

Liberty – Equality – Fraternity  
FRENCH REPUBLIC

Ministry of Ecology and Sustainable Development

Directorate of Economic Studies and Environmental Evaluation

Department of Research and Foresight  
Office of Foresight and Research in Human Sciences

Paris, 6 July 2005

## **“CLIMATE CHANGE MANAGEMENT AND IMPACTS” PROGRAMME: PHASE II (GICC-2)**

SECOND CALL FOR RESEARCH PROPOSALS (2005)

**Deadline: 20 October 2005**

The Ministry of Ecology and Sustainable Development (MEDD), working in conjunction with the Interministerial Mission on the Greenhouse Effect (MIES), has extended the “Climate Change Management and Impacts” Programme (GICC: call for tenders in 1999, 2000, 2001 and 2002), with a second phase initiated in 2003 (see: <http://medias.obs-mip.fr/gicc>).

As part of this second phase, it is launching a second call for research proposals (APR).

The overall objective remains to broaden the understanding that will help decision-makers choose the best strategies for preventing an increase in the greenhouse effect and adapting to CC<sup>1</sup>, with a three-fold purpose: instituting the measures needed to enforce the Climate Plan; preparing climate change adaptation policy, in particular under the aegis of the National Observatory on the Effects of Climate Warming (ONERC); and broaching the upcoming international negotiations on the period following the implementation of the Kyoto Protocol, after 2012, taking into account France’s stated objective of cutting global emissions in half by 2050 and dividing emissions from all industrialised countries by a factor of four.

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<sup>1</sup> Climate change

As regards the aim set out through the structure of the previous GICC2-2003 call for proposals, it should be pointed out that:

- The uncertainty involved needs to be carefully assessed and reduced, whether in biophysical estimates or in the assessment of damages and socio-economic processes.
- Average trends will not suffice. Extreme values determine damages to goods and the behaviours of players yet subject to little scrutiny in the field of climate change. On both these aspects, there are many methodologies to be improved and databases to be enriched and made more reliable. The findings of previous projects, in particular those of IMFREX, can be of use in this regard.
- Whereas the previous calls for tender emphasised, first and foremost, GHG<sup>2</sup> emission reduction, this one wishes to balance out reduction and adaptation.
- New technological pathways must be taken into account, from deep in-ground geological repository to the paper-free economy.

With a view toward conducting the European project ERA-Net<sup>3</sup> CIRCLE (2005-2009), under which the GICC-2 Programme will coordinate with similar programmes from many European countries, proposal submitters are asked to set their project within the European framework and explicitly cite any related research project in which they are participating. The said references must include the objectives of the projects, the European teams involved and the type and amount of funding received. Also to be specified are the prospects for cooperation with other countries.

It is also requested that proposal submitters situate their project, if applicable, with respect to projects from the previous GICC programme or other national programmes, including that of the ANR, or regional programmes directly or indirectly related to the greenhouse effect, from CC and meteorological or climate-related risks or connected thematic programmes (health, biodiversity, risks, programmes funded by the ANR, etc.). Proposal submitters shall also specify how, to what extent and under what conditions they might contribute to the IPCC<sup>4</sup>'s work.

## **Topic 1: “Decisions, Players and Ties Between the National and International Arenas”**

**Objective:** The Kyoto Protocol's coming into effect was an essential step forward in building an international regime for fighting climate change. Yet, unquestionably, the said international regime remains incomplete, in both its temporal (nothing is planned beyond 2012) and spatial (the United States' reneging, no commitment from developing countries) aspects. Moreover, it does not include any significant plan with regard to R&D, the development and dissemination of low-carbon technologies and on *adaptation*, and thus leaves the requests of those most vulnerable to climate change unanswered.

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<sup>2</sup> Greenhouse gas

<sup>3</sup> European Research Area Network (European Union)

<sup>4</sup> Intergovernmental Panel of Experts on Climate Change

## **I.1. Expertise, Players and Decision-Making: Building the Legitimacy of Climate Policies**

How is the legitimacy of climate policies built at the national and international levels? A possible starting point is the experience developed on the topic of the climate since the mid-1990s and, if necessary, from the experience gained through other negotiations around environmental issues. Priority will be given to comparative analyses, the identification of constants in how legitimacy is built and possible developments in the political and media environment.

### **How should expertise and decision-making interact?**

Organising dialogue between decision-makers and scientists; taking into account tension between progress in scientific knowledge, cycles in the political activity of major players in negotiations and the negotiation process itself.

### **What role should enterprises and NGOs play on the international scene?**

How do enterprises set out their industrial strategies, in relation to climate change policies: how do they contribute in international regulatory efforts on the environment?

How do NGOs come into the debate, lending legitimacy to their action? What can their role be in the global governance of CC?

## **I.2. The Pace of Long-Term GHG Concentration Stabilisation Policies**

The Climate Agreement has the stated objective of stabilising GHG concentrations in the atmosphere, but specifies neither the level nor the timeframe for doing so. The French government aims to divide emissions by a factor of four in the long term. The challenge for research lies in the final concentration target, the pace at which economic growth and net emissions can be disconnected (decrease CO<sub>2</sub> and other GHG emissions, biological and geological sequestering). Analysis must highlight the uncertainties on climate sensitivity, damages and the costs of reducing emissions.

### **I.2.1 Stabilisation Scenarios and Uncertainties on Global Growth, Technology and the Price of Fossil Energies**

Better understanding is needed on the determinants in long-term scenarios, on the basis of which stabilisation scenarios are analysed, insofar as the uncertainty impairing them is as large as that which weighs down the costs of low-carbon technologies. The topics dealt with shall include: a) the macroeconomic assumptions on which the scenarios are based (catch-up development, poverty traps, capital and labour flows) and parameters likely to make them non-viable (financial constraints, unilateral protectionist measures, investment risks, social dualism); b) the link between the said scenarios and the rarefaction of conventional hydrocarbons and the uncertainties on the price of oil (endogenisation of price time profiles, geopolitical variables and oil crises); c) the sensitivity of the reference and stabilisation scenarios to assumptions on technology, not only as regards the availability of techniques, but also connections between technical change (including on demand for energy) and the economic environment (technical progress brought about versus independent technical progress). Facts will be provided to frame the stabilisation scenarios, covering a wide spectrum of ceilings, well below 550 ppm eqv. CO<sub>2</sub>.

### I.2.2 Ties Between the Pace of Action, Concentration Thresholds and Damages:

This section will clarify the main points of explanation in favour of various emission abatement time profiles. Incorporated into this will be the damages associated with a certain level of concentration and, thereafter, a certain level of temperature increase, taking into account the existence of factors for non-linearity, such as changes too quick for any adaptation to change, or even major ecological risks. Care will be taken to include the chain of uncertainties that impinge upon each level of analysis. Also discussed will be the extent to which the assessments are dependent upon assumptions about the economies of the future (will growth be rapid or slow? with or without catch-up?) and on the risks of shock propagation between regions and countries.

### I.2.3 Scenarios on Concentration Stabilisation Threshold Exceeding and Catch-Up:

Due to technological and climate-related uncertainties, along with risks of delay in significant action, it is necessary to clarify the implications of temporarily exceeding a desired critical threshold (aka “overshooting”), followed by a gradual return back below the said threshold. This must moreover clarify the terms of the debate on the pace at which storage potential is used in the future.

### I.2.4 Pace of Climate Change:

In order to effectively address macroeconomic aspects, it is necessary, as relates to the climate, to achieve a more precise understanding of the carbon cycle (see II.1) and better analyse the amplifying effects of non-linear couplings between biophysical and biochemical compartments.

## **I.3 International Medium-Term Regulation of Action to Mitigate Greenhouse Gases**

This general topic addresses the type, form and extent to which, beyond 2012, the United States, Europe, other developed countries, DCs<sup>5</sup> considered major emitters of continental magnitude (China, India, Brazil, etc.) and other DCs, will participate in a global GHG reduction strategy.

### I.3.1 Incentives for Participating in a Post-2012 Regime:

The challenge here is to identify the incentives that would lead countries to become members of an international regime (United States, China, India, Brazil, South Africa, Mexico, Korea, OPEC) or continue to make restriction-bearing commitments after 2012 (Russia, Japan, Canada), even if the regime were to not cover all of the main emitters. On the one hand, we will look at possible ties with other international issues: energy safety, competitiveness in the event of asymmetric constraints between nations with the specific issue of carbon-intensive industries subject to international competition, development policies, anti-poverty efforts, globalisation (WTO, international funding, other environmental agreements, technological transfers, assistance in reducing vulnerability and adapting to climate change).

Applicants shall endeavour to discuss the positive incentives toward participating in all-encompassing or fragmented regimes, the possible synergies or contradictions between ‘climate coalitions’, and coalitions formed around other issues (energy, trade, food policy, etc.) or on the basis of regional cooperation efforts. If possible, the distinction will be made between incentives from the States’ viewpoint and from the viewpoint of the main economic players, including the major consuming sectors.

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<sup>5</sup> Developing countries

### I.3.2 Which Is the Best Architecture for a Future Regime?

- Kyoto-type architecture for universal purposes versus fragmented regimes; if the former option were to be taken, how much room for manoeuvre would there be for an approach that would enable the parties to choose the level and terms for their participation in a regime (absolute, relative, soft or hard, global or sector-based, commitments on policies and measures) without threatening the regime's consistency? If the latter is chosen, what economic, political and legal challenges would arise from the regime's fragmentation and what would the key factors be for ensuring the compatibility and future consistency of the various regimes?
- Type of observance regime: can such a regime go as far as financial penalties? How would it function with respect to commitments that are not soft quantitative commitments? Can it and should it be formally provided for within the climate regime or through interlinking with other levels of global governance? What would the implications of commitments from other economic players be, in isolation from States?

### I.3.3 Climate Issues and Investment Dynamics in the Energy Sector and Infrastructures:

Investment dynamics in the energy sector can be affected in several different ways by the climate issue: through climate policies (change in relative competitiveness of each branch or industry), through adaptation to expected damages (hydrology), through the gradual integration of how international law sees liability or through the political pressure displayed in such initiatives as the "Brazilian Proposal". On each of these dimensions, uncertainty is a key factor that may or may not lead investments to be re-channelled, but which may cause less risk to be taken, thereby creating underinvestment with respect to currently-anticipated trends.

It is important here to analyse in what form the climate issue, against a backdrop of major change in the institutional regulatory framework for the energy sector, can change the investment behaviours of the main players involved. Another possible area of study lies in the interactions between new energy market arrangements, investment decisions and climate issues: to what extent can market liberalisation put a brake on or speed up emission-reduction investments?

### I.3.4 Economic and Legal Issues in North/South Cooperation in the Field of Technological Innovation

Current efforts to speed up the penetration of low-carbon technologies in energy supply or in energy-using infrastructures, biological or geographical sequestering technologies, is coming up against specific problems in the developing countries (in particular as regards technological cooperation).

It is important here to study what economic and legal factors are likely to block such acceleration and, based on that diagnosis, to determine the factors that need to be brought into international negotiation to remove those obstacles and achieve a Kyoto Research & Development Area. Emphasis will be placed first and foremost on distinguishing between that which falls under patent law (for instance, the development of ADPIC agreements on the issue of technology transfer in the very role of commercial barriers) and the tightly-delineated question of how to finance the economic overburden of low-carbon technologies.

This question could be broached, for instance, through international sector-based agreements covering industrialised and developing countries on sectors such as steel, aluminium, glass or cement. For, indeed, significant differences remain in the efficiency of the technologies used to produce the aforementioned goods around the globe and such agreements would entail, implicitly or explicitly, technology transfers.

## **I.4 International Policies and Adaptation to Climate Change**

The Buenos Aires Work Programme on Adaptation launched a process, including in particular the five-year programme under the SBSTA, which might lead to a stepping up of the multilateral regime on adaptation under a post-2012 regime.

The main component of the work on adaptation under this call for tenders is found in Section II, below. Here, the focus will be on the specific issue of international negotiations around these issues, and how they are taken into account in the post-2012 climate regime. In particular, we will cover two types of questions:

### **I.4.1 Negotiations and Uncertainty on the Geographic Breakdown of Damages**

The paradox in the issue of how adaptation issues are incorporated into climate negotiations lies in the fact that the uncertainty about the geographic breakdown of the impacts is of greater magnitude than the uncertainty about the average rise in temperature at the global level. What is important here is, on the one hand, to discuss the way in which adaptation issues can reasonably be incorporated into such a context, in order to prevent the risk of ill-channelled investment, or the rise of ill-directed claims. In particular, applicants shall endeavour to define to what extent a portion of the adaptation investments (infrastructures, insurance, crisis management, coverage for extreme poverty situations) can be considered catch-up, following under-adaptation to current climate hazards and, thereby, might be likened to no-regret policies. Along the same line of thinking is the institution of more robust investments in response to possible climate change.

From the methodological standpoint, incorporating heterogeneous data into the cost of damages brings up the issue of their reliability and robustness when used in integrated multi-regional models. Special consideration can be given to this methodological issue.

### **I.4.2 International Cooperation and Managing Adaptation Action**

Certain provisions in the Kyoto Protocol refer to adaptation funding and coverage for the damage cost of climate change. These provisions may need to be taken further in the future. Here, it is important to work on the connection between possible new sources of funding (international taxes, automatic deductions on all permit exchanges, payments on all commitments not kept) and the selection procedures for the projects and countries likely to receive those grants, addressing problems in additionality, oversight on the proper use of funds, interconnections with other funding and cooperation programmes.

## **Topic II “Strategies for GHG Emission Reduction and Adaptation to the Impacts of CC at the European, National and Territorial Levels (including Overseas France and Neighbouring Regions)”**

### **II.1. Emissions and GHG Wells**

The aim here is to develop the knowledge, methods and tools needed:

- to quantify and monitor GHG flows and levels (emissions by source and absorption by well) pursuant to international agreements;
- to reduce uncertainty;
- to assess carbon sequestering possibilities in natural environments and their potential role in international negotiations;
- to economically assess actions/policies to be instituted taking into account the outcomes of the two previous points;
- to assess the related risks.

Some of the priority focus areas include:

#### **- the development of inventory methods:**

With a focus on greenhouse gases, ozone precursors, perfluorated and organohalogenated gases, methods must be developed to establish the gas balance across a territory, effectively accounting for the change in scale, and estimating and developing the intercalibration protocols needed in the negotiation.

#### **- carbon sequestering and storage in the terrestrial biosphere (integrated assessment):**

Results were achieved under the previous programmes; in addition to extending the overseas territories, understanding of sources and wells needs to be improved (ground, plant, ocean, etc.).

As land use patterns change, what dynamic can be expected for storage capacity? The associated costs and local impacts (ecological and economic) will be taken into account.

#### **- underground sequestering in France:**

What is the storage potential of the underground layers (coal mines, oil and depleted gas reserves, salt domes, etc.)? What are the associated costs and impacts on the environment?

#### **- ocean sequestering:**

A reflection seminar will be organised to analyse progress in knowledge and the potential of the national community as regards assessing ocean sequestering possibilities. *The teams interested in participating in this seminar are invited to make themselves known by drawing up a statement of intent.*

- **“technological sequestering”:**

What conditions would be needed to gain a first estimate of costs by industry in the major emitting countries? What methodological questions are raised as regards tying those data back in with those of the cost of emission reduction and mitigation policies?

## **II.2 GHG Emission Reduction Strategies**

### **II.2.1. National and European Implementation Strategies for Programmes to Fight GHG Emissions**

The implementation of European and French commitments is occurring as two-thirds of the Kyoto Protocol's Reference Period (1990-2012) has come to an end. The window for initiating large-scale policies capable of significantly changing trends is closing. Large disparities can be seen between the progress notable in countries that are faring better than expected and those that are far ahead of their 2012 objective.

Research will be expected to focus on the following points:

- Analysis of R&D policies and climate policies in the EU: How will the target set by the EU – reducing emissions by 15 to 30% by 2020 – play out at the European and French levels, in terms of technology penetration by that date? What effects will the price signal issued pursuant to the Quota Directive to stimulate technological breakthroughs in the field of energy have at the European level? Applicants will compare these effects with those of any other concrete approaches underway in other countries – the US, Japan, China, Russia, etc. (taxation, large subsidies for R&D as in the United States or Japan, voluntary agreements, etc.). What policies would optimise the conditions for technological breakthroughs? More generally speaking, when dealing with a public good such as the climate, what incentives should be given to R&D in order to lead to technological breakthroughs? What international cooperation could contribute to technological breakthroughs? How so?
- Strategies for achieving synergies with other policies (environmental, sustainable development, etc.): comparative analysis of the degree of restriction in European and American policies in relation to the fight against climate change (policies on renewable energies, policies on energy efficiency in buildings, energy demand control policy, etc.), lessons to be learned from the experience of other European countries, such as combining Dutch efforts to become compliant with the ceiling directive on air pollution and its commitments as regards the climate?
- R&D policies and climate policies in developed countries:  
Which combination of public policies would optimise the conditions for technological breakthroughs and lend them credibility?
- Which synergies can be expected with other public policies (environment, sustainable development)?
- Which strategies are best for developing GHG-reduction policies at the territorial level?



### II.2.2. Strategies for the Territorial Implementation of Programmes to Fight GHG Emissions

The aim of this topic is to analyse, at the level of the regions and local authorities, strategies for reducing GHG emissions in line with the implementation of the Climate Plan and to assess the consequences thereof, with an emphasis on policies regarding renewable energies (wind, biofuels, for example) from a territorial standpoint: for the wide variety of regional situations in France (climate, ecological, economic) implies more regional studies and, thus, a finer understanding of regional carbon balances.

The studies and research projects carried out under this topic shall place emphasis on regional analysis of the techniques, of varying levels of innovation, used to reduce GHGs and their effects, whether environmental or socioeconomic, as well as on the role played by social players with diverging interests. More generally speaking, they shall be based on the identification of environmental and socioeconomic indicators of CC and on the use of a very broad spectrum of methodologies that call on sociology and political and legal sciences to define the role of players, by using economic theory to approach how to best allocate reduction efforts.

The aim is to: identify players; analyse risks, conflicts of interest and/or use, messages from the main lobbying groups and their action in the decision-making process and in regional-level implementation of public policies; and, lastly, to look at the respective roles at various levels (Europe, State, Regions, local authorities) in the implementation of strategies at the regional level. Applicants shall consider how objectives should be allocated between the various levels, suggesting approaches for territorializing national objectives, taking into account the modes of production, agriculture and industries (energy-intensive or not) of each territory, the structure in the field of services, housing, transport infrastructures and, more generally speaking, their land development policies, etc.

### II.2.3 Sector-Specific Implementation Strategies for Programmes Fighting GHG Emissions

This section will encompass topics such as understanding the price per tonne of carbon prevented by renewable energies and studying sectors such as building, transport, alternative fuels, tourism (from observations to possible remedies – technical and socio-economic analysis of GHG emission control due to tourist travel).

## **II.3 Strategies for Adapting to Climate Change**

Adaptation as listed in the Climate Plan is governed by the ONERC, is in charge of developing a strategy in this field. Above and beyond the sector-specific issues dealt with below, applicants may also scrutinise, drawing upon other European countries (Great Britain, for example), France's strategy, focusing on the methodologies most appropriate for implementing it and analysing the impacts of climate change in mainland France and overseas (see the work carried out by the European Environment Agency), etc. The robustness of the said strategies in the face of uncertainties on climate change is sensitive properties to be analysed.

### II.3.1 European and National Strategies: Case Studies

- adapting energy regimes to climate constraints, taking into account extreme events and focusing on production, transfer and consumption
- adapting farming and forestry production systems to climate change

Based on regionalised CC scenarios on France (and Europe): assess, from the socioeconomic standpoint, the adaptation opportunities offered by different farming, breeding and forestry regimes (extensive, intensive, irrigated, etc.); take into account the effects of future changes in CAP and global trade and exchanges of farming products also influenced by the CC?

With this in mind, how do economic and political players perceive the issues at stake in the policy change requested of them and how could they be made ready to take a better part in this?

### II.3.2 Adaptation Strategies at the Level of the French Regions

The APR remains open to any and all proposals, provided they have the stated intent of dealing with the evolution of the regional system including, first, the ecosystems (natural or anthropised) along with their physical, chemical or biological sub-systems and, secondly, their social systems. Generally speaking, it is preferable to give priority to regions where climate risks are very marked, but where the issues remain significant in socio-economic, ecological or GHG-related terms.

Generally speaking, it would be desirable to embark on a series of research projects on the consequences of climate change on ecosystems (managed or not) and the benefits they provide, natural resources (managed or not managed, halieutic, for instance) and the way in which the fears generated by these changes will come into play in adaptation strategies: to what extent are players able (or willing to) forecast the consequences of climate change on the future developments of the sector for which they are responsible? To what extent are these forecasts (objectively designed or fully subjective) influence the many ways of broaching the way the said sectors are and will be managed? To what categories of scenarios do local players refer when anticipating the policies to be implemented?

In this regard, emphasis shall be placed on characterising the ties between the perception of change, anticipation of consequences and measures recommended for coping with the consequences of these changes.

Highlands (with the impacts of CC on tourism), coastal areas (with the rise in sea level and endangerment of fragile ecosystems – lagoon, coral; wetlands, for instance), river hydrosystems (with the change in pluviometrics and constraints on users) and urban conurbations (with heat islands and the water issue – flooding, drinking water, etc.) are all vulnerable situations warranting the suggested approaches.

Applicants will take care to look both at the secular climate change trends and the frequency and magnitude of extreme events. In this regard, the 2003 heat wave may provide an integrated methodology for anticipating and monitoring heat wave events, and initiate foresight on the adaptation of urban living environments and the adaptation of farming and forest activities to drought and heat wave situations.

## **II.4 Analysis of the Institution and Enforcement of Sector-Specific and Territorial Policies for Reducing Emissions and Adapting to CC. Impact Assessment. Role of Various Players in Society.**

- GHG emission-reduction policies and climate change adaptation policies all refer back to the complex character of addressing environmental issues. The complexity is all the greater that it comes along with change processes subject to arbitration that is just as individual as it is collective. To take up this issue, it is necessary to engage in analysis of how players take action and interact through the various policies and scales involved.
- These same players have various regimes by which they can implement public action at the local level. How are public climate policies decided at national or European spatial scales interpreted and enforced? What are the guiding forces in the way national issues are translated into local issues? How effective are the regimes invented to regulate the issue of climate change at the local level (geographic, as well as social, cultural, organisational, or even institutional)? How can tools be improved to assess the costs and benefits of risk prevention policies (for instance, flooding)?
- How do projects and programmes aimed at fighting climate change crystallise with local players, whether they belong to the political or administrative arena, or fall within the private sector?
- Effort-sharing: How are efforts to fight and/or adapt to climate change divided up between different categories of society? What actual changes does this bring about in how players behave and how policies are conducted? What participatory democracy procedures are in place? Upon whose impetus? What part does lobbying play in the technological innovations to fight climate change and better adapt to it?
- The role of technology in fighting CC: digression through technology is a well-known way of effectively triggering change in behaviours and practices. Less-known is the extent to which the potential of technology is familiar to players and taken onboard by them. Attention will first be focused on determining how much local players know about the existence of materials and technologies that may potentially contribute to making a publicly-decided initiative to fight CC effective. Thereafter, the question will be raised as to how local players (project owners, local officials, State officials, etc.) see the role and use of technologies in fighting climate change (transport, housing, etc.)? Do they not overestimate the potential of certain upcoming technologies, already announced by the research world? Does this not cut down their motivation to take action? In contrast, are certain improvements not overlooked by the said players, in favour of certain already-existing solutions?
- Legal questions: is it desirable that powers be recognised to local authorities in the field of GHG emission reduction and adaptation to the impacts of CC change? What legal instruments are or should be available to them (for instance, in the field of urban travel and traffic restrictions, even when urban tolls are in existence)?

## **Topic III “Climate Change and Health”**

### General Objective

The IPCC’s latest report on changes in the climate emphasises that physical and biological systems are already being influenced by climate change (CC).

In particular, the impacts of CC on human, animal and plant health are recognised as important, but are difficult to quantify to an acceptable level of reliability.

To achieve real quantification of the climate/health relationship, it is vital to view the situation from within an integrated, multi-disciplinary approach. This approach, by determining and prioritising the key physical, biological and socio-economic processes involved, must make it possible to design predictive models of the climate’s impacts on human health.

Under the present call for research proposals, and in order to foster feasibility for these multi-disciplinary studies, it is important that case studies – in human, animal and plant health – be offered, showcasing clearly-identified and preponderant climate forcing with respect to anthropic forcing.

Research proposals are sought on three types of health risks.

### **III.1. Human Excess Mortality in France Triggered by Heat Waves and Extreme Cold**

Proposals shall take into account developments in the main climate-related and biological factors behind excess mortality due to heat waves and cold.

They may take existing epidemiological studies further and use the results from regional modelling on extreme events, already carried out under the first phase of the GICC programme. In particular, it would be beneficial that the study on thermoregulation mechanisms enabling human organisms to adapt to climate-related and environmental (urban pollution) stress be included.

These studies will also need to take into account the health-related and social contexts, as well as air pollution and the heat island effect in cities, which can amplify the effect of CC.

The quantification of the impacts from these various factors is expected to make it possible to issue recommendations regarding *preventive solutions* and adapt the “climate (heat wave, extreme cold)/health” plans to future developments.

### **III.2 The Emergence or Re-Emergence of Human and Animal Diseases**

The research projects proposed may focus on national soil (mainland and overseas), as well as regional entities in tropical Africa or in the Mediterranean Basin.

Research proposals must develop an integrated multidisciplinary approach to the emergence or re-emergence of human and/or animal diseases, in particular, so-called “vector-borne” diseases or spatio-temporal developments in allergy phenomena. The approach shall be built around the main processes behind interactions between climate factors and the pathologies under consideration and take into account socio-economic issues related to public health. It may draw upon the findings from other climate projects (such as the AMMA project on the African monsoon).

The findings from this research are expected to make it possible to issue recommendations regarding the prevention and monitoring of these diseases in risk areas.

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### **III.3. The Emergence of Plant Diseases**

Ecosystems are particularly vulnerable to climate change. Some consequences have already been observed, such as the extension of the vegetative period, early tree flowering, and the development of new insect populations in certain regional entities.

The projects sought here will be those focusing on the emergence of plant diseases in connection with the climate. The findings of GICC projects, whether completed or underway, on the impacts of CC on the prairies, the forest and agrosystems may foster the multidisciplinary approach sought on plant diseases, insofar as they have already completed the coupling between the functioning of the said ecosystems with climate forcing. The projects may also deal with preventive solutions.

The proposed research projects shall focus on national soil (mainland and overseas).

## **Topic IV: “Biodiversity and CC”**

The aim here is to develop the knowledge, methods and tools required to assess possible interactions between CC and biodiversity, likely to contribute to better definition and implementation of preservation policies suited to the new climate context.

The Climate/Biodiversity interaction must be broached from within a context of global change (societal interactions) and be based on hypotheses regarding adaptative processes.

Moreover, climate change is global, all the while presenting sharp regional and local contrasts. The changes affecting biodiversity and human/biodiversity relationships occur (and can be seen) at the local level.

While progress has been achieved in understanding the changes in area of species distribution using factorial epidemiology methods, it remains that the adaptation of individuals, populations and ecosystems, still inadequately studied, can seriously modulate previous results.

In order to make headway on the viability and robustness of ecosystems and the biodiversity they are able to handle, it is important to be familiar with the key habitats, better understand the relationship between species and their physical environment, in particular by determining their ability to adapt to changes in the said environment. It is also important to determine interactions between species and the synergetic or antagonistic effects of anthropic action (i.e., CC, industrial pollution, use, territory fragmentation, restoration measures, etc.).

With a view toward biodiversity management, protected areas may be both laboratories for observation the interaction between biodiversity and CC and “building grounds” for developing biodiversity preservation policies that take into account CC.

## **Project Submission and Assessment Process**

**Completed applications must be sent by 20 October 2005 at the latest to:**

### **Projects will be assessed by the two bodies governing the GICC-2 Programme:**

The **Scientific Board**, composed of experts from the different fields involved and chaired by Claude MILLIER, Scientific Director of ENGREF and INAPG, will examine and assess the scientific quality of the projects and their structuring and innovative character, according to how well they suit the terms of the APR.

The **Guidance Committee**, which includes representatives from the MIES, ONERC, relevant MEDD departments and public establishments, including ADEME, other ministries and bodies involved, as well as the users of research projects, will select the projects according to the Scientific Board's expertise and research priorities set out.

The selected projects will be funded between Autumn 2006 and Spring 2007.