

**Gender: the missing component
in the response to climate change**

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Food and Agriculture Organization of the United Nations
October 2005

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Acknowledgements

The authors would like to thank Dieter Schoene, Wulf Killman and Alex Michaelowa for their much appreciated assistance with earlier drafts of this paper.

INTRODUCTION¹

This report analyses the gender dimension of climate change and the policies enacted to mitigate and adapt to its impacts with the aim of developing gender sensitive approaches with regards to mitigation measures, adaptation projects and national regimes. The framework of the study is represented, on the one hand, by the scientific assessment of climate change, with its impacts and associated effects on human and natural systems, and, on the other hand, by the international response to this challenge. The findings show that the gender aspects have generally been neglected in international climate policy. This is a major concern given the emphasis of policymakers on general equity issues. It is only during the last few years, on the occasion of the sessions of the Conference of the Parties (COP), COP-8 (held in New Delhi, in October 2002) and COP-9 (held in Milan, December 2003), that gender was tangentially broached .

The lack of attention to gender issues according to some authors can be considered as the result of the perceived need felt by negotiators to focus their attention, and the limited available resources, on more universal issues.² Both with regards to mitigation and adaptation policies, scientific and technological measures are preferred to “soft” policies addressing behaviour and social differences, particularly with regards to incomes and general opportunities.

The overall resilience of a society to climate change as well as its ability to change economic processes to achieve greenhouse gas reductions often masks important differences of adaptive and mitigative capacity of specific social strata. Moreover, their emission profiles exhibit large differences. Poor and marginalized men and women have a limited ability to cope with these challenges.³ As in most societies, particularly in developing countries, women have lower incomes and fewer opportunities than men. Thus their adaptive and mitigative capacity is lower than those of males. Climate policies are thus not automatically gender-neutral.

The gender-specific differences in adaptive and mitigative capacity must be fully acknowledged and considered paying special attention to the design and implementation of response strategies. Given this reality, the next step should be the search of new ways for integrating the gender variable into international negotiations for the second and subsequent commitment periods, into national regimes for mitigation and adaptation and into project activities under the Clean Development Mechanism and Joint Implementation.

Experience in reviewing gender aspects in natural disaster management and development cooperation, offer good suggestions for the development of policies to address the gender variable. The message is clear: while women are generally more vulnerable to impacts of climate change, in many cases they exhibit surprising resilience. Moreover, their responsibility for greenhouse gas emissions is relatively lower than the one of men (as some early data shows), but the differences narrow with increasing equality of opportunity. How can we enhance resilience and adaptive capacity for women while avoiding that their emission profiles follow a “male model”? The challenge is to elaborate responses not imposed from

¹ This document was prepared by Grazia Piana (consultant) and Yianna Lambrou (Senior Officer, FAO), with inputs from Axel Michaelowa, Consultant.

² N. Wamukonya, M. Skutsch, “Is there a gender angle to the climate change negotiations?”, *Energia Paper*, 2001.

³ R. Masika, “Editorial – Gender and climate change”, *Gender and development*, Vol. 10, No. 2, July 2002.

above, but modelled on needs, aspirations, knowledge and capabilities of individuals that are then actively involved as crucial partners in these efforts. An active dialogue between the development and the climate policy communities should address much more the deep linkages between development, poverty eradication and climate protection. On the road towards COP-11 and to the first meeting of the Parties to the Kyoto Protocol, the following considerations could offer occasion for further developments and initiatives for gender sensitive climate strategies: “Gender, like poverty, is a cross cutting issue in climate change and needs to be recognised as such. In fact, gender and poverty are interrelated and create mutually reinforcing barriers to social change. There is a need to be strident to overcome the uniformed view of many involved in climate change that climate change is neutral, and real life examples are needed to make the alternative case clear and convincing”.⁴

1 Human-induced climate change: dynamics and consequences

1.1 The scientific fundamentals

Human-induced climate change represents one of the most serious global environmental problems. While the Earth’s climate has always varied naturally over millennia, there is a scientific consensus that human activities are now changing global climate. The Third Assessment Report of the Intergovernmental Panel on Climate Change states that “there is new and stronger evidence that most of the warming observed over the last 50 years is attributable to human activities”.⁵ Global average temperature increased about 0.6°C over the 20th century. Precipitation patterns characterizing land areas of the Northern Hemisphere have progressively changed. These changes include more rainfall in the mid to high latitudes and, on the contrary, less rainfall in the sub-tropics. Average sea levels have risen by 10-20 cm while snow and ice covers have fallen almost world-wide. However, no statistically significant trends have been noticed in relation to extreme events (i.e. tropical storms, tornadoes or hail storms).

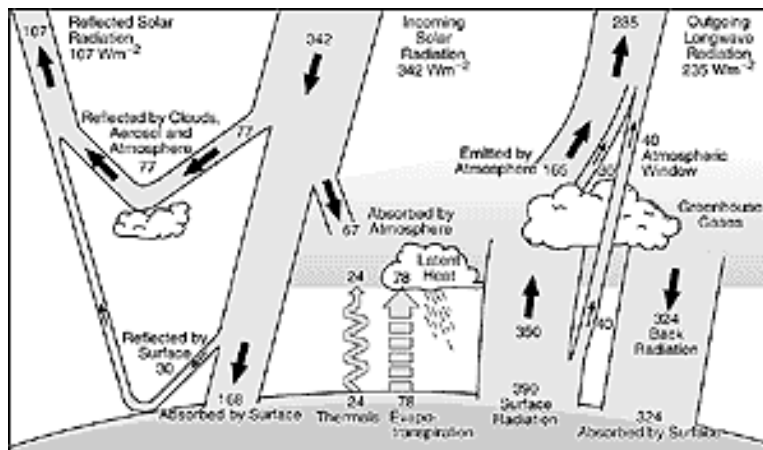
Human activities contribute to an increase of concentrations of greenhouse gases (GHGs)⁶ in the atmosphere from their natural background level. Figure 1 shows how greenhouse gases trap heat near the Earth’s surface.

⁴ The Gender and Climate Change Network, 2004.

⁵ IPCC: Climate Change 2001: Synthesis Report, Summary for Policymakers, p. 5. The IPCC’s Assessment Reports are published every 5–6 years and subject to a thorough review procedure.

⁶ The main GHGs are, carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), and chlorofluorocarbons (CFCs).

Figure 1: The greenhouse effect



Source: IPCC (2001): *Climate change 2001: The scientific basis*, p. 90.

Since the Industrial Revolution, human-induced activities including industrial processes, energy generation from fossil fuels, deforestation and intensive land use practices have produced GHG emissions into the atmosphere at rates faster than the planet's ability to sequester them. Worldwide CO_2 emissions from fossil fuels continue to increase at a rate of about 1% p.a. Under a business-as-usual scenario, by 2035 humans will be annually emitting about 12 billion tons of CO_2 . Of this amount about 50% will be due to developed countries and the remaining 50% to developing nations (considering their progress towards current patterns of industrialization). IPCC (2001) states that "Human influences will continue to change atmosphere composition throughout the 21st century".⁷ Projections suggest that the global average surface temperature is expected to increase by 1.4 °C to 5.8 °C until 2100, with extreme values of over 10 °C possible with a low probability. Warming would be particularly evident and rapid in land areas, with special reference to those placed in high latitudes and during winter. Globally precipitation is projected to rise, with the occurrence of more rainfall and larger annual variations in some regions and less in others. Average sea level would rise by 0.09–0.88 metres between 1990–2100.

Unusual weather events would likely increase, including for instance greater frequency and intensity of El Niño type of weather patterns.⁸ According to these projections, many territories will experience intensified rainfalls; more violent cyclones will intervene in tropical areas while mid-latitude continental regions would be at the risk of drought.⁹

1.2 Impacts and vulnerability: adaptation challenges

Climate change as described in the IPCC scenarios will have impacts on food security, freshwater supply, rural and urban settlements and their infrastructure, even if emissions

⁷ IPCC, Third Assessment Report - Climate Change - The scientific base, 2001, Cambridge, UK.

⁸ "El Niño is a natural hydro-climatic event that slows and reverses the Equatorial westward currents of the Pacific Ocean every 4-5 years. El Niño warms sea surface temperatures in the Eastern Pacific and has resulting knock-on effects to the global climate system," B. Hiblin, "Climate change and energy: can we weather the switch to sustainable energy?", *Environment Briefing*, No. 2, 2001, <http://www.earthsummit2002.org>.

⁹ In addition to this, "Working Group I sends a mixed message on the potential for climate change to trigger large-scale, catastrophic events, combining reassurance in the near term with starker warning for the long term". Depledge, J., "Climate change in focus: the IPCC Third Assessment Report", The Royal Institute of International Affairs, *Briefing Paper New Series*, No. 29, February 2002.

would be curbed immediately. Thus, humans need to adapt to face challenges due to some climate change that is already inevitable. This is also true for biodiversity and there may be a large number of varied feedback effects on natural systems, including, for instance, the irreversible loss of key species and habitats.¹⁰

Climate change potential impacts in the future will imply both adverse and beneficial effects across different regions and sectors. Agricultural productivity could potentially rise in the mid-high latitudes in the case of modest temperature rise. However, negative impacts will be increasing at higher rates than temperature increases. In this context, the developing countries are expected to be the hardest hit by climate change. In the tropics and sub-tropics even small temperature increases could drastically affect crop yields. Human health would suffer from the diffusion of epidemic malaria and dengue and malnutrition and diseases could be caused by intensified extreme weather events. Flooding and landslides will represent serious threats for human settlements, especially those located on low-lying coastal areas. In fact, some of the poorest nations are most vulnerable to climate change impacts and have minimal capacity to adapt. “Many of these countries are located in regions that are already subject to heat waves, drought, desertification, deforestation, flooding, tropical diseases and natural disasters as well as poverty and lack of infrastructure.”¹¹

Table 1 summarizes the probable impacts on the principal human systems deriving from climate change.

Table 1: Human systems and impacts of climate change

System	Negative Impacts	Positive Impacts
Water resources	Decreased availability in many water-scarce regions, especially sub-tropics and small island states	Increased availability in some water-scarce regions, e.g. parts of South-East Asia
Agriculture and forestry	Reduced crop yields in most tropical and subtropical regions, and in mid latitudes for strong warming	Increased crop yields in some mid-latitude regions for low to moderate warming Potential increase in timber supply from appropriately managed forests
Fisheries	Decreases in commercial (mainly cold water) fish stocks in some areas	Increases in commercial (mainly warm water) fish stocks in some areas
Human settlements, energy and industry	Widespread increased risk of flooding, landslides and avalanches Permafrost melting destroys physical infrastructure Increased energy demand for space cooling in low and mid	Reduced energy demands for space heating in mid and high latitudes

¹⁰ G. Piana, Energy and gender issues: Reflections and strategies on the road from Johannesburg – A special focus on African and Asian rural areas, FAO, SDWW, Rome, Italy, 2003.

¹¹ T.B. Johansson, G. Karlsson, Mitigating climate change impacts through sustainable development solutions, *Climate change and development*, Yale University, USA, 2000.

System	Negative Impacts	Positive Impacts
	latitudes Decreased hydro power potential and waterway transport capacity in areas with lower water availability and decreased glaciers areas Decreased appeal of some tourist destinations in low and mid latitudes and many mountains areas	Increased hydro power and waterway transport capacity potential in areas with higher water availability Increased appeal of some tourist destinations in higher latitudes and some mountain areas
Insurance and financial services	Increase of payments due to damages	
Human health	Increased number of people exposed to vector- and water-borne diseases	Reduced mortality in mid and high latitudes in winter

Source: Michaelowa, A., "Mitigation versus adaptation: the political economy of competition between climate policy strategies and the consequences for developing countries", HWWA, Discussion Paper, No. 153, Hamburg Institute of International Economics, Germany, 2001.

Further regional details can be found in Annex I, taken from a recent work devoted to adaptation to climate change, in order to assess the impacts associated to the phenomenon, in terms of vulnerability and adaptive capacity and their distribution by region.

It is by now widely acknowledged that "the impacts will be felt more acutely by those with least adaptive capacity: poor countries and the poor in developing countries".¹² And that: "the vulnerability or susceptibility of a population group to the effects of climate change depends on the resilience of the surrounding natural landscape unit and society's capacity to adapt".¹³

2 The response of the international community to climate change

2.1 The international policy regime

The international response to climate change is embodied in the United Nations Framework Convention on Climate Change (UNFCCC) and its Kyoto Protocol.

The UNFCCC, adopted at UNCED in 1992 and in force since 1994, has as ultimate objective to "achieve stabilization of GHGs concentrations in the atmosphere at a level that would prevent dangerous Human-induced interference with the climate system within a timeframe sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner".

In order to meet this goal all countries are committed themselves to addressing climate change issues, adapting to its effects and reporting their initiatives for implementing the Convention. Countries are divided into two groups: Annex I Parties, composed of industrialized countries and those with economies in transition, and Non Annex I Parties, including developing

¹²¹² GTZ, *Klima* – Info Special Issue: "Adaptation to climate change, Deutsche Gesellschaft für Technische Zusammenarbeit, Germany, 2003.

¹³ Ibid.

countries. Annex I Parties committed themselves to adopt policies and measures to reduce their CO₂ emissions by the year 2000 to 1990 levels. Despite this division, all parties to the UNFCCC, both developed and developing countries, share some common commitments¹⁴ such as to:

- develop and submit “national communications” including inventories of GHGs emissions classified by sources as well as GHGs removals by sinks;
- introduce national programmes aiming at mitigating climate change and design strategies to adapt to its impacts;
- promote technology transfer and the sustainable management of GHGs sinks and reservoirs;
- include climate change issues in relevant sectoral policies; improve cooperation in technical, scientific and educational subjects; exchange information related to climate change.

The Convention represents an important example of the application of the principle of “common but differentiated responsibilities”. According to it, all Parties to the Convention must contribute to the solution of climate change issues, but the lead in combating its threats is assigned to developed countries.¹⁵ Moreover, the principle underlines the necessity to consider with particular attention the specific requirements and conditions of the developing nations. This approach is reflected in the provision of separate and differentiated “obligations” attributed to industrialized and developing realities.

Another central feature of the Convention is the introduction of the “precautionary principle”. According to it, “the lack of full scientific certainty should not be used as an excuse to postpone action when there is a threat of serious or irreversible damage”.

Article 4.1 (e) of the Convention states that all Parties should “cooperate in preparing for adaptation to the impacts of climate change”. Furthermore, it underlines the vulnerability of Africa and, as a consequence, it commits Parties to “develop and elaborate appropriate and integrated plans for coastal zone management, water resources and agriculture, and for the protection and rehabilitation of areas, particularly in Africa, affected by drought and desertification, as well as floods”

The Kyoto Protocol, adopted by the Parties to the UNFCCC in 1997, marks a significant step of the international response to climate change issues. For the first time, international binding targets and timetables had been agreed. In fact, at the base of the Protocol there are the legally binding emission targets for Annex I Parties for the period 2008-2012. The targets that range from -8% to +10% compared to 1990 levels refer to a basket of six of the main GHGs: carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆). The Protocol gives the Parties the

¹⁴ A. Koopmans, The United Nations Framework Convention on Climate Change, *Wood Energy News*, Vol. 15, No. 2, 2000.

¹⁵ *Ibid.*

prospect to decide which of these gases will be a component for their national emission reduction approach.¹⁶

Measures and actions are suggested to the Parties, at Article 2, in order to meet their emissions targets and promote, at the same time, sustainable development. These actions are based on the elaboration of policies and measures that include, for instance:

- the enhancement of energy efficiency in the relevant sectors of the national economy;
- the promotion of sustainable forms of agriculture inspired on climate change considerations;
- the development, research and increased use of new and renewable forms of energy, of carbon dioxide sequestration technologies and advanced environmentally sound technologies;
- the promotion of initiatives aiming at reducing emissions in the transport sector;
- the reduction of methane emissions through recovery and use in waste management and in the production, transport and distribution of energy.

Among the most innovative aspects of the Kyoto Protocol are its provisions for international market mechanisms to allow Annex I Parties to achieve their required emissions reductions cost-effectively. It should be noted that “no international environmental agreement to date has relied on flexible market mechanisms to the extent called for in the Protocol.”¹⁷ These flexible mechanisms are the International Emission Trading (IET), the Joint Implementation (JI) and the Clean Development Mechanism (CDM). They give countries and their authorized entities the possibility to reduce/sequester emissions anywhere in the world, and then count the emission credits towards their own targets.¹⁸ The following box describes the main characteristics of the three mechanisms.

Box 1: The Kyoto flexible mechanisms

The innovative mechanisms introduced by the Kyoto Protocol enable countries subject to a reduction commitment to cut GHGs emissions or sequester carbon in other countries at lower costs than at home. The initial rules, modalities and guidelines of the mechanisms have been adopted by the 7th Conference of the Parties (COP-7) in 2001 as part of the “Marrakech Accords”.

The Clean Development Mechanism (CDM) and Joint Implementation (JI) are project-based mechanisms that reward projects achieving emissions reductions or carbon removals that are additional to what would have occurred in the absence of the project with emission credits.

¹⁶ Piana, op.cit.

¹⁷ G. Wiser, Frontiers in trade: the CDM and the General Agreement on Trade on services, *International Journal of Global Environmental Issues*, CC 02-1, <http://www.ciel.org7publications>.

¹⁸ Climate Change Knowledge Network (CCKN), “Kyoto Mechanisms”, <http://cckn.net/kyoto.asp>.

Joint Implementation (JI) projects, defined in Article 6, must be undertaken between partners from developed countries (Annex I with emission targets). Credits from emission reduction projects under JI are called Emission Reduction Units (ERUs). They are deducted from the emission budget of the country hosting the project. The total emission permitted in the involved countries remains the same (zero-sum operation), as only a transfer from one country to another takes place. JI initiatives are supervised by the Supervisory Committee, which will be constituted after the Kyoto Protocol's entry into force. There are two tracks for JI; for the first one, the control procedures are less strict than under the CDM.

The Clean Development Mechanism (CDM) is defined in Article 12 of the Protocol. It allows an Annex I Party to invest in a GHG mitigation project in a developing country (without an emission target) and be rewarded with Certified Emission Reductions (CERs). CERs are issued by a UNFCCC Body, the CDM Executive Board (EB), which took up its work in 2001. The EB enlists independent certifiers to check whether the reductions have actually occurred and whether a proposed CDM project is conforming to the rules. In addition to carbon benefits, the CDM is expected to result in transfer of environmentally sound technologies to developing countries, and must assist them in achieving their sustainable development objectives. A special small-scale project category in the energy and forestry field is explicitly suitable for low income communities and individuals and offers new opportunities for women's groups.

International Emissions Trading (ET): The UNFCCC Secretariat will issue emission allowances, the so-called Assigned Amount Units – AAUs, to countries on the basis of their emission commitments under the Protocol. Allowances not needed to offset the countries' emissions can be traded. Countries are free to allocate their allowances to domestic private companies with imposed commitments and thereby entitle them to directly participate in emissions trading. Emissions allowances can be directly acquired on the international market (with some restrictions, e.g. those imposed by the EU). Also tradable are under certain circumstances credits from the CDM/JI I projects. Participating in the project based mechanisms as well as in the international ET requires an electronic, national registry, in which an account is maintained for each market participant.

2.2 The instruments for the action: mitigation and adaptation

The strategy envisaged by both scientists and politicians is based on the combination of adaptation and mitigation efforts. The latter has dominated the international policy regime described above. Only recently has adaptation entered the policy debate. The recognition of potential adverse impacts should be considered a stimulus to address appropriate actions to react. In this framework adaptation and mitigation represent key elements for interventions.¹⁹

Recent studies state that adaptation refers to changes in “processes or structures to moderate or offset potential dangers or to take advantage of opportunities associated with changes in climate”. Adaptation involves adjustments to decrease the vulnerability of communities and regions to climate change and variability. The adaptive capacity of a system is its ability or potential to adapt to the effects or impacts of climate. In this sense, actions directed to increase the adaptive capacity of a region can be regarded as strategies for coping to the threat

¹⁹ Piana, op.cit.

of climate change. In fact, “the enhancement of adaptive capacity is a way of reducing vulnerabilities and promoting sustainable development”.²⁰ Adaptation can be spontaneous or planned and can be carried out in response to or in anticipation of changes in conditions. The concept of adaptation has generally been used to focus attention on the impacts associated to climate change mechanisms and, in particular, how ecosystems and human societies can cope with them.²¹

Adaptation to climate change is not something that must “start from scratch”, but it is rather an incremental process that could be based upon a long experience of previous adaptation. “What is new is the need to adapt much more rapidly because of the impacts of human activities on climate”.²²

According to the IPCC, the requirements for a country to assure a high adaptive capacity include: a prosperous and stable economy, a high degree of access to technology options, well designed adaptation strategies, a system in place for the dissemination of climate change and adaptation information at all levels as well as a distribution of access to resources based on equity principles. A great part of developing countries does not meet these requirements. This is the case, in particular, of the Least Developed Countries (LDCs),²³ characterized by a low adaptive capacity. On the basis of the TAR findings, we notice that Africa, and in particular sub-Saharan Africa where most of LDCs are located, as well as Asia (where are the remaining LDCs), represent the most vulnerable regions to the adverse effects of climate change. This vulnerability is strictly correlated to the low adaptive capacity of the populations, which in turn, linked to the extreme poverty and inequality that affects many of them. Integrated approaches and the support of the International Community will play a key role in reducing their vulnerability and thus facing adverse effects of climate change.

If adaptation issues are “essentially about who will bear the cost of coping with climate change to the extent that it occurs”²⁴ on their side, mitigation issues are about preventing or limiting the occurrence of climate change. Mitigation focuses on tackling the very cause of climate change: the increase of GHGs by either reducing these emissions at source or by increasing sequestration of these gases by sinks or reservoirs. Mitigation, in fact, considers primarily interventions acting on the root cause of the problem, that is to say the increase in GHGs emissions. Options for tackling them include both their reductions at source as well as

²⁰ S. Huq et al., *Mainstreaming adaptation to climate change in Least Developed Countries (LDCs)*, IIED, London, UK, April 2003, <http://www.iied.org>.

²¹ Experiences of adaptation approaches include, for instance, increasing the robustness of infrastructure designs and long-term investments, such as increasing the range of precipitation roads and buildings can withstand without failure. Authors point out that adaptation covers also vulnerable natural systems (i.e. the creation of eco-corridors) as well as efforts aiming at the reversal of trends that increase vulnerability (i.e. the introduction of setbacks for developments in vulnerable areas.). Yamin, F., "Adaptation and the Clean Development Mechanism", Draft Working Paper, CSDA (Center for Sustainable development in the Americas), 1998.

²² I. Burton, *Adaptation to climate change and variability in the context of sustainable development*, in *Climate change and development*, Yale School of Forestry and Environmental Studies, New Haven, Connecticut (USA), 2000.

²³ The Economic and social Council of the UN developed three criteria to be used to determine which countries in part of the LDC group. 1) the low income criterion (based on a three-year average estimate of the GDP per capita). The GDP per capita must be under \$900 to be included in the LDC group and above \$1 035 to graduate from that group. 2) the human resource weakness criterion. It involves the Augmented Physical Quality of Life Index (APQLI) obtained through health, nutrition, education and adult literacy indicators. 3) The economic Vulnerability Index (EVI) based on indicators such as: the instability of agricultural production, the instability of exports of services and goods, the economic importance of non-traditional activities, merchandise export concentration and the handicap of economic smallness (Huq et al., op.cit.).

²⁴ F. Yamin, *Adaptation and the Clean Development Mechanism*, Draft Working Paper, 1998, CSDA.

increasing their sequestration through sinks. Examples of mitigation activities include the strengthening of energy efficiency of power plants, the correction of the current patterns of energy production and consumption and both the enhancement and the conservation of forests. Table 2 summarizes the main characteristics of these instruments for action.

Table 2: A Comparison of mitigation and adaptation characteristics

Characteristics	Mitigation	Adaptation
Timing	Costs now, benefits delayed	Costs whenever, benefits may be later or relatively soon after
Temporal incidence	Costs now, benefits to later generations	Benefits more or less appropriable by those bearing costs
Geographic incidence	Local costs, global benefits	Local costs, often relatively local benefits
Sectoral incidence	Emphasis on emissions from energy consumption but also options in other sectors (land use, industrial processes)	Very heterogeneous
Sectoral and regional sensitivity	Reduces impacts on all sectors and regions	More feasible for certain sectors and region than others
Relation to uncertainty	Must act earlier despite greater uncertainty	May act later after reducing uncertainty, although anticipatory adaptation may require earlier action

Source: adapted from Wilbanks et al., "Integrating mitigation and adaptation. (Possible responses to global climate change)", *Environment*, June 2003

Adaptation is neither opposed to mitigation nor an alternative to it. Given the inevitability of a certain amount of climate change, a balanced portfolio of responses becomes relevant. As Burton underlines, "substantial mitigation will take considerable time to achieve. Adaptation measures to address existing and future vulnerability can be taken now."²⁵

The recent sessions of COPs have been characterized by a growing attention to the issues related to developing countries. In these areas the problem is complex. In fact, mitigation efforts must be harmonized with their developmental needs, while fast adaptation is crucial to avoid damages from continuing climate change. The challenge for developing countries is to embark on a low-emissions path that includes access to low-carbon and efficient energy technologies to promote a real sustainable development, while assuring a dynamic approach to the challenges deriving from climate change.²⁶

Growing attention is also paid to the emergence of adaptation issues in the developing world, especially in LDCs. In 2001, the Marrakech Accords, issued at the Seventh Conference of the Parties (COP-7), emphasize the importance for developing countries to receive more support from the international community to support their adaptation efforts. The Accords introduce new funds for the following actions:

- the Special Climate Change Fund (adaptation, technology transfer, capacity building and climate change mitigation) and the LDCs Fund (assistance for the

²⁵ Burton, op.cit.

²⁶ Piana, op. cit.

development of National Adaptation Programmes of Action – NAPAs), both under the UNFCCC and managed by the Global Environment Facility (GEF);

- the Adaptation Fund under the Kyoto Protocol to finance concrete adaptation projects and programmes. It will receive a share of the proceeds from the CDM.

The aim of these initiatives, directed to assure the funding of anticipatory adaptation measures, is to incorporate adaptation objectives into other policy areas (mainstreaming) and develop a country specific prioritisation of the various adaptation options.

During the last few years, to assist developing countries, international organizations have set up various joint working groups to carry out studies of the effects of climate change on the developing areas with the aim at designing strategies that integrate adaptation measures into national development programmes. For instance, Eriksen and Næss, have identified in their report strategic entry points for adaptation, depicted in the following table.²⁷

Table 3: Suggested entry points for adaptation

Livelihoods	Local capacity and sensitivity	Risk management and early warning
<ul style="list-style-type: none"> • Creation of economic opportunities for the poorest • Introduction of climate considerations in economic and infra-structural development • Access to, and viability of, communal resources and biodiversity (including forest products) • Processing and marketing of local products • Health and education issues • The role of local knowledge in economic development • Women's coping mechanisms, and the 'informal' based mechanisms 	<ul style="list-style-type: none"> • Integration between 'traditional' and 'modern' agricultural and pastoral technologies and management systems • Promotion of crop diversity, agro biodiversity • Seed and input distribution (including local seed varieties and inputs) • Support to local research on livestock, crops and economic development modelled on the local climate • Land use and infrastructure planning • Integration of adaptation into government department activities • Linkages between local 'informal' institutions and authorities 	<ul style="list-style-type: none"> • Early warning systems • Elaboration of local disaster response strategies • Natural resource management based protection • Assuring the space of local climate information as well as meteorological and climatological capacities of national institutions • Elaboration of national adaptation plans and vulnerability assessments • Improving coastal defences, urban drainage and water supply, hydroelectricity, flood defences

Source: adapted from ERIKSEN, S., NÆSS, L. O., Pro-poor climate adaptation: Norwegian development cooperation and climate change adaptation. An assessment of issues, strategies and potential entry points, Report 2003:02, CICERO, Oslo, Norway, 2003.

²⁷ S. Eriksen, L.O. Næss, Pro-poor climate adaptation: Norwegian development cooperation and climate change adaptation. An assessment of issues, strategies and potential entry points, Report 2003:02, CICERO, Oslo, Norway, 2003.

3 Gender dimensions of climate change

The discussion that follows, will in due time benefit from the ever-expanding collection of sex disaggregated quantitative data which is a challenge to get at this moment in time. However, there is in any case sufficient data (both qualitative and quantitative) which permits us to discuss with some confidence the gender aspects of climate change in this section.

Different classes have different causal and reactive links to climate change as shown in Table 4.

Table 4: Social differentiation according to emissions and mitigative / adaptative potential

	Emissions	Mitigative potential	Adaptive potential
High income/well educated	High	High	High, unless income generation activity is linked to a sector with high impacts
Marginalized/ uneducated	Low. High in some cases of industrialised society (e.g. U.S.)	Low	Low. High, if people are nomadic and have a low ownership of goods that can be damaged by extreme weather events

These relations between class and emissions exist in all societies but the absolute values can differ (on average, a wealthy Japanese has a much lower emissions level than a wealthy US citizen). Recent studies devoted to adaptation to climate change highlight the role that adaptation policies could have in terms of poverty eradication, through the reduction of the exposure of vulnerable people. The findings lead to the recognition of existing linkages between climate change and the Millennium Development Goals, as depicted by the Annex II to this paper.²⁸ However, experience from disaster analysis shows that “disaster vulnerability is not synonymous with poverty or social class. Within societies, people’s relative ability to access or control key resources is shaped as well by age and physical ability, citizenship status, social/ethnic and cultural group, and gender.”²⁹ In reality, experience highlights that the most socially excluded and economically insecure in any community represent those least able to access to or control strategic resources during and in the aftermath of a natural disaster. Gender relations, through their evolution and change across history and cultures, have determined social conditions that “leave millions of women around the globe in substandard housing, socially marginalized, impoverished or economically insecure, overborne with care giving responsibilities, and lacking social power and political voice”.³⁰

Traditional configuration of gender roles meant that women had multiple responsibilities in the home, at the workplace and in the community. These many demands leave women with less time for political involvement and without the possibility to actively participate in the decision-making processes that impact their lives, environment and aspirations.³¹ Moreover, gender bias reinforces this situation: “attitudinal barriers are deeply rooted in patriarchy-based

²⁸ See in particular: Eriksen and Næss (2003) and AfDB et al., Poverty and climate change – reducing vulnerability of the poor through adaptation, Washington, USA, 2003.

²⁹ E. Enarson, Gender and natural disasters, Working Paper No. 1, ILO, Geneva, Switzerland, 2000.

³⁰ Enarson, op.cit.

³¹ M. Fordham, Challenging boundaries: a gender perspective on early warning in disaster and environmental management, UNDAW, *Environmental management and the mitigation of natural disasters: A gender perspective*, Report of the Expert Group Meeting (Ankara, Turkey, November 2001), New York, NY (USA), 2001.

socialization, where men are considered superior to women - a systematic disempowerment that left women with little presence in decision-making bodies, resulting in the exclusion of their issues and concerns from the policy agenda.”³²

As in most countries households with a lower average income and level of education are likely to generate lower emissions but also have a lower mitigative and adaptive capacity than men. The diverse roles of women and men in such poor households have to be studied specifically to see exactly what their specific contribution to the household’s emissions are. This fact so far has not been acknowledged in international climate negotiations or the design of domestic climate policy instruments. Negotiators may not always assess the impacts of their decisions on different social strata. Only during the last years at COP-8 (held in New Delhi, in October 2002) and COP-9 (held in Milan, December 2003) were side events devoted to this topic.

In recent years, some researchers have raised the issue of disproportionate impacts of climate change on women.³³ However, these studies have not addressed the differences in emissions profiles and mitigative capacity between women and men. Whether the CDM could specifically benefit economically disadvantaged women in developing countries has been discussed. “The argument favouring implementation of the Kyoto Protocol would be strengthened if it included a recognition of gender economics.”³⁴

A challenge is the absence of good data: “more gender-specific data are urgently needed. Such data are necessary to evaluate women’s situation as compared to that of men in relation to specific environmental concerns.”³⁵ Information should include: household structure, demographic trends, and the division of labour, local power structures, women’s working conditions and their relative control over key economic assets.

3.1 Women’s emissions and mitigative capacity

3.1.1 Transport

Evidence so far suggests that typically, women in developed countries use much less-emissions intensive modes of transport than men. Their level of car-ownership is lower and their share in public transport use is higher.³⁶ If they own a car, it is likely to be smaller and more fuel efficient than the average car owned by men, at least in the European context. They see cars less as a high-powered status symbol than as a means of transport. Female drivers generally are more fuel efficient than males due to less aggressive driving styles with a lower average speed. This has been shown by studies from Sweden.³⁷ However, in highly car-

³² WEDO, *WEDO primer: women and sustainable development - A local Agenda*, May 2001, <http://www.wedo.org>.

³³ F. Denton, Climate change vulnerability, impacts, and adaptation: why does gender matter?, *Gender and Development*, Vol. 10, No.,2, July 2002; Wamukonya and Skutsch (2001); Masika (2002).

³⁴ N. Pandey, Gender economics of the Kyoto Protocol, *Conservation Ecology*, 6(1): r14, 2002 - (online) www.consecol.org/vol6/iss1/resp14.

³⁵ WEDO, op.cit.

³⁶ K. Hamilton, Gender and Transport in Developed Countries, Background Paper for the Expert Workshop Gender Perspectives for Earth Summit 2002: Energy, Transport, Information for Decision-Making, Berlin, Germany, 10–12 January 2001.

³⁷ A. Carlsson-Kanyama, A.-L. Linden, Travel patterns and environmental effects now and in the future: implications of differences in energy consumption among socio-economic groups, *Ecological Economics*, Vol 30, 405–417, 1999.

dependent living patterns such as the U.S. urban sprawl, women are substantially more dependent on the private car driven alone than are comparable numbers of men and far less likely to switch to alternative modes.³⁸

3.1.2 Households

In most societies, women carry a large measure of responsibility of household expenses and on management of the household. This obviously involves choices regarding the emissions intensity of the goods the household uses. Unfortunately, so far there are no robust studies on the differences of male versus female household management with regards to emissions. The lower-than-average education of women will mean that their awareness of mitigation options such as the use of energy-efficient devices is limited. It can be assumed that in societies where women have a higher education, they will choose more energy efficient options. However, this is common sense and no reliable data exists to support this assumption at the moment.

Extreme weather events have a negative impact on women's time management in the household. When nearby wells and water sources run dry or are contaminated by floods, women have to search for water in the surrounding area and to travel long distances.³⁹

3.1.3 Agriculture

A general discussion on agriculture suggests that in many poor societies and poor strata of society, women have a high share of agricultural activities but only little decision-making power or control over inputs and outputs. While men prefer mechanized agriculture and are responsible for irrigation, women usually are involved in a very labour-intensive, low-emission subsistence agriculture. In societies where irrigation is important, men are generally vested with water rights, participate in formal and informal decision-making at field canal level and at the higher tiers, and are exclusively the ones to invest and own their private equipment. Thus women are not seen as directly needing irrigation water and are only marginal stakeholders in irrigation. Often women who manage their own farms still have to ask the men to mediate in ensuring water for their plots, fulfilling labour obligations, and especially in representing them in meetings. This leads to high transaction costs. Irrigation intervention in the past even further weakened women's economic resource base as irrigation agencies have been the strongest adherents and promoters of the norm that irrigation water should only serve men's businesses. Only recently, some development agencies corrected earlier mistakes in this respect.⁴⁰ In Southeast Asia, it is only through common property that women have had some sort of access to water resources. Women's ability to fall back on such common resources has been gradually eroded as the availability of these resources, especially in rural communities, has rapidly declined as a result of their appropriation by the state.⁴¹

3.1.4 Emissions increase with equal opportunities

In countries where more equal opportunities exist for men and women, women tend to orient themselves versus a lifestyle that is similar to the average current male lifestyle. In the US, for

³⁸ S. Rosenbloom, S. Burns, Gender Differences in Commuter Travel in Tucson: Implications for Travel Demand Management Programs, UCTC No. 273, Berkeley 1993.

³⁹ S. Kunst, T. Kruse, Integrating gender perspectives: realising new options for improved water management, Cross-cutting Thematic Background Paper, International Conference of Freshwater, Bonn, 2001.

⁴⁰ World Water Vision, Results of the gender mainstreaming project. The way forward, Marseille, 2000.

⁴¹ Kunst and Kruse, op.cit.

example, women now belong to the most intensive users of highly inefficient SUVs.⁴² So their emissions are likely to rise. However, it has been noted that higher education levels increase their mitigative capacity. Gender equality may be good for women (not always so for men!), but it may not necessarily be good for the environment , since women with equal access to and control of resources may tend to adopt current male models and patterns of consumption in emulation of men. With equal gender opportunities a new environmentally respectful model needs to be invented that makes men and women equally accountable for their personal consumption and renders them responsible for the impact it has on the environment. Raising women’s (and men’s) consciousness about accepting the ‘current male lifestyle’ as the universal model without examining its environmental impacts is imperative, to ensure that equal opportunities for men and women does not mean carelessly endorsing and accepting models that may lead to huge environmental costs and irretrievable disasters.

3.2 Women’s adaptive capacity

The fundamental goal of adaptation strategies is the reduction of the vulnerabilities to climate-induced change in order to protect and enhance the livelihoods of poor people.⁴³ These, in turn, are strictly correlated to the concept of “livelihood assets”. This expression comprises “the means of production available to a given individual, household or group that can be used in their livelihood activities”.⁴⁴ As a consequence, as some authors underline with particular emphasis, “the greater and more varied the asset base the higher and more durable the level of sustainability and security on their livelihoods”.⁴⁵ Generally, the great part of the existing literature identifies five categories of livelihoods assets:

- natural capital;
- social-political capital;
- human capital;
- physical capital;
- financial capital.

In its Third Assessment Report (TAR) the IPCC underlines how the ability to adapt to climate-induced changes is a function of several strategic factors including wealth, technology, information, skills, infrastructure, institutions, equity, empowerment and the ability to spread risk.⁴⁶ On the household level this translates into control over land, money, credit and tools; low dependency ratios; good health and personal mobility; household entitlements and food security; secure housing in safe locations; and freedom from violence. Furthermore, “diverse income sources, secure employment, labour mobility, relevant job skills, control over economic decisions in the household are critical” (Enarson 2000). Poverty,

⁴² Rosenbloom and Burns, op.cit.

⁴³ J. Soussain, I. Burton, A. Hammil, Livelihoods and climate change: combining disaster risk reduction, natural resource management and climate change adaptation in a new approach to the reduction of vulnerability and poverty, IUCN/IISD/SEI, 2003.

⁴⁴ Ibid.

⁴⁵ Id.

⁴⁶ IPCC, Climate change 2001: impacts, adaptation and vulnerability, contribution of Working Group II of the IPCC to the Third Assessment Report (TAR), Cambridge, UK, 2001.

on the other hand, influences the vulnerability of the critical segments of societies through mechanisms such as, the access to those resources that are fundamental to allow coping with extreme weather events and the marginalization from decision making and social security.⁴⁷

Vulnerability and poverty are strictly connected to gender inequality. In fact, as the IPCC points out, experience shows that vulnerability is differentiated by gender. This is the case, for instance, of the “feminisation of poverty” brought about by the existing different gender roles in the framework of natural resource management. It could occur, that given the traditional view of women’s roles, in an eventual increase of water scarcity caused by climate change, women would most likely be expected to bear the associated labour of looking for water and facing the difficulties in ensuring their family’s food security.⁴⁸

Women in developing (and developed) countries are generally considered part of the vulnerable groups. High dependence from agriculture, forest resources, fisheries and bio-fuels can increase the vulnerability and the risk of environmental depletion. Women’s active involvement in activities dealing with these sectors and their dependence on biomass energy necessitates effective environmental management. Moreover, the problems relating to the management of the environmental common assets can become worse under the pressure of global warming. Food and water insecurity, which represent even now a serious threat for many people of the world could be further worsened. In this way climate change could potentially accentuate the gaps between the North and the South of the world, the richest and the poorest, and women are among the poorest and most disadvantaged.

Women represent the majority of low-income earners. They are imprisoned in cycles of dependency and have to fight each day to maintain their household and take care of their families. Women generally have a lower education level than men and are thus less likely to be reached by extension agents. Diversification of crop and livestock varieties, including the replacement of plant types, cultivars, hybrids, and animal breeds with new varieties intended for higher drought or heat tolerance that are recommended as adaptation options to climate change are rarely available to such women farmers.⁴⁹ So overall the perverse outcome results that female farmers contribute less to climate change than male farmers but are more vulnerable to it.

Women do develop adaptive strategies to protect the sustainability of their livelihoods. Despite this, the magnitude and scale of predicted environmental stress is such that it can “overwhelm” their ability to react to the new threats. Very poor, nomadic women may have a relatively high adaptive capacity due to their intimate knowledge of their natural environment. Densely populated agrarian regions that are subject to increased extreme events may be the most vulnerable. Increased malaria and dengue cases for example, weaken vulnerable members of the household with the caring for the ill falling mainly on women. On the other hand, the additional nutritional difficulties, and, in particular, food and water issues, will impact more severely on women rather than on men, considering their respective roles in communities.

In the developing areas of the world, women are the main natural resources users and managers. Environmental degradation implies serious adverse effects on women and their

⁴⁷ Ibid.

⁴⁸ Id.

⁴⁹ P. Kurukulasuriya, S. Rosenthal, *Climate Change and Agriculture. A Review of Impacts and Adaptations*, *Climate Change Series No. 91*, World Bank, Washington, 2003.

families. In fact, as some authors point out, “households dependent on women’s labour in subsistence or cash cropping or on plantation are also badly affected by storms and droughts”.⁵⁰ Impacts of more frequent extreme weather events will be gender differentiated, including:

- increasing male migration, causing a further burden for women’s responsibilities and chores inside and outside the household;
- changes in cropping and livestock production with associated effects of gender division of labour and income opportunities;
- increased difficulties in access to resources, especially for fuelwood and water, with consequent increased workload for women and children.

As natural resource managers, women must be involved in the efforts of anticipating adverse impacts deriving from climate change. If women are primarily responsible for water collection and household gardens, as a consequence, a drought will probably increase their workload. In reality, “Deforestation increases the workload of fuel collectors, usually women. Recovery strategies and efforts to deal with the causes of drought and deforestation should always include the primary users of the basic resource – in these cases women”.⁵¹ “Through factoring gender considerations and analysis into activities such as training and participatory planning it is possible to contribute significantly both to reducing disaster occurrence and loss as well as to more equitable and sustainable development”.⁵² Strategies for responding to the challenges launched by climate change should be modelled on these very livelihoods dynamics, reducing existing vulnerabilities and strengthening the resilience to these vulnerabilities. Studies underline that often both individuals and communities take “conscious and planned steps to adapt the pattern of their livelihoods to reflect immediate or anticipated change to climate conditions”.⁵³

Economic insecurity has gender implications for climate change mitigation and adaptation. The gendered division of labour, particularly that existing in poor households and in the context of the global economy, contributes to make women less able than men to access and control key economic resources. In particular, factors including high level of poverty, secondary status in the labour force, extensive informal sector work and lack of land rights associated to intensive domestic responsibilities decrease both the adaptive and mitigative capacity of women.

Studies carried out in the field of risk management, underline that gender relations (in terms of coping mechanisms) can be considered as causal factors in the determination of a risk scenario.⁵⁴ In fact, these relations can influence a great part of the processes leading to

⁵⁰ V. Nelson et al., Uncertain predictions, invisible impacts, and the need to mainstream gender in climate change adaptation, *Gender and Development*, Vol 10, No. 2, July 2002, 51–59.

⁵¹ M. Anderson, P. Woodrow, Rising from the ashes: developing strategies in times of disaster, 1989 quoted in Enarson, (2000).

⁵² N. Sequeira, Risk management: an alternative perspective in gender analysis, UNDAW, Environmental management and the mitigation of natural disasters: a gender perspective, Report of the Expert Group Meeting (Ankara, Turkey, November 2001), New York, USA, 2001.

⁵³ Soussain et al., op.cit.

⁵⁴ The risk management perspective considers disasters as unresolved problems of development, or better, as "characteristics and consequences of development processes". Risk is represented through a complex combination of vulnerabilities and hazards. Hazard, on this side, refers to the probability of occurrence of a

hazards and vulnerabilities. However, they are themselves impacted by these events.⁵⁵ The following citation depicts the root causes of women's vulnerability to disasters highlighted by the studies carried out by Mary Anderson.

In general, around the world, women are poorer than men. [...] Women are disproportionately employed in unpaid, underpaid and non-formal sectors of economies. Inheritance laws and traditions, marriage arrangements, banking systems and social patterns that reinforce women's dependence on fathers, husbands and sons all contribute both to their unfavourable access to resources and their lack of power to change things. The health dangers that result from multiple births can contribute to interrupted work and low productivity. Traditional expectations and home-based responsibilities that limit women's mobility also limit their opportunities for political involvement, education, access to information, markets and a myriad of other resources, the lack of which reinforces the cycle of their vulnerability (Understanding the disaster-development continuum", *Focus on gender*, No. 2/1, 1994, quoted in Enarson, 2000).

During recent years, research highlights the consequences, associated to natural disasters, on women's work.⁵⁶ In synthesis, there are five major adverse impacts:

- women's economic insecurity increases more than men's. This process involves the loss of economic resources and deterioration of economic status. In fact, women lose productive assets and/or become sole earners.⁵⁷ Moreover, they are also exposed to the loss of entitlements. It should be noted that households couldn't be no longer considered as unitary associations characterized by an equal distribution of resources among its members. For instance, as studies carried out in the famine analysis context, reveal: "women's bargaining position in the household weakens as their assets are depleted, their income-earning options become inferior, and they are less mobile, leaving men in crisis in a stronger 'fall-back-position'".⁵⁸
- gender barriers obstacle women's relief and reconstruction work. Enarson underlines that "short -term change may occur in gender roles, but the gendered division of labour may also become more intense".⁵⁹
- a sustained increase of women's workload.
- a progressive deterioration of women's working conditions.
- women recover slowly from economic losses.

potentially damaging event. Hazards can be natural, but normally are socio-natural in character, considering the influence of human intervention on the occurrence of events such as floods, flash floods, landslides, and drought. Etc. Finally, in this context, vulnerability refers to the ability of people to absorb the impact and recover from hazard. Sequeira, N., "Risk management: an alternative perspective in gender analysis", UNDAW, *Environmental management and the mitigation of natural disasters: a gender perspective*, Report of the Expert Group Meeting (Ankara, Turkey, November 2001), New York, USA, 2001.

⁵⁵ Sequeira, op.cit.

⁵⁶ As Enarson observes, the knowledge on specific gender impacts is actually limited by lack of gender analysis in most disaster research. More recent gender-focused studies examine only women's work.

⁵⁷ Earning represent the key strategy for both men and women in order to replace lost crops or business equipment. However, women's dependent care responsibilities make them less mobile than men and less able to migrate outside the impacted area to earn income (Enarson, 2000).

⁵⁸ Enarson, op.cit.

⁵⁹ Ibid.

Factors such as reduced income, employment loss, expanded workloads and critical working conditions make the recovery from natural disaster problematic for both men and women. However, gender inequality plays a relevant role: it emphasises the adverse affects on women's lives, limiting their long-term recovery.

Some lessons from FAO's experience (see FAO website www.fao.org) during the Tsunami in Asia in 2004 showed that this natural disaster had different effects on women and on men, due to the strong gender-based division of labour of productive and reproductive activities in the areas it struck. Men have traditionally taken care of fishing and marketing, while women were responsible for fish processing, small markets and home gardening.

Coastal fishermen and farmers from poor fishing villages and small coastal towns of low economic value were among the communities hit the hardest in the tsunami area. Land and most probably the sweet water wells that provided water for drinking and irrigation could not rapidly be returned to use for agriculture once they were inundated by the sea. . Small entrepreneurs who, for example, marketed dried fish or provided specialized traditional equipment to coastal communities faced economic devastation. Women who used to process fish may did not have more fish to process.

Due to the household division of labour, women traditionally take care of the sick. Their burden increased due to the high number of persons injured or become ill, as epidemics developed. In addition, as they usually have the responsibility to fetch water, they needed to find water for their household needs and for their agriculture crops.

In this context, women and men took on new roles and responsibilities to adapt to the new socio-economic conditions they found themselves in, to secure their own and their families' survival. While many people were able to return to fishing or farming livelihoods, many others had both the need and the opportunity to shift. Even for those who returned to previous livelihoods, the structure of those livelihoods changed. Over the longer term, such shifts were essential to improving the livelihoods and reducing poverty.

Lessons learned in natural disasters reveal that interventions to save lives and secure livelihoods are more efficient and effective when gender issues are properly understood and addressed.

These findings suggest the formulation of eligible actions for responding to these threats. At the base of the interventions there is the need for a correct assessment of local hazards, capacities and vulnerabilities.⁶⁰ The following box quotes a brief extract from Oxfam's Handbook of development and relief, synthesizing the importance of the adoption of a gender-sensitive approach in this context.

⁶⁰ "Planners cannot anticipate resources or needs when key questions about women's and men's lives are neither asked nor answered," Enarson (2000).

Box 2. Gender-sensitive risk mapping

Relief efforts to assist “the community” will not assist women and men equally, or address the needs of its weaker or less vocal members, unless they are specifically designed to do so. The appropriateness and effectiveness of this kind of intervention depend crucially on how much it is known and understood about existing social structures. Gender relations are crucial dimension of all socio-economic systems, and the distinct roles and needs of women and of men, as well as of other specific groups of people, should continually be analysed. Crucial questions need to be answered, such as: who cultivates which crops, and when; who markets the crops, and who controls the resources; who cares for which livestock; who decides on changes in cropping or livestock management patterns and on what basis?

Source: Fade and Williams, 1995, quoted in Enarsond, 2000.

In this context, the role played by the local knowledge systems is of strategic importance. A growing number of studies have progressively acknowledged the relevance of local knowledge as a precious source of information of natural resource management.⁶¹ What makes local knowledge systems a strategic component is the development dynamics at their base. In fact, these have been developed with the passing of the years, over centuries from one generation to another, and through a fundamental interaction between people and the changes in the environment.⁶² This contributed to the development of participatory approaches in research and development initiatives, involving local communities and their knowledge. In this way, local populations are regarded as “management experts” with their special expertise and having the right to take active participation, as partners, in the efforts to promote sustainable resource use. It should be underlined that local knowledge systems are gender-specific. This implies that within communities, different groups, women, men, youth and elders, develop different types of knowledge modelled on their specific access to basic resources (water, seeds and land) and participation to decision power at both household and village levels. However, one has to be careful not to perpetuate reactions that are appropriate to past climatic conditions but are inappropriate to the recent changed climate conditions.

“Women are a vital part of disasters mitigation and response efforts, whether acting within their traditional gender roles”,⁶³ or, when and where possible, transcending them. As PAHO points out on the basis of its experience, natural disasters often offer women the opportunity to challenge their gendered status in society. To understand these potentials, it is enough to consider that:

- women have proven themselves indispensable in the response to disasters. “Though often against men’s wishes, women have been willing and able to take an active

⁶¹ There are many different definitions of local knowledge. It can be considered in terms of traditional and indigenous knowledge unique to a particular community.

⁶² Examples included: drought coping strategies, local plant varieties and animal breeds developed and nurtured by local treatment of livestock, soil conservation practices, forest and water resources management.

⁶³ Pan American Health Organization (PAHO), Gender and natural disasters, Fact Sheet, Women, Health and Development Programme, 2001.

role in what are traditionally considered ‘male tasks’. This can have the effect of changing society’s conceptions of women’s capabilities”.⁶⁴

- women are most effective at mobilizing the community to respond to disasters. In fact, they generally organize groups and networks with the involvement of social actors working to identify and, then, to satisfy the most pressing needs of the community.
- as a result of their response efforts, women are developing new skills such as natural resource and agricultural management, which, in the presence of appropriate enabling frameworks, could represent opportunities for income generation.

The majority of responses are designed for the entire population of a vulnerable area. Despite this, when these strategies rely on existing structures of resource distribution reflecting the patriarchal structure of society, women, as a consequence, are generally marginalized in their access to resources.

An effective development process must include both the needs and the potential contribution of women as well as men.⁶⁵ A community-based preparedness and response to the threats of climate change that takes women’s physical, psychological, social and economic vulnerabilities into due consideration will help to reduce their exposure to the adverse effects of the phenomenon. Furthermore, plans, projects, strategies and initiatives that recognize women’s abilities and include them in the efforts to respond and mitigate climate change will contribute to change gendered beliefs about women. Finally, as several authors point out, a gendered approach to the study and analysis of the impacts deriving from the effects associated to the dynamics of climate change is essential to reach the goal of gender equity in this type of intervention.⁶⁶

Many approaches have been suggested to exploit the synergies deriving from these potentials reducing vulnerabilities to adverse climate impacts. Social changes are generally regarded as instruments able to correct gender inequalities while improving, at the same time, women’s lives.

Gender analysis is considered one of the best approaches to reach this objective, promoting a shift from a special focus on women to the adoption of a broader gender approach, based on the relations between men and women. In particular, the “confusion between a gender-aware approach and women-only support can lead to a range of problems, such as the marginalisation of women’s issues and inappropriate projects for women (...) No development work can be effective which does not take into account the relationships between people. As the relationships between males and females form the basis of human society, the analysis of the implications of these relations must form the basis of development and relief interventions”.⁶⁷

As some authors point out, focusing simply on women’s activities can exclude relevant dimensions of their livelihood strategies such as “vital relations of interdependence between

⁶⁴ For instance, after Hurricane Mitch in 1998, women in Guatemala and Honduras were directly involved in the reconstruction activities (including building houses, digging wells and ditches, hauling water and building shelters (PAHO, op.cit.).

⁶⁵ Ibid

⁶⁶ Cf. PAHO, op.cit. and Enarson, op.cit.

⁶⁷ D. Fade, S. Williams, *Oxfam Handbook of development and relief*, London, UK, 1995.

men and women”.⁶⁸ In this way the challenge becomes “not whether to include men and masculinity” in the analysis but rather “the degree of centrality they should assume”.⁶⁹

4 The debate: key issues on the climate change agenda

4.1 Acknowledging gender in climate policy

The preceding discussion has shown that gender aspects have been neglected in the climate change negotiations. Therefore, the following activities are necessary both on the national and international level:

- Mapping of gender-specific emissions profiles, mitigative and adaptative capacity
- Assessment of impacts on changing status of women on these parameters
- Development of new policy instruments and adaptation of existing ones with regards to gender specificities

The aim must include avoiding women taking up a male emissions profile while achieving an adaptive capacity that is as good as the one of the average male. A necessary condition for achieving gender neutrality of climate policy is to achieve equality of income and opportunity for women.

A mainstreaming of climate policy into development policy is called for. As gender policies go hand in hand with general development policies that increase overall societal resilience to meteorological extreme events, mitigative and adaptive capacity.

A closer collaboration between the three Rio Conventions, the Convention to combat desertification – CCD; the Convention of Biological Diversity – CBD; and the Climate Convention – FCCC) can help to achieve this mainstreaming.

In particular, the CCD and CBD have been characterized during the years, by an intense work devoted to social implications, with a special focus attributed to local populations and communities regarded as “custodians of knowledge and skills” on resource management.⁷⁰ These could contribute to re-orient the Climate Convention towards social issues traditionally disregarded in the negotiations. Responses to global environmental problems require measures to be undertaken into a variety of sectors, including for instance agriculture, forestry, energy and water. Conventional approaches consider these issues in terms of a “stand alone agenda”. In order to benefit of existing synergies, “it is urgent to take necessary corrective actions, focussing on development strategies that respond simultaneously to social and economic development and global environmental concerns”.⁷¹

⁶⁸ A. Cornwell, Men, masculinity and 'gender in development', in C. Sweetman, *Men and Masculinity*, Oxford, UK, 1997.

⁶⁹ Fordham, op.cit.

⁷⁰ Eriksen and Næss, op.cit.

⁷¹ OECD, *Integrating the Rio Conventions into development cooperation*, The DAC Guidelines, Paris, France, 2002.

4.2 Mitigation

The role of women in mitigation has to be acknowledged. The only instrument involving developing countries in mitigation so far is the Clean Development Mechanism (CDM). This mechanism has the twin aim of achieving sustainable development in the host countries of the emission reduction projects and achieving cost-efficient reductions for the developing countries. Naturally, these aims do not necessarily coincide. “The capacity of developing countries to evaluate projects, the inclusion of the poor in the design of CDM projects and streamlined approval procedures for small projects could all contribute to increasing the CDM’s effect on poverty”.⁷² It is generally agreed that the highest potential of the CDM to combine poverty alleviation to GHG abatement, in brief “the win-win projects” are small-scale, off-grid projects in micro-hydro and biomass energy generation and small-scale afforestation and reforestation projects, which cover tree plantings in agroforestry and urban landscapes of low-income communities and individuals, as defined by the host countries. However, the international process to register an emission reduction project as a CDM project is cumbersome and costly. The transaction costs make regular scale projects unviable that generate less than 20,000 t of CERs per year. These small projects, which benefit from simplified modalities and conditions and lower fees however would be those with a maximum benefit for marginalized groups because they would be more likely to be implemented in rural areas. The CDM Executive Board’s simplified rules for small-scale projects remain to show their effectiveness. It is encouraging that among the 50 odd projects lining up for official registration, about half are small and some are real rural micro projects such as hydro plants in Bhutan and Honduras generating 500 to 1000 CERs annually. It is also encouraging that in the form of small-scale sequestration projects, Parties have conceived a special project type aimed particularly at the poorest segment of society, in which women are over represented. COP10 has specifically mandated international agencies, like FAO, to facilitate and build capacity for this project type.⁷³

5 The way forward: the integration of the gender variable

5.1 Assuring that gender is mainstreamed in current responses to climate change

Most of the examined literature agrees on the fact that the gender variable should be taken into due account considering that the emissions, mitigative and adaptive capacity of men and women differ as regards climate change. In particular any discussion on the economics of climate change to be effective should include issues including:⁷⁴

⁷² R. Reynolds, C. Mc Guican, D. Wiedmer, Poverty and climate change: assessing impacts in developing countries and the initiatives of the international communities, London School of Economics, UK, 2002.

⁷³ *Invites* relevant multilateral agencies, intergovernmental organizations and non-governmental organizations: (a) To formulate, develop and implement programmes to support capacity-building activities to assist low-income communities and individuals in the development and implementation of small-scale afforestation and reforestation project activities; (b) To develop web-based tools for small-scale afforestation and reforestation project activities to assist in project development, including small-scale forestry options and their quantified carbon sequestration potential, satellite/aerial images, carbon assessment models and market information for these project activities; (c) To organize regional workshops, in collaboration with relevant international organizations and institutions, to facilitate the development and implementation of small-scale afforestation and reforestation project activities under the clean development mechanism; etc.

⁷⁴ Pandey, op.cit.

- differences in emissions characteristics between men and women
- the additional work burden of women and female children;
- the gender differences in access to resources and consumption patterns;
- the comparative vulnerability of women to climate change.

Adverse impacts associated to natural disasters and environmental degradation affect with particular emphasis vulnerable populations, including women, children and the elderly, with the least access to essential and vital resources for recovery. Experience shows that in both developed and developing countries, women are not adequately represented among those most impacted by environmental changes. Many reasons are at the base of this attitude: for instance, women's income levels are lower than those of men. Moreover, in many parts of the world, women lack ownership or control of resources, access to information and decision making authority. There is a need to take measures to ensure that the effects of climate change do not further impoverish women and plunge them further into the perpetuation of poverty.

However, “focusing solely on vulnerability may be misleading since women often have untapped skills, coping strategies and knowledge that could be used to minimize the impacts of crisis, environmental change and disasters”.⁷⁵ In reality, “women have a key role in development, and any potential environmental policy should take cognisance of women as key players particularly given their role as natural resource managers”.⁷⁶ Studies underline the existence of potentials linked to women's active involvement in agriculture and their dependence on biomass energy that make them the “key stakeholders” in effective environmental management.

It should be underlined that the development of appropriate strategies to respond to climate change impacts “necessitates an understanding of systemic interactions and an emphasis on an integrated, holistic planning process that includes multi-sector cooperation and participation”.⁷⁷ One of the central aspects of any participatory planning is gender equality. As a consequence, the gender factor, being a key component of the political, social, economic and cultural characteristics of a society, can be thus considered a strategic tool for identifying roles and responsibilities within a community. To achieve gender equity, as recent studies point out, the construction of enabling frameworks does not only involve “government spending” targeted on equal opportunities between sexes, but a special focus should be reserved for the adoption of gender-sensitive policy-making.⁷⁸

It should be noted that negotiations for the next commitment period start in 2005. It would be important to introduce the gender issue into these negotiations by lobbying with national negotiators. In addition, women's groups could comment to proposed CDM projects and insist that gender issues are integrated adequately. In addition, the inclusion of gender concerns into the Side events at SBSTA/COP/MOP might be also effective.

⁷⁵ Ibid.

⁷⁶ Denton, op.cit.

⁷⁷ C.L. Anderson, Gender matters: implications for climate variability and climate change and for disaster management in the Pacific Islands, *Intercoast*, Winter 2002.

⁷⁸ See Editorial, *Feminist Economics*, Vol. 9, No. 2, 2003.

6 Conclusions: a set of recommendations

Studies, debates and international fora suggest integrating the gender variable into emerging national and future international responses to climate change. Gender considerations should be introduced in the key critical issues on the climate change agenda, namely: mitigation, the CDM, adaptation and capacity building. More efforts should be directed towards a wider application of a gendered approach even in other strategic sectors, including, for instance, technology transfer and vulnerability studies. In this way, scientific and policy efforts on climate change and sustainable development should take advantage, and thus benefit from the synergies derived from the influence that gender has on any collective effort to build a really sustainable society, based on a collaboration between the North and the South.

6.1 Emissions patterns and mitigation

According to the intention of climate change negotiations, mitigation will not be mainly based on reduction of production and economic growth. The way forward passes through the substitution of old conventional technologies based on fossil fuels, with clean and efficient technology, in both developed and developing countries. Moreover, there is a distinct behavioural component to emissions, where gender differences play a non-negligible role that needs to be considered. As already noted, there is the provision of adequate incentives in order to facilitate the implementation of these measures.

As some authors underline with particular emphasis: “Depending on the key players within the context of an incentive, penalty of technology, a gendered approach might be the most efficient way to proceed”.⁷⁹

Given the fact that, as gender analysis shows, men and women have differential knowledge of local resources and climate change, and given the linkage existing between women and natural resources, it should be noted that women could play a crucial role in climate change mitigation. In fact, they can contribute to the adaptive management of local vegetation resources, thus saving ecosystems from catastrophic shifts.⁸⁰

Skutsch, on the other hand, underlines that the response to climate change is becoming more and more a “multi-billion dollar business” with the design of funds directed to all kinds of projects in both the private and public sectors. Given this reality, the problem is then “whether women are likely to be able to take an equal share in this, and what needs to be done to ensure that they do”.⁸¹ The response to this question must be based on a right combination of carbon reduction (climate objective) and equity (development objective). The initiatives must thus include, on the one hand, efforts aimed at assuring women’s access to funds to meet climate objectives with, on the other hand, the generation of beneficial gender-based effects, that is to say, the possibility for women to acquire improved energy technologies, traditionally out of their reach. Moreover, it should be attempted to keep women’s lifestyles less emissions-intensive than those of males while safeguarding equal opportunities.

⁷⁹ Wamukonya and Skutsch, op.cit.

⁸⁰ Pandey, op.cit.

⁸¹ M.M. Skutsch, Protocols, treaties and action: the ‘climate change process’ viewed through gender spectacles, *Gender and Development*, Vol. 10, No. 2, July 2002, pp. 30–39.

6.2 The Clean Development Mechanism (CDM)

With reference of one of the Kyoto flexible mechanisms, the CDM, recent analyses find that there is strong evidence that women might be targeted for a range of technologies in various areas such as household energy, agricultural and food processing, forest management and water pumping in the rural areas. However, generally extension related to technology is directed towards men regarded as the principal stakeholders and decision-makers as well as the direct managers of these technologies. On the contrary, experience shows that women “are avid users of technology provided it meets their particular needs”.⁸² As Denton notes, structural obstacles, including a lack of education and entrepreneurial skills, as well as cultural restrictions, contribute to limit or even inhibit women’s efforts in entrepreneurial activities.⁸³

The CDM offers an important new opportunity to market new technology to women on a large scale. In fact, the additional value of emission reduction may make investment projects attractive in those cases where otherwise might not have been.⁸⁴ To exploit these opportunities a marketing strategy should be introduced by investors in host countries. This should be based on the recognition of gender differences in needs and acquisition possibilities. Moreover, CDM projects also have the opportunity to play a relevant role not only in the context of the efforts directed to the reduction of dangerous human-induced emissions but even in the broader framework of sustainable development. For this reason, there is more justification for an explicit focus on women and their active involvement.

However, while in theory the CDM offers new opportunities to sustain the widespread diffusion of renewable and efficient energy options particularly useful for women’s daily energy needs,⁸⁵ in reality “this may not be as attractive to carbon investors as large one-off investments in industry, despite the additional financial bonus that is implied by the emission reduction”. In particular, as Skutsch adds, “they are unlikely to decide that targeting women will result in grater efficiency in offsetting carbon”.⁸⁶ This view does not take into account the evidence of equity reasons requiring the promotion of these technologies to women. It also misses the latest regulatory developments in small-scale energy-, afforestation, agroforestry and urban forestry projects, which could easily be tailor made to specifically promote women. In fact, by doing so, it might be easier to meet the additionality criterion of the CDM and social impact criteria. As a consequence, in this framework, it is particularly recommended that women’s lobby take up this issue, ensuring that investment decisions of governments and private sector companies are taken in such a way that women are able to participate in a substantial way, especially at the implementation level.⁸⁷ The need for government approval of all CDM projects allows the definition of a criterion that checks whether gender aspects have been properly taken into account.

⁸² Wamukonya and Skutsch, op.cit.

⁸³ Denton, op.cit.

⁸⁴ Wamukonya and Skutsch, op.cit.

⁸⁵ Including, for instance, household energy, agricultural and food-processing, forest management and water pumping in rural areas. See Piana, op.cit.

⁸⁶ Skutsch, op.cit.

⁸⁷ Wamukonya and Skutsch, op.cit.

6.3 Adaptation

According to recent studies, there are various kinds of investments in the field of adaptation measures and initiatives to be considered, with the objective of sustaining vulnerable populations to preserve their livelihoods against the threats deriving from the changes in climatic conditions. These include, for instance, projects in agriculture and in forestry, and civil engineering interventions to shore up dikes and seawalls. All these sectors are characterized by a considerable women's involvement. It appears thus clearly that the introduction of a gender sensitive approach could assure real benefits both in efficiency and equity terms.⁸⁸ Moreover, chances to obtain climate change-related funds from the GEF climate change focal area and from the three funds newly established under UNFCCC and Kyoto Protocol might increase, if capacity building is aimed specifically at women.

In a recent report, issued by the Norwegian Centre for International Climate and Environmental Research (CICERO), and devoted to the adaptation to climate change, Eriksen and Næss underlined the role of education in this context and its implication in terms of gender. According to the authors, the education sector can support adaptation through the strengthening of women's coping mechanisms.⁸⁹ In reality, "education increases women's ability to access relevant information and, importantly, to get their voices through to decision-makers".⁹⁰ Furthermore, this type of gender approach when appropriately adapted to local needs and skills linked to climate responses, can contribute to strengthen the adaptive abilities of people operating in the informal and alternative sectors. In order to support women's knowledge systems and benefit of their contribution to the adaptation to climate induced changes, the availability of gender-disaggregated data on households is of key importance to reach two relevant objectives: first, an improved assessment of actual coping strategies, and, second, to target women in communication of information related to climate change.⁹¹

6.4 Capacity building

Capacity building is considered a critical area to enable the implementation of climate change commitments. Considering the flexibility mechanisms introduced by the Kyoto protocol and as well as the challenge of technology transfer, capacity building will be essential for identifying, assessing, accessing and assimilating technologies whilst implementing them.

In the context of the international negotiations, capacity building is considered an important element. In reality, it is a strategic tool to enable the UNFCCC and the Kyoto Protocol. Funds, as a consequence, have been and will continue to be introduced in increasing amounts.⁹²

Analysing this framework from a gender point of view, a pressing question appears: "To what extent women, and particularly women with low incomes, can benefit from this, and what steps need to be taken to ensure that they do?"⁹³ It should be noted that, as some authors underline, the pool of women professionals in the field of engineering, energy and other technical sectors at all levels is still very limited. Many reasons are at the core of this situation, including, a remarkable lack of financial opportunities and management

⁸⁸ Skutsch, op.cit.

⁸⁹ Eriksen and Næss, op.cit.

⁹⁰ Ibid.

⁹¹ Id.

⁹² Skutsch, op.cit.

⁹³ Ibid.

methodologies to address the problem. From this point of view, the following reflection of Skutsch is enlightening: “if women are to be able to tap climate change-related finances at all, it is clear that capacity building focused on their needs will be necessary, including the need to lobby for their own interests within the climate negotiations”.⁹⁴

Capacity building can represent a great opportunity for women if their specific needs and capabilities are taken in due consideration, to create a more “women-friendly” approach. This can be introduced in both mitigation and adaptation frameworks. For instance, the introduction of cleaner technological options in the water and agricultural sectors could target women, requiring in this way adequate gender-sensitive training.⁹⁵ Here again, small-scale carbon offset project in agroforestry and urban forestry might harbour a treasure trove of creative CDM projects suitable particularly for women.

⁹⁴ Id.

⁹⁵ Id.

ANNEX I

Impacts of climate change, vulnerability and adaptive capacity

Region	Likely regional impacts of climate change	Vulnerability and adaptive capacity
Africa	<p>Increase in droughts, floods, and other extreme events would add to stress on water resources, food security, human health, and infrastructure, constraining development.</p> <p>Changes in rainfall and intensified land use would exacerbate the desertification process (particularly in the Western Sahel and Northern and Southern Africa).</p> <p>Grain yields are projected to decrease, diminishing food security, particularly in small food-importing countries.</p> <p>Sea level rise would affect coastal settlements, flooding and coastal erosion, especially along the eastern Southern African coast.</p> <p>Major rivers are highly sensitive to climate variations and may experience decreases in run-off and water availability, affecting agriculture and hydropower systems, which may increase cross-boundary tensions.</p> <p>Increase in frequency of some extreme events in some places.</p>	<p>Adaptive capacity is low due to low GDP per-capita, widespread poverty (the number of poor grew over the 1990s), inequitable land distribution, and low education levels. There is also an absence of social safety nets, in particular after harvest failures.</p> <p>Individual coping strategies for desertification are already strained, leading to deepening poverty. Dependence on rain-fed agriculture is high.</p> <p>More than one quarter of the population lives within 100 kilometres of the coast and most of Africa's largest cities are along coasts vulnerable to sea level rise, coastal erosion, and extreme events.</p> <p>Climate change has to be recognized as a major concern with respect to food security, water resources, natural resources productivity and biodiversity, human health, desertification, and coastal zones.</p> <p>Adaptive capacity will depend on the degree of civil order, political openness, and sound economic management.</p>
Asia	<p>Extreme events have increased in temperate Asia, including floods, droughts, forest fires, and tropical cyclones.</p> <p>Thermal and water stress, flood, drought, sea level rise, and tropical cyclones would diminish food security in countries of arid, tropical, and temperate Asia.</p> <p>Agriculture would expand and increase in productivity in northern areas.</p> <p>Reduced soil moisture in the summer may increase land degradation and desertification.</p>	<p>Adaptive capacity varies between countries depending on social structure, culture, economic capacity and level of environmental degradation.</p> <p>Areas of concern include water and agriculture sectors, water resources, food security, biodiversity conservation and natural resource management, coastal zone management, and infrastructure.</p> <p>Capacity is increasing in some parts of Asia, for example the success of early warning systems for extreme weather events in Bangladesh, but is still constrained due to poor resource bases, inequalities in income, weak institutions, and limited technology.</p>

Region	Likely regional impacts of climate change	Vulnerability and adaptive capacity
	Sea level rise and an increase in intensity of tropical cyclones would displace tens of millions of people in low-lying coastal areas of temperate and tropical Asia.	
Latin America	<p>Loss and retreat of glaciers would adversely impact runoff and water supply in areas where snowmelt is an important water resource.</p> <p>Floods and droughts would increase in frequency, and lead to poorer water quality in some areas.</p> <p>Increases in the intensity of tropical cyclones would change the risk to life, property and ecosystems would be negatively affected by sea level rise.</p>	<p>Some social indicators have improved over the 1990s including adult literacy, life expectancy, and access to safe water.</p> <p>However, other factors such as high infant mortality, low secondary school enrolment, and high-income inequality contribute to limiting adaptive capacity.</p> <p>Areas of particular concern are agriculture, fisheries, water resource management, infrastructure, and health.</p>
Small Island States	<p>The projected sea level rise of 5 millimetres per year for the next 100 years would cause enhanced soil erosion, loss of land, poverty, dislocation of people, increased risk from storm surges, reduced resilience of coastal ecosystems, saltwater intrusion into freshwater resources, and high resource costs to respond to and adapt to changes.</p> <p>Coral reefs would be negatively affected by bleaching and by reduced calcification rates due to higher CO₂ levels; mangrove, sea grass bed, and other coastal ecosystems and the associated biodiversity would be adversely affected by rising temperatures and accelerated sea level rise.</p>	<p>Adaptive capacity of human systems is generally low in small island states, and vulnerability high; small island states are likely to be among the countries most seriously impacted by climate change.</p> <p>Areas of concern are food security, water resources, agriculture, biodiversity and coastal management, and tourism.</p> <p>Islands with very limited water supplies are highly vulnerable to the impacts of climate change on the water balance.</p> <p>Declines in coastal ecosystems would negatively impact reef fish and threaten reef fisheries, those who earn their livelihoods from reef fisheries, and those who rely on the fisheries as a significant food source.</p> <p>Limited arable land and soil salinization make agriculture of small island states, both for domestic food production and cash crop exports, highly vulnerable to climate change.</p> <p>Tourism, an important source of income and foreign exchange for many islands, would face severe disruption from climate change and sea level rise.</p>

Source: AfDB et al., Poverty and climate change – reducing vulnerability of the poor through adaptation, Washington, USA, 2003.

ANNEX II

Climate Change and the Millennium Development Goals

The potential impacts of climate change on the Millennium Development Goals

Millennium Development Goals: Climate Change as a Cross-Cutting Issue	
Millennium Development Goals	Examples of links with Climate change
Eradicate extreme poverty and hunger (Goal 1)	<ul style="list-style-type: none"> Climate change is projected to reduce poor people's livelihood assets, for example, health, access to water, homes, and infrastructure. Climate change is expected to alter the path and the rate of economic growth due to changes in natural systems and resources, infrastructure, and labour productivity. A reduction in economic growth directly impacts poverty through reduced income opportunities. Climate change is projected to alter regional food security. In particular in Africa, food security is expected to worsen.
Health related goals: <ul style="list-style-type: none"> Combat major diseases Reduce infant mortality Improve maternal health (Goals 4, 5 & 6)	<ul style="list-style-type: none"> Direct effects of climate change include increases in heat-related mortality and illness associated with heat waves (which may be balanced by less winter cold-related deaths in some regions). Climate change may increase the prevalence of some vector-borne diseases (for example malaria and dengue fever), and vulnerability to water, food or person-to-person borne diseases (for example cholera and dysentery). Children and pregnant women are particularly susceptible to vector and water-borne diseases. Anaemia – resulting from malaria – is responsible for a quarter of material mortality. Climate change will likely result in declining quantity and quality of drinking water, which is a prerequisite for good health, and exacerbate malnutrition – an important source of ill health among children – by reducing natural resource productivity and threatening food security, particularly in Sub-Saharan Africa.
Achieve universal primary education (Goal 2)	<ul style="list-style-type: none"> Links to climate change are less direct, but loss of livelihood assets (social, natural, physical, human, and financial capital) may reduce opportunities for full-time education in numerous ways. Natural disasters and drought reduce children's available time (which may be diverted to household tasks), while displacement and migration can reduce access to education opportunities.
Promote gender equality and empower women (Goal 3)	<ul style="list-style-type: none"> Climate change is expected to exacerbate current gender inequalities. Depletion of natural resources and decreasing agricultural productivity may place additional burdens on women's health and reduce time available to participate in decision-making processes and income generating activities. Climate related disasters have been found to impact more severely on female-headed households, particularly where they have fewer assets to start with.
Ensure environmental sustainability (goal 7)	<ul style="list-style-type: none"> Climate change will alter the quality and productivity of natural resources and ecosystems, some of which may be irreversibly damaged, and these changes may also decrease biological diversity compound existing environmental degradation.
Global partnerships	<ul style="list-style-type: none"> Global climate change is a global issue and response requires global cooperation, especially to help developing countries to adapt to the adverse impacts of climate change.

Source: AfDB et al., Poverty and climate change – reducing vulnerability of the poor through adaptation, Washington, USA, 2003.

ANNEX III

The Clean Development Mechanism (CDM)

Article 12.2 of the Kyoto Protocol provides the definition of this mechanism. “The purpose of the Clean Development Mechanism shall be to assist Parties not included in Annex I in achieving sustainable development and in contributing to the ultimate objective of the Convention, and to assist Parties included in Annex I in achieving compliance with their quantified limitations and reduction commitments under Article 3”.

It has been observed that: “the CDM is unique among the Kyoto mechanisms because it permits industrialized countries with emissions targets and developing countries that do not have targets (non-Annex I Parties) to collaborate to reduce or avoid GHGs emissions”

The Kyoto Protocol describes this mechanism in a more detailed way compared to the other flexible systems. According to its provisions, an Executive Board will supervise the CDM while external Operational Entities will verify that the projected reductions have taken place and certify the number of credits to be issued. It has been established the assignment of a percentage of the proceeds deriving from CDM projects to cover both costs of the Executive Board and assisting developing countries in their adaptation to adverse effects associated to climate change. In fact, “the ‘host’ developing country receives environmentally sustainable technology at no added cost”.

The international debate on the CDM has focused on the extent to which Annex I Parties can use it to achieve their reduction targets. Some, like the US, consider this mechanism as an efficient instrument to meet emission requirements. For this reason, according to their position, there must be no limitation to its adoption. Others, like the EU, outlined the importance of the introduction of some limitations, with special reference to land use measures. Developing countries, on their side, agree on the economic opportunities that will be created by CDM envisaged as a “tremendous flow of capital to their countries”.

Other issues that characterize the debates and negotiations during last years covered, like in the case of the other mechanisms, various aspects. It has been outlined the need for a correct interpretation of the additionality concept in CDM and whether this should be applied to investments that are profitable in their own right. Regarding baselines, the problem refers to the requirement, agreed by governments during international negotiations, to avoid that emission reductions are overestimated. They have also outlined the importance of the organization of an ad hoc system for certifying and verifying CERs to assure credibility to the regime. In fact, “in both JI and CDM projects there is an incentive for both participants in the projects to exaggerate the emission reductions”.

For those issues related to project eligibility, debates underline the necessity to give a preference to small-scale projects, dealing in particular with renewable energy. However, difficulties persist on the identification of appropriate methods to organize these priorities.

Besides the problems animating international debates during the recent COPs, it must be recognized the relevant role that the CDM can potentially play in the broader context of sustainable development. In fact, this flexible mechanism aims not only to mitigate climate change but also to promote a “clean development”. This can be envisaged as a type of

development that is compatible with environmental, social and economic systems in a sustainable way over the future.

The Marrakech Accords, issued at COP-7 (2001), specify the basic rules of the CDM, such as eligibility to participate, and baseline principles. Industrialized countries are required to have ratified the protocol and established their assigned amount. They must comply with the Protocol's reporting requirements. Developing countries to be eligible for CDM must have ratified the Protocol and set up a "Designated National Authority" for project approval. The level of the Adaptation Levy is 2%; the only sinks projects included are afforestation and reforestation . Baseline rules for small-scale CDM projects were set by the Executive Board; all other projects had to develop them on the basis of a bottom-up procedure.

ANNEX IV

Impacts of climate change, vulnerability and adaptive capacity

Region	Likely regional impacts of climate change	Vulnerability and adaptive capacity
<p>Africa</p>	<p>Increase in droughts, floods, and other extreme events would add stress on water resources, food security, human health, and infrastructure, constraining development.</p> <p>Changes in rainfall and intensified land use would exacerbate the desertification process (particularly in the Western Sahel and Northern and Southern Africa).</p> <p>Grain yields are projected to decrease, diminishing food security, particularly in small food-importing countries.</p> <p>Sea level rise would affect coastal settlements, flooding and coastal erosion, especially along the eastern Southern African coast.</p> <p>Major rivers are highly sensitive to climate variations and may experience decreases in run-off and water availability, affecting agriculture and hydropower systems, which may increase cross-boundary tensions.</p> <p>Increase in frequency of some extreme events in some places.</p>	<p>Adaptive capacity is low due to low GDP per-capita, widespread poverty (the number of poor grew over the 1990s), inequitable land distribution, and low education levels. There is also an absence of social safety nets, in particular after harvest failures.</p> <p>Individual coping strategies for desertification are already strained, leading to deepening poverty. Dependence on rain-fed agriculture is high.</p> <p>More than one quarter of the population lives within 100 kilometres of the coast and most of Africa's largest cities are along coasts vulnerable to sea level rise, coastal erosion, and extreme events.</p> <p>Climate change has to be recognized as a major concern with respect to food security, water resources, natural resources productivity and biodiversity, human health, desertification, and coastal zones.</p> <p>Adaptive capacity will depend on the degree of civil order, political openness, and sound economic management.</p>
<p>Asia</p>	<p>Extreme events would increase in temperate Asia, including floods, droughts, forest fires, and tropical cyclones.</p> <p>Thermal and water stress, flood, drought, sea level rise, and tropical cyclones would diminish food security in countries of arid, tropical, and temperate Asia.</p> <p>Agriculture would expand and increase in productivity in northern areas.</p> <p>Reduced soil moisture in the summer may increase land degradation and desertification.</p>	<p>Adaptive capacity varies between countries depending on social structure, culture, economic capacity and level of environmental degradation.</p> <p>Areas of concern include water and agriculture sectors, water resources, food security, biodiversity conservation and natural resource management, coastal zone management, and infrastructure.</p> <p>Capacity is increasing in some parts of Asia, for example the success of early warning systems for extreme weather events in Bangladesh, but is still constrained due to poor resource bases, inequalities in income, weak institutions, and</p>

Region	Likely regional impacts of climate change	Vulnerability and adaptive capacity
	Sea level rise and an increase in intensity of tropical cyclones would displace tens of millions of people in low-lying coastal areas of temperate and tropical Asia.	limited technology.
Latin America	<p>Loss and retreat of glaciers would adversely impact runoff and water supply in areas where snowmelt is an important water resource.</p> <p>Floods and droughts would increase in frequency, and lead to poorer water quality in some areas.</p> <p>Increases in the intensity of tropical cyclones would change the risk to life, property and ecosystems would be negatively affected by sea level rise.</p>	<p>Some social indicators have improved over the 1990s including adult literacy, life expectancy, and access to safe water.</p> <p>However, other factors such as high infant mortality, low secondary school enrolment, and high-income inequality contribute to limiting adaptive capacity.</p> <p>Areas of particular concern are agriculture, fisheries, water resource management, infrastructure, and health.</p>
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Source: AfDB et al., Poverty and climate change – reducing vulnerability of the poor through adaptation, Washington, USA, 2003.

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