The Working Group II of the IPCC
Short background information and its participation in TAR

From its inception IPCC , has assigned to Working Group II the task of assessing the effects of changes in climate on natural and managed systems , their production and services; (energy production, industry, transportation, tourism, etc), human settlements and human health. From the first assessment, such impacts, either adverse or beneficial, had to be considered in association with their socio-economic values and ,take into consideration the concept of sustainability, stemming from the Brutland report (1987). As it happens in any scientific and technological endeavor , the assessment was influenced by factors additional to those stemming from the bibliographic review. Inputs came various sources, particularly from users involved in decision making. Consideration was also given to views from sectors considering that Earth's warming is a natural process, hence negating its anthropogenic origin. Each of these inputs brought the necessary incentive for a progressive and continuous advance in the knowledge of causes and effects of global warming and its implications on life on Earth. This step by step progress is noted not only in the conceptual approaches of the various Working Group II reports, but also can be grasped from their titles , as shown in the list included in Annex 1.

Its First Assessment Report (FAR), published in 1990, identified as ***The IPCC Impacts Assessment*** , only covered that issue, i.e the assessment of the impacts of climate change on agriculture and forestry, natural terrestrial ecosystems, hydrology and water resources, human settlement and socio-economic activities, oceans and coastal zones and the cryosphere.

The scenarios used in this report were not defined as they should, to provide the benchmarks on which the WG II analyses could have been referred . Consequently the authors engaged in this first WG II assessment used a number of scenarios based on the existing models available in literature prior to the 90s. In fact, the simultaneous initiation of the activities of Working Group I, which had just initiated the development of scenarios for emission-induced climate change, only permitted the use of scenarios which were based in the following features:

(i) effective doubling of CO_2 in the atmosphere over pre-industrial levels between then and 2025 to 2050, for a "business-as usual" scenario, with no changes to present policy
(ii) an increase of mean global temperature in the range 1.5º C to 4.5º C, corresponding to the effective doubling of CO_2;
(iii) an unequal global distribution of this temperature increase, namely half of the global mean in the tropical regions and twice the global mean in the polar regions;
(iv) a sea-level rise of about 0.3 to 0.5 m by 2050 and about 1 m by 2100, together with a rise in temperature of the surface ocean layer of between 0.2º C and 2.5º C.

The comparison of these scenarios with those produced by WG I, which for the simultaneous development of both reports had not been available in time for use in FAR, showed that the predictions, for a "business-as-usual" scenario were 1º C above the temperature value by 2025 and 3º C before the end of the next century. Further, WG I had estimated the magnitude of sea level rise to be about 20 cm by 2030 and about 65 cm by the end of the next century. In this connection, WG II presentation of this issue remarked that (quote) " the impacts based on 1-2 m rise serve as a warning of the consequences of continued uncontrolled emissions ".

Because of these differences , and due to factors such as:

- the continuing need for the most up-to-date on climate change and the preparations for the United Nations Conference on Environment and Development (UNCED)
- the need for more accurate analyses of the impacts of climate change as a basis for negotiating measures for the prevention or mitigation of the effects of climate change
- The new issues which had appeared in the scientific debate,

WG II, as well as the other two IPCC working groups, prepared its ***Supplementary Report*** to the IPCC Impacts Assessment, identified as ***Climate Change 1992***.

In this regard, it should be noted that this Supplementary Report also included the very valid subject of : *Prediction of the regional distribution of climate change and associated impact studies, including model validation studies*.

The work carried out under this task was discussed under the following two headings:

1.- Systematic observations to identify climate change consequences,
2.- Preliminary Guidelines for assessing impacts of climate change.

but the goals were not fully achieved, and the outcome of this Report presented no degrees of confidence, because the regional estimates of critical climate factors, such as precipitation and soil moisture, were still quite inaccurate.

At this stage, policy makers participating in the Intergovernmental Negociating Committee (INC) had already put some pressure on IPCC, calling for information on the degree of uncertainty of the FAR's impact predictions, and requesting details on their social and economic implications and about the compatibility of the decision frameworks used to assess the available bibliography. These requirements, which had been poorly satisfied in FAR, would become more stringent after the approval of the United Nations Framework Convention on Climate Change (UNFCCC).

Further, the global character of the climate change process and the large number of international and regional meetings held after the Declaration of Toronto (1) and the subsequent adoption of the United Nations Assembly Decision - UN/GA43/49/Add.1, (December 1988) , on the Protection of Climate for Present and Future Generations, had made evident the need for a larger participation of developing countries' experts in the IPCC work. Furthermore, when IPCC convened its Eight Session, held in Harare (Zimbabwe), in November 1992, the UNCED (Rio de Janeiro, June 1992) held only four months before, had already established the **precautionary principle;** endorsed the concept of **sustainability** , and confirmed the principle already established by the Conference of Ministries, held during the Second World Climate Conference Geneva, 1990) of **the common but differentiated responsibility** , in respect of the increasing concentration of greenhouse gases, of anthropogenic origin, responsible for the Earth warming.

(1) Proceedings of the World Conference on the Changing Atmosphere. Implications for Global Security. 27 – 30 June 1988 (WMO, Nº 710, 1989)

Moreover, a number of issues emerging from the UNFCCC had brought government representatives to emphasize that decision making required politically acceptable degrees of confidence to better evaluated the social and economic impacts of climate change as well as the performance of integrated assessments, which would give the climate change component its right stand vis à vis the other components of Global Change. The need for an improved regional emphasis to undertake the required appropriate policy actions, in each of region of the world, was also made evident.

These issues and the relevance of climate change as an additional component to Global Change, defined the environing conditions IPCC would have to recognize before planning for a Second Assessment Report (SAR).

Consequently, the Eight Session of IPCC asked a newly established Working Group II to review the state of knowledge concerning the impacts of climate change on physical and ecological systems, human health and socio-economic sectors , and also to reviewing available information on the technical and economic feasibility of a range of potential adaptation and mitigation strategies.

In developing SAR, leading authors had understood the need to confront the fact that confidence in regional projections of temperature, precipitation, soil moisture and other climate parameters important to impact models remained low, that uncertainty increases as scale decreases, that patterns of climate change are interwoven with climate variability, and that regional patterns are likely to be affected by greenhouse gases and anthropogenic aerosols, the latter of which were only then beginning to be incorporated into transient GCM simulations.

To provide useful information to decisionmakers, the objective of WG II was to find a way to distinguish between uncertainties arising from the responses of systems to a given level or rate of climate change and uncertainties related to the regional-scale climate projections themselves. Consequently, SAR focused on assessing the sensitivity and vulnerability of systems to a range of climate changes , and only then, having identified response functions and/or potential thresholds, on evaluating the impacts that would result from a particular regional scenario. In the course of the assessment, WG II also aimed at developing a common approach to describe the levels of confidence that author teams were asked to assign to the major findings in the executive summaries of their chapters. This was an attempt to communicate to decisionmakers a rough sense of collective judgement of the degree of uncertainty, though recognizing the imperfections of the tool. These imperfections stemming from the fact that the assignation of levels of confidence to research findings is a subjective process.

Meanwhile, the UNFCCC had started its activities through the Conference of the Parties(CoP) and their subsidiary bodies : the Subsidiary Body for Scientific and Technological Advice (SBSTA) and the Subsidiary Body for Implementation (SBI), which were temporarily complemented by the Ad-Hoc Group of the Berlin Mandate (AGBM), established to build-up what became, in 1997, the Kyoto Protocol. IPCC became the natural scientific advisor to these bodies, which, reflecting the needs for information on the climate change process and its implications, submitted by policy and decision makers,

requested the Intergovernmental Panel the preparation of a number of technical and Special Reports. (See Annex 1 for its listing).

Among the Special Reports, SBSTA requested the preparation of one on the Regional Impacts of Climate Change, subtitled as : An Assessment of Vulnerability. This report was built on the WG II contribution to SAR and incorporated the additional information available since mid-1995 to, approximately, mid-1997. Most of this information was obtained from the country studies developed in association with the national greenhouse gas inventories, undertaken by a number of developing countries with the support of the USSCP and the GEF.

This Special Report on Regional Impacts of Climate Change (SRRICC) explored the potential consequences of changes in climate for ten continental – or subcontinental – scale regions. Because of the uncertainties associated with regional projections of climate change, the report necessarily took the approach of assessing sensitivities and vulnerabilities of each region, rather than attempting to provide quantitative predictions of the impacts of climate change. As in the SAR, " vulnerability " , considered as the extent to which climate change may damage a system; became a function of both sensitivity to climate and the ability to adapt to new conditions.

It is important to remark that this report also provided a very initial step in examining the interlinkages that changes in climate have with other environmental changes (e.g. biodiversity loss, land degradation, stratospheric ozone depletion, and degradation of water resources) and social trends (e.g. population growth, economic development and technological progress). Also served to emphasize that additional research into the interlinkages among environmental issues also is needed. The recent report Protecting Our Planet / Securing Our Future (November 1998), prepared by the United Nations Environment Programme (UNEP), the U.S. National Aeronautics and Space Administration (NASA) and the World Bank (WB), provides information on the linkages among Global Environmental Issues and Humans Needs.

IPCC Third Assessment Report (TAR).

The scope of the Third Assessment Report is to provide a comprehensive information and cover the complete range of scientific, technical, economic and social issues deemed important by the expert and policy communities. The IPCC agreed that TAR will summarize the state of knowledge covered in previous IPCC reports, but will primarily assess information generated since SAR, emphasizing the regional aspects of climate change.

The IPCC (XIII Session, Maldives, 1997), also agreed that the Third Assessment Report should include a Synthesis Report (SR) that would be written in a non-technical style suitable for policymakers and will address a broad range of key policy-relevant questions. The SR will include a policy-relevant synthesis and the integration of the three Working Group Reports, .and the development of the key policy-relevant scientific questions became the responsibility of the IPCC Chair and Co-Chairs, undertaken in consultation with the President of the Conference of the Parties (CoP) and the chairs of the subsidiary and other bodies of the CoP,

Subsequently, the IPCC Bureau found it necessary to analyze the outcome of the Maldives session, at the light of other developments taking place under the aegis UNFCCC and the activities of its subsidiary bodies. The adoption, by consensus, of the Kyoto Protocol had added new scientific and technological questions in respect of the climate change issue. The increasing interest on the inter-linkages between the subject matters of the UNFCC and other UN Conventions and international agreements on environmental matters called for a more integrated approach in respect of these global issues.

These requirements pushed forward the gradual and progressive development of the climate system matters, and suggested that it would be wise to find out which other components of TAR and its SR would require further analyses before embarking in the development of this assessment exercise. This idea was supported by the fact that previous reports had undertaken their tasks with comparatively reduced emphasis on social and economic matters , in particular, those related to the human dimensions of the global change, missing important aspects of development, sustainability and equity, pointed out in the UNFCCC and other conventions and interwoven in the initial outlines of the IPCC Working Groups, in particular WG II and III..

An IPCC Scoping Meeting, was held in Bad Munstereifel in mid-1998, to provide a forum for the development of detailed outlines of the TAR chapters and sub-chapters ; to consider matters related to the SR ; to define a list of the cross-working group needs and issues and coordination plans; to analyze matters associated to policy-relevant questions as well as discussions on the policy relevancy of the IPCC work , the latter in the perspective of the CoP – 3 decisions, the Kyoto Protocol, and the outcome of UNFCCC subsidiary bodies meetings in Bonn and its implications on the IPCC work

Regarding the very important matter of the listing of the cross-working group needs, the Scoping Meeting prepared a list of what were defined as cross-cutting issues involving eight main subjects. Seven of then involve the IPCC WGs and the eighth, which stems out from a request SBSTA formulated to IPCC, is in charge of a ad-hoc working group, though also involves the participation the IPCC WGs and, particularly WG II. This issue concerns the scientific and technological as well as the procedural matters necessary to bring into implementation the flexibilization mechanisms resulting from the Kyoto Protocol. It involves the preparation of a Special Report on Land Use, Land Use Changes and Forestry (SRLUCF), aiming at the validation and certification of offsets deriving from the sinking/emission capacities of terrestrial ecosystems and land use and its changes.

The consideration of the other seven cross-cutting issues has been limited, for the time being, to four of them closely associated with the ongoing tasks for the preparation of TAR. These cross-cutting issues are : Development, Equity and Sustainability ; Costing Methodologies ; Decision Making Frameworks, and Consistent Assessment and Reporting of Uncertainties.

The purpose of the cross-cutting papers, currently in the state of a step by step progressive development , is to provide guidance to help improving consistency, clarity and credibility of the TAR. They development started with the preparation of experts' papers which were discussed through e-mail conferences, and will continue to be developed through interactive/iteractive activities between their authors, the CLAs and LAs involved in the TAR, the Bureaux of WG II and III and from contributions from other scientists. A page on the web, operated by TERI Institute (India) is opened to up-date

information on these issues. Further, the convening of expert meetings and workshops, as the present one, in Tokyo, will provide the fora for the discussion of the issues involved and for developing case studies and practices to bring these guidance papers to the category of tools in the IPCC assessments. The whole exercise is supervised by two of the Vice-Chairs of the IPCC, namely , Prof. T. Taniguchi and Dr R. Pachauri. Regarding their present status it should be noted these papers have been recommended for use in TAR , although their use is not obligatory. As it should, WG II, through its Technical Support Unit (TSU) has brought the corresponding information to CLAs and LAs responsible in charge of the preparation of the report to TAR, and also recommended them to participate in the e-mail conferences, access to the website and participate in the experts meeting. The further development and application of the cross-cutting issues guidance papers, and their concurrent use by authors, is aimed at providing decision and policy makers with comparable estimates (for costing and uncertainties) and homogeneous decision frameworks, plus concurrent ways and means to face sustainable development in equity..

Structure and contents of the WG II contribution to TAR.

Under the TAR's umbrella, WG II was assigned the responsibility for assessing the scientific, economic, technical and social aspects of the impact of and adaptation options to, climate change. This responsibility embedded the assessment of the regional sectoral and cross-sectoral impacts of and adaptation strategies to, changes in climate (mean, variability and extremes), including the economic, environmental and social costs and benefits, including equity.

The impacts studies, quantified to the extent possible, should be performed for specified time periods using a range of potential climate scenarios, including, but not limited to, transient GCM projections of climate change, and for a range of climates associated with different greenhouse gas stabilization levels ; placed in the context of other changes in socio-economic and environmental conditions, and assess to what degree climate change affects the ability to meet human needs.

With such elements in hand and the outcome of the Scoping Meeting, WG II had prepared the outline for its contribution to TAR. The analysis made by the XIV-IPCC (Vienna, 1-3 October 1998) brought a thorough and deep consideration of the WG II proposal with the result that the initial set-up was slightly modified, resulting in a four sections and nineteen chapters report, which development was initiated immediately, after completing the designation of the corresponding CLAs, LAs and CAs.

The work undertaken by authors in WG II includes other matters of specific interest in TAR. These are those related to the cross-cutting issues and the integration of the Synthesis Report, for which the policy relevant questions constitutes an important component . Therefore, the WG II bureau and TSU have undertaken a series of actions, including e-mail discussions, to enforce the use of the IPCC cross-cutting issues guidance materials, similar action has been taken by WG I and WG III, to enable the necessary concurrence between the various chapter / sub-chapters in each working group and, when pertinent, with chapters from other working group reports. The policy-relevant questions were also brought to the attention of CLAs , who were requested to sent to the working group bureau its comments on these topics.

Regarding the development of the WG II report for TAR, the drafting activities were initiated in March last along the lines established in the sections and chapters included in the outline approved by the IPCC - XIV Session, held in Vienna, in 1998. In this regard, the work has been apportioned among its four main sections and their
corresponding chapters, with the necessary guidance on the experts' obligation to interact between the corresponding sections and chapters, including the consideration of the cross-cutting issues guidance material and also ensuring the concurrence of their conclusions with those the other working groups and with the corresponding IPCC technical and special reports. At the First Lead Authors meeting, held in Geneva (5-8 January 1999) the TSU provided information on the communication services for TAR, available through a broadcast alias (sendmail aliai) and a FTP Site, through aTSU workstation serving as a repository to disseminate chapter drafts.

The work of CLAs , LAs and CAs is distributed between the Sections and Chapters of the WG II outline, as included in Annex 2.

Current state of the drafting activites.

The zero-draft reports were commented by the WG II members, the WG II TSU and experts from different extractions who have received or accessed to those drafts through the FTP Site > The comments received were considered at the WG II Coordinating Lead Authors (CLAs) Meeting held in Washington, on May 25 – 27. The discussion also involve the needs for strengthening cross-chapter linkages and eliminating cross-chapter inconsistencies , and the adoption of measures to prepare the first-draft. The comments on the chapters are now in a revision process by the WG II bureau members and the TSU for preparing some general comments and guidance for the preparation of such a first-draft, which completion deadline is August 16, for distribution to external expert review on August 30. The meeting agreed that authors would, as far as possible, produce, by mid-July, another internal, interim draft prior to the draft intended for the above mentioned external review . These interim drafts would provide another opportunity to review each others' chapters to identify omissions and inconsistencies. The WG II Bureau remembered the authors the need to check cross-cutting issues with the relevant chapters of the other IPCC Working Groups.

The CLAs Meeting also enabled the adoption of decisions on matters of common interest, relative to :

- the characterizations of future climate, atmospheric composition and related socio-economic conditions, to define benchmark scenarios in respect of which vulnerabilities and impacts would be projected. These characterizations will be derived from Atmosphere-Ocean General Circulation Models and referred to two emission scenarios, taken from the Special Report on Emission Scenarios(in preparation). In addition to broadscale (global and continental) characterizations, also subcontinental scale projections would be provided for use in the regional chapters of TAR. These projections would provide the benchmark scenarios in respect of which vulnerabilities and impacts of climate change may be projected and provided to policy and decision makers, as they have expected from the outset of IPCC,

- the use of uncertainty estimations, by applying the guidance material included in the cross-cutting issues to the current drafting activities within the WG II,

- the participation of WG II authors in the internal review and improvement of such participation for the coming review of the first-level draft and in the review of chapters of WG I and III,

- the coordination between the sectoral and regional chapters, to obviate unnecessary repetitions, but keeping a certain redundancy for the sake of readers who devote their time to read a few of the chapters,

- the adoption of common definitions throughout the whole report and the building-up of glossary of terms, based on existing definitions,

- the use of the same set of units for compatible magnitudes,

- the provision of inputs to chapters in Section IV of the report, namely chapters 18 and 19, under which WG II will synthesized information on the the sectoral and regional vulnerabilities and impacts and provide guidance for adaptation strategies, and

* the consideration of the policy-relevant questions within the pertinent chapters.

Last but not least, the Meeting reiterated the responsibilities the WG II have in the preparation of the Synthesis Report (SR) of TAR, and remarked that CLAs should, at every stage of the WG II report development, address the IPCC adopted policy-relevant questions, which constitute an important component of the SR.

Final comments

TAR will provide an step further in the gradual and progressive action undertaken by IPCC to inform the Society on the implications of the changes in climate (climate change and climate variability) and to satisfy decision and policy makers' requirements regarding the evaluation of costing of the associated impacts as well as those of adaptation strategies. The availability of adaptation costs to different vulnerabilities and impacts will be decisive in defining future mitigation strategies, particularly in those cases when changes in energy generation to use renewable sources or changes in the land use , the cost of the changes to be made on the landscape, the use of natural renewable resources or else, could be compared with the benefits which might result from mitigation actions..

As known. the implementation of adaptation actions depends, in turn, from the level of education and quality of training of people, the availability of technologies and the necessary financing means to adapt and apply such technologies.

The above mentioned factors are the driving components for achieving sustainable development . and explain why IPCC , and in particular its WG II, are bounded to improve the quality of the assessment, providing the best possible estimates of "certainty" and "costing" and enabling the use of common decision making procedures, so to provide decision and policy makers with the best possible as well as comparable information.

The UNFCC is associated to this endeavor, particularly because it recognizes the precautionary principle and that of the common but differentiated responsibility. Even though, in the long term, developing countries would reach GHG emissions similar to those of developed countries, the very fact that the latter recognized their initial responsibility in creating the warming conditions on Earth, explain why Article 4, of the Convention and, in particular its 4.8 and 4.9 components, are oriented to activate funding, insurance and the transfer of technology to meet specific needs and concerns of developing countries from adverse effects of climate change and / or the impact of the implementation of response measures.

In this connection the SR of TAR, to which WG II, together with WG I and WG III, contribute through this assessment exercise, should be considered as the necessary and sufficient answer to the scientific relevant, no policy prescriptive, questions on which UNFCCC and its Subsidiary Bodies should guide its Parties to provide the assistance means foreseen in the Convention.

Finally, the interlinking between adaptation and mitigation will serve to bring the Global Environment Facility of the World Bank to fund not only GHG mitigation projects, but also monitoring and adaptation projects, which end results are concurrent with the objective of the Convention of preventing dangerous anthropogenic interference with the climate system.

Dr Osvaldo F.Canziani
Co-Chair Working Group II

Buenos Aires, June 16, 1999

Annex 1.

GLOBAL CLIMATE CHANGE ISSUE - IPCC ASSESSMENTS.

1.- Climate Change 1990
First Assessment Report of the Intergovernmental Panel on Climate Change

- The IPCC Scientific Assessment (Working Group I)
- The IPCC Impacts Assessment (Working Group II)
- The IPCC Response Strategies (Working Group III)

2.- Climate Change 1992

- The Supplementary Report of the IPCC Scientific Assessment (WG I)
- The Supplementary Report of the IPCC Impacts Assessment (WG II)

3.- Climate Change 1995
Second Assessment Report of the IPCC

- The Science of C limate (WG I)
- Impacts, Adaptations and Mitigation of Climate Change. Scientific-Technical Analyses (WG II)
- Economic and Social Dimensions of Climate Change (WG III)
- The IPCC Second Assessment Synthesis of Scientific-Technical Information Relevant to Interpreting Article 2 of the UNFCCC, 1995.

4.- Technical Papers and Reports

- Technologies, Policies and Measures for Mitigating Climate Change 1996 (WG II). Technical Paper I.
- An Introduction to Simple Climate Models used in the IPCC Second Assessment Report 1997 (WG I) Technical Paper II
- Stabilization of Atmospheric Greenhouse Gases. Physical, Biological and Socio-economic Implications, 1997 (WG I) Technical Paper III.
- Implications of Proposed CO_2 emission limitations, 1997 (WGI) Technical Paper IV
- The Regional Impacts of Climate Change : An Assessment of Vulnerability, 1998 WG II. Special Report.

* Aviation and the Global Atmosphere, 1998. (WG I and III) Special Report

Annex 2

Outline of the IPCC WG II Report for TAR

The IPCC WG II contribution to TAR will be devoted to :

Climate Change : Impacts, Adaptation and Vulnerability

The Report will have four Sections, as follows:

Section I.- Setting the Stage for Impact, Adaptation and Vulnerability Assessment.

This Part will explain the importance of the issue of climate change impacts ; explain the approaches available in the literature, including those resulting from the guidance papers on cross-cutting issues, and introduce the methods and tools that will be used in sectoral and regional analyses including projections of the key aspects of the environment, economy and society that are likely to influence the future vulnerability to climate variability and change, and describing existing and emerging scenarios to be considered by TAR ' s authors in preparing their assessments.

Section II.-. State of Knowledge.

Building on the conclusions of SAR and the pertinent IPCC Technical and Special Reports, developments in the state of knowledge of climate change and climate variability impacts will be assessed. Special attention is given to vulnerabilities ; natural variability ; baseline trends ; cross-sectoral issues ; non-linear interactions, and adpatation options. The developments in experimental work, observations/monitoring and modelling that contributed to advances in the state of knowledge will be assessed, including estimation of confidence in reported results.

Section III .- Regional Analyses : Impacts, Adaptation, and Vulnerability

Each chapter (corresponding to one of the eight defined Regions of the World), will focus on key findings of the Special Report on Regional Impacts of Aclimate Change and update regional baselines and trends (climate, socio-economic, and other environmental issues). Each chapter and sub-chapter will explore what has been learned regarding the context of change , sensitivity, adaptation, and vulnerability of the key sectors and on integrated cross-sectoral analysis. A common template for regional chapters has been designed, however, each region's template will be tailored as appropriate for each region, giving full consideration to social / equity issues relevant to the Region, sub-Region or sectors.

The eight regions defined for the purpose of TAR are :

Africa	Asia	Australasia	Europe
Latin America	North America	Polar Regions	Small Island States

Section IV .- Global Issues and Synthesis

This section focus on cross sectoral and cross regional analyses, building upon the preceding sections. Such comparison will allow relative scaling of vulnerability across sectors and regions with respect to ecosystems, including, hydrology and water resources, food and fiber, wildlife, regional and marine coastal systems, human settlements, financial services and human health.

The nineteen chapters of the WG II Report for TAR. Are the following:

Section 1 : Setting the Stage for Impact, Adaptation and Vulnerability Assessment

- Chapter 1 . Overview of Impact Issues.
- Chapter 2.- Methods and Tools
- Chapter 3.- The Development and Application of Scenarios in Climate Change Impact, Adaptation and Vulnerability Assessment.

Section II : State of Knowledge

- Chapter 4.- Hydrology and Water Resources
- Chapter 5.- Natural and Managed Ecosystems
- Chapter 6.- Coastal Zones and marine Ecosystems
- Chapter 7.- Energy, Industry and Human Settlements
- Chapter 8.- Financial Services
- Chapter 9.- Human Health

Section III : Regional Analyses: Impacts, Adaptation and Vulnerability

- Chapter 10.- Africa
- Chapter 11.- Asia
- Chapter 12.- Australasia
- Chapter 13.- Europe
- Chapter 14.- Latin America
- Chapter 15.- North America
- Chapter 16.- Polar Areas (Artic and Antarctic)
- Chapter 17.- Small Island States.

Section IV : Global Issues and Synthesis

- Chapter 18.- Adaptation to Climate Change in the Context of Sustainable Development and Equity
- Chapter 19.- Synthesis and Integration of Impacts, Adaptation and Vulnerability