REPORTING ON CLIMATE CHANGE

user manual for the guidelines on national communications from non-Annex I Parties


UNFCCC

Foreword

By the middle of November 2003, 106 Parties not included in Annex I to the Convention (non-Annex I Parties) had presented their initial national communications to the Conference of the Parties (COP), using guidelines adopted by the COP at its second session. Several Parties have also produced addenda documenting their efforts in climate change. Parties have thus actively undertaken the task of sharing information on their implementation efforts as well as on the constraints, problems and gaps they face in implementing the Convention. As a result, these national communications have become not only one of the central features of the Convention process and of the active involvement of these Parties therein, but also one of the most important tools for bringing climate change concerns to the attention of policy makers at the national level.

As we enter a phase of the Convention process in which the focus is increasingly on implementation, national communications are bound to become even more important. In this new phase, national communications will not only continue to be the main reporting instrument of the Convention but will also be an important strategic tool to help countries align their interests and priorities to the overall goals of the Convention. National communications will continue to be the principal instruments for highlighting and disseminating climate change concerns to a wider national audience. As such, they will continue to serve as an educational tool and an information resource to the COP and other international, multilateral and bilateral processes.

Non-Annex I Parties have gained much experience in their first round of national communications. Building on this, the COP, at its eighth session, adopted a set of new and improved guidelines to help them prepare their second and, where appropriate, first and third national communications. This user manual is an attempt to provide Parties with a practical tool as they embark on this new round of communications. Rather than being a guide on how to undertake the various tasks or activities required for the preparation of these important documents, the focus is on what information should be reported, with some suggestions on how this information can be obtained.

This user manual is designed for use by Parties and national experts responsible for the preparation of the various sections of national communications, and also by national climate change teams or committees that facilitate the coordination, organization and management of various tasks and activities. It might also be useful for multilateral and bilateral programmes that support the preparation of national communications from non-Annex I Parties.

I am sure that this manual will provide useful assistance for reporting, and I trust that it will in this way contribute to strengthening the global climate change process.

Joke Waller-Hunter
Executive Secretary, UNFCCC

Bonn, November 2003

Contents

Introduction

Article 4, paragraph 1, and Article 12, paragraph 1, of the United Nations Framework Convention on Climate Change (UNFCCC), provide for each Party to report to the Conference of the Parties (COP) information on its emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol (greenhouse gas inventories); national or, where appropriate, regional programmes containing measures to mitigate, and to facilitate adequate adaptation to climate change (general description of steps taken or envisaged by the Party to implement the Convention); and any other information that the Party considers relevant to the achievement of the objective of the Convention.

UNFCCC Guidelines for the Preparation of National Communications from non-Annex I Parties

The guidelines for the preparation of initial national communications were adopted by the COP at its second session, by decision 10/CP.2. These guidelines were used by 106 non-Annex I Parties to prepare their initial national communications. At its fifth session, the COP initiated a process to revise those guidelines. The UNFCCC guidelines, as adopted by the COP, at its eighth session, by decision 17/CP.8, is the outcome of that process.

Paragraph 1 of the UNFCCC guidelines for the preparation of national communications from non-Annex I Parties (decision 17/CP.8) has the following principal objectives: (i) to assist non-Annex I Parties in meeting their reporting requirements under the Convention; (ii) to encourage the presentation of information in a consistent, transparent, comparable and flexible manner, (iii) to facilitate the presentation of information on support required for the preparation of national communications, (iv) to serve as policy guidance to the operating entity of the financial mechanism of the Convention, for the timely provision of financial support needed by non-Annex I Parties in order to fulfill their reporting requirements, and, (v) to ensure that the COP has sufficient information to carry out its responsibility for assessing the implementation of the Convention by Parties.

Paragraph 2 provides the scope of the information to be included in the national communications by each non-Annex I Party. This information include: (a) national inventory of anthropogenic emissions by sources and removal by sinks of all greenhouse gases not controlled by the Montreal Protocol, to the extent its capacities permit, using comparable methodologies promoted and agreed upon by the COP; (b) a general description of steps taken or envisaged by the non-Annex I Party to implement the Convention; and (c) any other information that the non-Annex I Party considers relevant to the achievement of the objective of the Convention and suitable for inclusion in its communication, including, if feasible, materials relevant for calculations of global emission trends.

Purpose of the user manual

The purpose of this manual is to provide for an effective and efficient use of the UNFCCC guidelines as contained in the annex to decision 17/CP.8, in the preparation of national communication, based on the best information currently available in the country. This information should be consistent, transparent and comparable. The user manual provides a "paragraph-by-paragraph" description of the types/kinds of information that can be reported in the national communication.

The objectives of preparing the manual will have been achieved if non-Annex I Parties indicate that they have been assisted by this document to report their information in the national communication in a transparent, comparable and flexible manner.

National circumstances

Development priorities, objectives and circumstances

Paragraph 3: Non-Annex I Parties should provide a description of their national and regional development priorities, objectives and circumstances, on the basis of which they will address climate change and its adverse impacts. This description may include information on features of their geography, climate and economy which may affect their ability to deal with mitigating and adapting to climate change, as well as information regarding their specific needs and concerns arising from the adverse effects of climate change and/or the impact of the implementation of response measures, as contained in Article 4, paragraph 8 and, as appropriate, in Article 4, paragraphs, 9 and 10, of the Convention.

Introduction

Information on national circumstances provides the opportunity for detailing the national or, as relevant, regional development priorities, objectives and circumstances that serve as the basis for addressing issues relating to climate change. Information provided on national circumstances is critical for understanding a country's vulnerability, its capacity and its options for adapting to the adverse effects of climate change, as well as its options for addressing its GHG emissions within the broader context of sustainable development.

Information on national circumstances should be clearly linked to information provided in other chapters of the national communication. Consequently, all sections and subject areas should refer back to the national situation and development priorities. This could be of interest to other national stakeholders investigating the benefits of specific activities and policies. Parties could also include information on the linkages between the activities and policies relating to climate change and those of other Conventions, such as the Convention on Biological Diversity and the Convention on Combating Desertification.

This section could contain the following information:

- Geographical characteristics, including climate, forests, land use and other environmental characteristics
- Population: growth rates, distribution, density and other vital statistics
- Economy, including energy, transport, industry, mining, tourism, agriculture, fisheries, waste, health and services sector
- Education, including scientific and technical research institutions
- Any information considered relevant by the Party, e.g. information relating to Article 4.8, 4.9 and 4.10, of the Convention

This information could be provided under a section on programmes containing measures to facilitate adequate adaptation to climate change, and in the case of Article 4, paragraph 10, of the Convention, information could be provided either in a separate chapter or as a part of the national circumstances chapter.

Use of tables, charts and maps

Paragraph 4: Non-Annex I Parties are encouraged to provide a summary of relevant information regarding their national circumstances, as appropriate, in tabular form.

Relevant information on the socio-economic and environmental conditions of the country could be presented in summary tables, charts and maps. Their use may enhance the presentation of information.

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Institutional arrangements

Paragraph 5: Non-Annex I Parties may provide a description of existing institutional arrangements relevant to the preparation of their national communications on a continuous basis.

A description of institutional arrangements relevant to the preparation of the national communications on a continuous basis could include the following elements:

- Distribution of responsibilities within government departments, universities, research institutions, etc.
- National Climate Change Committees or other relevant coordinating bodies (establishment, funding, membership)
- Involvement and participation of other stakeholders
- Technical/expert groups or teams (inventory, vulnerability and adaptation assessment, mitigation etc.)

Reference material and web links:

1. United Nations Convention on Biological Diversity
   http://www.biodiv.org/
2. United Nations Convention on Combating Desertification
   http://www.unccd.int/main.php
3. HDI report
   http://www.undp.org/hdr2003/
4. HDI ranking
   http://www.undp.org/hdr2003/pdf/presskit/HDR03_PKE_HDI.pdf
5. UNCTAD list of LDCs
   http://www.undp.org/hdr2003/indicator/indic_4_3_1.html
6. UNCTAD Country classifications and groupings
   http://www.unctad.org/Templates/WebFlyer.asp?intItemID=2161&lang=1
7. UN cartographic section including more than 100 electronic maps
   http://www.unctad.org/Templates/Page.asp?intItemID=2187&lang=1

National GHG inventories

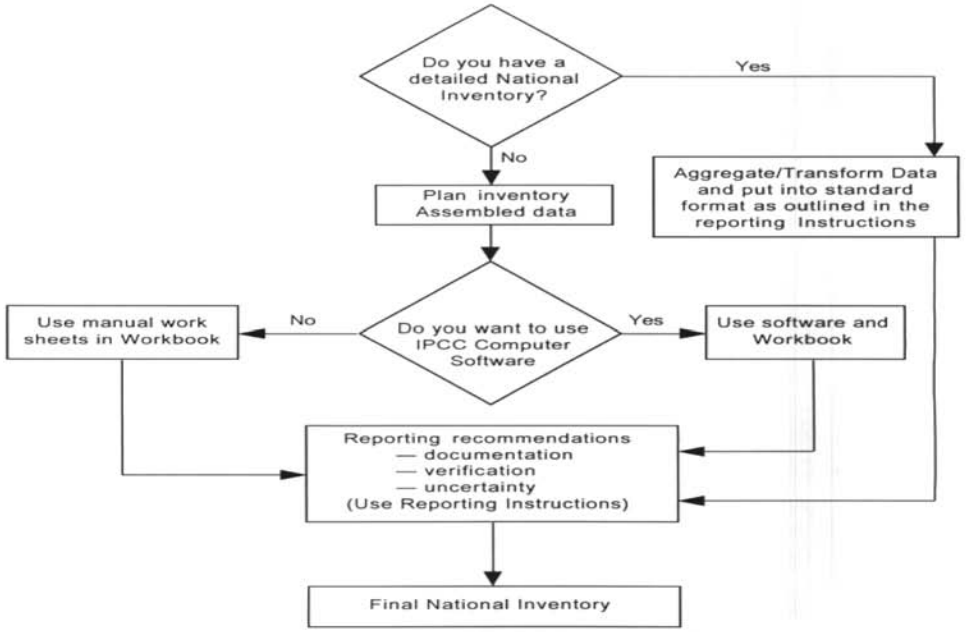
National inventory of greenhouse gases

Paragraph 6: Each non-Annex I Party shall, in accordance with Article 4, paragraph 1 (a), and Article 12, paragraph 1(a) of the Convention, communicate to the Conference of the Parties a national inventory of anthropogenic emissions by sources and removals by sinks of all greenhouse gases (GHGs) not controlled by the Montreal Protocol, to the extent its capacities permit, following the provisions in these guidelines.

Introduction

A national greenhouse gas inventory is a key element of the national communication. As an introduction, this section should include information on how inventory work is organized and carried out. The following diagram of various stages of inventory work may be useful. The stages of the inventory from which the work was started should be described.

FLOW DIAGRAM WITH THE STAGES NECESSARY TO PREPARE A NATIONAL GHG INVENTORY



Source: ***Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories (Vol. II).***

Inventory years

Paragraph 7: Non-Annex I Parties shall estimate national GHG inventories for the year 1994 for the initial national communication or alternatively may provide data for the year 1990. For the second national communication, non-Annex I Parties shall estimate national GHG inventories for the year 2000. The least developed country Parties could estimate their national GHG inventories for years at their discretion.

For the second national communication, the inventory year to be reported is 2000. However, Parties that are least developed countries (LDC) can choose any year at their discretion. In the past, LDC as well as other non-Annex I Parties reported mainly for 1994 or 1990 for their initial national communication. It would be preferable if Parties could report for any of the years from 1994, up to and including 2000, if data are available.

While conducting the second GHG inventory, it is advisable to revise the data provided for the first inventory. The revision may facilitate the understanding of possible changes to the first inventory. Parties wishing to report for years other than1990 or 1994 and 2000 are welcome to do so. This applies also to Parties that are preparing their first or third national communications.

A. Methodologies

Revised 1996 IPCC guidelines for national GHG inventories

Paragraph 8: Non-Annex I Parties should use the Revised 1996 Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories, hereinafter referred to as the IPCC Guidelines, for estimating and reporting their national GHG inventories.

In developing national GHG inventory, Parties should only use the latest version (i.e. Revised 1996) of the IPCC Guidelines for National Greenhouse Gas Inventories. These guidelines contain three volumes: volumes I and III of the methodology are only available in English, but volume II, which contains all the methodological tables and relevant explanations on how to calculate emissions, is also available in French, Russian and Spanish. These documents can be found at : http://www.ipcc-nggip.iges.or.jp/public/gl/invs1.htm

The use of the IPCC Guidelines is enhanced by the inventory software developed for use in calculating and estimating emissions (see Paragraph. 23 below). These Guidelines are complemented by the IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories (see Paragraph. 11). The Good Practice Guidance on Land Use, Land-Use Change and Forestry (GPG for LULUCF) was accepted by the IPCC in 2003 and will be used by Parties to prepare their inventories.

Tiers 1 and 2 or 3 methodologies

Paragraph 9: In accordance with the IPCC Guidelines, Parties may use different methods (tiers) included in the Guidelines, giving priority to those methods which are believed to produce the most accurate estimates, depending on national circumstances and the availability of data. As encouraged by the IPCC Guidelines, Parties can also use national methodologies where they consider these to be better able to reflect their national situation, provided that these methodologies are consistent, transparent and well documented.

The IPCC inventory methodology is divided into various levels or tiers. Generally, the higher the number designating the tier, the more detailed is the methodology and the more accurate are the emission estimates. Tier 1 represents the minimum, or default, methodology. If sufficient data are available, a Party can also try to apply a higher tier. Tiers 2 or 3 involve more elaborate methods which could be either source category-specific or technology-based. These methods require more detailed data and/or measurements for their application.

In the case where a national methodology exists, and is consistent with the IPCC Guidelines, it is highly advisable to use the national methodology. The national methodology used should be fully documented in order to allow the reader to understand why this particular method is better than the default one proposed by the IPCC.

Default emission factors and activity data

Paragraph 10: The IPCC Guidelines offer a default methodology which includes default emission factors and in some cases default activity data. As these default factors, data and assumptions may not always be appropriate for specific national circumstances, non-Annex I Parties are encouraged to use their country-specific and regional emission factors and activity data for key sources or, where these do not exist, to propose plans to develop them in a scientifically sound and consistent manner, provided that they are more accurate than the default data and documented transparently. Non-Annex I Parties are encouraged to formulate cost-effective national or regional programmes aiming at the development or improvement of country-specific or regional emissions factors and activity data.

The default IPCC methodology may not be appropriate for all countries. It is therefore important to use country-specific or regional emission factors and activity data, if available, in order to reduce the uncertainty when estimating the emissions and removals.

When or if country-specific or regional activity data and emission factors are not available, it might be useful to start thinking about the potentials for synergy among the countries of the region and elaborate plans to develop such information, bearing in mind the need to better reflect the national circumstances in terms of emissions and removals.

The formulation of cost-effective national or regional programmes aiming at the development or improvement of country-specific or regional emission factors and activity data can be a good way of dealing with the problem of the inappropriateness of emission factors and activity data.

It is also important to note that in the future some country-specific and regional emission factors may become available on the database on greenhouse gas emission factors, which is being developed by the IPCC. This database is available at: http://www.ipcc-nggip.iges.or.jp/EFDB/main.php

IPCC good practice guidance

Paragraph 11: Non-Annex I Parties are encouraged to apply the IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories (hereinafter referred to as the IPCC good practice guidance), taking into account the need to improve transparency, consistency, comparability, completeness and accuracy in inventories.

Countries can benefit from applying the good practice guidance as it provides useful guidance for selecting methods (tiered approaches), emission factors and activity data. It helps, inter alia, in selecting appropriate methods and emission factors, in quantifying and analysing uncertainty, in determining key source categories, in recalculating emissions data, and in setting up quality assurance and quality control plans.

The IPCC good practice guidance can be found at: http://www.ipcc-nggip.iges.or.jp/public/gp/gpgaum.htm

Key source analysis

Paragraph 12: Non-Annex I Parties are also encouraged, to the extent possible, to undertake any key source analysis as indicated in the IPCC good practice guidance to assist in developing inventories that better reflect their national circumstances.

A key source category is one that is prioritized within the national inventory system because its estimate has a major influence on a country's total inventory of direct greenhouse gases in terms of absolute level of emissions, or trends in emissions, or both.

By identifying these key source categories in the national inventory, countries can prioritize their efforts to improve their overall estimates. Such a process will lead to improved quality, as well as greater confidence in the emissions estimates that are developed. It is good practice for each country to identify its national key source categories in a systematic and objective manner. The IPCC good practice guidance explains how key sources are determined.

B. Reporting

Institutional arrangements

Paragraph 13: Non-Annex I Parties are encouraged to describe procedures and arrangements undertaken to collect and archive data for the preparation of national GHG inventories, as well as efforts to make this a continuous process, including information on the role of the institutions involved.

Parties are welcome to provide information about the procedures and arrangements (e.g. institutional) established in order to sustain the process of data collection and archiving. This is intended to help make inventory preparation a continuous process.

Greenhouse gases

Paragraph 14: Each non-Annex I Party shall, as appropriate and to the extent possible, provide in its national inventory, on a gas-by-gas basis and in units of mass, estimates of anthropogenic emissions of carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O) by sources and removals by sinks.

It is important that Parties make every effort to report on these three direct greenhouse gases, and that this information be provided on a gas-by-gas basis (i.e. no single aggregate figure) in units of mass (the IPCC generally uses gigagramme, i.e. 1,000 tonnes). This information will be used in table 1 (see Paragraph 22) and is greatly facilitated by the use of the IPCC inventory software which automatically summarizes this information.

Information on HFCs, PFCs and SF_6

Paragraph 15: Non-Annex I Parties are encouraged, as appropriate, to provide information on anthropogenic emissions by sources of hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6).

In their initial national communication, some Parties have already reported on emissions of HFCs, PFCs or SF_6. Table 2, contained in the annex to the UNFCCC guidelines (see para. 22), provides a framework for reporting such emissions.

Information on CO, NO_X and NMVOCs

Paragraph 16: Non-Annex I Parties are encouraged, as appropriate, to report on anthropogenic emission by sources of other greenhouse gases such as carbon monoxide (CO), nitrogen oxides (NO_x) and non-methane volatile organic compounds (NMVOCs).

The reporting of CO, NO_X and NMVOCs (see table 1) is greatly facilitated by the use of the IPCC inventory software which automatically summarizes this information.

Information on SO_x

Paragraph 17: Other gases not controlled by the Montreal Protocol, such as sulphur oxides (SO_x), included in the IPCC Guidelines, may be included at the discretion of the Parties.

The reporting of SO_x (see table 1) is greatly facilitated by the use of the IPCC inventory software which automatically summarizes this information.

Use of reference and sectoral approaches

Paragraph 18: Non-Annex I Parties are encouraged, to the extent possible, and if disaggregated data are available, to estimate and report CO_2 fuel combustion emissions using both the sectoral and the reference approaches, and to explain any large differences between the two approaches.

Parties can use both approaches (reference and sectoral) to estimate emissions. If there is a difference in the results obtained between the two approaches it would be useful for Parties to explain/discuss this difference. This can help countries to further improve future GHG inventories by progressively reducing this level of uncertainty. It has to be noted that the reporting of both approaches is greatly facilitated by the use of the IPCC inventory software which automatically summarizes this information.

Bunker fuels

Paragraph 19: Non-Annex I Parties should, to the extent possible, and if disaggregated data are available, to report emissions from international aviation and marine bunker fuels separately in their inventories. Emission estimates from these sources should not be included in the national totals.

When data on international bunker fuels are available, Parties should strive to report it, providing any breakdown of this information, as a memo item (these emissions are not included in the national total). The use of the IPCC inventory software greatly facilitates this reporting as it automatically summarizes this information.

Global warming potentials (GWP)

Paragraph 20: Non-Annex I Parties wishing to report on aggregated GHG emissions and removals expressed in CO2 equivalents should use the global warming potentials (GWP) provided by the IPCC in its Second Assessment Report ("1995 IPCC GWP Values") based on the effects of GHGs over a 100-year time horizon.

The reporting in terms of aggregate emissions (i.e. applying the GWPs in order to convert the emissions into CO_2 equivalent) facilitates comparison between sectors or comparing the relative importance of each direct GHG. If a Party chooses to use GWPs, it should use those provided by the IPCC in its Second Assessment Report, published in 1995 (i.e. 1 for CO_2, 21 for CH_4 and 310 for N_2O).

Sources of information

Paragraph 21: Non-Annex I Parties are encouraged to provide information on methodologies used in the estimation of anthropogenic emissions by sources and removals by sinks of greenhouse gases not controlled by the Montreal Protocol, including a brief explanation of the sources of emission factors and activity data. If non-Annex I Parties estimate anthropogenic emissions and removals from country-specific sources and/or sinks which are not part of the IPCC Guidelines, they should explicitly describe the source and/or sink categories, methodologies, emission factors and activity data used in their estimation of emissions, as appropriate. Parties are encouraged to identify areas where data may be further improved in future communications through capacity-building.

It is advisable that Parties describe as precisely as possible the sources of information (activity data and emission factors) and methodologies used, especially for country-specific sources and/or sinks which are not part of the IPCC Guidelines. This contributes to the clarity of the information and helps the reader to understand what was done and how it was done. It is important for Parties to identify the data gaps and to make the link with further improvement to be achieved through capacity-building in order to facilitate further requests for financial and technical assistance.

Use of table 1 and table 2

Paragraph 22: Each non-Annex I Party is encouraged to use tables 1 and 2 of these guidelines in reporting its national GHG inventory, taking into account the provisions established in paragraphs 14 to 17 above. In preparing those tables, Parties should strive to present information which is as complete as possible. Where numerical data are not provided, Parties should use the notation keys as indicated.

It is important that Parties use table 1 and table 2 (see at the end of this manual) contained in the annex to decision 17/CP.8. These two tables will be automatically generated by the IPCC inventory software which will be modified by the UNFCCC secretariat. This modified version of the inventory software can be obtained from the UNFCCC secretariat web site (see paragraph 23) or provided upon request when the modification is completed (modified software will be available on a CD-ROM).

It is also advisable to read carefully the footnotes in table 1 and table 2. The notation keys to be used by Parties are the ones agreed to by the IPCC and are listed in the footnote to table 1. Use of notation keys other than those provided in the footnote might lead to an erroneous interpretation of the information presented within the table. Particular attention should be paid as to how table 2 should be presented in order to suit the data available.

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Sectoral tables and worksheets

Paragraph 23: Non-Annex I Parties are encouraged to include in their national communications the inventory sectoral tables and worksheets[1] of the IPCC, in both electronic and hard copy format.

The sectoral tables, which summarize the emissions by sectors, are automatically generated by the IPCC inventory software. The provision of the electronic copy of the worksheets and sectoral tables of the GHG inventory is intended to facilitate the compilation of data for the preparation of compilation and synthesis reports and other documents produced by the UNFCCC secretariat. This task can easily be achieved by providing the electronic files generated by the IPCC GHG inventory software in MS Excel format.

This software is available at:
http://www.ipcc-nggip.iges.or.jp/public/gl/software.htm
A new version of the IPCC software that includes Table 1 and Table 2 of the UNFCCC guidelines, will be available at:
http://www.unfccc.int/program/mis/ghg/index.html

Level of uncertainty

Paragraph 24: Non-Annex I Parties are encouraged to provide information on the level of uncertainty associated with inventory data and their underlying assumptions, and to describe the methodologies used, if any, for estimating these uncertainties.

The IPCC good practice guidance has substantially improved the methodology for calculating and managing uncertainties (see chapter 7 of the good practice guidance). A major objective of the IPCC methodology is to help national experts reduce uncertainty in their GHG inventories to the minimum level possible. However, the approach also recognizes that uncertainties will remain despite these efforts, and that these uncertainties will vary widely. The provision of such information is intended to give the reader a better understanding of the information contained in the national GHG inventory.

Reference material and web links:

Technical Support Unit (TSU) for IPCC National Greenhouse Gas Inventories Programme (NGGIP)
http://www.ipcc-nggip.iges.or.jp/tsu/tsustaff.htm

http://www.ipcc.ch

[1] The IPCC software (see http://www.ipcc-nggip.iges.or.jp/public/gl/software.htm) provides for automated reporting in the worksheets and tables.

General description of steps taken or envisaged to implement the Convention

Paragraph 25: Each non-Annex I Party shall, in accordance with Article 12, paragraph 1 (b), communicate to the Conference of the Parties a general description of steps taken or envisaged by the Party to implement the Convention, taking into account its common but differentiated responsibilities and specific national and regional development priorities, objectives and circumstances.

Paragraph 26: Non-Annex I Parties may provide information on programmes containing measures to mitigate climate change by addressing anthropogenic emission by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol, and measures to facilitate adequate adaptation to climate change, following the provisions in these guidelines.

Paragraph 27: Taking into account Article 4, paragraph 7, and as appropriate, Article 4, paragraphs 3 and 5, of the Convention, the extent to which developing country Parties will effectively implement their commitment to communicate this information will depend on the effective implementation by developed country Parties of their commitments under the Convention relating to financial resources and transfer of technology.

Measures to facilitate adequate adaptation to climate change

Steps taken or envisaged to adapt to climate change

Paragraph 28: Each Party shall, in accordance with Article 12, paragraph 1 (b) and (c), of the Convention, provide to the COP information on the general descriptions of steps taken or envisaged towards formulating, implementing, publishing and regularly updating national and, where appropriate, regional programmes containing measures to facilitate adequate adaptation to climate change, and any other information they consider to be relevant to the achievement of the objective of the Convention and suitable for inclusion in their communications.

Introduction

The information in this section should include a description of activities, measures and programmes that are being undertaken or planned in the country to adapt to climate change. These activities, measures and programmes should be regularly updated as financial, technical and data resources become available. Some of the activities, measures and programmes could be undertaken on a regional basis. Information could include national and regional programmes, activities and measures that facilitate adequate adaptation to climate change.

The possible content of this section could include:

- Requirements of the UNFCCC and national communications
- Importance of understanding/assessing vulnerability and impacts of, and adaptations to, climate change
- Information on how Article 4.8 and 4.9, as appropriate, is being implemented in the country. It may be necessary to mention the links between the information provided in the section on national circumstances and in this section
- The basis for the provision of information, example, use of the IPCC Technical Guidelines for Assessing Climate Change Impacts and Adaptations and other approaches, such as the guidelines for national adaptation programmes of action or adaptation policy framework, other case studies, use of expert judgement, and use of international literature (i.e., lessons learned from elsewhere)
- Brief information on human systems/sectors/areas that are vulnerable
- Main limitations of the vulnerability and adaptation assessment, example, methodological, technical, institutional and financial

Information on some of the key sets of baseline conditions and their linkages might include:

- Climate-related disaster effects and response capabilities
- Population, food security, and agriculture,
- Urbanisation, housing, and water resources
- Climate and health
- Environmental problems (e.g. coastal erosion, reef exploitation (and conservation), deforestation, waste management, etc.) and their link to climate and socio-economic conditions
- Financial services, insurance and associated economic services (financial products) available for the management of climate risks (this has links to the baseline conditions)

It may be useful to use boxes, arrows and/or diagrams to show the key conditions and their links to climate change.

Vulnerability of, and adaptation to, climate change

Paragraph 29: In doing so, non-Annex I Parties should provide information on their vulnerability to the adverse effects of climate change, and on adaptation measures being taken to meet their specific needs and concerns arising from these adverse effects.

The main aim in this section is to outline conditions (climatic, environmental and socio-economic) as they exist in the country. The focus could be only on those issues that are relevant to an improved understanding of climate change effects, vulnerability and adaptation. Information may include the strengths (resilience) and weaknesses (vulnerability) of the baseline (current) conditions in the country, and the links between climate, environment and socio-economic baseline conditions of the country.

Specific needs and concerns

Information on the specific needs and concerns should provide an indication of why assessment of vulnerability and adaptation is an essential part of a national climate change response strategy and outline the reasoning, the approach and the methods used in the study. It is important to state that this report is a synthesis of the current state of knowledge, and to stress that vulnerability and adaptation assessment is an ongoing process.

The information provided should be relevant to the country's needs and priorities with respect to adapting to current climate variability and future climate change. The content of this section could focus on:

- Vulnerabilities to current climate variability and future climate change
- Specific human systems (livelihood), areas or sectors that are most critical
- Difficulties or barriers to adaptation in critical areas or sectors
- Opportunities and priorities for adaptation

A matrix could be used here to help summarize the above vulnerabilities, potential impacts and adaptation options (see annex)

A. Methodological approaches

Methodologies and guidelines

Paragraph 30: Non-Annex I Parties may use appropriate methodologies and guidelines[2] they consider better able to reflect their national situation for assessing their vulnerability and adaptation to climate change, provided that these methodologies and guidelines are consistent, transparent and well documented.

It is important to note that the methodologies, approaches and/or guidelines to be used in the vulnerability and adaptation assessment will depend on the national circumstances of the Party, with respect to the availability of data, and technical, financial and human resources.

If methodologies and guidelines other than those referred to in Paragraph 30 (e.g. national and/or regional methodologies and guidelines) were used, it is important to make available the documentation on those methodologies and guidelines as an annex to the information provided here. This will help improve the consistency and transparency of information on vulnerability and adaptation.

Evaluation of adaptation strategies and measures

Paragraph 31: Non-Annex I Parties are encouraged to use, for the evaluation of adaptation strategies and measures,[3] appropriate methodologies they consider better able to reflect their national situation, provided that these methodologies are consistent, transparent and well documented.

There are a number of broad approaches or methodologies that prescribe the entire process of assessing impacts, vulnerability and adaptation. One is presented in the IPCC technical guidelines. Other approaches for vulnerability and adaptation assessment are being developed and tested in different countries.[4] Each approach includes a set of methods and tools which could be used at various stages of the vulnerability and adaptation assessment. These methods and tools include qualitative and predictive models, empirical studies, expert judgement, decision support tools, etc. However, the choice of these methods will depend on the focus and scope of the assessment.

Evaluation and prioritization of adaptation strategies and measures are important, subject to their social, economic and political feasibility and/or cultural acceptance. This information could be presented in a table, with some summary text. Information on the methodologies used to evaluate adaptation strategies and measures should be made available.

B. Reporting

Scope of vulnerability and adaptation assessment

Paragraph 32: Non-Annex I Parties are encouraged to provide information on the scope of their vulnerability and adaptation assessment, including identification of vulnerable areas that are most critical.

Information on the scope of the assessment provides the main characteristics of the study and describes the way in which critical vulnerable areas/sectors (exposure units) are identified. Information in this section could include a description of:

- Purpose and objectives of the assessment
- Organization of the assessment work
- Participation of stakeholders
- Sectors/areas identified and studied
- Methods or approaches used
- Spatial/geographical boundaries and time horizons
- Description of exposure units and sectors studied (the vulnerable sectors or areas could include any number of the following: agriculture, health, water resources, coastal resources, terrestrial and marine ecosystems, human settlements, infrastructure, industry, energy, etc. depending on the national circumstances and on their significance for the livelihood of the population and the economy)
- Possible follow-up of the assessment

[2] Such as the IPCC Technical Guidelines for Assessing Climate Change Impacts and Adaptations (Carter, T.R., M.L. Parry, H. Harasawa, S. Nishioka, 1994), the UNEP Handbook on Methods for Climate Change Impact Assessment and Adaptation Strategies (Feenstra, J.F., I. Burton, J.B. Smith, R.S.J. Tol, 1998), and the International Handbook on Vulnerability and Adaptation Assessments (Benioff, R., S. Guill, J. Lee, 1996).

[3] Such as those contained in the Compendium of Decision Tools to Evaluate Strategies for Adaptation to Climate Change which is available from the UNFCCC web site, www.unfccc.int/issues/meth_tools.html

[4] Such as the adaptation policy framework, assessment of impacts of and adaptation to climate change, NAPAs, etc. A description of these approaches can be found in the Resource Book/Compendium on Methodologies to Assess Impacts, Vulnerability and Evaluate Strategies for Adaptation to Climate Change, which will be available from the UNFCCC web site: unfccc.int

Description of approaches, methods and tools

Paragraph 33: Non-Annex I Parties are encouraged to include a description of approaches, methodologies and tools used, including scenarios for the assessment of impacts of, and vulnerability and adaptation to, climate change, as well as any uncertainties inherent in these methodologies.

In this section a description of approaches, methods and tools used in the assessment work may be provided. Some of the existing methodologies and guidelines have been provided in paragraphs 30 and 31 of the UNFCCC reporting guidelines and presented in the corresponding sections of the manual.

It is important to know what general approach and what specific methodologies have been used for the analysis and why. It may therefore be useful to provide a short description of a general approach/framework/methodology for vulnerability and adaptation assessment. Examples may include the IPCC technical guidelines, the UNDP adaptation policy framework, the NAPA guidelines, national approaches, etc.

It might also be useful to make mention, if appropriate, of the regional climate models and integrated models used, such as MAGICC-SCENGEN and PRECIS. Information on other methods used to downscale the global circulation models could also be provided.

It is important to realize that scenarios should be used as a basis for asking **What if?** questions about the effects of climate change. The uncertainties and other limitations should be stressed.

Environmental and socio-economic scenarios

Information on the environmental and socio-economic scenarios should also be provided, emphasizing the fact that climate is not the only thing that is changing. The non-climatic scenarios should be relevant to, and build on, the key baseline conditions identified earlier. Additionally, the time horizon for the non-climatic scenarios should be linked to that of the climatic scenarios. The uncertainties should be stressed with all of these scenarios.

Environmental and socio-economic scenario information could include the following:

- Population size and density and associated variables such as water demand, food requirements, housing demand, etc.
- Percentage of land under forest cover and arable land
- Growing dependence on food imports
- Urban growth, increasing housing density and associated water and health problems
- Increased tourist developments on the coast
- Continued trends towards commercial agriculture and decline of traditional crops
- Growing dependence on external markets

If the approaches, methods and tools used are already described in the literature, it may not be necessary to provide detailed description of them.

Key findings and integrating effects

Paragraph 34: Non-Annex I Parties are encouraged to provide information on their vulnerability to the impacts of, and their adaptation to, climate change in key vulnerable areas. Information should include key findings, and direct and indirect effects arising from climate change, allowing for an integrated analysis of the country's vulnerability to climate change.

The purpose of this section is to describe, and where possible quantify, the effects of climate change and adaptation in key vulnerable sectors/areas. Depending on the purpose, scope and methods used in the assessment, the key findings might include the effects of climate variability and change, vulnerabilities of and adaptations in key sectors/areas, and the information on existing coping strategies and possible future adaptation options. Where possible, the indirect and combined effects of climate change and socio-economic changes, as well as integrated effects, should be included. This section could provide information on the interaction of effects between vulnerable sectors/areas as a means for considering the broad implications for the country as a whole. Such information on integration of effects may include:

- Highlighting the most important sectoral linkages and associated effects, based on current understanding (Parties might wish to use boxes, arrows and diagrams for this purpose);
- Emphasizing the need to achieve a better understanding of indirect and cumulative effects.

Parties may also qualify the effects of climate change on the key vulnerable sectors/areas by the possible effects of non-climatic changes (e.g. socio-economic and environment). The information could include the likely future conditions of the vulnerable sectors/areas taking into account the environmental and socio-economic scenarios.

Adaptation strategies and measures

Paragraph 35: Non-Annex I Parties are encouraged to provide information on and, to the extent possible, an evaluation of, strategies and measures for adapting to climate change, in key areas, including those which are of the highest priority.

This section may include information on the broad possibilities for responding to the effects, and their interactions, that have been identified. It may also be useful to include information on activities that are already ongoing; strengthening these could be seen as no-regrets options. Adaptations are not only the responses to specific effects (e.g. sea walls) but may also include general policies and development priorities, such as population planning, economic development planning, land-use change, etc.

The contents could include the following:

- Specific adaptations to effects identified in the study
- Evaluating/prioritizing these in terms of costs, practicability, environmental and cultural appropriateness
- General policies that have implications for adaptation
- Associated capacity-building and institutional strengthening needs
- Public awareness, education and information provision needs

Frameworks for adaptation

Paragraph 36: Where relevant, Parties may report on the use of policy frameworks, such as national adaptation programmes,[5] plans and policies for developing and implementing adaptation strategies and measures.

Existing frameworks such as the adaptation policy framework or NAPAs can assist in the identification of potential adaptation options, strategies and measures. They may also help provide information to national processes for adaptation, such as designing the adaptation strategies or specific adaptation projects, and mainstreaming adaptation into sustainable development programmes. Information may include:

- Priority adaptation needs and concerns, including those considered to be most urgent
- Barriers to adaptation, including legal arrangements, institutional management, financial and technological aspects
- Opportunities for adaptation, including policies and plans

Information in this section could also include specific gaps and limitations in areas such as:

- Socio-economic and environmental baseline data
- Climate and sea-level change scenarios;
- Understanding of the direct and indirect effects of climate and sea-level change and their interactions
- Appropriate adaptive options
- Capacity-building needs

Reference material and web links:

Methods and tools for vulnerability and adaptation assessments

1. The UNEP Handbook on Methods for Climate Change Impact Assessment and Adaptation Strategies (Feenstra, J.F., I. Burton, J.B. Smith, R.S.J. Tol, 1998) http://130.37.129.100/IVM/research/climatechange/Handbook.htm
2. Vulnerability and Adaptation Assessments: An International Handbook on (Benioff, R., S. Guill, J. Lee, 1996) http://www.neutrino.co.jp/abi_enst/0-7923-4140-6.PDF
3. An Adaptation Policy Framework: Capacity Building for Stage II Adaptation (UNDP-GEF, 2000) http://www.undp.org/cc/apf.htm
4. Methodologies and Tools to Evaluate Strategies for Adaptation to Climate Change (UNFCCC, 2000) http://unfccc.int/program/mis/meth/compendium.pdf
5. PRECIS http://www.metoffice.com/research/hadleycentre/models/PRECIS.html
6. Toolkit for Vulnerability and Adaptation Assessment (T. Downing) http://www.aiaccproject.org/resources/ele_lib_docs/Toolkit_VAA.pdf
7. Integrated modelling system for climate change impact and adaptation assessment (IGCI) http://www.waikato.ac.nz/igci/modelling/modelling1.html
8. http://www.unisdr.org/
9. Guidelines for the preparation of national adaptation programmes of action http://unfccc.int/text/program/sd/ldc/documents/13a04p7.pdf
10. Annotated guidelines for the preparation of national adaptation programmes of action http://unfccc.int/text/program/sd/ldc/documents/annguide.pdf

Baseline climatologies and climate change scenarios

1. High-resolution Climate Grids Prepared by the Climatic Research Unit and the Tyndall Centre for Climate Change Research, University of East Anglia http://www.cru.uea.ac.uk/cru/data/hrg.htm
2. Baseline Climate Datasets and Outputs of General Circulation Models (GCMs) Provided by the IPCC Data Distribution Centre http://ipcc-ddc.cru.uea.ac.uk
3. Guidelines on the Use of Scenario Data for Climate Impact and Adaptation Assessment (Carter, T.R., Parry, M. L., Harasawa, H., Nishioka, S. 1999) http://www.aiaccproject.org/resources/ele_lib_docs/TGCIAguidance_99.pdf
4. MAGICC/SCENGEN http://www.cgd.ucar.edu/cas/ACACIA/publications/magicc.html
5. MAGICC/SCENGEN Workbook (M. Hulme et al., 2000) http://www.aiaccproject.org/resources/ele_lib_docs/magicc_scengen_workbook.pdf
6. Statistical DownScaling Model (SDSM): A Decision Support Tool for Assessing Regional Climate Change Impacts (R. Wilby et al., 2001) http://www.aiaccproject.org/resources/ele_lib_docs/SDSM_manual.pdf

Socio-economic Scenarios

1. Guidance Materials on Spatially Distributed Socio-economic Projections of Population and GDP per Unit Area (S. Gaffin, G. Yerman., A. Mellinger. CIESIN, 2002) http://www.aiaccproject.org/resources/ele_lib_docs/GM_Gridded.pdf

[5] For example, national adaptation programmes of action (NAPAs) for least developed countries.

Annex

An example of a matrix for reporting on impacts, vulnerabilities and adaptation options

Critical Vulnerable Sector/system	Impacts	Adaptation Options I	Adaptation Options II	Adaptation Options III	Adaptation Options IV	Adaptation Options V	Difficulties/ barriers to adaptation
Water resources	1. Changes in water availability 2. Changes in water quality 3. Changes in the frequency and intensity of floods and droughts	Improvement of water use efficiency	Seasonal forecasting	Enhancement of treatment works	Improvement of flood warning and dissemination of information	Catchment management to reduce pollution and/or runoff	Lack of financial resources; inadequacy of technical capacity
Agriculture	1. Changes in the length of growing season 2. Changes in crop productivity 3. Changes in livestock productivity	Selection of plants and livestock	Multiple cropping system and agroforestry	Enhancement of the role of community participation and public policy	Improvement of irrigation systems	Development of heat and drought tolerant crop and livestock species	…
Coastal zone	1. Coastal flooding 2. Coastal erosion 3. Salt water intrusion 4. Retreat of shoreline	Identification of setback areas and no-build zones	Managed realignment of coastal structures/activities	Building of seawalls, beach nourishment	Introduction of new building design and salt tolerant crops	Relocation of population and economic activities	…
Human health	1. Thermal stress 2. Increase in the incidence of infectious diseases	Early warning systems	Promotion of health education	Promotion of personal hygiene behavior	Improvement of house/building design	Sustainable disease surveillance, prevention and control programs	…
Ecosystems	1. Loss of habitats for species; 2. Shift in the structure of biological communities; 3. Changes in the number and distribution of species; …	Establishment of national and regional management institutions	Expansion of aquaculture as a way of meeting increasing demand for seafoods of an increasing population	Support for innovative research and integrated management of ecosystems	Development of database on the results of integrated ecological monitoring to identify anthropogenic changes, and predict productivity	Organization of marine/terrestrial biosphere reserves and protected areas	…

Measures to mitigate climate change

Measures to mitigate climate change

Paragraph 37: Each Party shall, in accordance with Article 12, paragraphs 1 (b) and (c), of the Convention, provide to the COP information on the general descriptions of steps taken or envisaged for formulating, implementing, publishing and regularly updating national and, where appropriate, regional programmes containing measures to mitigate climate change by addressing anthropogenic emissions by sources and removals by sinks of all GHGs not controlled by the Montreal Protocol, and any other information they consider to be relevant to the achievement of the objective of the Convention and suitable for inclusion in their communications.

Introduction

Articles 4.1 and 12.1, of the Convention commits Parties to develop national and, where appropriate, regional programmes and measures that will result in the mitigation of human-induced climate change. Such measures may either reduce the increase in greenhouse emissions (abatement) or increase terrestrial storage of carbon (sequestration).

Although developing countries are not required to take on emission reduction commitments, undertaking climate change mitigation and assessment could provide ancillary benefits for sustainable development, such as particulate pollution reduction, increase in technological efficiency and effectiveness, improvements in the security and availability of power supply, reduction in road congestion when a shift from private to public transport takes place, and increase in employment resulting from mitigation projects.

Undertaking mitigation evaluation analysis could also facilitate the implementation of mitigation projects, strengthening of institutional and human capacity-building and the prioritization and evaluation of social, economic and environmental programmes.

1. Methodological approaches

Mitigation assessment

Paragraph 38: Based on national circumstances, non-Annex I Parties are encouraged to use whatever methods are available and appropriate in order to formulate and prioritize programmes containing measures to mitigate climate change; this should be done within the framework of sustainable development objectives, which should include social, economic and environmental factors.

Mitigation assessment should entail the generation of information on the national or regional analysis of the potential costs and impacts of the various technologies and practices to mitigate climate change. This information should be relevant for sustainable development and useful for policy makers, and should also help formulate and prioritize mitigation programmes. It may be useful to describe how and by whom the mitigation assessment has been undertaken.

There are several methods and models that may be used in mitigation assessment, ranging from a broad description of main development trends and statistics to formalized modelling at sector and macro-economic levels. Many of these methods and models are provided in a number of technical resources, as described under paragraph 39.

Because mitigation assessment may include a detailed evaluation of specific programmes and policies, the steps taken should be well elaborated and should include the description of:

- The social and economic development framework for climate change mitigation
- The main national economic and social development trends including expected GHG emissions in energy, industrial processes, agriculture, land-use change and forestry and waste management.

Technical resources for mitigation assessment/evaluation

Paragraph 39: In their assessment of these programmes on various sectors of the economy, non-Annex I Parties may use the appropriate technical resources.[6]

In order to improve the understanding of the potential for mitigation effort in the country, it is important to describe the technical resources used in the mitigation assessment by explaining:

- What it is/what they are
- How and in what sectors of the economy does/do it/they apply
- Data and/or information gaps
- Limitations of the technical resources

Information could include:

- Description of approaches used to conduct mitigation analysis, e.g. top-down or bottom-up
- Description of a variety of tools/models and methods used to assess the mitigation. Examples of the models that could be used include:

Bottom–up models

- STAIR (Services, Transport, Agriculture, Industry and Residential energy model) : flexible model for long-term mitigation scenarios
- GACMO: Spreadsheet module for project-based mitigation analysis;
- COPATH (Carbon Pasture Agriculture Total Harvesting): spreadsheet model for the estimation of carbon flows associated with forest use
- LEAP: (Long-range Energy Alternatives Planning system) end-use accounting modelling system for energy
- ETO (Energy Technology Optimization): compares energy supply sources to identify the lowest cost option
- EM (Environmental Manual for power development): tool for the inclusion of environmental and cost data into decision- making for energy projects, especially in developing countries

Top–down models

- MARKAL-MACRO (market allocation macro-economic model): an energy-economy-environment optimization model (combined bottom-up and top-down)
- ENPEP (Energy and Power Evaluation Program); integrated approach for modelling energy system (partial bottom-up characteristics)

Information could include the use and the limitations of tools/models and methods.

Baseline and mitigation scenarios and projections

Most approaches to mitigation analysis emphasize the importance of assumptions and scenario definition. In particular, the definition of the baseline scenario is of crucial importance for the results of the mitigation costing calculation.

[6] Such as Technologies, Policies and Measures for Mitigating Climate Change (IPCC Technical Paper I); Greenhouse Gas Mitigation Assessment: A Guidebook by the U.S. Country Studies Program; Climate Change 2001: Mitigation (Contribution of Working Group III to the Third Assessment Report of the IPCC)

Information provided could include the impacts of implementing mitigation strategies/options identified in relation to "baseline" or "business as-usual" baseline projections in which there are no policies in place designed to reduce GHG emissions, and the assessment of the options for allocating additional resources to mitigation policies compared to non-policy case.

Information should also be provided on the mitigation scenario(s) projection(s) used to reflect a future with climate change mitigation as a primary focus. This section could include the following information:

- Identification of mitigation options relating to the most important future sources and sinks sectors
- Screening of mitigation options
- Assessment of reduction potential and cost of mitigation
- Integration of GHG reductions and costs across measures and sectors, through the construction of GHG mitigation marginal cost curves.

If a macroeconomic assessment was undertaken, information should be included on the:

- Qualitative description of main macroeconomic impacts of national climate change mitigation strategies
- Assessment of key macroeconomic parameters.

Barriers to and opportunities for mitigation

Mitigation assessment should include information on the barriers and opportunities for implementation. It might be useful to state/identify main implementation requirements including:

- Financial support
- Assessment of technology options for the different mitigation options in various sectors
- Institutional capacity-building to sustain mitigation work
- Regulation policies
- Further improvements of the national decision framework

2. Reporting

Programmes and measures implemented or planned

Paragraph 40: Based on national circumstances, non-Annex I Parties are encouraged to provide, to the extent their capacities allow, information on programmes and measures implemented or planned[7] which contribute to mitigating climate change by addressing anthropogenic emissions by sources and removals by sinks of all GHGs not controlled by the Montreal Protocol, including, as appropriate, relevant information by key sectors on methodologies, scenarios, results, measures and institutional arrangements.

In reporting on programmes and measures, it would be useful to concentrate on sector-specific measures, which could facilitate mitigation of climate change.

[7] Such as measures being considered by the government for future implementation.

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Information on programmes and measures could be included in projects aimed at reducing GHG emissions and enhancing the removals by sinks. This information could be provided either within the national communication or as a separate document.

The information on the projects should include:

- An elaboration of the costs of implementation
- A description of the mitigation potential
- A description of the project concepts which should include environmental and social benefits
- A description of the constraints to implementation

Information on any mitigation projects that are being implemented or proposed could include information on funding resources provided by multilateral and bilateral programmes.

Reference material and web links:

1. "Technologies, Policies and Measures for Mitigating Climate Change". IPCC Technical Paper I, 1996 (http://www.ipcc.ch/pub/techrep.htm)
2. Atténuation des changements climatiques. Contribution du Groupe de Travail III au troisième rapport d'évaluation du Groupe Intergouvernmental d'experts sur l'Evolution du Climat (http://www.grida.no/climate/ipcc_tar/wg3/index.htm)
3. UNEP Collaborating Centre on Energy and Environment (UCCEE) (http://www.uccee.org)
4. "Methodological Guidelines, Main Reports: Economics of Greenhouse Gas Limitations", UNEP-Risø, 1999. (http://uneprisoe.org/EconomicsGHG/MethGuidelines.pdf)
5. Summary Guidelines, Main Reports: Economics of Greenhouse Gas Limitations, UNEP-Risø, 1999. (http://uneprisoe.org/EconomicsGHG/SummGuidelines.pdf)
6. Long-range Energy Alternatives Planning system (LEAP) (http://forums.seib.org/leap/)
7. Energy and Power Evaluation Program (ENPEP) (http://www.dis.anl.gov/CEEESA/ENPEPwin.html)
8. MARKet ALlocation macro-economic model (MARKAL) (http://www.ecn.nl/unit_bs/etsap/markal)

Other information

Steps taken to intergrate climate change

Paragraph 41: With a view to facilitating the formulation and implementation of sustainable development programmes, non-Annex I Parties are encouraged, as appropriate, to provide information on any steps they have taken to integrate climate change considerations into relevant social, economic and environmental policies and actions in accordance with Article 4, paragraph 1 (f), of the Convention.

Introduction

This section provides for the provision of other information considered relevant to the achievement of the objectives of the Convention. This information could include relevant national, social, economic and environmental policies and activities geared towards the implementation of the Convention.

In the context of addressing climate change at the national level, the following information should be included:

- Steps taken to integrate climate change into relevant social economic and environmental policies
- Activities related to technology transfer
- Climate Change research and systematic observations
- Research to adapt to and mitigate climate change
- Information on education, training and public awareness
- Information on capacity-building at the national, regional and subregional levels
- Efforts to promote information sharing

The information provided in this section should build on that provided in the earlier section on national circumstances, that would, for example, impact directly or indirectly the implementation of national social, economic and environmental policies. This section can include information on how climate change considerations, as outlined above, are being integrated into sustainable development programmes and poverty reduction strategies. Information on this may include social, economic and environmental policies directed at minimizing the adverse effects on the economy, public health and the quality of the environment of projects or measures undertaken to mitigate or adapt to climate change.

Activities relating to technology transfer

Paragraph 42: Pursuant to decision 4/CP.7, its annex, and the implementation of Article 4, paragraph 5, of the Convention, non-Annex I Parties are encouraged, in the light of their social and economic conditions, to provide information on activities relating to the transfer of, and access to, environmentally sound technologies and know-how, the development and enhancement of endogenous capacities, technologies and know-how, and measures relating to enhancing the enabling environment for development and transfer of technologies.

This section could include information on how the country is addressing activities relating to the transfer of, and access to environmentally sound technologies and know-how, the development and enhancement of endogenous (local) capacities, technologies and know-how, and measures relating to enhancing the enabling environment for the development and transfer of technologies. In providing information on activities relating to measures to enhance the enabling environments, Parties may wish to make use of the information contained in the UNFCCC technical paper on the enabling environments for technology transfer (FCCC/TP/2003/2) and the IPCC special report on *"Methodological and Technological Issues in Technology Transfer"* www.grida.no/climate/ipcc/tectran/index.htm Parties could also

provide information on their prioritized technology needs. The content of this section could include information on:

- Technology needs and needs assessment
- Technology
- Enabling environments
- Capacity-building
- Mechanisms for technology transfer

Climate change research and systematic observation

Paragraph 43: Non-Annex I Parties are encouraged to provide information on climate change research and systematic observation, including their participation in and contribution to activities and programmes, as appropriate, of national, regional and global research networks and observing systems.[8]

Research and systematic observations usually provide information and tools for understanding the climate system. In this context, Parties could provide information on their participation in, and contribution to, activities undertaken, on a global, national, regional and sub-regional basis in the areas of climate change research and systematic observations, as well as in global change research networks.

Parties may already be engaged in research and systematic observation that could provide data, information and tools for various activities relating to the preparation of national communication. It is therefore important to include information on the needs, constraints and gaps in climate change research and systematic observation.

In reporting on the research and systematic observation, Parties may wish to include the following elements of information:

- Status of national programme for research and systematic observation
- Meteorological, atmospheric and oceanographic research and observations
- Level of participation in the global research and observation systems
- Needs and priorities for climate change research and systematic observations

Information on research programmes

Paragraph 44: Non-Annex I Parties are encouraged to provide information on research relating to programmes containing measures to mitigate climate change; programmes containing measures to facilitate adequate adaptation to climate change; and the development of emission factors and activity data.

The information provided in this section should build on those provided in the earlier sections on mitigation, vulnerability and adaptation, and greenhouse gas inventory. The content could include specific research programmes that are being undertaken in the areas of mitigation, adaptation, development of emission factors and activity data, either on a national or regional basis. Parties could also include information on involvement in such research activities with other bilateral and multilateral institutions, projects and programmes. Furthermore, any such information which may have been provided earlier might usefully be summarized here.

[8] Such as the Global Climate Observing System, Global Terrestrial Observing System and Global Ocean Observing System.

Information on education, training and public awareness

Paragraph 45: Non-Annex I Parties are invited to provide information on activities relating to climate change education, training and public awareness.

Reporting of information on activities relating to climate change education, training and public awareness can serve as a basis for the periodic review of the progress made towards the implementation of Article 6, of the Convention. It should be noted that these activities also relate to public participation, public access to information and international cooperation.

The content of this section could include the following information:

- Institutional framework for the implementation of Article 6 of the Convention
- Level of awareness and understanding of climate change issues
- Implemented or planned initiatives and programmes for education, training and public awareness
- Institutional and/or legal frameworks for public participation and access to information
- Subregional, regional and international cooperation to promote education, training and public awareness
- Gaps, needs and priorities in climate change education, training and public awareness

Capacity-building

Paragraph 46: Non-Annex I Parties are encouraged to provide, in accordance with decision 2/CP.7, information on how capacity-building activities, as contained in the framework annexed to that decision, are being implemented at national and, where appropriate, at subregional and/or regional levels. This could include, inter alia, options and priorities for capacity-building, participation in and promotion of South–South cooperation, the involvement of stakeholders in capacity-building, coordination and sustainability of capacity-building activities, and the dissemination and sharing of information on capacity-building activities.

Paragraph 47: Non-Annex I Parties are encouraged to include, as appropriate, information on national, subregional and/or regional capacity-building activities for integrating adaptation to climate change into medium and long-term planning.

Capacity-building is a cross-cutting issue which transcends all of the activities relating to the preparation of national communication and the implementation of the Convention. In recognition of the needs for capacity-building, the COP has provided a framework for capacity-building in developing countries, as an annex to decision 2/CP.7. The framework provides the initial scope of capacity-building needs relating to the implementation of the Convention as well as preparation for the effective participation in the Kyoto Protocol process. The request is focused on the provision of information on how capacity-building activities, outlined in paragraphs 15-17 of the framework, are implemented at all levels.

This section should include information on:

- Specific needs, options and priorities for capacity-building (such as those identified in the national capacity self-assessment, national adaptation programmes of action and phase II enabling activity projects)
- Status of activities and level of participation in and promotion of South-South cooperation with other institutions in developing countries
- Promotion and level of involvement of a wide range of stakeholders (governments, national and international organizations, civil society)
- Status of activities related to coordination and sustainability of capacity-building activities
- Dissemination and sharing of information on capacity-building activities
- Capacity-building activities aimed at integrating adaptation to climate change into medium- and long-term planning

Information and networking

Paragraph 48: Non-Annex I Parties are encouraged to provide information on their efforts to promote information sharing among and within countries and regions. Information could cover, as appropriate, participation in and contribution to networks, and access to, and use of, information technologies for information exchange.

Information and networking is an integral part of the process of preparing national communications and other activities relating to the implementation of the Convention. Information and networking in this context generally refers to several interrelated activities that assist a Party in the preparation of a national communication. As an example, the use of information systems forms an important part of GHG inventories, vulnerability and adaptation assessment and GHG mitigation analysis.

Networking has a more encompassing function and refers to the national, subregional, regional, interregional and global processes which provide access to information, advice and guidance in the process of the preparation of national communications.

This section could include information on:

- Efforts to promote information sharing among and within countries and regions
- Participation in and contribution to information networks
- Access to, and use of, information technologies for information exchange.

Reference material and web links:

1. Global change research
   http://www.geo.ucl.ac.be/LUCC/links/links.html
   http://www.igbp.kva.se/cgi-bin/php/frameset.php
   http://www.ihdp.org/
   http://www.geo.ucl.ac.be/LUCC/links/links.html#Institutions_and_Networks
   http://www.apn.gr.jp/
   http://www.iai.int/
   http://www.wmo.ch/web/wcrp/wcrp-home.html

2. Systematic observations
   http://www.wmo.ch/web/gcos/gcoshome.html
   http://www.fao.org/GTOS/
   http://ioc.unesco.org/goos/
   http://www.pol.ac.uk/psmsl/programmes/gloss.info.html

3. Technology transfer
   http://www.grida.no/climate/ipcc/tectran/051.htm
   http://www.grida.no/climate/ipcc/tectran/290.htm
   http://ttclear.unfccc.int/ttclear/jsp/
   http://unfccc.int/resource/docs/tp/tp0199.pdf
   http://unfccc.int/program/sd/technology/index.html

4. Education, training and public awareness
   http://www.devalt.org/newsletter/sep03/of_1.htm
   http://unfccc.int/program/sd/article6/index.html

5. Capacity-building
   http://unfccc.int/program/sd/cb/system.html

Constraints and gaps, and related financial technical and capacity needs

Introduction

Taking into account Article 4, paragraph 7, and Article 4, paragraphs 3 and 5, of the Convention, the extent to which developing country Parties will effectively implement their commitment to communicate information will depend on the implementation by developed country Parties of their commitments under the Convention relating to financial resources and the transfer of technology. Accordingly, it is important to include information on the constraints and gaps and the related financial, technical and capacity needs.

Some of the information to be provided in this section may have been included already under various sections of the national communication. However, it would be necessary to further elaborate on the specific constraints, gaps and needs that have been identified.

Financial, technical and capacity needs

Paragraph 49: Non-Annex I Parties should, in accordance with national circumstances and development priorities, describe any constraints and gaps, and related financial, technical and capacity needs, as well as proposed and/or implemented activities for overcoming the gaps and constraints, associated with the implementation of activities, measures and programmes envisaged under the Convention, and with the preparation and improvement of national communications on a continuous basis.

While undertaking activities, measures and programmes to implement the Convention and to prepare the national communication, difficulties, constraints and gaps relating to financial, technical and capacity needs might have been encountered. The information could include constraints and gaps associated with the preparation and improvement of national communications on a continuous basis.

The GEF, Annex II Parties, multilateral/bilateral contributions

Paragraph 50: Non-Annex I Parties should provide information on financial resources and technical support for the preparation of their national communications provided by themselves, as well as those received from the Global Environment Facility (GEF), Annex II Parties or bilateral and multilateral institutions.

Paragraph 51: Non-Annex I Parties should also provide information on financial resources and technical support provided by themselves and by the GEF, Annex II Parties or bilateral and multilateral institutions, for activities relating to climate change.

Information on financial and technical resources for the preparation of national communications made available by the Party, the Global Environment Facility (GEF), Annex II Parties, bilateral or multilateral institutions should be provided. The preparation of national communication entails a myriad of related climate change activities that could be supported by various organizations. Information on financial and technical resources could include descriptions of contributions from:

- The Party, including in-kind costs, staff resources and associated costs
- The GEF, through one of its implementing agencies
- Annex II Parties, through either bilateral programmes or a multilateral institution
- Other multilateral and bilateral programmes and activities

Proposed projects for financing

Paragraph 52: Non-Annex I Parties are encouraged to provide, to the extent their capacities permit, a list of projects proposed for financing, in accordance with Article 12, paragraph 4, of the Convention, in preparation for arranging the provision of technical and financial support.

In this section, Parties could provide information on the proposed projects aimed at reducing emissions by sources and enhancing removals by sinks. Information on the proposed projects could include:

- Specific technologies to be used
- Materials/ equipment required
- Techniques or practices that would be needed to implement such projects, together with, if possible: an estimate of all incremental costs, of the reductions in emissions and increments of removals of greenhouse gases; and an estimate of the consequent benefits.

The proposed projects could be presented as part of the national communications or as separate documents for financing.

Information on implement adaptation measures

Paragraph 53: Non-Annex I Parties may include information on opportunities for the implementation of adaptation measures, including pilot and/or demonstration adaptation projects, being undertaken or proposed. They may also provide information on barriers to the implementation of adaptation measures. They may include, as appropriate, information on how support programmes from Parties included in Annex II to the Convention are meeting their specific needs and concerns relating to vulnerability and adaptation to climate change.

Information on the priority areas for adaptation will have been provided in the section on "Programmes Containing Measures to Facilitate Adequate Adaptation to Climate Change". Some of these priority adaptation measures might have been undertaken or planned already in the context of the programmes to implement the Convention. It is therefore important to include information on adaptation projects (pilot or demonstration) that are being undertaken or proposed for future implementation. The information on adaptation projects could include:

- Specific barriers to the implementation of adaptation projects
- Opportunities for adaptation
- Identification of support programmes which provide financial and technical resources for adaptation
- How such support programmes are meeting the specific adaptation needs and concerns

Technology transfer

Paragraph 54: With regard to the development and transfer of technology, non-Annex I Parties are encouraged to provide information on country-specific technology needs and assistance received from developed country Parties and the financial mechanism of the Convention and, as appropriate, on how they have utilized this assistance in support of the development and enhancement of endogenous capacities, technologies and know-how.

Information on the needs, constraints and gaps of activities relating to technology transfer is important in understanding the level of assistance provided by developed country Parties and the GEF. Information may include:

- Country-specific technology needs and technology needs assessment
- The level of financial support from Annex II Parties and the GEF
- Development and enhancement of capacities, technologies and know-how

Capacity-building needs other than those identified

Paragraph 55: Non-Annex I Parties are encouraged to provide information on other relevant needs and/or areas for capacity-building other than those mentioned in paragraphs 45, 47, 48 and 50.

Provision of information is encouraged on capacity-building needs for the implementation of the Convention and the achievement of its objectives, separate from that iprovided under other headings.

Reference material and web links:

1. http://www.gefweb.org/
2. http://www.gefweb.org/Documents/Council_Documents/GEF_C22/gef_c22.html
3. http://www.unep.org/
4. http://www.undp.org/
5. http://www.worldbank.org/
6. http://130.37.129.100/english/o_o/instituten/IVM/research/climatechange/
7. http://www.cpacc.org/aboutframe.htm
8. http://www.sprep.org.ws/sprep/about.htm
9. http://www.enda.sn/energie/cc/ccfr.htm
10. http://www.unescap.org/
11. http://www.eclac.cl/
12. http://www.uneca.org/

Submission

Introduction

The submission of national communications and their related supporting information facilitates the communication of information to all Parties of the Convention and the secretariat's role of compiling, synthesizing and analysing the information contained therein in accordance with the relevant COP and subsidiary bodies decisions and conclusions. It also facilitates the sharing of this information globally.

Documentation

Paragraph 56: The information provided in accordance with these guidelines shall be communicated by each non-Annex I Party to the COP in a single document, with an executive summary outlining the information contained in the full document, in both hard copy and electronic format.

When drafting and compiling of information is complete, there should be one single document with an executive summary contained within it. The document could be presented as a hard copy and in electronic format.

Submission

Paragraph 57: Each non-Annex I Party shall submit its national communication in one of the official languages of the United Nations. The executive summary, which is to be of no more than 10 pages, shall be translated into English and made publicly available. Parties are also encouraged to submit, to the extent possible and where relevant, English translations of their communications.

The information should be presented in one of the official languages of the United Nations (English, French, Spanish, Arabic, Chinese, Russian). The choice of language will depend on the Party's national circumstances. However, Parties are encouraged to translate their national communications into English.

For the purposes of making the national communication publicly available and for ease of dissemination, it is important to submit an executive summary in English, which should be no more than 10 pages long.

Additional documents

Paragraph 58: Additional or supporting information may be supplied through other documents such as a technical annex.

Parties may also submit other documents, either as a technical annex or an addendum, if deemed necessary.

In producing this user manual, the UNFCCC secretariat has benefited from the advice, comments and suggestions received from various members of the Consultative Group of Experts on National Communications from Parties not included in Annex I to the Convention and from several experts of the Global Environment Facility and its implementing agencies. The manual is designed to facilitate the process of preparation of national communications of Parties not included in Annex I to the Convention. In order to enhance its utility and to respond to the needs of Parties, the secretariat will continue to seek to improve it. The secretariat, therefore, welcomes any questions, comment or suggestions, which can be sent to: usermanual@unfccc.int

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Table 1. National greenhouse gas inventory of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol[a] and greenhouse gas precursors

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 emissions (Gg)	CO_2 removals (Gg)	CH_4 (Gg)	N_2O (Gg)	CO (Gg)	NO_X (Gg)	NMVOCs (Gg)	SO_x (Gg)
Total national emissions and removals	X	X	X	X	X	X	X	X
1. Energy	X	X	X	X	X	X	X	X
A. Fuel combustion (sectoral approach)	X		X	X	X	X	X	X
1. Energy industries	X		X	X	X	X	X	X
2. Manufacturing industries and construction	X		X	X	X	X	X	X
3. Transport	X		X	X	X	X	X	X
4. Other sectors	X		X	X	X	X	X	X
5. Other (please specify)	X		X	X	X	X	X	X
B. Fugitive emissions from fuels	X		X		X	X	X	X
1. Solid fuels			X		X	X	X	X
2. Oil and natural gas			X		X	X	X	X
2. Industrial processes	X	X	X	X	X	X	X	X
A. Mineral products	X				X	X	X	X
B. Chemical industry	X		X	X	X	X	X	X
C. Metal production	X		X	X	X	X	X	X
D. Other production	X				X	X	X	X
E. Production of halocarbons and sulphur hexafluoride								
F. Consumption of halocarbons and sulphur hexafluoride								
G. Other (please specify)	X		X	X	X	X	X	X
3. Solvent and other product use	X			X			X	
4. Agriculture			X	X	X	X	X	X
A. Enteric fermentation			X					
B. Manure management			X	X			X	
C. Rice cultivation			X				X	
D. Agricultural soils			X	X			X	
E. Prescribed burning of savannahs			X	X	X	X	X	
F. Field burning of agricultural residues			X	X	X	X	X	
G. Other (please specify)			X	X	X	X	X	
5. Land-use change and forestry	X[b]	X[b]	X	X	X	X	X	X
A. Changes in forest and other woody biomass stocks	X[b]	X[b]						
B. Forest and grassland conversion	X	X	X	X	X	X		
C. Abandonment of managed lands		X						
D. CO_2 emissions and removals from soil	X[b]	X[b]						
E. Other (please specify)	X	X	X	X	X	X		
6. Waste			X	X	X	X	X	X
A. Solid waste disposal on land			X		X		X	
B. Waste-water handling			X	X	X	X	X	
C. Waste incineration					X	X	X	X
D. Other (please specify)			X	X	X	X	X	X
7. Other (please specify)	X	X	X	X	X	X	X	X
Memo items								
International bunkers	X		X	X	X	X	X	X
Aviation	X		X	X	X	X	X	X
Marine	X		X	X	X	X	X	X
CO_2 emissions from biomass	X							

Notes: Shaded cells do not require entries.

[a] The following standard indicators should be used, as appropriate, for emissions by sources and removals by sinks of GHGs: **NO** (not occurring) for activities or processes that do not occur for a particular gas or source/sink category within a country, **NE** (not estimated) for existing emissions and removals which have not been estimated, **NA** (not applicable) for activities in a given source/sink category which do not result in emissions or removals of a specific gas, **IE** (included elsewhere) for emissions and removals estimated but included elsewhere in the inventory (Parties should indicate where the emissions or removals have been included), **C** (confidential) for emissions and removals which could lead to the disclosure of confidential information.

[b] Do not provide an estimate of both CO_2 emissions and CO_2 removals. "Net" emissions (emissions - removals) of CO_2 should be estimated and a single number placed in either the CO_2 emissions or CO_2 removals column, as appropriate. Note that for the purposes of reporting, the signs for removals are always (-) and for emissions (+).

Table 2. National greenhouse gas inventory of anthropogenic emissions of HFCs, PFCs and SF_6

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	HFCs[a,b] (Gg)			PFCs[a,b] (Gg)			SF_6[a] (Gg)
	HFC-23	*HFC-134*	*Other (to be added)*	*CF_4*	*C_2F_6*	*Other (to be added)*	
Total national emissions and removals	X	X	X	X	X	X	X
1. Energy							
A. Fuel combustion (sectoral approach)							
1. Energy industries							
2. Manufacturing industries and construction							
3. Transport							
4. Other sectors							
5. Other (please specify)							
B. Fugitive emissions from fuels							
1. Solid fuels							
2. Oil and natural gas							
2. Industrial processes	X	X	X	X	X	X	X
A. Mineral products							
B. Chemical industry							
C. Metal production	X	X	X	X	X	X	X
D. Other production							
E. Production of halocarbons and sulphur hexafluoride	X	X	X	X	X	X	X
F. Consumption of halocarbons and sulphur hexafluoride	X	X	X	X	X	X	X
G. Other (please specify)							
3. Solvent and other product use							
4. Agriculture							
A. Enteric fermentation							
B. Manure management							
C. Rice cultivation							
D. Agricultural soils							
E. Prescribed burning of savannahs							
F. Field burning of agricultural residues							
G. Other (please specify)							
5. Land-use change and forestry							
A. Changes in forest and other woody biomass stocks							
B. Forest and grassland conversion							
C. Abandonment of managed lands							
D. CO_2 emissions and removals from soil							
E. Other (please specify)							
6. Waste							
A. Solid waste disposal on land							
B. Waste-water handling							
C. Waste incineration							
D. Other (please specify)							
7. Other (please specify)	X	X	X	X	X	X	X
Memo items							
International bunkers							
Aviation							
Marine							
CO_2 emissions from biomass							

[a] Parties may wish to express HFC, PFC and SF_6 emissions as either potential or actual. Potential emissions should be estimated using the tier 1 approach of the IPCC Guidelines. Actual emissions should be estimated using the tier 2 approach of the IPCC Guidelines.

[b] Parties reporting HFCs and PFCs should provide emission estimates on a gas-by-gas basis, that is, disaggregated estimates by chemical expressed in units of mass (Gg), as indicated in the table (e.g. HFC-23), where information is available. This should be done by inserting a column for each HFC and PFC gas for which emissions do occur in the country. The gases in the column headings are given as examples only. Other gases to be reported in this table include HFC-32, HFC-41, HFC-43-10, HFC-125, HFC-134a, HFC-152a, HFC-43-10mee, HFC-143a, HFC-227ea, HFC-236fa, HFC-245ca, C_3F_8, C_4F_{10}, c-C_4F_8, C_5F_{12}, C_6F_{14}, and any other GHG with high global warming potential not covered in this list.