Topic 4 – Adaptation and mitigation options and responses, and the inter-relationship with sustainable development, at global and regional levels (31 August 2007)

4.1 Responding to climate change

Societies can respond to climate change by adapting to its impacts and reducing the rate and magnitude of climate change by reducing GHG emissions (mitigation). This topic focuses on adaptation and mitigation options that can be implemented by 2030, and their inter-relationship with sustainable development; topic 5 addresses the complementary roles of adaptation and mitigation on a more conceptual basis and extends the timeframe.

The capacity to adapt and mitigate is dependent on socio-economic and environmental circumstances and the availability of information and technology[14]. However, much less information is available about the costs and effectiveness of adaptation measures than about mitigation measures. {WGII 17.1, 17.3; WGIII 1.2}

4.2 Adaptation options

Adaptation reduces vulnerability, especially in the short-term. {WGII 17.2, 18.1, 18.5, 20.3, 20.8}

Vulnerability to climate change can be exacerbated by non-climate stresses and factors. Non-climate factors, for example, poverty, unequal access to resources, food insecurity, trends in economic globalisation, conflict, and incidence of diseases such as HIV/AIDS may reduce the capacity of some communities to respond to the effects of climate change. {WGII 7.4, 8.3, 17.3, 20.3, 20.4, 20.7, SPM}

Societies across the world have a long record of adapting and reducing their vulnerability to the impacts of weather- and climate-related events such as floods, droughts and storms. Regardless of the scale of mitigation undertaken up to 2030, additional adaptation measures will be required at regional and local levels to reduce the adverse impacts of projected climate change and variability. However, adaptation alone is not expected to cope with all the projected effects of climate change, especially over the long term as most impacts increase in magnitude. {WGII 17.2, SPM; WGIII 1.2}

Some planned adaptation to climate change is already occurring on a limited basis. Table 4.1 provides examples of planned adaptation options by sector. Many adaptation actions have multiple drivers, such as economic development and poverty alleviation, and are embedded within broader development, sectoral, regional and local planning initiatives such as water resources planning, coastal defence and disaster risk reduction strategies. Examples of this approach are the Bangladesh National Water Management Plan, and the coastal defence plans of The Netherlands and Norway which incorporate specific climate change scenarios. {WGII 1.3, 11.6, 15, 5.2, 17.2}

[14] Technology is defined as the practical application of knowledge to achieve particular tasks that employs both technical artefacts (hardware, equipment) and (social) information ("software", know-how for production and use of artefacts).

Comprehensive estimates of the costs and benefits of adaptation at the global level are limited in number. However, the number of adaptation cost and benefit estimates at the regional and project levels for impacts on specific sectors such as, agriculture, energy demand for heating and cooling, water resources management and infrastructure, is growing. Based on these studies there is *high confidence* that there are viable adaptation options that can be implemented in some of these sectors at low cost, and/or with high benefit-cost ratios. Empirical research also suggests that higher benefit/cost ratios can be achieved by implementing some adaptation measures now compared to retrofitting long-lived infrastructure at a later date. {WGII 17.2}

Adaptive capacity is intimately connected to social and economic development, but it is not evenly distributed across and within societies. The poor, elderly, women, children, and indigenous populations typically have less capacity. {WGII 7.1, 7.2, 7.4, 17.3}

The capacity to adapt is a dynamic process influenced by a society's productive base including: natural and man-made capital assets, social networks and entitlements, human capital and institutions, governance structures, national income, and technology. It is also affected by multiple climate and non-climate stresses, as well as development policy. {WGII 17.3}

Recent studies reaffirm the TAR finding that adaptation will be vital and beneficial. However, financial, technological, cognitive, behavioural, political, social, and cultural constraints limit both the implementation and effectiveness of adaptation measures. Many societies have high adaptive capacity and the necessary financial resources, but remain vulnerable to climate change, variability and extremes. For example, a heat wave in 2003 caused high levels of mortality in European cities (especially among the elderly), and in 2005 Hurricane Katrina caused large human and financial costs in the United States. {WGII 7.4, 8.2, 17.4}

1 **Table 4.1.** Selected examples of planned adaptation by sector.

Sector	**Adaptation option/strategy** * indicates potential synergy with mitigation. # indicates potential trade-off with mitigation	**Underlying policy framework**	**Key constraints and opportunities to implementation** (Normal font = constraints; *italics = opportunities*)
Water {WGII, 5.5, 16.4; Tables 3.5, 11.6,17.1}	Expanded rainwater harvesting; water storage and conservation techniques*; water re-use; desalination#; water-use# and irrigation efficiency	National water policies and integrated water resources management; water-related hazards management	Financial, human resources and physical barriers; *integrated water resources management; synergies with other sectors*
Agriculture {WGII 10.5, 13.5; Table 10.8}	Adjustment of planting dates and crop variety; crop relocation; improved land management, e.g. erosion control and soil protection through tree planting*	R&D policies; institutional reform; land tenure and land reform; training; capacity building; crop insurance; financial incentives, e.g. subsidies and tax credits	Technological & financial constraints; access to new varieties; markets; *longer growing season in higher latitudes; revenues from 'new' products*
Infrastructure/settlement (including coastal zones) {WGII 3.6, 11.4; Tables 6.11, 17.1}	Relocation; seawalls and storm surge barriers#; dune reinforcement; land acquisition and creation of marshlands/wetlands as buffer against sea level rise and flooding; protection of existing natural barriers	Standards and regulations that integrate climate change considerations into design; land use policies; building codes; insurance	Financial and technological barriers; availability of relocation space; *integrated policies and managements; synergies with sustainable development goals*
Human health {WGII 14.5, Table 10.8}	Heat-health action plans; access to public 'cooling centres'; emergency medical services; improved climate-sensitive disease surveillance and control; safe water and improved sanitation	Public health policies that recognise climate risk; strengthen health services; regional and international cooperation	Limits to human tolerance (vulnerable groups); knowledge limitations; financial capacity; *upgraded health services; improved quality of life*
Tourism {WGII 12.5, 15.5, 17.5; Table 17.1}	Diversification of tourism attractions & revenues; shifting ski slopes to higher altitudes and glaciers; artificial snow-making#	Integrated planning (e.g. carrying capacity; linkages with other sectors); financial incentives, e.g. subsidies and tax credits	Appeal/marketing of new attractions; financial and logistical challenges; potential adverse impact on other sectors (e.g. artificial snow-making may increase energy use); *revenues from 'new' attractions; involvement of wider group of stakeholders*
Transport {WGII 7.6, 17.2}	Realignment/relocation; design standards and planning for roads, rail, etc. to cope with warming and drainage*	Integrating climate change considerations into national transport policy; investment in R&D for special situations, e.g. permafrost areas	Financial & technological barriers; availability of less vulnerable routes; *improved technologies and integration with key sectors (e.g. energy)*
Energy {WGII 7.4, 16.2}	Strengthening of overhead transmission and distribution infrastructure; underground cabling for utilities; energy efficiency; use of renewable sources*#; reduced dependence on single sources of energy, e.g. large hydropower dams	National energy policies, regulations, and fiscal and financial incentives to encourage use of alternative sources; incorporating climate change in design standards	Access to viable alternatives; financial and technological barriers; acceptance of new technologies; *stimulation of new technologies; use of local resources*

4.3 Mitigation options

There is *high agreement* and *much evidence* from both bottom-up and top-down studies[15] indicating that there is a substantial economic potential[15] for the mitigation of global GHG emissions over the coming decades, that could offset the projected growth of global emissions or reduce emissions below current levels[16]. {WGIII 11.3, SPM}

Table 4.2 provides information on the global economic mitigation potential in 2030. Bottom-up studies suggest that mitigation opportunities with net negative costs[17] have the potential to reduce emissions by about 6 $GtCO_2$-eq/yr in 2030. The economic potential is generally greater than the market potential[15]. {WGIII 11.3, SPM}

Table 4.2. Global economic mitigation potential in 2030 estimated from bottom-up and top-down studies. {WGIII 11.3, 3.6, SPM}

Carbon price	Economic mitigation potential	Reduction relative to SRES A1B projection of 68 $GtCO_2$-eq in 2030	Reduction relative to SRES B2 projection of 49 $GtCO_2$-eq in 2030
US$/$tCO_2$-eq	$GtCO_2$-eq/yr	percent	percent
estimated from bottom-up studies:			
0	5-7	7-10	10-14
20	9-17	14-25	19-35
50	13-26	20-38	27-52
100	16-31	23-46	32-63
estimated from top-down studies:			
20	9-18	13-27	18-37
50	14-23	21-34	29-47
100	17-26	25-38	35-53

Note: 50 US$/$tCO_2$-eq equals: ~25 US$/bbl crude oil, or ~0.12 US$/litre gasoline (~0.50 US$/gallon), or ~5 US cents/kWh electricity from coal, or ~1.5 US cents/kWh electricity from gas.

Sectoral estimates of economic mitigation potential and marginal costs derived from bottom-up studies corrected for double counting of mitigation potential are shown in Figure 4.1. While top-down and bottom-up studies agree at the global level, there are considerable differences at the sectoral level. {WGIII 11.3, SPM}

[15] For a definition and explanation, see glossary.

[16] Emissions in 2000 were equal to 43 $GtCO_2$-eq.

[17] Net negative costs (no regrets opportunities) are defined as those options whose benefits such as reduced energy costs and reduced emissions of local/regional pollutants equal or exceed their costs to society, excluding the benefits of avoided climate change.

Economic mitigation potentials for different sectors in 2030 derived from bottom-up studies

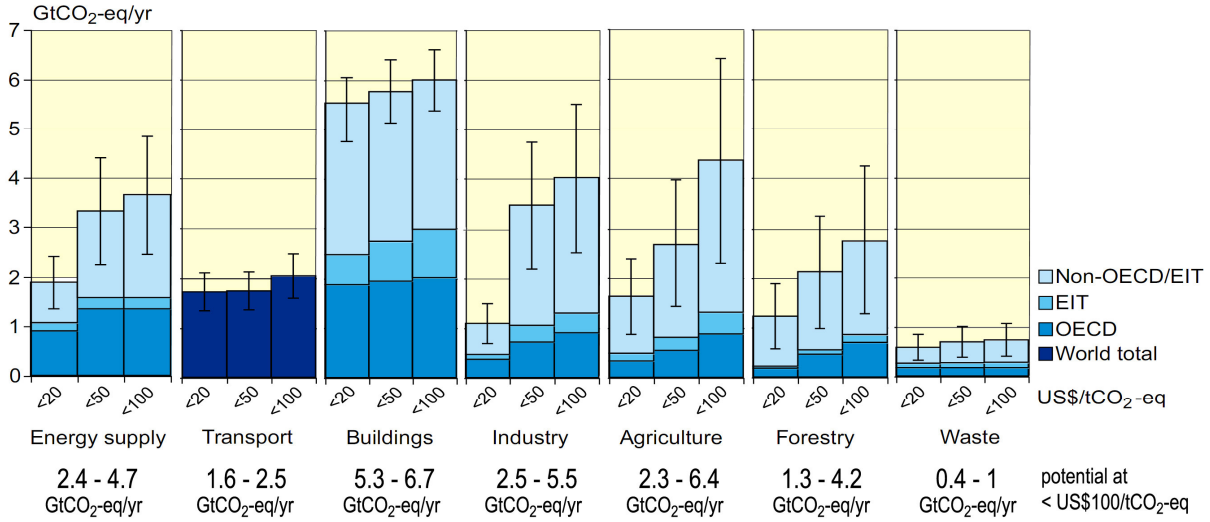

Figure 4.1. Estimated economic mitigation potential by sector and region using technologies and practices expected to be available in 2030. Notes: {WGIII Figure SPM.6}

a) The ranges for global economic potentials as assessed in each sector are shown by vertical lines. The ranges are based on end-use allocations of emissions, meaning that emissions of electricity use are counted towards the end-use sectors and not to the energy supply sector.
b) The estimated potentials have been constrained by the availability of studies particularly at high carbon price levels.
c) Sectors used different baselines. For industry the SRES B2 baseline was taken, for energy supply and transport the WEO 2004 baseline was used; the building sector is based on a baseline in between SRES B2 and A1B; for waste, SRES A1B driving forces were used to construct a waste specific baseline, agriculture and forestry used baselines that mostly used B2 driving forces.
d) Only global totals for transport are shown because international aviation is included.
e) Categories excluded are: non-CO_2 emissions in buildings and transport, part of material efficiency options, heat production and cogeneration in energy supply, heavy duty vehicles, shipping and high-occupancy passenger transport, most high-cost options for buildings, wastewater treatment, emission reduction from coal mines and gas pipelines, fluorinated gases from energy supply and transport. The underestimation of the total economic potential from these emissions is of the order of 10-15%.

No one technology can provide all of the mitigation potential in any sector, and the potential can only be achieved when adequate government policies are in place. Table 4.3 lists selected examples of key technologies, policies, constraints and opportunities by sector. {WGIII SPM}

Future energy infrastructure investment decisions, expected to total over 20 trillion US$[18] between now and 2030, will have long term impacts on GHG emissions, because of the long life-times of energy plants and other infrastructure capital stock. The widespread diffusion of low-carbon technologies may take many decades, even if early investments in these technologies are made attractive. Initial estimates show that returning global energy-related CO_2 emissions to 2005 levels by 2030 would require a large shift in the pattern of investment, although the net additional investment required ranges from negligible to 5-10%. {WGIII 4.1, 4.4, 11.6, SPM}

[18] 20 trillion = 20,000 billion = 20×10^{12}.

Table 4.3 Selected examples of key sectoral mitigation technologies, policies and measures, constraints and opportunities. {WGIII Tables SPM.3, SPM.7}

Sector	**Key mitigation technologies and practices currently commercially available.** ***Key mitigation technologies and practices projected to be commercialised before 2030 shown in italics.*** * indicates potential synergy with adaptation. # indicates potential trade-off with adaptation.	**Policies, measures and instruments shown to be environmentally effective**	**Key constraints or opportunities** (Normal font = constraints; *italics = opportunities*)
Energy Supply {WGIII 4.3, 4.4}	Improved supply and distribution efficiency; fuel switching from coal to gas; nuclear power; renewable heat and power (hydropower, solar, wind, geothermal and bioenergy)*#; combined heat and power; early applications of CCS (e.g. storage of removed CO_2 from natural gas); *Carbon Dioxide Capture and Storage (CCS) for gas, biomass and coal-fired electricity generating facilities; advanced nuclear power; advanced renewable energy, including tidal and wave energy, concentrating solar, and solar photovoltaics*	Reduction of fossil fuel subsidies; Taxes or carbon charges on fossil fuels	Resistance by vested interests may make them difficult to implement
		Feed-in tariffs for renewable energy technologies; Renewable energy obligations; Producer subsidies	*May be appropriate to create markets for low emissions technologies*
Transport {WGIII 5.4}	More fuel efficient vehicles; hybrid vehicles; cleaner diesel vehicles; biofuels*#; modal shifts from road transport to rail and public transport systems; non-motorised transport (cycling, walking); land-use and transport planning*; *Second generation biofuels*#; higher efficiency aircraft; advanced electric and hybrid vehicles with more powerful and reliable batteries*	Mandatory fuel economy, biofuel blending and CO_2 standards for road transport	Partial coverage of vehicle fleet may limit effectiveness
		Taxes on vehicle purchase, registration, use and motor fuels, road and parking pricing	Effectiveness may drop with higher incomes
		Influence mobility needs through land use regulations, and infrastructure planning; Investment in attractive public transport facilities and non-motorised forms of transport	*Particularly appropriate for countries that are building up their transportation systems*
Buildings {WGIII 6.5}	Efficient lighting and daylighting; more efficient electrical appliances and heating and cooling devices; improved cook stoves, improved insulation; passive and active solar design for heating and cooling; alternative refrigeration fluids, recovery and recycling of fluorinated gases; *Integrated design of commercial buildings including technologies, such as intelligent meters that provide feedback and control; solar photovoltaics integrated in buildings*	Appliance standards and labelling	Periodic revision of standards needed
		Building codes and certification	*Attractive for new buildings.* Enforcement can be difficult
		Demand-side management programmes	Need for regulations so that utilities may profit
		Public sector leadership programmes, including procurement	*Government purchasing can expand demand for energy-efficient products*
		Incentives for energy service companies (ESCOs)	*Success factor: Access to third party financing*
Industry {WGIII 7.5}	More efficient end-use electrical equipment; heat and power recovery; material recycling and substitution; control of non-CO_2 gas emissions; and a wide array of process-specific technologies; *Advanced energy efficiency; CCS for cement, ammonia, and iron manufacture; inert electrodes for aluminium manufacture*	Provision of benchmark information; Performance standards; Subsidies, tax credits	*May be appropriate to stimulate technology uptake.* Stability of national policy important in view of international competitiveness
		Tradable permits	Predictable allocation mechanisms and stable price signals important for investments
		Voluntary agreements	Success factors include: clear targets, a baseline scenario, third party involvement in design and review and formal provisions of monitoring, close cooperation between government and industry
Agriculture {WGIII 8.4}	Improved crop and grazing land management to increase soil carbon storage*; restoration of cultivated peaty soils and degraded lands; improved rice cultivation techniques and livestock and manure management to reduce CH_4 emissions; improved nitrogen fertiliser application techniques to reduce N_2O emissions; dedicated energy crops to replace fossil fuel use*#; improved energy efficiency; *Improvements of crop yields*	Financial incentives and regulations for improved land management, maintaining soil carbon content, efficient use of fertilisers and irrigation	*May encourage synergy with sustainable development and with reducing vulnerability to climate change, thereby overcoming barriers to implementation*
Forestry/ forests {WGIII 9.4}	Afforestation*; reforestation*; forest management*; reduced deforestation*; harvested wood product management; use of forestry products for bioenergy to replace fossil fuel use; *Tree species improvement to increase biomass productivity and carbon sequestration. Improved remote sensing technologies for analysis of vegetation/ soil carbon sequestration potential and mapping land use change*	Financial incentives (national and international) to increase forest area, to reduce deforestation, and to maintain and manage forests; Land-use regulation and enforcement	Constraints include lack of investment capital and land tenure issues. *Can help poverty alleviation.*
Waste {WGIII 10.4}	Landfill CH4 recovery; waste incineration with energy recovery; composting of organic waste; controlled waste water treatment; recycling and waste minimisation; *biocovers and biofilters to optimise CH_4 oxidation*	Financial incentives for improved waste and wastewater management	*May stimulate technology diffusion*
		Renewable energy incentives or obligations	Local availability of low-cost fuel
		Waste management regulations	Most effectively applied at national level with enforcement strategies

While studies use different methodologies, there is *high agreement* and *much evidence* that in all analysed world regions near-term health co-benefits from reduced air pollution, as a result of actions to reduce GHG emissions, can be substantial, and may offset a substantial fraction of mitigation costs. {WGIII 11.8, SPM}

Energy efficiency and utilisation of renewable energy offer synergies with sustainable development. In least developed countries energy substitution can lower mortality and morbidity by reducing indoor air pollution, reduce the workload for women and children, and decrease the unsustainable use of fuelwood and related deforestation. {WGIII 11.8, 11.9,12.4}

Literature since the TAR confirms with *high agreement* and *medium evidence* that there may be effects from Annex I countries action on the global economy and global emissions, although the scale of carbon leakage remains uncertain. {WGIII 11.7, SPM}

Fossil fuel exporting nations (in both Annex I and non-Annex I countries) may expect, as indicated in the TAR, lower demand and prices and lower GDP growth due to mitigation policies. The extent of this spill over depends strongly on assumptions related to policy decisions and oil market conditions. {WGIII 11.7, SPM}

Critical uncertainties remain in the assessment of carbon leakage. Most equilibrium modelling supports the conclusion in the TAR of economy-wide leakage from Kyoto action in the order of 5-20%, which would be less if competitive low-emissions technologies were effectively diffused. {WGIII 11.7, SPM}

There is also *high agreement* and *medium evidence* that changes in life style and behaviour patterns can contribute to climate change mitigation across all sectors. Management practices can also have a positive role. {WGIII SPM}

Examples that can have positive impacts on mitigation include: changes in consumption patterns, education and training, changes in building occupant behaviour, transport demand management, and management tools in industry. {WGIII 4.1, 5.1, 6.7, 7.3, SPM}

Policies that provide a real or implicit price of carbon could create incentives for producers and consumers to significantly invest in low-GHG products, technologies and processes. {WGIII SPM}

An effective carbon-price signal could realise significant mitigation potential in all sectors. Modelling studies show carbon prices rising to 20-80 US$/t$CO_2$-eq by 2030 are consistent with stabilisation at around 550 ppm CO_2-eq by 2100. For the same stabilisation level, studies since TAR that take into account induced technological change lower these price ranges to 5-65 US$/t$CO_2$-eq in 2030. {WGIII 3.3, 11.4, 11.5, SPM}

There is *high agreement* and *much evidence* that a wide variety of national policies and instruments are available to governments to create the incentives for mitigation action. Their applicability depends on national circumstances and an understanding of their interactions, but experience from implementation in various countries and sectors shows there are advantages and disadvantages for any given instrument. {WGIII 13.2, SPM}

Four main criteria are used to evaluate policies and instruments: environmental effectiveness, cost effectiveness, distributional effects, including equity, and institutional feasibility. {WGIII 13.2, SPM}

General findings about the performance of policies are: {WGIII 13.2, SPM}

- *Integrating climate policies in broader development policies* makes implementation and overcoming barriers easier.
- *Regulations and standards* generally provide some certainty about emission levels. They may be preferable to other instruments when information or other barriers prevent producers and consumers from responding to price signals. However, they may not induce innovations and more advanced technologies.
- *Taxes and charges* can set a price for carbon, but cannot guarantee a particular level of emissions. Literature identifies taxes as an efficient way of internalising costs of GHG emissions.
- *Tradable permits* will establish a carbon price. The volume of allowed emissions determines their environmental effectiveness, while the allocation of permits has distributional consequences. Fluctuation in the price of carbon makes it difficult to estimate the total cost of complying with emission permits.
- *Financial incentives* (subsidies and tax credits) are frequently used by governments to stimulate the development and diffusion of new technologies. While economic costs are generally higher than for the instruments listed above, they are often critical to overcome barriers.
- *Voluntary agreements* between industry and governments are politically attractive, raise awareness among stakeholders, and have played a role in the evolution of many national policies. The majority of agreements have not achieved significant emissions reductions beyond business as usual. However, some recent agreements, in a few countries, have accelerated the application of best available technology and led to measurable emission reductions.
- *Information instruments* (e.g. awareness campaigns) may positively affect environmental quality by promoting informed choices and possibly contributing to behavioural change, however, their impact on emissions has not been measured yet.
- *Research, Development and Demonstration (RD&D)* can stimulate technological advances, reduce costs, and enable progress toward stabilisation.

Some corporations, local and regional authorities, NGOs and civil groups are adopting a wide variety of voluntary actions. These voluntary actions may limit GHG emissions, stimulate innovative policies, and encourage the deployment of new technologies. On their own, they generally have limited impact on national or regional level emissions. {WGIII 13.4, SPM}

4.4 Relationship between adaptation and mitigation options and relationship with sustainable development

There is growing understanding of the possibilities to choose and implement climate response options in several sectors to realise synergies and avoid conflicts with other dimensions of sustainable development. {WGIII SPM}

Climate change policies related to renewable energy are often economically beneficial, improve energy security and reduce local pollutant emissions. Reducing both loss of natural habitat and deforestation can have significant biodiversity, soil and water conservation benefits, and can be implemented in a socially and economically sustainable manner.

Forestation and bioenergy plantations can restore degraded land, manage water runoff, retain soil carbon and benefit rural economies, but could compete with food production and may be negative for biodiversity, if not properly designed. {WGII 20.3, 20.8; WGIII 4.5, 9.7, 12.3, SPM}

There is growing evidence that decisions about macro-economic policy, agricultural policy, multilateral development bank lending, insurance practices, electricity market reform, energy security and forest conservation, for example, which are often treated as being apart from climate policy, can significantly reduce emissions (Table 4.4). Similarly, non-climate policies can affect adaptive capacity and vulnerability. {WGII 20.3; WGIII SPM, 12.3}

Both synergies and trade-offs exist between adaptation and mitigation options. {WG II 18.4.3; WG III 11.9)

Examples of synergies include properly designed biomass production, formation of protected areas, land management, energy use in buildings, and forestry, but options are rather limited in other sectors (see Tables 4.1 and 4.3). Potential trade-offs include increased GHG emissions due to increased consumption of energy related to adaptive responses. {WGII 18.4.3, 18.5, 18.7, TS.5.2; WGIII 4.5, 6.9, 8.5, 9.5, SPM}

Table 4.4. Integrating climate change considerations into development policies – selected examples in the area of mitigation. {WGIII 12.2.4.6}

Selected sectors	Non-climate change policy instruments and actions	Potential impact on GHG emissions
Macro-economy	Implement non-climate taxes/subsidies and/or other fiscal and regulatory policies that promote sustainable development	Total global GHG emissions
Forestry	Adoption of forest conservation and sustainable management practices	GHG emissions from deforestation
Electricity	Adoption of cost-effective renewables, demand-side management programs, and transmission and distribution loss reduction	Electricity sector CO_2 emissions
Petroleum imports	Diversifying imported and domestic fuel mix and reducing economy's energy intensity to improve energy security	Emissions from crude oil and product imports
Insurance for building, transport sectors	Differentiated premiums, liability insurance exclusions, improved terms for green products	Transport and building sector GHG emissions
International finance	Country and sector strategies and project lending that reduces emissions	Emissions from developing countries

4.5 International and Regional Cooperation

There is *high agreement* and *much evidence* that notable achievements of the UNFCCC and its Kyoto Protocol are the establishment of a global response to the climate change problem, stimulation of an array of national policies, the creation of an international carbon market and the establishment of new institutional mechanisms that may provide the foundation for future mitigation and adaptation efforts. {WGII 18.7; WGIII 13.3, SPM}

The impact of the protocol's first commitment period relative to global emissions is projected to be limited. Its economic impacts on participating Annex-B countries are projected to be smaller than presented in the TAR, that showed 0.2-2% lower GDP in 2012 without emissions trading, and 0.1-1.1% lower GDP with emissions trading among Annex-B countries. To be more environmentally effective, future mitigation efforts would need to achieve deeper reductions covering a higher share of global emissions (see topic 5). {WGIII 1.4, 11.4, 13.3, SPM}

The literature provides *high agreement* and *much evidence* of many options for achieving reductions of global GHG emissions at the international level through cooperation. It also suggests that successful agreements are environmentally effective, cost-effective, incorporate distributional considerations and equity, and are institutionally feasible. {WGIII 13.3, SPM}

Greater cooperative efforts to reduce emissions will help to reduce global costs for achieving a given level of mitigation, or will improve environmental effectiveness. Improving and expanding the scope of market mechanisms (such as emission trading, Joint Implementation and Clean Development Mechanism) could reduce overall mitigation costs. {WGIII 13.3, SPM}

Efforts to address climate change can include diverse elements such as emissions targets; sectoral, local, sub-national and regional actions; RD&D programmes; adopting common policies; implementing development oriented actions; or expanding financing instruments. These elements can be implemented in an integrated fashion, but comparing the efforts made by different countries quantitatively would be complex and resource intensive. {WGIII 13.3, SPM}

Actions that could be taken by participating countries can be differentiated both in terms of when such action is undertaken, who participates and what the action will be. Actions can be binding or non-binding, include fixed or dynamic targets, and participation can be static or vary over time. {WGIII 13.3, SPM}