptation policies on coastal vulnerability, using a range of impact and adaptation indicators. DIVA will contain an extensive library of climate scenarios, derived from a climate system model of intermediate complexity, as well as socio-economic scenarios, a set of impact modules to assess changes in flood risk, wetland losses and

socio-economic impacts, and an adaptation assessment module that includes both autonomous and planned adaptation.

4. opportunities / gaps / needs / constraints / barriers

5. possible ways to develop and better disseminate this method or tool

6. training opportunities

POTSDAM INSTITUTE FOR CLIMATE IMPACT RESEARCH, 4 C Telegrafenberg Haus 4 C, P.O. Box 601203, 14412 POTSDAM, GERMANY

7. References

www.ce.pik-potsdam.de/Zope/ce/DINAS-COAST/

DIVA

2. General information and brief description

DIVA is freely available software tool for assessing coastal vulnerability to sea-level rise and exploring different adaptation strategies. The tool enables its users to produce quantitative information on a range of coastal vulnerability indicators, for user-selected climatic and socio-economic scenarios and adaptation policies, on national, regional and global scales, covering all coastal nations. More information and the model for download can be found at <http://www.pik-potsdam.de/favaia/diva>.

3. Views / experiences / lessons learned

DIVA has been used in a number of scientific, policy and training activities. Within science, it has been used in the EU-funded PESETAS and BRANCH projects to estimate the costs of climate change in Europe and to assess the role of climate change in European spatial planning, respectively. Further scientific applications included the usage of DIVA as a component in integrated assessments at the Tyndall Center and the Hadley Center. Currently DIVA is applied in an integrated vulnerability assessment of coastal areas in the Southeast Asia and East Asian Region. Within policy, DIVA contributed to reports on the future of the Oceans prepared by the German Advisory Council on Global Change (http://www.wbgu.de/wbgu_sn2006_en.html). The tool was also used in the African and Asian UNFCCC regional workshops for training policy makers on coastal impacts, vulnerabilities and adaptation. DIVA is currently being used for education at several European universities.

4. opportunities / gaps / needs / constraints / barriers

While DIVA is useful for exploring vulnerabilities and adaptation strategies from a global or national policy perspective, its spatial resolution and its underlying global datasets do not allow its usage for coastal planning and decision making. There is, however, a high demand for DIVA like tools that operate at a resolution that is adequate for coastal decision making in the face of sea-level rise and associated climate risks. Another limitation of DIVA is that it does not include some important processes like the impacts of changing river sediment discharge on coastal erosion/sedimentation as well as the impacts of changing river sediment discharge, sea-surface temperature rise and acidification on aquatic eco-systems (e.g., coral reefs).

5. possible ways to develop and better disseminate this method or tool

Because of its modular structure the DIVA tool can easily be extended to include the above-mentioned processes. Furthermore, the DIVA tool was built by an innovative method, the DIVA method, that supports the iterative integration of models from different knowledge domains for the assessment of coastal vulnerability and adaptation. This method can be applied to develop regional coastal assessment tools that offer the spatial resolution that is required for coastal planning. Currently the development of a South-East Asian tool is being explored.

6. training opportunities

DIVA has proven to be very useful training tool for policy makers. It is quickly accessible because it is equipped with a user-friendly graphical interface. Another opportunity exists in training coastal planners in the application of the DIVA method to develop their own vulnerability and adaptation assessment, which can account for the relevant location-specific factors.

7. References

<http://www.pik-potsdam.de/favaia/diva>.

Hinkel, J. and R.J.T. Klein, 2006: Integrating knowledge for assessing coastal vulnerability to climate change. In: *Managing Coastal Vulnerability: An Integrated Approach*, L. McFadden, R.J. Nicholls and E.C. Pennin

EFAS - The European Flood Alert System - a European Commission initiative to increase preparedness for riverine floods across Europe

2. General information and brief description

The European Flood Alert System seeks to provide the European Commission and National Water Authorities with useful information for the preparation and management of aid during a flood crisis.

EFAS is aimed at complementing national flood forecasting systems.

The advantages of EFAS for the European Commission are

- Overview of current flood situation in Europe for European Commission services
- Comparable results across Europe
- Fostering harmonised exchange of hydrological data and information in Europe

The advantages of EFAS for the National hydrological Institutes could be

- Additional information on possible flood situations more than 3 days in advance based on different weather forecasts
- Interpretation of flood ensemble prediction system forecasts based on full sets of EPS
- Increased exchange on flood forecasting issues and EPS research between the different institutes participating in EFAS.

3. Views / experiences / lessons learned

LISFLOOD is a grid-based catchment model that has been developed to simulate floods in large European river basins. Because the model is spatially distributed, changes in e.g. land use can be easily included in a LISFLOOD simulation. The typical size of one grid cell is 1 by 1 km, although the model can be run at both much finer and coarser resolutions if needed. LISFLOOD plays a central role within the activities of the WDNH Action, and it is currently being used and tested for flood forecasting (EFAS), scenario modelling, and drought forecasting.

4. opportunities / gaps / needs / constraints / barriers

5. possible ways to develop and better disseminate this method or tool

6. training opportunities

7. References

EFFIS - The European Forest Fire Information System

2. General information and brief description

The European Forest Fire Information System was set up in 2003 as part of the Regulation (EC) No 2152/2003 (Forest Focus) of the European Council and Parliament on monitoring of forests and environmental interactions. The research group works specifically on the development and implementation of advanced methods for the evaluation of forest fire risk and mapping of burnt areas at the European scale. EFFIS is aimed to provide relevant information for the protection of forests against fire in Europe addressing both pre-fire and post-fire conditions.

3. Views / experiences / lessons learned

EFFIS - Risk Forecast - the pre-fire phase focuses on the development of systems to provide forest fire risk forecast based on existing fire risk indices, and on the development of new integrated forest fire risk indicators, for a harmonized assessment of forest fire risk at the European scale.

EFFIS - Damage Assessment - On the post-fire phase, EFFIS is focused on the estimation of annual damage caused by forest fires in southern EU. All burned areas larger than 50 ha are mapped every year using satellite imagery. The first cartography of forest fire damages in southern EU was produced on year 2000 and continued for the subsequent years.

EFFIS - Rapid Damage Assessment - as from 2003 a new activity for rapid assessment of forest fire damage has been developed in order to map all the fires larger than 100 ha twice during the fire season: at the beginning of August and at the beginning of October

4. opportunities / gaps / needs / constraints / barriers

5. possible ways to develop and better disseminate this method or tool

6. training opportunities

7. References

<http://effis.jrc.it/Home/>

ENACT

2. General information and brief description

Enhanced ocean data assimilation and climate prediction

3. Views / experiences / lessons learned

Ocean analyses provide a detailed description of ocean physical structure, and reproduced by assimilating observations into numerical ocean circulation models. The main aims of the ENACT proposal are: (A) to enhance ocean data assimilation systems, by implementing the latest techniques and making full use of data from ocean observation networks, and thus to produce global ocean analyses over a multi-decadal period; (B) to quantify the benefits of the enhanced systems with regard to their impact on seasonal climate prediction, and to use the analyses to investigate ocean climate and its variability. The improved ocean analyses will lead to more accurate and reliable climate forecasts for seasonal to internal timescales, with benefit to European activities that are sensitive to climate variations.

4. opportunities / gaps / needs / constraints / barriers

5. possible ways to develop and better disseminate this method or tool

6. training opportunities

SECRETARY OF STATE FOR DEFENCE - MINISTRY OF DEFENCE, London Road, Sutton House
Room SG/12, RG12 2SZ BRACKNELL, UNITED KINGDOM

7. References

www.cls.fr/enact/

EPICA

2. General information and brief description

European project for ice coring in antarctica

3. Views / experiences / lessons learned

EPICA is a long-term European deep ice-core drilling project in Antarctica to derive high-resolution records of climate and atmospheric composition through several glacial-interglacial cycles. To achieve EPICA's goals it is necessary to drill at two sites, both to achieve the required resolution on different timescales and an adequate continent wide perspective. On the one hand the project will focus on an ice core from Dome C, where core retrieval has already started during the first EPICA phases and will continue during the timeframe of this proposal. On the other hand deep drilling will start in Dronning Maud Land, where the presite survey has identified a suitable drill site and where we will specifically look for the signatures of the rapid climatic oscillations found in the Greenland ice core records.

4. opportunities / gaps / needs / constraints / barriers

5. possible ways to develop and better disseminate this method or tool

6. training opportunities

ALFRED WEGENER INSTITUTE FOR POLAR AND MARINE RESEARCH, Columbusstrasse, 27568
BREMERHAVEN, GERMANY

7. *References*

www.awi-bremerhaven.de/GPH/EPICA/

ERA-40

2. *General information and brief description*

A forty-year european re-analysis of the global atmosphere

3. *Views / experiences / lessons learned*

Problem to be solved: Understanding and detecting seasonal climatic variability and climate change.

Objectives and approach ERA-40 will use a variational data assimilation system to make a new synthesis of the in-site and remotely-sensed measurements made over the period since mid-1957, when a major improvement was made to the atmospheric observing system in preparation for the International Geophysical Year, 1958. The products will be of high temporal and spatial resolution, provided three-hourly throughout the period with a grid spacing close to 125km in the horizontal and with sixty levels in the vertical located between the surface and a height of about 65km. The basic analysed variables will include not only the conventional meteorological wind, temperature and humidity fields, but also stratospheric ozone and ocean-wave and soil conditions. Additional information will be produced concerning the quality of both the observations used and the analyses generated. A sophisticated archival/retrieval system will be used to store the results and make them widely available. Particular attention will be given to generating data sub-sets on compact media that can be made available to users at affordable cost. Extensive documentation will enable customers and users of the results to gain maximum benefit. Validation and demonstration studies form an important component of ERA-40. A major aim of these is to provide checks on the quality of the analyses by comparison with independent measurements. This will be done either by direct verification of analysed or simply-derived values, or by verifying the output of different types of model that have been forced by the analysed values, for example an ocean circulation model and a snow model. This verification will be complemented by a selection of diagnostic, process and climatological studies based on the analyses which will not only provide examples to the general user of the ways in which the data can be applied, but also provide specific contributions towards meeting some of the broader targets of the EC's Work Programme in Energy, Environment and Sustainable Development. The studies will focus on trends in the observing system, the hydrological cycle, clear-sky radiation, Alpine snow simulation, upper-tropospheric and stratospheric ozone and water vapour, ocean waves, global mass, heat, energy and moisture budgets, and diagnosis of atmospheric circulation systems. Expected impact: The results of the project will make a major contribution to climate research and monitoring particularly in the areas of seasonal prediction, impacts, change detection and atmospheric chemistry. The availability of ERA-40 analyses will revitalise the use of data from past field experiments, as well as documenting the benefit of enhancements to global climate observing systems and the deployment of satellite systems over the past three decades.

4. *opportunities / gaps / needs / constraints / barriers*

5. *possible ways to develop and better disseminate this method or tool*

6. *training opportunities*

European Centre for Medium Range Weather Forecasts (ECMWF), Shinfield Park, RG2 9AX Reading,
UNITED KINGDOM

7. *References*

EUROFACE

2. *General information and brief description*

An integrated european scientific infrastructure for global change studies on forest and agroforest ecosystems utilising face technology

3. Views / experiences / lessons learned

A fundamental issue of the research on global change effects on the biosphere is the need of proper design of experiments at the ecosystem level. FACE technology has the merit of not altering the climate of the test area and allows research on impacts of global change to be conducted at ecosystem level, where the gained knowledge will be useful for elaborating mitigation strategies for climate change. EUROFACE will use an existing CO₂ enrichment infrastructure (FACE technology) on forest tree stands. At EUROFACE an integrated research will be conducted at the trans-European level on the role of forest plantations to mitigate greenhouse gases in support of the Kyoto protocol and under conditions of climate change, with the aim of improving and making available to a larger scientific community a FACE infrastructure and to quantify-uptake and soil storage of carbon as affected by global climate change and management.

4. opportunities / gaps / needs / constraints / barriers

5. possible ways to develop and better disseminate this method or tool

6. training opportunities

UNIVERSITÀ DEGLI STUDI DELLA TUSCIA, Via S. Camillo de Lellis, 01100 VITERBO, ITALY

7. References

www.unitus.it/euroface

EUROSPICE

2. General information and brief description

European project on stratospheric processes and their impact on climate and the environment

3. Views / experiences / lessons learned

Problems to be solved: EuroSPICE is centred on investigating the impact of the Montreal and Kyoto protocols on the atmosphere. Research on chemistry-climate coupling has suggested that control of both future greenhouse gas emissions and halogen concentrations is necessary to avoid future severe ozone loss. However, the likely level of future ozone depletion is uncertain due to the fact that previous studies have not represented all the known processes. In this project detailed simulations are carried out to help understand past stratospheric trends and to predict future temperature, ozone and surface ultraviolet amounts. Scientific objectives and approach; The trends in ozone, surface ultraviolet and temperature determined from observations are updated for the period 1980-2000. Trends in these quantities are then simulated using a range of numerical models of the atmosphere, varying from simpler models to very detailed models. These simulations are then extended to the year 2020 with a particular emphasis on the prospect for severe ozone depletion in northern high latitudes and its possible impact on Europe. The results are analysed to determine the likely causes of past stratospheric trends. The results are investigated to understand more clearly the impact of stratospheric change on tropospheric climate and photochemistry. Expected impacts: With improved simulations of past stratospheric changes we have more confidence in the ability of numerical models to predict future changes. These predictions of the future ozone levels have an important impact on the future health and well being of the European citizen because of the connection with surface ultraviolet amounts. Also, the results give improved understanding the atmospheric climate system and in particular whether a detailed stratosphere is necessary for accurate climate simulation.

4. opportunities / gaps / needs / constraints / barriers

5. possible ways to develop and better disseminate this method or tool

6. training opportunities

SECRETARY OF STATE FOR DEFENCE - MINISTRY OF DEFENCE, London Road, Sutton House Room SG/12, RG12 2SZ BRACKNELL, UNITED KINGDOM, RG12 2SZ BRACKNELL, UNITED KINGDOM

7. References

www.aero.jussieu.fr/~sparc/News21/21_Austin.html

Eururalis

2. General information and brief description

Eururalis is a tool to support decision makers in discussions and decision making on rural areas. The output sketches what could happen to rural Europe (EU-25) based on conditions that differ in nature, course, duration or place. It uses a selection of four contrasting but scientific and politically accepted scenarios in a model framework with the major driving forces that are considered crucial for future developments.

3. Views / experiences / lessons learned

Eururalis is mostly fuel for discussions. Most importantly it generates threats and opportunities, with different policy options. The package deal of autonomous developments and policy options give insight in the long term effects.

4. opportunities / gaps / needs / constraints / barriers

The impact of the policy options has not been made visible separately, therefore the transparency of the chain of effects is relatively small. Amongst others this will be subject to change in the next version.

5. possible ways to develop and better disseminate this method or tool

At this moment a version 2.0 is developed and there are ideas for a version 3.0. The main concepts will be the same as in the first version, but additionally policy relevance, downscaling information and more interactivity will be added as well as a broadening of the basis. Version 2.0 will be ready in the near future.

6. training opportunities

There are no training opportunities in relation to the Eururalis project, nevertheless the project is used for different discussions, where people use the outcomes of the scenarios as a basis.

7. References

<http://www.eururalis.nl> (in English)

ExternE - Externalities of Energy - Project. EcoSense and EcoSenseLE

2. General information and brief description

The ExternE project is the first comprehensive attempt to use a consistent 'bottom-up' methodology to evaluate the external costs associated with electricity production. EC - US Department of Energy collaboration project initiated in 1991. The main objectives are to apply the methodology to a wide range of different fossil, nuclear and renewable fuel cycles for power generation and energy conservation options, and a series of National Implementation Programmes to implement the methodology for reference sites throughout Europe. The methodology is also being extended to address the evaluation of externalities associated with the use of energy in the transport and domestic sectors and a number of non-environmental externalities such as those associated with security of supply.

3. Views / experiences / lessons learned

4. opportunities / gaps / needs / constraints / barriers

The scope of the ExternE Project is to value the external costs, i. e. the major impacts of economic activities, both referred to production and consumption. Up to now, valuations of external costs have mainly been applied to energy-related activities such as fuel cycles, and activities related to transport of persons and freight, but the focus is being broadened and the methodology extended to activities such as different industrial processes. Individual sources of uncertainty have also been identified: data, model, policy and ethical choice, future technology, etc...

5. possible ways to develop and better disseminate this method or tool

6. training opportunities

7. References

EXTERNE <http://www.externe.info/>

FLOODSite - Integrated Flood Risk Analysis and Management Methodology

2. General information and brief description

FLOODSite is an Integrated Programme currently in progress under the European Commission's 6th Framework Programme which aims to deliver:

- An integrated, European, methodology for flood risk analysis and management.
- Consistency of approach to the causes, control and impacts of flooding from rivers, estuaries and the sea.
- Techniques and knowledge to support integrated flood risk management:
 1. sustainable “pre-flood” measures (spatial planning, flood defence infrastructure and measures to reduce vulnerability),
 2. Flood event management (early warning, evacuation and emergency response),
 3. Post-event activities (review and regeneration).
- Dissemination of this knowledge.
- Networking and integration with other EC national and international research.

3. Views / experiences / lessons learned

in progress

4. opportunities / gaps / needs / constraints / barriers

in progress

5. possible ways to develop and better disseminate this method or tool

the project seeks to develop tools to disseminate the information better to the public, professionals and educational institutes through:

- Integrated information management
- Text-based knowledge transfer
- Web-based knowledge transfer
- Face-to-face knowledge transfer

6. training opportunities

in progress

7. References

general information: <http://www.floodsite.net/default.htm>

FRAGILE

2. General information and brief description

Fragility of arctic goose habitat: impacts of land use, conservation and elevated temperatures

3. Views / experiences / lessons learned

The tundra is a vulnerable ecosystem. Damage would result in it turning from a carbon sink into a carbon source, thus adding to current climate warming. The numbers of geese breeding in the tundra have been increasing for 40 years and will continue to increase, largely due to protective measures and changes in agricultural practice in NW Europe where they spend the winter. Evidence from other parts of the world suggests that tundra ecosystems can be severely damaged if overgrazed for extended periods. In addition, effects of climate change, will also provide pressures of change for tundra ecosystems. The proposed project will assess the tundra's vulnerability to these cumulative pressures and define thresholds beyond which irreparable damage will occur. The project will provide tools and make recommendations to facilitate the managed protection of the tundra by EC and appropriate stakeholders.

4. opportunities / gaps / needs / constraints / barriers

5. possible ways to develop and better disseminate this method or tool

6. training opportunities

NETHERLANDS INSTITUTE OF ECOLOGY, Korrिंगaweg 7, PB : 140, 4400AC YERSEKE,
NETHERLANDS

7. References

www.fragile-eu.net/

GLACIORISK

2. General information and brief description

Survey and prevention of extreme glaciological hazards in European mountainous regions

3. Views / experiences / lessons learned

Glacier catastrophes like extreme floods due to lake outburst or sudden draining of internal water pockets and devastating ice avalanches are scarce but highly dangerous because unpredictable. Today, dangerous sites like moraine dammed lakes or serac falls are NOT systematically surveyed, by lack of knowledge and financial support. Dangerous sites are hundreds in Europe (F, CH, I, A, N, IS). Because of varying environmental and climatological conditions (increasing tourism, global change inducing a glacier retreat in the Alps-), the risk is increasing. The fight against this hazard starts with the development of a database gathering every information on past events and on actual dangerous sites. A durable network of field technicians will permanently up-date this database. Scientific studies on each phenomenon will be conducted on selected sites. Survey techniques and methods will be elaborated and tested in order to prevent and mitigate new catastrophes.

4. opportunities / gaps / needs / constraints / barriers

5. possible ways to develop and better disseminate this method or tool

6. training opportunities

CENTRE NATIONAL DU MACHINISME AGRICOLE, DU GENIE RURAL, DES EAUX ET DES FORETS, Rue de la Papeterie 2 Domaine Universitaire, B.P. 44, 38402 SAINT-MARTIN-D'HERES, FRANCE

7. References

www.glaciorisk.grenoble.cemagref.fr/

GLIMPSE

2. General information and brief description

Global implications of arctic climate processes and feedbacks

3. Views / experiences / lessons learned

The target is to better identify and model the key processes of the climate system, including natural variability, than has been done so far using coarse resolution Atmosphere-Ocean General Circulation Models. This will be carried out by a better description of physical processes in the coupled climate system of the Arctic in high-resolution regional climate models. GLIMPSE address and reduce the deficiencies by developing improved physical descriptions and parameterisations of regional Arctic climate feedbacks (stable planetary boundary layer-, cloud-radiation-, land surface and permafrost parameterisations, (P - E) feedbacks on sea-ice distribution and influence on ecosystems) in regional climate models. The improved parameterisations of regional Arctic climate feedbacks will be applied into coupled AGCMs, to determine and understand their global consequences for natural decadal scale climate variability in the past and future

4. opportunities / gaps / needs / constraints / barriers

5. possible ways to develop and better disseminate this method or tool

6. training opportunities

ALFRED WEGENER INSTITUTE FOR POLAR AND MARINE RESEARCH, Columbusstrasse, 27568 BREMERHAVEN, GERMANY

7. References

www.awi-potsdam.de/www-pot/atmo/glimpse/

Global Dynamic Vegetation-Soil Process Model (LPJ-DGVM)

2. General information and brief description

LPJ is one of the leading numerical simulation models for the development of terrestrial ecosystems. It has recently been expanded to include the major crops of the world (LPJmL) and is capable of translating scenarios of atmospheric CO₂, temperature and rainfall into the performance or failure of managed or unmanaged land vegetation. LPJ has been used to assess ecosystem goods and services in a range of conditions.

3. Views / experiences / lessons learned

Being applied in many different contexts, LPJ has been able to show multiple aspects of biospheric vulnerability to climate and land use change, as well as the feedbacks that will likely arise from broad-scale alteration of the land surface.

4. opportunities / gaps / needs / constraints / barriers

LPJ may still be more widely applied for multiple purposes, although it is not designed to be an enduser tool and is therefore lacking a convenient interface for non-scientists. A major gap in LPJ is the incomplete treatment of nutrient cycles and of soil organic matter dynamics - both shortcomings are due to incomplete scientific knowledge and data/observations.

5. possible ways to develop and better disseminate this method or tool

Each application to new problems illustrates opportunities for better development. A fundamental research effort is needed for the better representation of soil organic matter dynamics and nitrogen cycling.

6. training opportunities

Training occurs for young scientists developing masters or Ph.D. theses on the basis of LPJ.

7. References

Bondeau A, Smith PC, Zaehle S, Schaphoff S, Lucht W, Cramer W, Gerten D, Lotze-Campen H, Müller C, Reichstein M, Smith B 2007 Modelling the role of agriculture for the 20th century global terrestrial carbon balance. *Gl Ch Biol* 13:??, doi: 10.1111/j.1365-

GLORIA-EUROPE

2. General information and brief description

The european dimension of the global observation research initiative in alpine environments - a contribution to gtos

3. Views / experiences / lessons learned

The project is proposed to establish an urgently required international network of long-term observation settings to detect climate change-induced effects on alpine mountain ecosystems (i.e. from the tree line upwards). Alpine environments are particularly appropriate for such a network, due to their presence in all major life zones of Europe and due to their high vulnerability and sensitivity to climatic changes. The project aims to implement a particularly cost-effective in site observation of plant biodiversity and vegetation patterns at 72 sites in 18 Target Regions. This includes the development, evaluation and application of standardised observation tools and the assessment of cost-effective options for the long-term operation.

4. opportunities / gaps / needs / constraints / barriers

5. possible ways to develop and better disseminate this method or tool

6. training opportunities

UNIVERSITY OF VIENNA, Dr. Karl Lueger-Ring 1, 1010 Vienna; AUSTRIA

7. References

www.gloria.ac.at

GLOWA-Elbe

2. General information and brief description

The environmental quality and socio-economic capability of the Elbe region is influenced to a substantial extent by factors which either depend on water or themselves have an impact on water. Building on the first phase of the GLOWA Elbe project we investigate how the potentially conflict-laden areas of surface water availability and quality of surface water are affected by structural economic change and/or global climate change, and, on a longer-term planning horizon, whether the region has the potential to adapt. Scenarios of the future development of critical driving forces (climate, social development) and alternative policy strategies are used as a basis to carry out numerical simulations of water-dependent sectors. The results are analysed for both water availability and water quality, as well as for some areas where availability and quality interconnect, and are drawn together to give an integrated assessment of the overall impact. This forms a basis for deriving long-term policy options which may serve as guidelines for policy and economy in the region.

3. Views / experiences / lessons learned

climate change impacts interact strongly with other global change impacts

4. opportunities / gaps / needs / constraints / barriers

development of complex watershed management systems is feasible

5. possible ways to develop and better disseminate this method or tool

application within the framework of the European water frame directive

6. training opportunities

short term research stays possible

7. References

www.glowa-elbe.de

GREENICE

2. General information and brief description

Greenland arctic shelf ice and climate experiment

3. Views / experiences / lessons learned

A radical change occurred a decade ago in Arctic atmospheric circulation. associated with a reversal of the Arctic Oscillation (AO). This resulted in changes of sea ice motion and characteristics, most manifest in the critical region north of Greenland. Green ICE takes advantage of winter ice camps in this region. Sea-bed sediment cores will map the climatic record, and a multilevel study of sea ice - in situ thickness and roughness measurements; buoys for ice dynamics, and satellite coverage - will be performed. An existing sea ice model will be improved and used to extend regional results to basin scales. The aim is to form a complete picture of ice response to an AO reversal, matching this to concurrent climate change. By reference to the regional climatic record for the past 2000+ years, we thus aim to understand the nature and magnitude of Arctic sea ice response to observed climate variability

4. opportunities / gaps / needs / constraints / barriers

5. possible ways to develop and better disseminate this method or tool

6. training opportunities

THE SCOTTISH ASSOCIATION FOR MARINE SCIENCE, Dunbeg, PO Box 3, PA37 1QA OBAN,
UNITED KINGDOM

7. References

www.greenice.org/

HALL

2. General information and brief description

The north atlantic oscillation: oceanic response and influence on climate

3. Views / experiences / lessons learned

The atmospheric North Atlantic Oscillation (NAO) is the most important mode of northern hemisphere climate variability, and has major impacts over Europe. This project will investigate the response of the ocean circulation to NAO-related atmospheric forcing, and assess the potential predictability of the NAO. Existing integrations of a high resolution primitive equation model of the Atlantic ocean circulation will be diagnosed to trace the influence of the atmospheric NAO from the surface forcing through to the general circulation. Processes such as the establishment of SST anomalies, their subduction and advection, and the creation of deep water masses and modification of the meridional overturning circulation will be traced back to the NAO through individual process studies and through statistical analysis of correlated time series of selected oceanic indices. The subsequent impact on the atmospheric circulation will be addressed with coupled model simulations using the same ocean model. Long integrations and "perfect model" ensemble experiments will be used to assess objectively the potential for predicting the NAO on timescales from seasons to decades. Atmospheric processes will be diagnosed using a simplified primitive equation model. Research findings will be disseminated through scientific articles in international journals, popular articles for the general reader and a web page with popular explanations and downloadable data.

4. opportunities / gaps / needs / constraints / barriers

5. possible ways to develop and better disseminate this method or tool

6. training opportunities

UNIVERSITE JOSEPH FOURIER - GRENOBLE 1, Rue de la Piscine 1025, Domaine Universitaire, 38041 GRENOBLE, FRANCE

7. References

High resolution climate scenario for the Alpine region

2. General information and brief description

In the Framework of the project reclip:more (coordinated by Austrian Research Centers System Research, cooperation with University of Vienna, University for Life Sciences Vienna, ZAMG) a climate scenario for the greater Alpine region with 10 km horizontal resolution for the decade 2041-2050 has been developed. The results are available and are already applied in various climate impact studies (e.g., water supply, heating/cooling energy, agriculture)

3. Views / experiences / lessons learned

The unique high resolution of the scenarios enables to distinguish various small climatic subregions around the Alps which is of crucial importance for many impact studies. Cooperation with partners in the field of climate impact research has shown that 10km resolution is often regarded as minimum requirement of climate input data for impact studies.

4. opportunities / gaps / needs / constraints / barriers

Opportunities: Many new applications in the fields of hydrology, agriculture, and others became possible due to the high resolution. Constraint 1: The uncertainty of such high resolution simulations is yet only vaguely known because only very few comparable simulations exist and even those have not yet been systematically intercompared. Constraint 2: For the inner Alpine region 10km horizontal resolution is still not sufficient to resolve important climate processes. Further refinement either by post processing techniques or by higher resolution modelling is necessary.

5. possible ways to develop and better disseminate this method or tool

Currently, Austrian Research Centers System Research extracts impact-relevant climate parameters from the climate scenarios. However, due to funding constraints, only a very basic set of parameters can be made available via the internet (<http://systemsresearch.ac.at/LUC/reclip/>). More detailed data is available directly from modelling groups (WegCenter/UniGraz and IMG/Univ. Vienna)

6. *training opportunities*

7. *References*

<http://systemsresearch.ac.at/LUC/reclip/>

IMFREX – Database on climate change scenarios in France

Contributor: FR

2. *General information and brief description*

IMFREX is a data base developed under the GICC project of the Ministry of ecology and sustainable development, providing climate change data and scenarios on the frequency of extreme events (wind, temperature, precipitation) over the country, with a space resolution of about 50 km.

3. *Views / experiences / lessons learned*

This data base is widely used by the French research community on impacts and adaptation.

4. *opportunities / gaps / needs / constraints / barriers*

One remaining constraint is the lack of access to daily data

5. *possible ways to develop and better disseminate this method or tool*

Developments are continuing

6. *training opportunities*

No training opportunities are planned for this project.

7. *References*

<http://medias.cnrs.fr/imfrex/>

Impacts Database

2. *General information and brief description*

A database of impacts that have come about by extreme weather-related events is being held and continually updated by staff at UKCIP. The database contains examples of current weather impacts that we might see more of in the future because of climate change.

3. *Views / experiences / lessons learned*

The database represents a useful tool for stakeholders to obtain an overview of weather-related impacts on their sector of interest. These will provide insight into the range of possible weather-related impacts that could possibly occur under a changing climate. It is also useful to highlight to users the extent and range of climate impacts. UKCIP work in general has found that often people are not aware of the full range of impacts or just how far reaching these might be.

4. *opportunities / gaps / needs / constraints / barriers*

It is labour intensive to keep the database up-to-date and allocating one person this responsibility could result in a loss of valuable information being entered into the database because of lack of communal knowledge. It is therefore important to make this an integrated UKCIP staff activity. Once the impacts database represents (what UKCIP consider to be) a comprehensive dataset, it could be made available online via the UKCIP website.

5. *possible ways to develop and better disseminate this method or tool*

The tool could be further developed by the involvement of more people in the 'impacts examples' collection process. This could be expanded to stakeholder contributions once the impacts database is available on the internet.

6. *training opportunities*

The impacts database would play a secondary role in training by providing examples of potential weather-related impacts for use in workshops or training as part of UKCIP dissemination activities.

7. *References*

Indicators of UK climate change based on the Environmental Change Network long-term ecological research (LTER) sites.

2. General information and brief description

Launched in 1992, the Environmental Change Network (ECN) is the UK's long-term environmental monitoring programme. It is designed to collect, store, analyse and interpret long-term data based on a set of key physical, chemical and biological variables which drive and respond to environmental change at a range of terrestrial and freshwater sites across the UK. A sub-set of the data collected relates specifically to observations of a changing climate.

3. Views / experiences / lessons learned

ECN provides an effective example of long-term ecosystem research (LTER) and observation sites that are increasingly regarded as an essential part of the Global Earth Observation System of Systems (GEOSS). ECN data have been used to develop climate impact indicators based on changes in the species composition of ecosystems (e.g. changes in moth, butterfly and beetle communities at sites across the UK). The indicators are updated annually and are reported as part the "Biodiversity Strategy for England". The strength of the approach is that the data are derived from a network of sites and the indicators are easily updated. The weakness of the indicators is that they reflect a measure of changing state of biodiversity which are not necessarily informative about impacts on ecosystem services and therefore lack immediate policy significance.

4. opportunities / gaps / needs / constraints / barriers

Further development is required to develop robust and informative indicators of climate change impacts on ecosystems. Three key issues need to be addressed are: (i) the lack of suitable data; (ii) the technical difficulty of extracting a meaningful climate signals from "noisy" data; and (iii) how to present the data in ways that provide some intuitive understanding of the significance of change (answering the "so what" question) e.g. in terms of impacts on ecosystem services, thresholds and alert limits.

5. possible ways to develop and better disseminate this method or tool

Support needs to be provided to programmes aimed at developing national and international long-term ecosystem monitoring programmes such as ILTER (the International Long-term Ecological Research Network) and to initiatives aimed at organising data from distributed systems. An example of the latter is the ESFRI "LifeWatch" infrastructure programme which aims to develop a European "E-Science and technology infrastructure for biodiversity data and observatories" through which data will be made available to address, amongst other things, climate change issues.

6. training opportunities

Training is a key component of ECN and ILTER activities and most sites (particularly those LTER sites in the developing world) have a demonstration or training function. The LifeWatch programme also plans to include a training function.

7. References

<http://www.ecn.ac.uk/CCI/cci.asp>

www.lifewatch.eu

Institutional research

2. General information and brief description

There is a lot of institutional research in Germany dealing with the topic. The relevant institutions are:

MPI for Meteorology Hamburg

MPI for Biogeochemistry Jena

MPI for Chemistry Mainz

Potsdam Institute for Climate Impact Research (PIK)

Alfred Wegener Institute for Polar and Marine Research (AWI)

German Aerospace Center (DLR)

Research Centre Jülich (FZJ)

Research Centre Karlsruhe (FZK)

National Research Centre for Geosciences Potsdam (GFZ)

GKSS Research Centre Geesthacht
Centre for Environmental Research Leipzig-Halle (UFZ)
National Research Center for Environment and Health (GSF)
German Climate Computing Centre (DKRZ)

3. *Views / experiences / lessons learned*
4. *opportunities / gaps / needs / constraints / barriers*
5. *possible ways to develop and better disseminate this method or tool*
6. *training opportunities*
7. *References*

<http://www.mpimet.mpg.de/>

<http://www.bgc-jena.mpg.de/>

<http://www.mpch-mainz.mpg.de/>

<http://www.pik-potsdam.de>

<http://www.awi-bremerhaven.de/>

<http://www.dlr.de/>

<http://www.fz-juelich.de/>

<http://www.fzk.de/>

<http://www.gfz-potsdam.de/>

<http://www.gkss.de/>

INTERACT

2. *General information and brief description*

Interaction in eu climate policy

3. *Views / experiences / lessons learned*

Interaction between different policy instruments is of growing significance to the integration of sustainability into all areas of EU policy. Interaction can be complementary and mutually reinforcing, but there is a risk that different policy measures may interfere with one another and undermine the objectives and credibility of each. INTERACT will develop a methodology for systematically analysing such interaction issues, and use this to explore interaction between Kyoto mechanisms and other climate policy instruments in the EU. In so doing, it will make recommendations on the design, implementation and reform of Member State and EU climate policy, with the aim of ensuring it operates efficiently and effectively and exploits positive synergies between instruments. In particular, it will make recommendations on the implementation of Kyoto mechanisms, and suggest how the interaction analysis technique can be applied to other policy areas.

4. *opportunities / gaps / needs / constraints / barriers*

5. *possible ways to develop and better disseminate this method or tool*

6. *training opportunities*

UNIVERSITY OF SUSSEX, Mantell Building, BN1 9RF Falmer - Brighton, UNITED KINGDOM

7. *References*

www.sussex.ac.uk/spru/1-4-7-1-5.html

ISONET

2. *General information and brief description*

400 years of annual reconstructions of european climate variability using a high resolution isotopic network - isonet

3. *Views / experiences / lessons learned*

ISONET will improve greatly our understanding of European climate systems providing independent quantitative data for model verification & policy making. A network of 24 sites provides dendro-chronological coverage from Iberia to Fennoscandia, Caledonia and the Tyrol. The stable isotope (C,H,O) ratios of these annually resolved time series will be analysed and in conjunction with non-linear process models, developed within this project, to reconstruct past climate regimes (temperature, relative humidity & precipitation characteristics) for the last 400 years. Climate variability is addressed on three timescales; decade-century (source water/air mass dominance); inter-annual (quantifying baseline variability, extreme events & recent trends); and intra-annual (high resolution exploration of seasonality signals within tree-rings). ISONET goes far beyond existing tree-ring analyses in its spatial process based investigation and interpretation.

4. *opportunities / gaps / needs / constraints / barriers*

5. *possible ways to develop and better disseminate this method or tool*

6. *training opportunities*

INSTITUT FUER CHEMIE UND DYNAMIC DER GEOSPHAERE
SEDIMENTARY SYSTEMS, FORSCHUNGSZENTRUM JUELICH GMBH
Leo-Brandt-Strasse 52425 JUELICH GERMANY

7. *References*

www.isonet-online.de

KNMI06 climate change scenarios

2. *General information and brief description*

The KNMI06 scenarios are based on a range of global and regional climate model simulations (from the IPCC-PCMDI-GCM and EU-PRUDENCE-RCM archives) and weigh the outcomes using expert judgement of plausibility, relevance and internal consistency. Regional Climate Change Analyses in other regions of the world are subject of active research.

3. *Views / experiences / lessons learned*

Consultation of stakeholders (mainly in the areas of water management and coastal engineering) led to a selection of the most relevant variables for the KNMI06 scenarios. These are often local quantities at high time resolution, which have a direct relation with the climatic extremes causing the impacts. It is important to supply clear tools to manipulate time series and locally used data to correspond with the climate change signal. These tools are quickly and widely used.

4. *opportunities / gaps / needs / constraints / barriers*

Because the KNMI06 scenarios include all recent model projections and are developed in close cooperation with the Dutch impact community, they will serve as the national standard in adaptation policies for the coming years. Regular updates of scenarios (for instance different seasons, new findings in GCM analyses) are unavoidable but need to be disseminated with care. Contributions to other regions in the world could in principle be considered.

5. *possible ways to develop and better disseminate this method or tool*

Contributions to workshops and conferences, e.g. IPCC's TGICA. Making example downloadable programs for e.g. time series manipulation

6. *training opportunities*

Several projects are underway that guide scenario users and tailor the scenarios to their specific needs

7. *References*

Hurk, B.J.J.M. van den, A.M.G. Klein Tank, G. Lenderink, A.P. van Ulden, G.J. van Oldenborgh, C.A. Katsman, H.W. van den Brink, F. Keller, J.J.F. Bessembinder, G. Burgers, G.J. Komen, W. Hazeleger and S.S. Drijfhout, 2006. KNMI Climate Change Scenarios 20

Local Climate Impacts Profile (LCLIP)

2. General information and brief description

A UKCIP resource that brings together data on weather and consequences particular to a Local Authority locality, for use by Local Authority Directorates, Service Managers and others such as community groups. Data are gathered from a wide variety of sources (including local media reports) and covers weather and its impact in the past, present and future. A LCLIP may lead to the development of actions that help local authorities and other organisations adapt to a changing climate.

3. Views / experiences / lessons learned

This tool has several unique benefits. It provides an opportunity to record current weather events specific to a council locality and to gather information on the consequences or impacts of the event and the effect it had on council services. This information has hitherto not often been assembled for one locality in a way that is accessible to a wide range of users/service managers across a local authority.

4. opportunities / gaps / needs / constraints / barriers

At present there is no other systematic recording of the consequences of weather events and their impacts locally. LCLIP provides a record of actions taken in response to current climate impacts and the effectiveness of these actions. The information assists councils and other organisations to change the conventional, generally short-term business drivers. LCLIP creates a context for making the longer term climate data more relevant to a council's locality. It also creates ownership of climate information in a way that responds to particular climate sensitivities of a locality.

5. possible ways to develop and better disseminate this method or tool

A Local Climate Impacts Profile can be shared or customised by authorities within a region. The detailed content and format will be determined locally but the kind of information and interpretations made of an LCLIP will be of interest more broadly. The opportunity is to use the LCLIP as a resource for planning and development across all Council departments service sectors and by elected members as well senior officers, interested community groups and members of the public.

6. training opportunities

The creation of a Local Climate Impact Profile is a first step in increasing awareness of local climate and climate change within a local authority or other organisations. It has proved a useful way of reviewing the consequences of current weather events with service directors across a range of responsibilities. Indeed, involvement in LCLIP is sometimes the first occasion managers consider weather impacts on their service areas. UKCIP will look at developing more guidance on the creation of an LCLIP based on our experience of helping Oxfordshire County Council develop their profile.

7. References

A Local Climate Impacts Profile. UK Climate Impacts Programme. www.ukcip.org.uk

MAIA

2. General information and brief description

Monitoring the atlantic inflow toward the arctic

3. Views / experiences / lessons learned

Problem to be solved: Cost-effective monitoring of ocean circulation and understanding links to climate change. Objectives and approach: The overall objective is: to develop an inexpensive, reliable method to monitor ocean fluxes using existing observation system. Other objectives are: a) to monitor the inflow of salt and heat to the northern seas for the analysis of climate variability, distinguishing between the warmer (eastern) and cooler (western) inflow past the Faroes, and the major routes through the Barents Sea, with a time resolution better than a week, a spatial resolution of the major routes (e.g. slope currents) and an accuracy better than 15%, and b) to understand the causes of errors and recommend strategies to improve the future accuracy of such a monitoring tool. The proposed method is based on a simplified geostrophic theory with an exterior sea at rest. The work will involve gathering an adequate database for the analysis of historical variability back to the mid 70's. This will include coastal sea level, bottom pressure, coastal hydrography, satellite altimetry, ice-front motions, meteorologic forcing data

and in-site measurements of currents. The analyses of these data will be used to demonstrate the details to be expected by this method over the larger inflow domain from the North Atlantic to the Arctic shelf seas. The main coastal stations are Lerwick, Torshavn, Bodo, Hammerfest, Ny Aalesund and Amderma. Emphasis will be put on the effects of the outer reference conditions as a source of error for the application of the method. A dedicated validation study of flows in the Shetland-Iceland section and in the Barents Sea, including bottom pressures, is planned for summer 2000 through summer 2001. This will extend the period of in-site monitoring of the inflow beyond the present field programs (VEINS). The project will use the results of earlier measurement programs. The analyses of these data and the results of the dedicated validation study will be used to evaluate the accuracy of such a tool for monitoring climate variability, among other things, and reveal necessary changes to improve the accuracy and resolution of the method. Expected impact: The project will lead to a better understanding of efficient monitoring techniques and the relationship between oceanic phenomena and their coastal impacts. A user-oriented steering committee will ensure that the results will be available to the public and to decision makers.

4. opportunities / gaps / needs / constraints / barriers

5. possible ways to develop and better disseminate this method or tool

6. training opportunities

FOUNDATION FOR TECHNICAL AND INDUSTRIAL RESEARCH AT THE NORWEGIAN INSTITUTE OF TECHNOLOGY, 153 Rich. Birkelandsvei 3
7465 TRONDHEIM, NORWAY

7. References

www.bodc.ac.uk/projects/european/maia/

Malta General 1

2. General information and brief description

Malta's First National Communication to UNFCCC documents main climate-related risks of relevance to Malta as being the consequence of the projected regional changes in temperature, precipitation, evapotranspiration and sea level.

3. Views / experiences / lessons learned

4. opportunities / gaps / needs / constraints / barriers

Malta's First National Communication has been printed in 2004. The experience of the past years connected to the recent adaptation issues need to be elaborated in depth.

5. possible ways to develop and better disseminate this method or tool

A project to draft Malta's Second National Communication to UNFCCC is also currently being developed for financial support by the GEF.

6. training opportunities

7. References

<http://www.um.edu.mt/noticeboard/fnc.pdf>

Malta General 2

2. General information and brief description

The Physical Oceanography Unit at the International Ocean Institute's Malta Operational Centre at the University of Malta, monitors sea level changes and elaborates trends on sea level rise.

3. Views / experiences / lessons learned

4. opportunities / gaps / needs / constraints / barriers

Human and financial resources poor.

5. possible ways to develop and better disseminate this method or tool

Need to link with other data systems and policy preparation.

6. training opportunities

7. References

<http://www.capemalta.net>

Malta Climate Scenario

2. General information and brief description

The expected changes in the seasonal and annual mean temperature and precipitation up to the year 2100 were constructed using the climate scenario generator software MAGICC/SCENGEN, distributed by the Climatic Research Unit of the University of East Anglia. The data used to analyse recent climatic trends concerns rainfall recorded in different locations of the island.

3. Views / experiences / lessons learned

4. opportunities / gaps / needs / constraints / barriers

Limitations in forecasting precipitation and temperature.

5. possible ways to develop and better disseminate this method or tool

The Physical Oceanography Unit at the International Ocean Institute's Malta Operational Centre at the University of Malta and the Meteorological office of Luqa can contribute in providing more detailed data through the monitoring of sea level changes, elaboration of trends on sea level rise data storage and forecasting on expected changes in temperature and precipitation.

6. training opportunities

7. References

<http://www.maltairport.com/weather> <http://www.capemalta.net/ioimoc/projects.html>

Malta Adaptation Options

2. General information and brief description

The study furnishes adaptation measures in key areas related to the terrestrial and marine ecosystem, natural water resources, public health, fisheries and agriculture in the Maltese islands.

3. Views / experiences / lessons learned

The draft provides the vulnerability rate of each sector, driving the focusing on "win-win" strategies. This is instrumental for the implementation at a political level.

4. opportunities / gaps / needs / constraints / barriers

The study reports a summary of policy measures.

5. possible ways to develop and better disseminate this method or tool

6. training opportunities

7. References

<http://www.um.edu.mt/noticeboard/fnc.pdf>

Meteorological Extreme Events Early Warning System, Meteorological National Institute (INM)

2. General information and brief description

Due to the increase of vulnerability to the meteorological events it has been developed the Adverse Meteorology Prediction National Plan (Meteoalerta) in accordance with the criteria of other European Meteorological Services. Meteoalerta facilitates the last information with the highest possible detail about the adverse atmospheric phenomena in Spain that could affect the national territory in a period up to 60 hours and it gives a detailed evolution of the phenomena once it has started its development.

3. Views / experiences / lessons learned

The alert bulletins are distributed immediately to the Civil Protection Service and to the press media and they are continuously updated in the INM web page.

4. opportunities / gaps / needs / constraints / barriers

Observed weather events: Rains, snowfall, snow, ice, ice melting, coastal events (wind and sea), aerosol particles, tropical storms, avalanches, fog, extreme high and low temperatures, cold and heat waves.

5. possible ways to develop and better disseminate this method or tool

More publicity of the web site would increase the public usage of the available information. Nevertheless the Radio Service of the INM, through more than 200 hundred public and private radio and tv stations spread all over Spain, gives a complete and effective information diffusion.

6. training opportunities

<http://www.inm.es>

7. References

http://www.inm.es/web/infmet/avi/pr/conavi_c.php

MICE

2. General information and brief description

Modelling the impact of climate extremes

3. Views / experiences / lessons learned

It is widely recognized that the impacts of climate change will be manifest more through changes in extremes than as a result of changes in the mean climate. It is the aim of MICE to study changes in extreme event occurrence resulting from anthropogenic climate change, as predicted for Europe by global and regional climate models; and to evaluate the impacts of the predicted changes on selected categories of the human environment and activities. Spatial and temporal patterns of extreme event occurrence will be analysed for precipitation (flood, drought and snow lying), temperature (heat stress) and windstorm. MICE will estimate likely future changes in extremes and define the uncertainties. The impacts of interest are forestry, agriculture, energy use, tourism, and property and life insurance. Interpretation of the results for use by stakeholders and policy-makers is central to the project.

4. opportunities / gaps / needs / constraints / barriers

5. possible ways to develop and better disseminate this method or tool

6. training opportunities

INSTITUTO DE CIENCIA APLICADA E TECNOLOGIA DA FACULDADE DE CIENCIAS DA
UNIVERSIDADE DE LISBOA, Campo Grande
1749-016 LISBOA, PORTUGAL

7. References

MIND

2. General information and brief description

Mediterranean terrestrial ecosystems and increasing drought: vulnerability assessment

3. Views / experiences / lessons learned

The MIND project will address relevant questions concerning the vulnerability of terrestrial Mediterranean Ecosystems to changes in rainfall. The objectives of the project will be achieved by developing unprecedented large-scale manipulative experiments in four sites in Southern Europe (Italy, France, Spain and Portugal). Innovative tools will be used to assess the flows of carbon, water and energy to and from the terrestrial biosphere across the spectrum of time (two to three years) and space (Northern Mediterranean region). The definition of specific Vulnerability Indices and the preparation of a comprehensive Vulnerability Assessment will be the major deliverables of the project. Accordingly, the MIND project will become an unprecedented collaborative, multinational and interdisciplinary effort dealing with Mediterranean ecosystems, in the area of Global Change Research

4. opportunities / gaps / needs / constraints / barriers

5. possible ways to develop and better disseminate this method or tool

6. training opportunities

NATIONAL RESEARCH COUNCIL OF ITALY, P. delle Cascine, 18, 50144 FIRENZE, ITALY

7. References

MISP - Mitigation Strategies for Portugal

2. General information and brief description

This is a research project for helping defining post-Kyoto targets for Portugal. It has a specific product, a medium-long term GHG emissions model, which models the various economic sectors (agriculture, residential and tertiary buildings, transportation, fossil, renewable and nuclear energy supply, etc.), and integrates them at the level of energy and emissions. It contains socio-economic scenarios (SRES compatible) for Portugal. The model enables the exploration of mitigation strategies such as CO₂ sequestration, installing nuclear and renewable power plants, etc.

3. Views / experiences / lessons learned

The model indicates that Portugal could be just now reaching a peak in GHG emissions and it is possible to enter in a reduction path with the existing technologies and mitigation plans, without too much strain on the economy. However, the strenght of the reductions is very sensitive to "exogenous" factors such as population trends and technological developments worldwide. Climate change itself could be introduced in some features of the models, e.g. building HVAC demand and hydropower production, and this proved to have a significant impact on emissions.

4. opportunities / gaps / needs / constraints / barriers

While calibrating the model many data gaps in surveys and statistics were identified. Also methodologies and past emissions at the National Reports to UNFCCC kept changing during the work; that is possibly overcome, but indicates the interest of adopting consistent data and methodologies for modelling at all time and spatial scales. The models holds potential to linking with other shorter term studies, such as those basing the Mitigation and Emission Allocation Plans, however the science community-government links need more clarification, openness and support.

5. possible ways to develop and better disseminate this method or tool

Although the tool is country-level and country-specific, it can be adapted to other countries or to sub-regions. It would benefit from more openness of the Administration about data, methods and plans and of cooperative effort of the various groups of the portuguese scientific community itself, that are currently working essentially in isolation. As it still in its beginnings, the tool has yet to be deployed as user friendly software and at the Internet. Publication of the main features and results as a book is also possible. It is expected that the Public Lab INETI, currently under restructuration, will come to support the maintenance and development of the tool.

6. training opportunities

A position will soon open to help maintenance, updating and improvement of the tool.

7. References

MISP - Mitigation Strategies in Portugal. [F.D. Santos and R. Aguiar, Eds.] Final Report of Project MISP, April 2006, Calouste Gulbenkian Foundation, Lisbon, Portugal.

MITCH

2. General information and brief description

Mitigation of climate induced natural hazards

3. Views / experiences / lessons learned

MITCH will bring together the various research institution and user representatives, including insurers, with a leading involvement in the mitigation of natural hazards with a meteorological cause. The aim will be to assist planning and management for these events, by evaluating the state of research, and to match that with both users perceptions and needs as to what the research community can provide. A primary focus of the CA will be on flood forecasting and warning, but it will also include other flood related hazards, such as landslips and debris flow. It will also look at longer-term climate hazards, such as drought, and the possible impact of climate change on the frequency and magnitude hazards. The CA will be conducted through a series of 5 workshops and an active website for exchange of views and evaluation of best practice.

4. opportunities / gaps / needs / constraints / barriers

5. possible ways to develop and better disseminate this method or tool

6. training opportunities

HR WALLINGFORD LTD, Howbery Park, OX10 8BA WALLINGFORD, UNITED KINGDOM

7. References

www.hrwallingford.co.uk/Mitch/project_information.htm

MOTIF

2. General information and brief description

Models and observations to test climate feedbacks

3. Views / experiences / lessons learned

The project will assess the ability of state-of-the-art European models used to project future climates to reproduce a climate different from today through comparisons with benchmark palaeo environmental datasets. We will analyse both mean climate, internal to multi-decadal climate variability, and the relationship between them. The European models include dynamic representations of the atmosphere, ocean, sea-ice and land-surface, and interactions among these components. The project will use different configurations of the coupled models to study feedbacks between ocean circulation, vegetation and the atmosphere. We focus on 6000 years before present (6 ka) and 21 ka, which represent different states of the climate system and the ocean circulation. In addition to using global syntheses of palaeoenvironmental data to evaluate the simulated mean climate, we will use high-resolution terrestrial and marine records to evaluate the simulated changes in high-frequency variability.

4. opportunities / gaps / needs / constraints / barriers

5. possible ways to develop and better disseminate this method or tool

6. training opportunities

COMMISSARIAT A L'ENERGIE ATOMIQUE, CNRS Orme des Merisiers, batiment 709, 91191 GIF SUR YVETTE, FRANCE

7. References

www-lsce.cea.fr/motif/home.shtml

NEEDS - New Energy Externalities Development for Sustainability

2. General information and brief description

The ultimate objective of the NEEDS Integrated Project is to evaluate the full costs and benefits (i.e. direct + external) of energy policies and of future energy systems, both at the level of individual countries and for the enlarged EU as a whole. In this context NEEDS refines and develops the externalities methodology already set up in the ExternE project, through an ambitious attempt to develop, implement and test an original framework of analysis to assess the long term sustainability of energy technology options and policies.

3. Views / experiences / lessons learned

4. opportunities / gaps / needs / constraints / barriers

5. possible ways to develop and better disseminate this method or tool

6. training opportunities

7. References

<http://www.needs-project.org/>

Nottingham Declaration Action Pack (NDAP)

2. General information and brief description

NDAP provides online guidance to assist UK local authorities to draw up climate change action plans. The guidance is organised in 5 project management milestone stages and under the local authority roles

of: Own estate manager; Service provider; and Community leader. There are separate threads covering adaptation and mitigation for each role.

3. Views / experiences / lessons learned

The tool provides useful guidance to local authorities assessing climate risks and vulnerabilities to their operations, and the development of adaptation responses.

4. opportunities / gaps / needs / constraints / barriers

The Nottingham Declaration is a voluntary pledge to address the issues of climate change which commits a signatory to drawing up a CC Action Plan within 2 years. More than 200 English local authorities have signed to date. The principle barriers to LA action are lack of drivers and funding from central government.

5. possible ways to develop and better disseminate this method or tool

The Nottingham Declaration and NDAP are well known within the UK local authority sector. There is a programme of development planned to update the tool on the bases of lessons learnt from the first version. There is a strong demand from users for case studies as examples adaptation practice.

6. training opportunities

UKCIP are in the process of providing introductory training to local authority officers in each of the English regions. This is scheduled to be completed by April 2007. This may be followed up by more detailed training in future.

7. References

OMEGA

2. General information and brief description

Development of operational monitoring system for european glacial areas - synthesis of earth observation data of the present, past and future

3. Views / experiences / lessons learned

The goal of the OMEGA project is to develop an operational monitoring system for European glacial areas. This tool will be useful for operational glacier mass balance monitoring and in global change studies, since changes in glacier volume are indicators of global change. Our research will focus on the direct measures of glacier changes at local and regional scale based on modern developments in the glacier remote sensing. The rapid retreat or advance of glaciers is a potential economic and environmental threat for agriculture and tourism in the mountainous parts of Europe. Glacier monitoring is also important in applications, such as hydropower production, environmental conservation and natural hazard forecasting. An important contribute of OMEGA project will be to develop a cost effective monitoring system offering accurate and up-to-date information to authorities and the public.

4. opportunities / gaps / needs / constraints / barriers

5. possible ways to develop and better disseminate this method or tool

6. training opportunities

UNIVERSITY OF TURKU, DEPARTMENT OF GEOGRAPHY - FACULTY OF MATHEMATICS AND NATURAL SCIENCES, Luonnontieteiden Talo I 20014 TURKU / ABO, FINLAND

7. References

www.omega.utu.fi/

ONERC – Climate change scenarios data base

Contributor: FR

2. General information and brief description

This data base provides the user a view of two reference climate change scenarios (A2 and B2) over any part of the country, on time-intensity representation.

3. Views / experiences / lessons learned

This data base is used by the French research community on impacts and adaptation and by local communities.

4. opportunities / gaps / needs / constraints / barriers

One remaining constraint is the lack of access to daily data

5. possible ways to develop and better disseminate this method or tool

Developments are continuing

6. training opportunities

No training opportunities are planned for this project.

7. References

<http://onerc.gouv.fr>

PACLIVA

2. General information and brief description

Patterns of climate variability in the north atlantic

3. Views / experiences / lessons learned

The project intends to significantly extend observations of decadal to century scale climate variability of the North Atlantic Ocean and its impact on climate change in Europe beyond the instrumental period, which at best only covers the last 1-2 centuries. It will provide critical data for testing/validating climate models over time scales of high importance for climate prediction. The approach has a comprehensive geographical coverage, very high temporal and significant spatial resolution, and will identify the degree to which the oceanic anomaly patterns associated with the North Atlantic Oscillation (NAO) reflect the main long term mode of variability of North Atlantic climates. This will be done by the use of state of the art observation-observation methods, building upon a unique European world class network of collaborating laboratories.

4. opportunities / gaps / needs / constraints / barriers

5. possible ways to develop and better disseminate this method or tool

6. training opportunities

UNIVERSITY OF BERGEN, Museclass, 1, P.O. Box 7800, 5020 BERGEN, NORWAY

7. References

www.bjerknes.uib.no/research/PACLIVA/

PESETA Project; Institute for Prospective Technological Studies (IPTS)

2. General information and brief description

The objective of the PESETA project (Projection of Economic impacts of climate change in Sectors of the European Union based on bottom-up Analysis) is to make a multi-sectoral assessment of the impacts of climate change in Europe for the 2011-2040 and 2071-2100 time horizons. The PESETA project focuses on the impacts of climate change on the following sectors: Coastal systems, Energy demand, Human health, Agriculture, Tourism, and Floods. For each of these sectoral categories, a corresponding sectoral-based study is developed by the project partners.

3. Views / experiences / lessons learned

The value-added from the PESETA project relies on the following issues: 1) Policy-relevant time horizon: 2020s, in addition to the 2080s. 2) Use of high-resolution scenario data. 3) Consistent climatic and socio-economic framework across sectoral assessments. 4) Use of state-of-the-art climate impact modelling tools. 5) Use of a common impact metric (monetary) to aid decision-making.

Preliminary results of PESETA have been published in the Staff Working Paper accompanying the EC Communication on "Limiting Global Climate Change to 2 degrees Celsius. The way ahead for 2020 and beyond" (see DG Environment related Web site

http://ec.europa.eu/environment/climat/future_action.htm).

4. opportunities / gaps / needs / constraints / barriers

PESETA aims to contribute to a better understanding of the possible impacts of climate change in Europe, an extremely complex issue. In this respect, there are several limitations of the PESETA study (in part, due to the limited resources available for the study, both in terms of time and money) that should be considered when interpreting the results: 1) Cascade of uncertainty. Making a quantitative assessment of the impacts of climate change implies necessarily to deal with many sources of uncertainty, ranging e.g. from the future evolution of population to the monetary valuation of impacts. Each of them should ideally be considered in a probabilistic way. Such an exercise is, however, beyond the scope of the PESETA study and the current state-of-the-art. 2) Adaptation. The PESETA project is primarily an impact assessment as the quantitative treatment of adaptation is relatively simple in most of the sectors, while being absent in some of them (e.g. river floods). 3) Scope of the assessment. The scope of the PESETA assessment is relatively limited compared to the many expected impacts of climate change. In particular, while for some sectors the assessment is pan-European (e.g. human health, coastal zones), for others the evaluation is limited to specific geographical areas (e.g. for river floods). Moreover, possible inter-sectoral effects are not considered (such as the effects of water supply constraints on agriculture and tourism). Another limitation of the study comes from the fact that some relevant market impacts (e.g. forestry) and non-market impacts (e.g. ecosystems) are not considered. Finally, the effects of extremes are not taken into account, though they can be crucial in some sectors (e.g. heat waves in the Human health assessment). Despite these limitations, the PESETA project provides a valuable indication of the economic costs of climate change in Europe based on physical impact assessment and state-of-art high-resolution climate scenarios.

5. possible ways to develop and better disseminate this method or tool

The project is to be finished by mid 2007.

6. training opportunities

The project is to be finished by mid 2007.

7. References

<http://peseta.jrc.es/references.html>

PNACC FRAMEWORK (Spanish National Adaptation Plan on Climate Change)

2. General information and brief description

The National Climate Change Adaptation Plan (PNACC) establishes the general framework for the initiatives and assessments of impacts, vulnerability and adaptation to climate change in Spain.

3. Views / experiences / lessons learned

4. opportunities / gaps / needs / constraints / barriers

5. possible ways to develop and better disseminate this method or tool

6. training opportunities

7. References

http://www.mma.es/portal/secciones/cambio_climatico/areas_tematicas/impactos_cc/pnacc.htm

PNACC FRAMEWORK: ECCE Project

2. General information and brief description

This preliminary assessment (published in 2005) on the possible impacts of climate change in the different ecosystems and socio-economic sectors in Spain constitutes an important step in the efforts by the Spanish Ministry of the Environment to make progress in the fight against climate change. Spain's geographic location and socio-economic characteristics make us very vulnerable to climate change, the effects of which we have recently suffered. Among other aspects, the impacts of climate change can have particularly serious consequences in relation to reduced hydric resources, coastal retreat, loss of biodiversity and natural ecosystems, increased soil erosion processes and loss of human lives and

property resulting from the intensification of the adverse events associated with extreme climatic phenomena, such as floods, forest fires and heat waves.

3. Views / experiences / lessons learned

The results of this preliminary assessment, drawn up by fifty main authors, in collaboration with other experts belonging to a wide range of Spanish universities and research centres (more than 400 expert), undoubtedly

constitute a basic element and the key, on one hand, to learning more about the vulnerability of our ecosystems and sectors to the impacts of climate change and, on the other, to developing and establishing adaptation policies enabling the Public Administrations and the private sector to adopt measures.

4. opportunities / gaps / needs / constraints / barriers

The ECCE project identifies the state of art, gaps in knowledge, research needs and opportunities along the 15 sectors considered in the study. One of the most important barrier is the coordination of such amount of researchers of this wide range sectors from public and private institutions.

5. possible ways to develop and better disseminate this method or tool

6. training opportunities

7. References

http://www.mma.es/portal/secciones/cambio_climatico/areas_tematicas/impactos_cc/eval_impactos.htm

PNACC FRAMEWORK: Impacts on coastal zone

2. General information and brief description

The objective is to define and to establish the scientific, technical and economic mechanisms to assist the Spanish Ministry of Environment and all other agents with responsibility in planning and managing coastal areas to face the climate change impacts. This study is divided into three phases: 1) Assessment of changes in the Spanish coastal dynamics 2) Impacts assessments in the Spanish coastline 3) Strategies to face climate change in the coastline. The project was developed during 2003-2005 period

3. Views / experiences / lessons learned

The study determined the changes on the coastline dynamics of the last past decades. These changes have been evaluated, among others, with historical data of levels and waves along the Spanish coastline. And it also has been developed an estimation of the future of the coastline dynamics for the 21st century under different climate change scenarios. With these projections, it has been assessed the effects of these changes on natural park protected areas and human use areas in a general approach. It has been also developed an index and a set of indicators system to obtain objective information in relation with the climate changes effects in the coastline.

4. opportunities / gaps / needs / constraints / barriers

Many outcomes have been developed under this study, mapping the impacts in relative big segments of the Spanish coastline. Local climate change effects have to be studied taking into consideration the specificities of single locations.

5. possible ways to develop and better disseminate this method or tool

The results and outcomes of the projects are being disseminated into the Spanish municipalities with coastline

6. training opportunities

7. References

http://www.mma.es/portal/secciones/cambio_climatico/

PNACC FRAMEWORK: Impacts on water resources

2. General information and brief description

The objective is to assess -qualitative and quantitative- the water resources for 21st century in Spanish river-basin, using a hydrological model called SIMPA, widely applied in Spain for the hydrological planning and management

3. Views / experiences / lessons learned

The study is currently in progress and will make use of the regional climate scenarios developed in the framework of the PNACC. The institutions in charge is the Center for Hydrographic Studies.

4. opportunities / gaps / needs / constraints / barriers

5. possible ways to develop and better disseminate this method or tool

To consider when the project produce its first outcomes and results

6. training opportunities

7. References

<http://www.cedex.es/castellano/hidrograficos/presentacion.html>

PNACC FRAMEWORK: Regional Climate Scenarios for Spain

2. General information and brief description

An essential element for the development of the PNACC is the detailed knowledge of the current climate conditions and the estimation of the future regional climate projections. The basic tools for the future climate projections are various AOGCM and the application of different downscaling techniques to these models to obtain data which will be used, as input data, for the impacts models of the different sectors and systems initially identified in the PNACC. In the first stage, already finished, a collection of regional climate scenarios have been compiled and made available to the impact assessment community, and for the next stage a coordinated programme with the Spanish research community active in this field will participate in the development of new better regional climate change scenarios

3. Views / experiences / lessons learned

These first collection of climate change scenarios provide a standard reference for Spain climate change assessments. The INM (Spanish National Meteorology Institute) is the coordinator of this task and brings together most of the centres and research groups actives in this field in Spain.

4. opportunities / gaps / needs / constraints / barriers

Numerous impact assessments in Spain are in progress on different systems, sectors and regions. The opportunity that offert this activity is to make available for all of them, and the new future projects, a common collection of regional climate scenarios for the Spanish geographic area.

5. possible ways to develop and better disseminate this method or tool

Possible ways to improve the dissemination of this tool include presentation of it in many relevant fora, dissemination among research community on impact, vulnerability and adaptation assessments and promotion of specific projects that make use of the collection of regional climate chage scenarios

6. training opportunities

7. References

Sending a brief description of the project that will make use of these regional climate chage scenarios and the references of the team that will develop it (to escenarios@inm.es), a user and password will be provide for download the data. Full documentati

PRECIS (Providing Regional Climates for Impacts Studies)

2. General information and brief description

Regional climate model that can be run on a Linux-based desktop-PC, provided free-of-charge by the Hadley Centre for Climate Prediction and Research. Once boundary conditions are provided (from GCM), the regional model can be callibrated to local conditions at a regional scale and then forced with greenhouse gas emissions scenarios, enabling a more detailed look at the way in which the climate will change.

3. Views / experiences / lessons learned

The model has been provided for use in several regions, including south Asia, central America, southern Africa and China. PRECIS modelling underlies sectoral impacts modelling work within Defra-funded research projects in India and China.

4. opportunities / gaps / needs / constraints / barriers

Opportunities: to provide accessible and well-supported tools which allow development of climate scenarios consistent with the latest developments in climate change science; to demonstrate the application of likely future climate scenarios in assessing the vulnerability to climate change and hence to inform adaptation strategies.

Gaps/needs/constraints/barriers: see column 5

5. possible ways to develop and better disseminate this method or tool

Long-term funding is critical: brings confidence to users, convinces managers and funders to support use of PRECIS, and as project/assessment time-scales can be long. Significant support is required in many developing country institutes, to overcome infrastructural problems. End-to-end application: scenario generation, their use in assessing impacts, and then integration with relevant socio-economic information, to inform adaptation.

6. training opportunities

Attendance at (usually 5-day) training workshops (funded from a variety of UK Government sources over the years) are a pre-condition of provision of PRECIS. To date workshops have been held in South Africa, Cuba, Bhutan, Brazil, India, Turkey, Argentina, Ghana, and five in the United Kingdom. Hadley Centre staff are subsequently available (via email etc.) for consultation. Further workshops are planned [details?]

7. References

<http://precis.metoffice.com/>

PROMISE

2. General information and brief description

Predictability and variability of monsoons, and the agricultural and hydrological impacts of climate change

3. Views / experiences / lessons learned

Problems to be solved: Natural year-to-year variability of monsoon climates and future impacts of anthropogenic climate change, including land use changes, have potential very important social and economic consequences for monsoon affected countries. Most of the world population live in monsoon climates and the issue is of global concern. Scientific objectives and approach. The project addresses the potential for seasonal prediction, and the benefits that would accrue in terms of management of water resources and agriculture. Also it will address the impacts of anthropogenic climate change on these tropical countries, in particular on the availability of water resources for human use, and on the productivity of crops and the potential changes in the natural vegetation. Natural variability of monsoon climates will be investigated on seasonal, interannual to interdecadal time scales using observations and model results. Seasonal predictability will be assessed using ensemble forecasts and origins of predictability will be sought. Specific studies will address the influence of Sea Surface Temperature (SST) anomalies, in particular ENSO, and the role of land surface conditions and processes in determining predictability. The project exploits existing or planned numerical simulations on seasonal and climate time scales and will undertake process studies through experimentation with global and high-resolution models; with special reference to land surface processes and the impacts of land use changes. Models of crop development/productivity ground hydrology and water balance in large river catchments will be developed and tested with atmospheric reanalyses and model output. The project incorporates a significant programme of collaboration with scientists and users in monsoon-affected countries. The participation of scientists from these countries will be extremely beneficial particularly in the validation of numerical simulations with local observations and the development of transfer models for hydrology and agricultural studies. In order to improve the exchange of results between research institutions in

European and extra-European countries and between scientists with expertise in climatology, hydrology and agricultural resources an easily accessible database with selected results from numerical simulations and observational data sets on atmospheric, hydrological and agricultural parameters will be established. Expected impacts: Substantial progress can be expected towards the development of an integrated approach in which the impacts on agriculture and water resources are properly integrated in the prediction process. Important societal and economic benefits can be expected on the medium term.

4. *opportunities / gaps / needs / constraints / barriers*

5. *possible ways to develop and better disseminate this method or tool*

6. *training opportunities*

UNIVERSITY OF READING, Earley Gate 2, Whiteknights, P.O. Box 217, RG6 6BB READING /
SILCHESTER, UNITED KINGDOM

7. *References*

www.ictp.trieste.it/~moltenif/projects/promise.html

PRUDENCE

2. *General information and brief description*

Prediction of regional scenarios and uncertainties for defining european climate change risks and effects

3. *Views / experiences / lessons learned*

PRUDENCE proposes to co-ordinate the analysis, and demonstrates the use, of European high-resolution climate change modelling involving 4 high-resolution Atmospheric General Circulation Models (Acmes) , 8 Regional Climate Models (ROMs) and several climate impacts models. Due to the heterogeneity of possible climate change through Europe and the impacts this may imply, European wide expertise from both climate and impacts modelling groups , as well as from within social and political sciences, is required. This will ensure a comprehensive utilisation of the entire set of climate change simulations takes place. A co-ordinated effort within one common 'end-to-end' project will enable an unprecedented quantification of the uncertainties associated with impacts of future climate changes for Europe. In demonstrating the feasibility of such a combined effort, a new standard for interdisciplinary work throughout Europe will be set .

4. *opportunities / gaps / needs / constraints / barriers*

5. *possible ways to develop and better disseminate this method or tool*

6. *training opportunities*

DANISH METEOROLOGICAL INSTITUTE, 100 Lyngbyvej 100, 2100 KOEPENHAGEN,
DENMARK

7. *References*

prudence.dmi.dk/

SCANNET

2. *General information and brief description*

Scandinavian/north european network of terrestrial field bases

3. *Views / experiences / lessons learned*

The AIM is to establish a distributed network of existing field sites to address questions of variation in system sensitivity and response to environmental change in relation to physical conditions, local variation in drivers , and consequences for stakeholders. WHY? Northern Europe has experienced extreme and variable climates in the past resulting in selection of organisms, processes and systems. Future climate change is forecast to be greatest in polar regions, interacting with land use, pollution and other factors. The impacts and feedback effects have important resource, conservation and socio-economic implications within the Arctic - and for lower latitudes. Global observing systems (GTOS) , circumpolar (AMAP , CAFF) and European (EEA) organisations require improved spatial and combined

effects of environmental changes of the main field bases propose to co-operate to form an interactive group of site managers and researchers to assess and

4. opportunities / gaps / needs / constraints / barriers

5. possible ways to develop and better disseminate this method or tool

6. training opportunities

ROYAL SWEDISH ACADEMY OF SCIENCES, Organisation: ROYAL SWEDISH ACADEMY OF SCIENCES, PO Box 50005, 98107 ABISKO SWEDEN

7. References

SIAM PROJECT - Climate Change in Portugal: Scenarios, Impacts and Adaptation Measures

2. General information and brief description

This research project was carried out in two phases - SIAM I (1999-2002) and SIAM II (2003-2006). It consisted of an integrated assessment of climate change impacts, derived from climate scenarios regionalized for Portugal within the project. Besides the characterization of the 20th century Portuguese climate and the development of future climate scenarios, this assessment covered several core socio-economic sectors, namely: Water Resources; Coastal Zones; Agriculture; Human Health; Forests and Biodiversity; Energy, and Fisheries. Within the SIAM project sectorial assessments, different models and tools were used to evaluate the potential impacts of climate change upon each sector. Examples are: the Temez hydrological model for runoff and infiltration simulations on the Water Resources sector; the SMART (Simple Multi-Attribute Rating Technique) to estimate the vulnerability distribution and land area loss in Coastal Areas; the MAR3G, a 3rd generation wave model that estimated potential shifts in marine wave propagation near Portuguese coast; the CERES and the CROPGRO models to simulate future climate change induces impacts on crops yield under the Agriculture sector; the RayMan model used to calculate future impact scenarios on human thermal conditions and effects on Human Health; the process-based model GOTILWA+ applied in the assessment of Forests potential productivity under climate change scenarios and the BIOME4 and MOPAQ models for evaluation of impacts on Portuguese Biodiversity. The climate data used throughout both phases of the SIAM project was retrieved from several GCM of common use in this type of assessments (e.g. CSIRO Mk2, ECHAM4/OPYC3, NCAR CSM, HadCM2-3, among others) as well as from RCM such as the HadRM2-3 (Hadley Centre's LINK project). Other regional models like the CIELO model for the Portuguese insular regions WAS also used to generate climate scenarios within the SIAM project assessment.

3. Views / experiences / lessons learned

The main lesson learned from the Project SIAM is the need to continue the assessment, particularly at regional level, of the impacts of climate change in Portugal and to develop an adaptation strategy.

4. opportunities / gaps / needs / constraints / barriers

There are still considerable gaps as regards the impacts of climate change in the agriculture sector, urban zones, and insurance and financial sectors. The development of economic assessments of adaptation in Portugal is still in its earlier stages. On the other hand there are currently a number of projects that address research gaps on climate change impacts on tourism and coastal zones. One important barrier that has been identified is the difficulty for the governmental institutions in various socio-economic sectors to develop an integrated approach to climate change adaptation.

5. possible ways to develop and better disseminate this method or tool

It would be desirable to disseminate the results of the SIAM Project at regional level. The SIAM Project addressed climate change impacts and adaptation in continental Portugal while the CLIMAAT II Project extended this integrated and multi-sectorial approach to the Madeira Islands. Based on this work it's now required to develop assessments focused at regional level and to develop ways and means to start a dialogue with regional stakeholders.

6. training opportunities

There are no plans for further training opportunities within the framework of the SIAM project, although it remains as the primary source of information on climate change related impacts and scenarios for the Portuguese official authorities. Nevertheless, within each research institution involved at the different sectorial assessments, work is still being carried out in these assessments methods and tools which may, in the future, lead to new training opportunities.

7. References

<http://www.siam.fc.ul.pt/>

SITHOS

2. General information and brief description

Sea ice thickness observation system

3. Views / experiences / lessons learned

The aim of SITHOS is to develop new observation techniques for sea ice thickness and related parameters which are important for climate monitoring as well as offshore operations in polar regions. SITHOS will investigate both space techniques using radar altimeter data and non-space techniques using fixed-wing aircraft, helicopters, and drifting ice stations. The techniques include: 1) electromagnetic induction combined with laser; 2) ice thickness via wave spectra from automatic ice stations; 3) AVV and submarines equipped with upward looking sonar; and 4) airborne laser combined with GPS to measure ice freeboard and topography. All techniques will be tested and validated during several winter and summer experiments. The non-space data will be important validation data for CRYOSAT, an ESA satellite scheduled for launch in 2004 with global ice thickness measurement as a main objective.

4. opportunities / gaps / needs / constraints / barriers

5. possible ways to develop and better disseminate this method or tool

6. training opportunities

NANSEN ENVIRONMENTAL AND REMOTE SENSING CENTER, 3A Edvard Griegsvej 3a, 5059 BERGEN, NORWAY

7. References

SOAP

2. General information and brief description

Simulations, observations and palaeoclimatic data : climate variability over the last 500 years

3. Views / experiences / lessons learned

SOAP will establish the capability of state-of-the-art European climate models for simulating climate changes over the past 500 years. The project will explore & quantify the model responses to natural & anthropogenic forcing on regional & global scales. SOAP will construct climate data sets, including seasonal temperature, precipitation, atmospheric circulation & sea level, with local to hemispheric coverage. These will be a combination of instrumental, historical & rigorously calibrated palaeon climate proxies. The characteristic variability contained in these data sets will be compared with the output of the forced & unforced climate models. By integrated analyses of the simulated & reconstructed climates, we will evaluate the credibility of these climate models, identify externally-forced climate signals, & re-assess climate change detection results that are currently based on untested model estimates of natural variability.

4. opportunities / gaps / needs / constraints / barriers

5. possible ways to develop and better disseminate this method or tool

6. training opportunities

SECRETARY OF STATE FOR DEFENCE - MINISTRY OF DEFENCE, London Road, Sutton House, RG12 2SY BRACKNELL, UNITED KINGDOM

7. References

www.cru.uea.ac.uk/cru/projects/soap/

Socio-economic scenarios

2. General information and brief description

The UKCIP socio-economic scenarios were developed in 2000 alongside the UKCIP 1998 climate change scenarios. They are intended to provide scenarios of how society may change in accordance with policy decisions made in the future. These should be utilised together with climate change emission scenarios in order to produce an integrated assessment of potential impacts under climate change.

3. Views / experiences / lessons learned

This a very important tool in terms of performing an integrated assessment of potential impacts under climate change. Uptake and use of these scenarios in the UK has been poor. This is partially because socio-economic scenarios are seen as being difficult to use, but mainly because of a lack of a dissemination strategy for this tool and training to allow users to understand how to use the scenarios. The key lesson we have learnt is that dissemination and training are vital for these types of tools if you want them to be used.

4. opportunities / gaps / needs / constraints / barriers

There is an opportunity for better use of the scenarios through further dissemination of guidance on their use. The development of the UKCIP08 climate change scenarios affords UKCIP an opportunity to update all their tools, including the socio-economic scenarios

5. possible ways to develop and better disseminate this method or tool

User-friendly guidance is required to address the methods for integrating the scenarios into impact assessment models. The scenarios are being reviewed internally in terms of their continued validity under new climate change science

6. training opportunities

Workshops could be undertaken to train impacts modellers in the use of the scenarios. However, possibly a more optimal approach would be to accompany the socio-economic scenarios with user-friendly guidance as to their use.

7. References

UK Climate Impacts Programme, (2000), Socio-economic scenarios for climate change impact assessment: a guide to their use in the UK Climate Impacts Programme. UKCIP, Oxford.
<http://www.ukcip.org.uk/resources/tools/socio.asp>

STARDEX

2. General information and brief description

Statistical and regional dynamical downscaling of extremes for european regions

3. Views / experiences / lessons learned

For many EU countries, climatic change from whatever cause is most evident, part-circularly to the public & media, through changing frequencies of extremes. While there is a clear need for scenarios of extremes, such scenarios are not readily available at present, mainly because a systematic framework for identifying & evaluating suitable construction methods is lacking. STARDEX will provide such a framework through the rigorous & systematic inter-comparison & evaluation of statistical, dynamical & statistical-dynamical downscaling methods for the reconstruction of observed extremes & the construction of scenarios of extremes for European case-study regions. The more robust techniques will be identified & used to produce reliable & plausible future scenarios of extremes for the case-study regions for the end of the 21st century. These scenarios will help to address the vital question as to whether extremes will occur more frequently in the future.

4. opportunities / gaps / needs / constraints / barriers

5. possible ways to develop and better disseminate this method or tool

6. training opportunities

KING'S COLLEGE LONDON, DEPARTMENT OF GEOGRAPHY, Strand, WC2R 2LS, London, UK

7. References

www.cru.uea.ac.uk/projects/stardex

SWURVE

2. General information and brief description

Sustainable water uncertainty, risk and vulnerability in Europe

3. Views / experiences / lessons learned

Crucial hydrologic systems are at risk to climate variability and predicted change. Two problems affect assessment of their vulnerability and sustainable operation; (1) great uncertainty in future climate scenarios (2) difficulty of quantifying risks from extremes in inherently variable climates. SWURVE has a dual strategy for addressing these problems in the context of planning for sustainable water and associated activities in Europe. (1) a probabilistic framework for the treatment of future scenarios and their impacts resulting in assigning probabilities of various critical outcomes and risks, rather than single central estimates; (2) a quantitative, transferable methodology for the measurement of sustainable performance using measures of reliability, resilience and vulnerability. This methodology will be developed and validated by application to a set of case studies covering all aspects of water management and related sectors across Europe.

4. opportunities / gaps / needs / constraints / barriers

5. possible ways to develop and better disseminate this method or tool

6. training opportunities

UNIVERSITY OF NEWCASTLE UPON TYNE, Cassie Building, Claremont Road, NE1 7RU
NEWCASTLE UPON TYNE, UNITED KINGDOM

7. References

www.ncl.ac.uk/swurve/

The Climate Impacts LINK project

2. General information and brief description

LINK is a DEFRA-funded project providing climate data, (in particular climate model data) from the Met Office Hadley Centre, to the climate impacts community. The LINK project has run for a number of years, and provides data, user-support and documentation via the British Atmospheric Data Centre (BADC). The climate model data archive includes climate change runs from HadCM3 and HadRM3, which have been used for major studies such as IPCC TAR.

3. Views / experiences / lessons learned

LINK has been a valuable mechanism for making data available to the climate impacts community, and has encouraged greater interaction between these researchers and the Met Office. On occasion, the recovery of these data from the Met Office archive has proved difficult and time-consuming. Any such data extractions in the future would benefit from greater Met Office direct involvement in the process.

4. opportunities / gaps / needs / constraints / barriers

The latest DEFRA contract to support LINK includes a component to assist with the actual data extractions, which will greatly increase the efficiency of the process. Better metadata from the Met Office concerning the data would also help LINK users, though it is again hoped that this will be addressed in the latest contract. Limited funding in this contract will mean that the additional LINK user support offered by the BADC will be quite limited.

5. possible ways to develop and better disseminate this method or tool

E-newsletters will be produced periodically for registered LINK users to inform them of new datasets, studies using LINK data, etc. Web-based interfaces to the latest data will also be of use to the impacts modelling community.

6. training opportunities

There are currently no LINK training opportunities. A workshop session at a conference has been suggested as a way to raise awareness of LINK and to showcase the results from the various projects which have made use of these data. A LINK "users manual" may also be useful for introducing non-expert users to the data.

7. References

<http://badc.nerc.ac.uk/data/link/>

The IPCC Data Distribution Centre (DDC)

2. General information and brief description

The DDC offers access to baseline and scenario data for representing the evolution of climatic, socio-economic and other environmental conditions. The data are provided by co-operating modelling and analysis centres. It also provides technical guidelines on the selection and use of different types of data and scenarios in research and assessment.

3. Views / experiences / lessons learned

The DDC is provided by three data centres presenting data from the three thematic areas. The British Atmospheric Data Centre (BADC) has recently taken over running the website that fronts the centre. Providing a consistent view of the three data archives is a challenge. One of the problems in updating the site has been a requirement for content to be agreed by consensus (chiefly the IPCC's Task Group on Data and Scenario Support for Impact and Climate Analysis (TGICA)). The BADC is engaging heavily with the various stakeholders and partners to improve the procedures to ensure that updates can occur quickly and in the appropriate manner.

4. opportunities / gaps / needs / constraints / barriers

The funding for the DDC has recently been increased thereby providing additional resources to develop the web site, archives and data services. New services are being developed to make use of new software technologies and standards (in the open-source domain) to improve the range and quality of data products that can be delivered by the web site. The TGICA has a number of suggestions for improvements that are still likely to be constrained by the resources available to the BADC to work on the project.

5. possible ways to develop and better disseminate this method or tool

More publicity would no doubt increase the usage of the existing web site and services. However, the underlying software that is being currently developed by the BADC will be made available via a publicly visible source code repository. Components of this code could be re-used in various other projects. The BADC intends to re-use them in other similar projects. A press release is planned when the site is upgraded with new visualisation software. This will coincide with a restyling of the main IPCC site (www.ipcc.ch).

6. training opportunities

There are currently no plans for the IPCC DDC to offer training events. However, the web interface attempts to make it very clear to users what is available and how to use it. The system is expected to provide information and data to thousands of anonymous users.

7. References

<http://www.ipcc-data.org/>

UKCIP02 climate change scenarios

2. General information and brief description

The UKCIP climate change scenarios show how the climate of the UK may change over the 21st century. The UKCIP02 scenarios (which evolved from the earlier UKCIP98 scenarios) are based on modelling by

the Hadley Centre. UKCIP provides support for the scenarios and helps stakeholders use the information for climate change impacts assessments.

3. Views / experiences / lessons learned

The UKCIP02 climate change scenarios provide a standard reference for UK climate assessments. The scenarios are available at several different levels. Each level presents the same changes, but in different formats and with different amounts of detail. These scenarios and their predecessor (UKCIP98) were crucial in the establishment of UKCIP as they allowed UKCIP to be recognised as the only UK source of easily accessible and credible climate change information for the UK.

4. opportunities / gaps / needs / constraints / barriers

In a recent user consultation, the spatial resolution, treatment of uncertainties and format or/access to the information were all cited as barriers to use. They will be superseded in 2008 by a new package of climate change information ("UKCIP08"), which is currently under development and being informed by stakeholders' requirements.

5. possible ways to develop and better disseminate this method or tool

Improved access to the scenarios has been provided by a major re-structuring of the web-page through which they are available (www.ukcip.org.uk/scenarios) as well as automation of the licensing procedure required to access the underlying information.

6. training opportunities

UKCIP02 continues to be supported by UKCIP, and advice and guidance about their use is provided on an ongoing basis to individual queries.

7. References

Hulme, M., Jenkins, G.J., Lu, X., Turnpenny, J.R., Mitchell, T.D., Jones, R.G., Lowe, J., Murphy, J.M., Hassell, D., Boorman, P., McDonald, R. and Hill, S. (2002) Climate Change Scenarios for the United Kingdom: The UKCIP02 Scientific Report. Tyndall Centre for Climate Change Research

VULCAN

2. General information and brief description

Vulnerability assessment of shrubland ecosystems in Europe under climatic changes

3. Views / experiences / lessons learned

European shrub land ecosystems are vulnerable to various environmental stress factors. Climate change will lead to higher nighttime temperature, more vigorous rainstorms and extended droughts which will likely have impacts on ecosystem functioning in European shrub lands. VULCAN investigates these impacts by experimental manipulations of 6 shrub land ecosystems in Europe and studies of the effects of warming and drought on plant, soil, fauna and soil water processes. Temperature manipulations are done as nighttime warming and drought as 2-month summer drought. Based on the experimental results and existing knowledge on management impacts on shrub land ecosystems an expert system is developed to conduct vulnerability scenarios for shrub lands in order to evaluate and prioritise management actions. The results are further integrated with experiences from potential end users through an end user panel and management guidelines to counteract climate change effects on shrub lands are developed.

4. opportunities / gaps / needs / constraints / barriers

5. possible ways to develop and better disseminate this method or tool

6. training opportunities

RISOE NATIONAL LABORATORY, Frederiksborgvej 399, P.O. Box 49, 4000 ROSKILDE, DENMARK

7. References

www.vulcanproject.com/mainframe.htm

WASAC

2. General information and brief description

West africa's savannah under change. sensitivity of the savannah in west africa to population change, cultivation change and climate change

3. Views / experiences / lessons learned

WASAC is aiming at providing a common platform for understanding the stability of savannah region soils in relation to soil organic matter and emissions, nutrients and plant growth, different management types and the need for increased food production. This knowledge is essential for identifying the net carbon balance in terms of the Kyoto protocol. In the project: - existing data on carbon and gas emissions will be identified and collated; - different plant covers will be considered as management options;- effects of fertilizers and fires will be integrated with the vegetation concept; - a data base will be established for savannah carbon and nitrogen data;- a synthesis volume on soil carbon and gas emission will be produced;- guidelines on sustainable management will be elaborated by topic groups;- in two languages. The project is directly based on experience from bilateral cooperation and a EU contract.

4. opportunities / gaps / needs / constraints / barriers

5. possible ways to develop and better disseminate this method or tool

6. training opportunities

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7. References

PAPER NO. 6: UNITED STATES OF AMERICA

Submission by the United States of America providing information on existing and emerging assessment methodologies and tools; and views on lessons learned from their application; opportunities, gaps, needs, constraints and barriers; possible ways to develop and better disseminate methods and tools; and training opportunities.

Both the process of assessing and the products that result serve as the mechanism through which researchers and practitioners interact and build a common understanding of how climate matters, to whom, and under what social, economic, and ecological conditions. Scientists and decision-makers are requesting answers to a number of questions that will shape investments over the coming years: What will we have to adjust to and over what time period? How can we design, implement, and evaluate adaptation strategies to ensure that we are meeting the goals that we establish? What new monitoring and process studies will be required? How can we better link our investments in new knowledge to the questions we have with regard to climate impacts?

The United States believes that integrated assessments and risk management approaches are emerging as our best mechanism to address these questions in a comprehensive manner. We see a need to strengthen the institutional capacity for regional and sectoral assessments, including the strengthening of regional modeling of climate change impacts. Methods will need to build upon recent advances in integrated assessment and risk management, be more continuous, provide finer grid-scale over regions, provide sector-specific insight and assessment products, be highly interactive with stakeholders, combine the understanding of the influences and interactions of both climate variability and change, incorporate knowledge of regional/local changes already observed, and assess and apply coping strategies.

This submission contains some examples of ongoing assessment activities undertaken by the United States of America and its partners.

Sub-Section Reference

- A) Information on existing and emerging assessment methodologies and tools:
- B) Views on lessons learned from the application of assessment methodologies and tools.
- C) Assessment opportunities, gaps, needs, constraints and barriers;
- D) Possible ways to develop and better disseminate methods and tools;
- E) And, assessment training opportunities.

U.S. Agency for International Development (USAID) Adaptation Guidance Manual

A) USAID has developed a Climate Change Adaptation Guidance Manual to enable development partners to assess and understand the vulnerabilities of projects and adapt their designs to increase resilience. USAID works with development partners to reduce the vulnerability of individual projects to the impacts of climate change. Climate variability and change are viewed as factors that could reduce the effectiveness and sustainability of development assistance projects, but factors whose impact can be minimized if properly considered in the design of projects. Pilot project have examined coastal development vulnerable to flooding and storm surge, infrastructure projects in urbanizing areas, farming practices in dry areas, and fisheries and livelihoods.

C) Gaps, Needs, Opportunities, Barriers and/or Constraints: Data, and access to data, are major impediments to more sustainable project design. There is a need for historical weather data; though that cannot be created now, efforts to recreate such data through proxies or through local knowledge would be useful. Baseline data – tomorrow’s historical record – should be gathered and kept. (It should be noted that the US, through GCOS and GEOSS, is contributing to these efforts. USAID is working with GCOS partners to develop tools and methods for gathering data, interpreting it, and applying it).

USAID and the National Oceanic and Atmospheric Administration (NOAA) Famine Early Warning System Network (FEWS)

A) The United States collaborates with developing country partners to operate the Famine Early Warning System Network (FEWS), which combines data from satellite observations with local meteorological, crop, and livelihood information to provide decision makers with early warnings of food security risks. FEWS operates in 27 countries and has been providing early warnings for 20 years. Similar programs are being developed to warn of risks of malaria, meningitis, and pests.

The National Aeronautics and Space Administration (NASA) and the U.S. Agency for International Development (USAID) SERVIR extension

A) The National Aeronautics and Space Administration (NASA) and the U.S. Agency for International Development (USAID) are developing tools to apply remotely sensed information to development assistance. Based on the successful web-based SERVIR model in Central America, this activity will develop a platform that integrates satellite and other geospatial data for improved scientific knowledge and decision making by managers, researchers, students, and the general public. The activity is expanding to serve other parts of the world. SERVIR addresses the nine societal benefit areas of the Global Earth Observation System of Systems. For example, SERVIR can be used to monitor and forecast ecological changes, as well as to respond to severe events such as forest fires, red tides, and tropical storms.

C) Gaps, needs, constraints, etc.: Need for data, computing power, internet connectivity for users.

U.S. National Research Council of the National Academies

A-D- The NRC, with support from the U.S. National Aeronautics and Space Administration (NASA), recently released a report “Analysis of Global Change Assessments: Lessons Learned”. This report reviews previous assessment efforts and evaluates their effectiveness; particularly with regard to the science – policy interface. A number of recommendations are provided based upon the successes and deficiencies of prior assessments.

U.S. National Oceanic and Atmospheric Administration (NOAA) Sectoral Applications Research Program (SARP)

A, B)- NOAA recently established an applied research program to generate information useful for decision making in high priority sectors. The Sectoral Applications Research Program (SARP) is designed to systematically build an interdisciplinary and expressly applicable knowledge base and mechanism for the creation, dissemination and exchange of climate-related research findings critical for understanding and addressing resource management challenges in vital social and economic sectors (e.g., coastal, water resources, agriculture, health, etc.).

The overarching goals of SARP include:

- 1) The provision of new and/or synthesized science-based knowledge that results in the identification and reduction of vulnerability to climate variability and change in key socio-economic sectors;
- 2) The enhanced and increasingly sophisticated use of climate information, including forecasts, in decision making; and
- 3) The development of a research and operations agenda that increasingly meets the need of the Nation and NOAA through an understanding by scientists and science managers of stakeholder requirements.

The SARP program develops new methodologies for assessing the impact of climate on sector-specific decision making processes and actors and for utilizing this information in resource management and other decision making processes. Project findings and the networks of researchers and stakeholders created to support and implement each project provide a critical, science-based information basis for other sector-specific assessment activities.

The SARP effort recently initiated a partnership with the National Sea Grant Program, the NOAA Coastal Services Center and the National Assembly of Sea Grant Extension to convene a Workshop on Climate Science and Services: Coastal Applications for Decision Making through Sea Grant Extension and Outreach. The purpose of the workshop was to explore and foster the use of the Sea Grant extension, communications, and education networks as a facilitator of climate science and services in coastal adaptation and decision making at the local level. The workshop facilitated a dialogue among representatives of the Sea Grant climate extension network, and the climate research and services communities. Sea Grant extension specialists were provided with an opportunity to develop a better understanding of some of the current and future impacts of climate in coastal regions and the range of existing and emerging decision support resources available for coping with these impacts. In addition, the workshop generated insight related to the climate information needs of the Sea Grant extension network.

U.S. National Oceanic and Atmospheric Administration (NOAA) Regional Integrated Science Assessments (RISAs)

Overview-

One of the key questions the National Oceanic and Atmospheric Administration (NOAA) faces is how can we improve the link between climate sciences and society. The Regional Integrated Sciences and Assessments (RISA) Program is helping to realign our nation's climate research to better serve society. Established by NOAA in the mid-1990s, RISA projects point the way toward a new paradigm of stakeholder-driven climate sciences that directly address society's needs and concerns.

RISA scientists provide information that decision makers can use to cope with drought, understand climatic influences on farming, ranching, water management, and wildfire, and assess climate impacts on the transportation sector, coastal communities and human health. Stakeholders can use such information to evaluate potential climate change impacts on water supplies and hydroelectric power and support disaster management planning. RISA program web site is: http://www.climate.noaa.gov/cpo_pa/risa/.

A)- All of the existing 8 RISA teams produce assessments methodologies and tools on an ongoing basis that focus on climate variability and/or change impacts on climate-sensitive issues (e.g., wildfire management, agricultural extension and farming/forest management/ranching, water resources management, transportation) of importance to their regions and within the constraints of limited funding for the teams. The newest area of development is an Alaskan-focused RISA, ACCAP, working on climate-sensitive transportation issues (e.g., changes in sea ice and shipping/hunting; changes in ice roads and transporting trucks and goods). Information about ACCAP can be found at: www.uaf.edu/accap.

B)- For regional assessments to be effective with stakeholders, the RISA experience suggests that assessments require a substantial and ongoing investment of resources to enable the scientific community to engage with stakeholders over time to build trust, credibility and eventually collaborative results/products. As Phillip Mote, RISA investigator, said during testimony to the U.S. Congress, the success of the RISA program is its ability to match high-level scientists with high-level decision makers. The success has also arisen from RISA's capacity to be a long-term presence in the regions that are covered by the teams. For instance, now that the RISA program has had teams present in several regions for up to a decade, public policy officials from state and county governments are now turning to these RISA teams for climate change impacts information and project collaboration.

C)- With concern over climate increasing, it is essential that institutions and governments more broadly establish the capacity to respond strategically to the demand for information on climate impacts and societal vulnerability that is already evident a wide range of state and local-level initiatives and increased requests from the public and private sector for information that is as local and as specific as possible with regard to climate change. Both the US Global Change Research Program and the US Climate Change Science Program have been oriented toward the production and synthesis of information for decision-making. However, these capacities need to be augmented to meet the needs for impact and vulnerability assessment and adaptation strategies that we foresee emerging in the near future.

D)- Web-based tools developed in collaboration with stakeholders or at least developed in large part based on stakeholder input have provided an extremely useful resource for stakeholders within a given region. The U.S. is now working on funding projects to test the transferability of

these tools and resources across regions so that they can be a resource applied in different regional contexts. However, all tools, models, and information produced needs to be done within an ongoing assessment of user needs and decision making contexts.

U.S. National Integrated Drought Information System (NIDIS)

A)- NIDIS is currently working to integrate existing drought information and forecasts, including the Drought Monitor and Drought Outlook, with additional observations and a coordinated research efforts to produce a dynamic and accessible drought information system. Overall, NIDIS will create a national drought early warning system to enable the Nation to move from a reactive to a more proactive approach to drought. The system will provide users with the ability to determine the potential impacts of drought and their associated risks and also provides the decision-support tools needed to better prepare for and mitigate the effects of drought. It is envisioned that water resource managers, ranchers, farmers, hydropower authorities, and municipalities and state agencies will have, as a result of NIDIS, more comprehensive and timely information to inform their decisions on allocating water and making decisions on planting and purchasing feed for livestock.

PAPER NO. 7: UZBEKISTAN

**Information of the Republic of Uzbekistan on
Nairobi work program on impacts, vulnerability and
adaptation to climate change**

The Republic of Uzbekistan supports the activities of secretariat on the implementation of Nairobi work program on impacts, vulnerability and adaptation to climate change.

In the republic in the framework of preparation of the First National Communication the identification of adaptive measures was made with the method of sectoral assessment. It was revealed that agriculture and water resources are the most vulnerable in the arid climate conditions of our country. And they are so closely interrelated that it is necessary to consider complex adaptive measures for these two sectors. The use and development of the models is the best method of analysis in this field.

Currently in the framework of preparation of the Second National Communication we conduct with WEAP the assessment of the capacities of the water resources in regard for satisfaction the irrigation needs. The structure of crops and areas are regarded with the account of the change of irrigation norms and flow changes with the climate and social-and-economical scenarios. Such analysis allow to “playing” possible versions and to recommend the optimum variant for the structure of sowing as adaptation measure as well as the introducing water-saving technologies in such sectors and water economy and agriculture.

The main gap in this field is the lack of the qualified specialists in the field of modeling, absence of the relevant research groups, of the technical and financial resources in the country.

In the framework of preparation of the Second National Communication for the analysis of adaptation measures it is planned to use MCA (Multi Criteria Analysis) elements which will enable to fulfill point estimation on several criteria with the wide involvement of stakeholders to the assessment process.

The difficulties arises, mainly, in the assessment of regional measures related to the transboundary water resources as in many cases the interest of the water using countries do not coincide. One of the most important potential adaptation strategies is the integrated management of water resources (IMWR). This system takes into account the interests of different sectors (agriculture, municipal services, public health, industry, power sector,

etc.) and hierarchy levels, it involves all stakeholders to the process of the decision making, facilitates the rational use of the water, land and nature resources.

The states of the Aral Sea basin are on the way to the realization of IMWR concept. This concept is already approved by the Water legislation in three of the five states. The priority of the mentioned measure is evident but its realization on the regional scale depends on many reasons, including the political ones.

The main obstacle for the implementation of any of adaptation measures in Uzbekistan is the lack of funds. At the moment in the country the strategy and action plan are not worked out but many measures included to the national and sectoral programs and individual projects have capacities to be the adaptation ones the analysis of which is not completed for the moment.

In this concern we think that it is expedient to allocate additional funds to the developing countries for the elaboration of action plans on the adaptation to climate changes at the national and regional levels.

As in our country the analysis of identification measures is not completed and adaptation measures strategy is not elaborated till now, we are not able to submit structural considerations required in FCCC/SBSTA/2006/L. 26, par.44 document.
