



Legal Issues Arising from the Impact of Climate Change in the Asia Pacific

Laura Horn

Part Time Lecturer, University of Western Sydney, Parramatta, Australia

Abstract

One of the most pressing environmental threats to the Earth and its inhabitants is the impact of climate change due to the greenhouse effect. Careful management of forests, agricultural lands and range lands can lessen greenhouse gas emissions and foster the development of carbon sinks. In 1992 the international community adopted the United Nations Framework Convention on Climate Change which seeks to stabilise emissions of greenhouse gasses. Further negotiations led to the 1997 Kyoto Protocol which has yet to enter into force. This article presents a general outline of the impact of climate change in the Asia Pacific and an overview of the Convention. The legal commitments under the Kyoto Protocol are considered, in particular measures to transfer technology and financial assistance to developing countries. A concluding assessment is made of the effectiveness of these commitments and the implications of climate change for the Asia Pacific.

Key Words

Climate change, Framework Convention, Kyoto Protocol, Asia Pacific.

This article reflects the law up until 1 July 2000.

Introduction

One of the most pressing environmental threats to the Earth and its inhabitants is the impact of climate change due to the greenhouse effect. The cause of global warming which leads to climate change is the increase in greenhouse gas emissions (such as carbon dioxide, methane and nitrous oxide) due to human activities. Some activities which contribute to the greenhouse effect are the burning of fossil fuels, land use and agriculture.¹ These human activities have led to the increased release of greenhouse gases (GHGs) into the atmosphere and many of these GHGs continue to remain in the atmosphere for lengthy periods of time.²

Some of the measures that can be taken to reduce GHG emissions are the adoption of more energy efficient technologies, and the recycling of materials in industry.³ Transport systems could be improved by the use of energy efficient vehicles and alternative fuels which do not increase GHG emissions.⁴ It is also possible to reduce emissions released from the use of fossil fuels by choosing alternative sources of energy or low-carbon fossil fuels and by promoting the development of new technologies.⁵ Careful management of forests, agricultural lands and range lands can lessen GHG emissions and foster the development of carbon sinks. Practices such as the promotion of forest growth, the establishment of tree plantations and the reduction of deforestation can conserve substantial amounts of carbon.⁶

A major contribution to the development of the 1992 United Nations Framework Convention on Climate Change (FCCC)⁷ was made by the Intergovernmental Panel on Climate Change (IPCC). This organisation was established by the World Meteorological Organization and the United Nations Environment Programme in 1988 to conduct research into climate change. There are three working groups in the IPCC. The first, Working Group I researches the scientific aspects of the climate system. Working Group II investigates the vulnerability of socio-economic and natural systems, consequences of climate change and response options. Working Group III considers options for limiting

- 1 IPCC Second Assessment Synthesis of Scientific-Technical Information Relevant to Interpreting Article 2 of the UN Framework Convention on Climate Change" (1995) at <www.ipcc.ch/cc95/synt.htm> (18 November 1998) at 1, 5.
- 2 *Ibid* at 5.
- 3 *Ibid* at 19-20.
- 4 *Ibid* at 20.
- 5 *Ibid* at 20-21.
- 6 *Ibid* at 22-23.
- 7 (1992) 31 ILM 849.

GHGs.⁸ The taskforce on National Greenhouse Inventories monitors the National Greenhouse Gas Inventories Program.⁹ There have been two important assessment reports from the IPCC with the third scheduled for completion in 2000.

The debate amongst members of the international community about the nature of global warming led to the adoption of a resolution by the UN (United Nations) General Assembly on 6 December 1988 titled "Protection of global climate for present and future generations"¹⁰ which recognized that climate change is a common concern of humankind. In December 1990 the UN General Assembly set up the Intergovernmental Negotiating Committee to commence negotiations with the aim of drafting a treaty to deal with the threat to climate change. The FCCC was adopted in New York on 9 May 1992 and entered into force on 21 March 1994. The aim of the Convention is to achieve stabilisation of GHGs,¹¹ however it failed to establish targets to limit GHG emissions. Further negotiations amongst members of the international community led to the adoption of the Kyoto Protocol¹² on 11 December 1997 in Kyoto, Japan.

This article commences by presenting a general outline of the impact of climate change in different regions of the Asia Pacific. This outline is followed by an overview of the background to the FCCC. Some of the provisions of this Convention will be considered as it is the initial attempt by the international community to deal with the global environmental threat of the greenhouse effect. This article also examines the development of legal commitments under the Kyoto Protocol. Next, there is a review of the significance of measures to transfer technology and financial assistance to developing countries in accordance with the Convention and accompanying Protocol. Finally, an assessment will be made of the effectiveness of these commitments and the implications of climate change for the Asia Pacific.

The Global Impact of Climate Change

Studies by the IPCC have produced reports on the global impact of climate change. One report which focuses on the regional assessment of the impacts of climate change is called the "Summary for Policymakers: The Regional Impacts of Climate

8 See "About the IPCC" at <www.ipcc.ch/about/about.htm> (6 June 2000).

9 Ibid.

10 United Nations General Assembly Resolution 43/53.

11 FCCC, Art. 2.

12 Kyoto Protocol to the United Nations Framework Convention on Climate Change (1998) 37 ILM 22.

Change: An Assessment of Vulnerability.”¹³ Some of the conclusions of this study will be referred to in the assessment of the effects of climate change upon regions in Asia and the Pacific. However as uncertainties occur about the rate, degree and extent of climate change in the future, some doubts remain about these effects at the regional level.¹⁴

The description “vulnerability” can be explained as follows:

Vulnerability is defined as the extent to which a natural or social system is susceptible to damage from climate change. Vulnerability is a function of the sensitivity of a system to changes in climate (the degree to which a system will respond to a given change in climate, including both beneficial and harmful effects) and the ability to adapt the system to changes in climate (the degree to which adjustments in practices, processes or structures can moderate or offset the potential for damage or take advantage of opportunities created, due to a given change in climate). Under this framework, a highly vulnerable system would be one that is highly sensitive to modest changes in climate, where the sensitivity includes the potential for substantial harmful effects, and one for which the ability to adapt is severely limited.¹⁵

An assessment of vulnerability to climate change in the Asia Pacific can be conducted by considering five main regions. These regions have been included in the special report of the Intergovernmental Panel on Climate Change (IPCC) Working Group II¹⁶ as follows:

- Small Island States
- Temperate Asia
- Arid Western Asia
- Tropical Asia
- Australasia.

The basis for the assessment of climate change on these regions is a range of 1–3.5⁰ C increase in global temperature and an average sea-level rise of 15–95cm by 2100.¹⁷

13 IPCC Working Group II “Summary for Policymakers The Regional Impacts of Climate Change: An Assessment of Vulnerability” (November 1997) at <www.ipcc.ch/special/regional.htm> (17 November 1998).

14 Ibid at 9.

15 Ibid.

16 Ibid at 36, 39, 41.

17 Ibid at 10.

Small Island States

The small island States are located in the tropics and many of the island States are low-lying so that a rise in sea level could lead to flooding and salinisation.¹⁸ Drought periods could increase as a result of climate change and this could affect the ability of people to inhabit the smaller islands. On many small islands rainfall is the main source of fresh water and if this is the case, then increased drought could lead to population migration and increased urbanisation of other islands.¹⁹ In some situations it is possible that migration and resettlement out of the countries jurisdiction will be necessary.²⁰ This situation could occur on the Majuro Atoll in the Marshall Islands where there is a predicted land loss of about 80 per cent.²¹

There is likely to be damage caused to ecosystems such as coral reefs, mangroves and tropical ecosystems. One of the main problems for these low-lying islands is the land loss and beach erosion due to a rise in sea level. This land loss could also lead to threats to settled areas because of their location near the coast which could involve costly repairs. Many small island States rely upon tourism as an important part of their economy so land loss, beach erosion and damage to infrastructure could result in threats to the survival of this industry.²² There could also be an increase of human health problems such as illnesses due to heat, cholera and dengue fever.²³ The overall conclusion is that these small island States are “extremely vulnerable” to climate change.²⁴

Temperate Asia

This region includes the areas from the Arctic Circle to 18°N and the islands of Japan, Korea, Mongolia, most of China and Siberia.²⁵ The impact of global climate change will depend upon the effects of climate change upon water resources. There would be likely to be changes to temperatures and to rainfall so that the area of the tundra could be decreased by as much as half, and large sections of glaciers could

18 Ibid at 37. Malta and Cyprus in the Mediterranean are also included in the area covered by small island States; see “Climate Change Vulnerability and Adaptation in Asia and Pacific: Workshop Summary” in L. Erda *et al* *Climate Change Vulnerability and Adaptation in Asia and the Pacific* (Kluwer, Dordrecht: 1996) 6-7.

19 G.A. Meehl “Vulnerability of Freshwater Resources to Climate Change in the Tropical Pacific Region” in Erda, note 18 at 203; note 1 at 12; note 13 at 39.

20 Note 13 at 39.

21 Ibid at 12.

22 Ibid at 39.

23 Ibid.

24 Ibid.

25 Ibid.

disappear. Remaining temperate forest vegetation would be reduced in size whereas grasslands and shrublands could increase.²⁶

An important aspect of climate change in this region is its impact upon water resources. It is likely that water supplies could be lessened after glacier runoff has decreased. Northern China is “quite vulnerable” to climate change because of glacier runoff and rainfall pattern changes.²⁷ There will need to be improved infrastructure to ensure water resources can be maintained to account for the uncertainties of climate change. The main uncertainties are the effects of climate change on the monsoons and the ENSO (El Nino/Southern Oscillation) which can affect river runoffs.

The effects on crop yield production remain uncertain as there is a lack of clarity about the changes to water resources and the effects of increased carbon dioxide on plant growth.²⁸ There could be a major impact upon countries such as China which depend upon agriculture. It is likely that many areas of China could become warmer and drier by 2050.²⁹ The IPCC report on “The Regional Impacts of Climate Change” states that:

In China, for example, across different scenarios and different sites, the changes for several crop yields by 2050 are projected to be: rice, -78 per cent to +15 per cent; wheat, -21 per cent to +55 per cent; and maize, -19 per cent to +5 per cent. An increase in productivity may occur if the positive effects of CO₂ on crop growth are considered, but its magnitude remains uncertain.³⁰

There are likely to be increased land subsidence problems in delta areas together with sea level rises which would threaten coastal zones. This could result in a severe threat to the Japanese coasts where important industrial areas are located (Tokyo, Osaka and Nagoya). Increased heat stress and changed distribution of infectious diseases could also affect human health.

Arid Western Asia

This region includes the Middle East and arid Asia, it ranges from Turkey to Kazakstan in the east. The region also includes Pakistan because this area extends

²⁶ Ibid.

²⁷ Ibid.

²⁸ Ibid at 41; see L. Erda “Agricultural Vulnerability and Adaptation to Global Warming in China” in Erda *et al*, note 18 at 63.

²⁹ W. Jimgua and L. Erda “The Impacts of Potential Climate Change and Climate Variability on Simulated Maize Production in China” in Erda *et al*, note 18 at 75.

³⁰ Note 13 at 40.

from Kazakstan in the North to Yemen in the south.³¹ There may be little change to vegetation as many of the arid areas will continue to remain arid. The main difficulty for these areas is the lack of water. It is not likely that water shortages will be relieved and there could be further problems with access to water.³² If more efficient methods of water use are introduced then this could lessen some of these shortages. Some research has indicated that Pakistan's production of wheat would be reduced due to the impacts of climate change but there is insufficient research to be certain of this conclusion.³³ Reductions in food production, water shortages, heat stress and spread of diseases could lead to an increase in human illness.

Tropical Asia

The climate of tropical Asia is based upon the monsoon seasons and the occurrence of tropical cyclones.³⁴ It is likely that changes to the climate could cause a rise in temperatures and a change to the seasonal rainfall patterns. These changes could lead to a reduction in glacier size and an increased possibility of glacier lake flooding.³⁵ In the longer term the rivers which rely upon melting snow run off could decrease in flow. The outcome of climate change in this region could be a reduction in water resources. There could also be changes in crop yields although the extent of these changes remains uncertain. Some alternatives for adaptation to these changes could include the introduction of new temperature resistant crops, technologies to lessen crop losses and integrated management of river basin and coastal areas.³⁶

The main areas at risk of flooding are coastal lands such as low-lying parts of Indonesia, the Philippines and Malaysia and the delta areas of Bangladesh, Viet Nam and Thailand.³⁷ There could be major social and economic impacts as a result of flooding in these areas. Flooding could cause damage to cities, ports and the tourist and fishing industries. These risks could lead to the introduction of very expensive measures to try to mitigate the impacts of climate change.³⁸

Uncertainty remains about the affects of climate change upon regional water supplies, however, it is likely that water resources in this region will be further

31 Ibid at 25.
32 Ibid.
33 Ibid at 26.
34 Ibid at 41.
35 Ibid.
36 Ibid at 44.
37 Ibid at 43.
38 Ibid.

stretched.³⁹ Some countries such as the Philippines have no snow but could be adversely affected by climate change which could affect rainfall patterns. If the size of the population and industrialisation in the Philippines continue to increase then the need for water could treble over the next 50 years and a reduction in rainfall could lead to a further drain on water supplies.⁴⁰ Alternatively, if an increase in rainfall of about 10 per cent occurred in the Philippines then this would have a deleterious affect on crop production because of flooding.⁴¹

Human health would be adversely affected by climate change because some diseases such as malaria, schistosomiasis and dengue fever could extend to new areas.⁴² Coastal areas are particularly vulnerable due to sea level rises and the costs of adaptation measures to lessen the impact of these rises could be enormous.⁴³ Climate change will impact upon areas which are already under pressure because of increased urbanisation, industrialisation and development leading to rising levels of pollution, unsustainable practices and other environmental problems.⁴⁴

Australasia

This area includes Australia, New Zealand and their outlying islands. Vulnerable areas include coastal systems which could be affected by sea level rise and changes in local climate. Coral reefs could be vulnerable to bleaching and the death of coral could occur. There is a high vulnerability to a reduction of water resources especially in areas susceptible to drought in Australia and on low-lying islands. Coastal areas are very vulnerable to sea-level rise and communities in the Torres Strait and in the Pacific island territories of New Zealand are especially vulnerable. Some degree of vulnerability is evident to impacts on human health especially for indigenous communities and the economically disadvantaged.⁴⁵

39 Erda *et al*, note 18 at 7.

40 Ibid.

41 R.D. Buan *et al* "Vulnerability of Rice and Corn to Climate Change in the Philippines" in Erda *et al*, note 18 at 50.

42 Note 13 at 43.

43 Ibid

44 Ibid at 41.

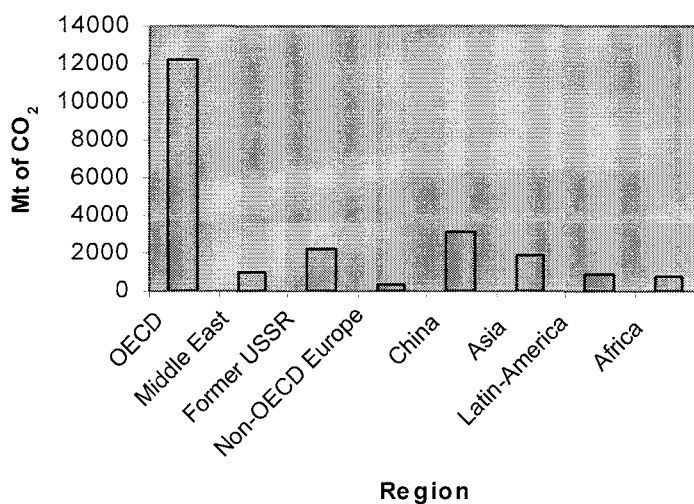
45 Ibid at 28.

Table 1: Population and CO₂ Emissions of Countries including those in the Asia Pacific Region for 1997⁴⁶

Country	Population (million)	CO ₂ Emissions (Mt of CO ₂)	CO ₂ /Population
Australia	18.53	306.10	16.52
Bangladesh	123.63	20.91	0.17
Brunei	0.31	5.12	16.52
China, People's Rep. Of	1227.18	3120.62	2.54
China, Hong Kong	6.50	41.33	6.36
Chinese Taipei	21.68	189.41	8.74
France	58.60	362.90	6.19
Germany	82.05	883.99	10.77
India	962.38	880.71	0.92
Indonesia	200.39	256.52	1.28
Italy	57.52	424.33	7.38
Japan	126.17	1172.64	9.29
Korea	45.99	422.11	9.18
Korea, DPR	22.89	77.80	3.40
Malaysia	21.67	123.71	5.71
Myanmar	43.89	6.94	0.16
Nepal	22.32	1.85	0.08
New Zealand	3.76	33.13	8.81
Pakistan	128.46	89.45	0.70
Philippines	73.53	68.74	0.93
Singapore	3.10	72.86	23.50

Sri Lanka	18.55	8.48	0.46
Thailand	60.60	175.36	2.89
USA	266.79	5470.49	20.50
Vietnam	76.71	48.37	0.63

Table 2: CO₂ Emissions by Region in 1997⁴⁷



46 International Energy Agency *Key World Energy Statistics* (STEDI: France, 1999) "Selected Energy Indicators for 1977" 48-57.

47 *Ibid.* Non-OECD Europe excludes Albania. Asia excludes China, DPR of Korea and Vietnam.

The FCCC

Background

The aim of the FCCC stated in Article 2 is to stabilize GHG concentrations in the atmosphere “at a level that would prevent dangerous anthropogenic interference with the climate system.”⁴⁸ The difficulty is to determine what levels of GHGs in the atmosphere amount to “dangerous” concentrations within the terms of this Article⁴⁹ and there continues to be uncertainty about what action can be taken to prevent this dangerous interference.⁵⁰

The IPCC considered what reductions of emissions of GHGs are necessary for stabilisation in a recent report. As far as one of the main gases, carbon dioxide, is concerned the IPCC states that:

Carbon cycle models show that immediate stabilization of the concentration of carbon dioxide at its present level could only be achieved through an immediate reduction in its emissions of 50–70% and further reductions thereafter.⁵¹

It is important to realise that even if stabilisation is achieved this does not necessarily mean that there will be no climate change in fact, there will continue to be rises in temperature and sea level for centuries.⁵² The FCCC provides the legal foundation for the efforts of the international community to deal with the threat of climate change. This Convention acknowledges the need for the “widest possible cooperation by all countries” because climate change poses a global threat to the environment.⁵³

General Concepts of International Environmental Law

The FCCC refers to some of the general concepts of international environmental law to guide the parties in the implementation of its provisions.⁵⁴ These concepts include the need to protect the climate system for the benefit of present and future

48 FCCC, Art. 2.

49 Note 1 at 2.

50 Ibid at 31.

51 Ibid at 13. In order for other gases to stabilize the levels of reduction required are for methane a reduction of emissions by 8 per cent, nitrous oxide a reduction of emissions by 50 per cent, and it is necessary to stop emissions of long lived gases such as perfluorocarbons in order to stabilize the emissions.

52 Note 1 at 18.

53 FCCC, Preamble para 6. At 7 September 2000 there are 186 ratifications of the FCCC.

54 FCCC, Art. 3. See the Kyoto Protocol, Preamble para 5.

generations of humankind taking into account equity and the concept of common but differentiated responsibilities.⁵⁵ “Intragenerational equity” emphasises the role of developed countries to take the initial responsibility for action to combat the effects of climate change. An important consideration of climate change is the need to take intergenerational equity into account because changes to climate will impose costs on present generations and are likely to result in increased costs for future generations of humans.⁵⁶

There are two areas where costs can be incurred and the first of these is the costs involved in trying to prevent or mitigate climate change. The issue of mitigation under the FCCC gives rise to the obligations of developed countries to take the first steps to reduce their GHG emissions.⁵⁷ The second area is the costs of damages as a result of the effects of climate change and/or the costs of adaptation to climate change.⁵⁸ Developing countries may have different planning considerations such as greater priorities to meet their social and developmental requirements (including access to fresh water, food and addressing poverty).⁵⁹ Some developing countries are more vulnerable to climate change and need stronger institutions to enable effective adaptation and mitigation measures. It is probable that GHG emissions in developing countries will continue to increase in the future and that there will be additional responsibilities for these countries to find solutions to deal with the problem of climate change.⁶⁰

The precautionary principle requires that measures be taken to ensure that action is prevented from causing harm to the environment even if there is a lack of full scientific certainty about the effects of the activities in question.⁶¹ As there is a lack of certainty about the greenhouse effect the precautionary principle can apply to enable action to be taken to minimise the causes of climate change and to try to mitigate its effects.⁶² Climate change involves much complexity and difficult policy decisions for the international community. Part of the problem is the lack of certainty about the effects of climate change (particularly in specific regions) and because there are a large number of GHGs to take into account. There are long periods of time between emissions of GHGs and the effects of climate change some

55 FCCC, Art. 3(1).

56 Note 1 at 25.

57 FCCC, Art. 4(2).

58 Note 1 at 26.

59 C. Zheng-Kang “Equity, Special Considerations, and the Third World” (1990) 1 *Colorado Journal of International Environmental Law and Policy* 57 at 61.

60 *Ibid* at 62.

61 See 1990 Bergen Ministerial Declaration on Sustainable Development in the ECE Region (1990) 20 *Environmental Policy and Law* 100.

62 FCCC, Art. 3(3).

of which can cause irreversible damage.⁶³ The lack of certainty about the potential threat of climate change, and how rapid this change will be could result in a failure to take timely policy decisions. The application of the precautionary principle indicates the need for decisions to be taken now despite the uncertainty about what effects climate change will have in the future.⁶⁴

A third aspect is that the parties aim to promote sustainable development when applying policies and measures to prevent climate change.⁶⁵ The aim of developing countries was to ensure that they could continue to develop in the future and this is reflected in the FCCC.⁶⁶ The FCCC anticipates that policies and measures aimed at protecting the climate should be integrated with national development programs “taking into account that economic development is essential for adopting measures to address climate change.”⁶⁷ It was inevitable that eventually a firm set of targets to limit GHG emissions would need to be negotiated and this requirement led to the development of the Kyoto Protocol.

The Origins of the Kyoto Protocol

The main impact of the FCCC was that it motivated the parties to take into account GHG emission limitations in their future policy decisions.⁶⁸ Some of the responsibilities are that all parties shall formulate and publish national programs with measures to mitigate and to facilitate adaptation to climate change.⁶⁹ All parties have responsibilities to cooperate in practices that reduce GHG emissions.⁷⁰ Social, economic and environmental policies should take climate change considerations into account.⁷¹ All parties are to publish inventories of the sources of GHG emissions including their removal by sinks and measures taken to mitigate climate change.⁷² According to the FCCC “sink” is defined as “any process, activity or

63 Note 1 at 3.

64 Ibid at 4.

65 FCCC, Art. 3(4). See the Kyoto Protocol, Art. 2(1) which refers to the aim of carrying out policies to reduce greenhouse gases in “order to promote sustainable development.” Article 2(1)(a) can be read with Art. 2(3) which states “The parties included in Annex I shall strive to implement policies and measures under this Article in such a way as to minimize adverse effects, including adverse effects of climate change, effects on international trade, and social, environmental and economic impacts on other Parties especially developing country Parties...”. The Kyoto Protocol, Art. 10 states “... reaffirming existing commitments under Article 4, paragraph 1, of the Convention, and continuing to advance the implementation of these commitments in order to achieve sustainable development...”

66 FCCC, Preamble para 22.

67 FCCC, Art. 3(4).

68 FCCC, Art. 4(1)(f).

69 FCCC, Art. 4(1)(b).

70 FCCC, Art. 4(1)(c).

71 FCCC, Art. 4(1)(f).

72 FCCC, Art. 4(1)(a).

mechanism which removes a greenhouse gas, an aerosol or a precursor of a greenhouse gas from the atmosphere". A "source" is "any process or activity which releases a greenhouse gas, an aerosol or a precursor of a greenhouse gas into the atmosphere."⁷³

The responsibilities of developed and developing countries are clearly differentiated. The developed countries and those referred to in Annex I (of the Convention) have greater responsibilities. These parties are required to adopt policies and measures to mitigate climate change, to limit greenhouse emissions and to protect GHG sinks and reservoirs.⁷⁴ There is also a requirement that these parties report information on these policies and measures. The aim was that these parties would return to 1990 levels of GHG emissions by about 2000.⁷⁵ Unfortunately this Convention failed to set out legally binding targets on emission reductions and left this issue to be determined at a later time. Provisions were made in the FCCC to review the adequacies of Article 4(2)(a) and (b) at the first session of the Conference of the Parties (COP).⁷⁶

Parties to the Convention met in 1995 in Berlin in order to provide for emission reductions beyond the year 2000 and to overcome the failure to establish binding targets. At the first Conference of Parties (COP 1) the adequacy of Article 4(2)(a) and (b) were reviewed and the decisions were outlined in the Berlin Mandate.⁷⁷ The COP 1 decided that these subparagraphs were inadequate and that a protocol or legal instrument needed to be adopted to strengthen the commitments and to make provision for the period of time beyond 2000.⁷⁸

This mandate eventually led to negotiations in COP 3 which was held from 1–10 December 1997 and resulted in the negotiation of the Kyoto Protocol. The bargaining positions of the States diverged widely concerning emission reductions. The baseline referred to for the following reductions is 1990. The European Union sought reductions in the three main GHGs of 7.5 per cent by 2005 and 15 per cent by 2010. The Group of 77 (developing countries) including China supported these targets and an additional cut of 35 per cent by 2020. Japan proposed a reduction of five per cent by 2008–2012 and members of the Alliance of Small Island States (AOSIS) sought a 20 per cent cut by 2005.⁷⁹ The USA supported the return of

73 FCCC, Art. 1(8)(9).

74 FCCC, Art. 4(2)(a).

75 FCCC, Art. 4(2)(b).

76 FCCC, Art. 4(2)(d).

77 "Report of the Conference of the Parties on its Fourth Session, Held at Buenos Aires from 2 to 14 November 1998" FCCC/CP/1998/16/Add.1 20 January 1999 Decision 9/CP.4 at 40, at <www.unfccc.de/resource/docs/cop4/16a01.pdf> (25 March 2001).

78 Conference of the Parties First Session "Report of the Conference of the Parties, Held at Berlin from 28 March to 7 April, 1995" at <www.unfccc.de/resource/docs/cop1/07a01.pdf> (25 March 2001).

GHGs to 1990 emission levels between 2008–2012 and the Russian Federation supported individual targets to result in an overall reduction of three per cent by 2010.⁸⁰ Complex negotiations resulted in the development of the Kyoto Protocol which contains legally binding targets for greenhouse gas emission reductions.

Impact of the Kyoto Protocol on Limitations to GHG Emissions

The Kyoto Protocol does not require developing countries to comply with emission reduction targets nor are there any further commitments for these countries beyond those in the FCCC. This is in accordance with the Berlin Mandate which provided that no new commitments would be introduced for developing country parties but their existing commitments would be reaffirmed.⁸¹ So the commitments in the FCCC are reaffirmed in the Kyoto Protocol for both developed and developing countries.⁸²

Targets

The most important impact of the Kyoto Protocol is that it has established legally binding commitments for GHG emission limitations for developed countries listed in Annex I to the FCCC (with the exception of Turkey). This reinforces the objectives of the FCCC which aims to stabilise GHG emissions before there are dangerous concentrations of GHGs in the atmosphere.⁸³

The Kyoto Protocol regulates the emissions of six GHGs. The first group of three are carbon dioxide, methane and nitrous oxide and the second group of three gases are hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride (which can be used as substitutes for ozone depleting substances).⁸⁴ The second group of three gases has different base years from the first group and can remain in the atmosphere for long periods of time.

79 This alliance includes many Pacific Island nations, the Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Marshall Islands, Nauru, Papua New Guinea, Solomon Islands, Tonga, Tuvalu, Vanuatu, Western Samoa and Singapore.

80 UNEP Information Unit for Conventions (IUC) Press Release “Governments to Seek Greenhouse Gas Cuts at Kyoto Climate Talks” at <wysiwyg://16/http://www.cop3.de/fccc/info/pr11-97.htm> (2 June 2000).

81 Note 78, Decision 1/CP.1 para 2(b).

82 Kyoto Protocol, Art. 10.

83 FCCC, Art. 2.

84 Kyoto Protocol, Annex A.

The Annex I parties (developed countries) to the Convention shall ensure that their anthropogenic carbon dioxide emissions do not exceed their assigned amounts with the aim to reduce the emissions by an overall target of five per cent below 1990 levels in the period from 2008 to 2012.⁸⁵ The abovementioned first three gases are measured against the 1990 base year.⁸⁶ The second set may be measured against the 1995 base year.⁸⁷ An important point is that the parties to the Kyoto Protocol have not agreed upon uniform targets but have agreed to individual targets. These individual targets differ for each country, indeed, in some cases, an increase in GHG emissions is permitted.⁸⁸ It is likely that further commitments for later periods of time will be introduced in the future and the Protocol makes provision for these.⁸⁹ When the Kyoto Protocol enters into force Annex I parties are required to produce an annual inventory of GHG emissions⁹⁰ which will be reviewed by expert review teams.⁹¹ These reviews are to be a complete evaluation which cover all areas of implementation by parties to the Protocol.⁹²

The COP 4 set out the Buenos Aires Plan of Action which provided a timetable for parties to complete work on the details of the Kyoto Protocol by the time of COP 6 at The Hague from 13–24 November 2000. The COP 5 continued the work specified in this action plan and was held at Bonn from 25 October – 5 November 1999. It is likely that the most important decisions will be taken at the COP 6.⁹³

Sources and Sinks

Annex I parties need to have a national reporting system in place by 2007 in order to estimate GHG emissions by sources and removals by sinks.⁹⁴ Developed countries will be permitted to account for reductions in GHG emissions due to afforestation and reforestation (sinks).⁹⁵ The Kyoto Protocol deals with land-use change and forestry in Article 3(3) which enables the Parties in Annex I to include provisions for these activities when meeting their commitments. “Changes in

85 Kyoto Protocol, Art. 3.

86 Kyoto Protocol, Art. 3(1).

87 Kyoto Protocol, Art. 3(8).

88 Kyoto Protocol, Annex B. Australia can raise emissions eight per cent; Iceland can raise emissions 10 per cent; Norway can raise emissions one per cent; New Zealand, the Russian Federation and the Ukraine can stabilise their emissions at 1990 levels.

89 Kyoto Protocol, Art. 3(9).

90 Kyoto Protocol, Art. 7(1).

91 Kyoto Protocol, Art. 8(1).

92 Kyoto Protocol, Art. 8(3).

93 M. Grubb *The Kyoto Protocol: A Guide and Assessment* (Earthscan Publications Ltd, London: 1999) 252. For details on the outcome of COP 6, see the COP 6 website at <www.cop6.unfccc.int> (21 November 2000).

94 Kyoto Protocol, Art. 5.

95 Kyoto Protocol, Art. 3(3).

greenhouse gas emissions by sources and removals by sinks resulting from direct human-induced land-use change and forestry activities” can be offset or added to a party’s GHG emissions.⁹⁶ This will enable countries to benefit by increasing their forestry sinks. So a party can adjust their amount of emissions based upon their:

verifiable changes in carbon stocks during the period 2008 to 2012 resulting from direct human induced activities of afforestation, reforestation and deforestation since 1 January 1990. Where the result of this calculation is a net sink, this value shall be added to the Party’s assigned amount. Where the result of this calculation is a net emission, this value shall be subtracted from the Party’s assigned amount.⁹⁷

There was substantial support at the COP 5 to settle the details of the Kyoto Protocol to encourage early ratification. The deadline for completing these details was COP 6 at The Hague. The Protocol enters into force on the ninetieth day after it receives 55 ratifications and 55 per cent of GHG emissions from Annex I parties to the Convention must be taken into account.⁹⁸ There are other mechanisms set out in the Convention which can assist the parties in the implementation of their obligations.

Mechanisms to Assist With GHG Limitation

Joint Implementation

There is provision for joint implementation to reduce GHG emissions under the FCCC.⁹⁹ Joint implementation applies to countries referred to in Annex I of the Convention. If Annex I parties are in compliance with the reporting and measurement provisions of the Protocol then they can cooperate together with private-enterprise to invest in projects with emission reductions in another Annex I country and credit these emission reductions towards their emission reduction targets.¹⁰⁰ The main aim of this scheme is to reduce costs so that one country may fund the reductions in another country to take advantage of the cheaper costs of the reductions.¹⁰¹ Another advantage of this procedure is that it gives greater

⁹⁶ Ibid; this Article limits these activities to “afforestation, reforestation and deforestation since 1990”.

⁹⁷ Note 77, Decision 9/CP.4 at 40. See F. Yamin “The Kyoto Protocol: Origins, Assessment and Future Challenges” (1998) 7 *Review of European Community and International Environmental Law* 113 at 118–119.

⁹⁸ Kyoto Protocol, Art. 25. These parties must include those which account for at least 55 per cent of total carbon dioxide emissions for 1990. As at 28 September 2000, there were 30 ratifications.

⁹⁹ FCCC, Art. 4(2)(a); Kyoto Protocol, Art. 6.

¹⁰⁰ Kyoto Protocol, Art. 6(1).

¹⁰¹ D. Bodansky “The United Nations Framework Convention on Climate Change: A Commentary” (1993) 18 *Yale Journal of International Law* 451 at 521.

flexibility to States to determine how to meet their GHG limitations.¹⁰² This procedure enables the aims of the FCCC to be implemented with lower costs¹⁰³ and it facilitates faster achievement of these goals. However if States prefer to use joint implementation schemes for emission reductions rather than taking action to reduce emissions within their own jurisdiction then these schemes could undermine the aims for States to take action themselves to reduce emissions.¹⁰⁴

Emission Trading

Emission trading is available to developed country parties in Annex B of the Kyoto Protocol.¹⁰⁵ The parties have not yet agreed to the rules for the means of emission trading,¹⁰⁶ however it was anticipated that agreement would be reached on these issues at COP 6.¹⁰⁷ The major difficulties arising from these emission reduction schemes is that if no limit is set upon the amount of emissions reductions that can be credited to these schemes, then it may be possible for a country to refrain from emission reductions within its own jurisdiction by relying upon emission reductions schemes in other countries. This could be a problem for developing countries if the developed countries misuse the scheme to import polluting schemes into developing countries.¹⁰⁸

Clean Development Mechanism

The clean development mechanism can be conducted by developed States parties in Annex I of the FCCC to assist other developing States who are parties to the Protocol.¹⁰⁹ States have the option as to whether or not they will participate in this scheme.¹¹⁰ Generally the Kyoto Protocol provides that developing country parties

102 F. Yamin "The Use of Joint Implementation to Increase Compliance with the Climate Change Convention" in J. Cameron, J. Werksman and P. Roderick (eds) *Improving Compliance with International Environmental Law* (Earthscan Publications, London: 1996) 229 at 231.

103 Note 101, at 520.

104 C. Warbrick and D. McGoldrick "Current Developments: Public International Law" (1998) 47 *International and Comparative Law Quarterly* 446 at 456. See J. Werksman "Compliance and the Kyoto Protocol: Building a Backbone into a "Flexible" Regime" (1998) 9 *Yearbook of International Environmental Law* 48 at 91 concerning compliance issues.

105 Kyoto Protocol, Art. 17. See Yamin, note 97 at 122 concerning the controversy over this issue.

106 Note 77. See Decision 7/CP.4 Decision 7 at 22. Report of the Conference of the Parties on its Fifth Session held at Bonn from 25 October to 5 November 1999 <www.unfccc.de/resource/docs/cop5/06a01.pdf> (25 March 2001). Decision 14/CP.5. See P. Cameron "From Principles to Practice: The Kyoto Protocol" (2000) 18 *Journal of Energy and Natural Resources Law* 1 at 9.

107 Kyoto Protocol, Art. 17. Note 106, Decision 14/CP.5 at 14.

108 See D. French "1997 Kyoto Protocol to the 1992 UN Framework Convention on Climate Change" (1998) 10 *Journal of Environmental Law* 227 at 235.

109 Kyoto Protocol, Art. 12.

110 *Ibid.*

(or those not referred to in Annex I) can volunteer to be involved in a project in order to achieve a mitigation of the effects of climate change.¹¹¹ Other requirements are that there must be real long-term benefits related to mitigation of climate change and additional reductions of emissions to those that would have taken place anyway.¹¹² Parties using this scheme to reduce their emissions can only credit these reductions for part of their overall emission reductions.¹¹³ The advantages would be that the developing country may gain the benefits from any use of new technologies involved in the project and assistance to fund the project.¹¹⁴ The project could be a means of transferring technology and finances to developing countries where the joint project is carried out in these countries.¹¹⁵ One of the difficulties for developing countries is that developed countries could seek to fund projects and gain credit for them while failing to take adequate emission reduction measures within their own jurisdiction.¹¹⁶

The clean development mechanism is to be supervised by an executive board and subject to the authority of the COP.¹¹⁷ The procedures of the clean development mechanism are to be elaborated by the COP “with the objective of ensuring transparency, efficiency and accountability through independent auditing and verification of project activities.”¹¹⁸ The main difficulty is that the precise mode of operating these schemes has not yet been settled. If these projects do not detract from the Annex I countries efforts to reduce emissions within their jurisdiction then they could be a useful means of transfer of technology to developing countries.¹¹⁹

Regional Agreements

Parties can form an agreement to reduce emissions jointly such as on a regional basis as in the case of the European Community.¹²⁰ All parties in Annex I to the Convention can fulfill their commitments jointly.¹²¹ The requirements are that the

111 Kyoto Protocol, Art. 12(5).

112 Kyoto Protocol, Art. 12(5)(a)(b)(c).

113 Kyoto Protocol, Art. 12 (3)(b).

114 S. Woo “Bilateral Governmental Cooperation as an Initiative to the Technology Transfer: Market Potential and Market Formation” at <www.unfccc.de/program/technology/techdoc/woo.pdf> (30 June 2000) at 14. See Yamin, note 102 at 231.

115 Bodansky, note 101 at 521.

116 Warbrick and McGoldrick, note 104 at 458.

117 Kyoto Protocol, Art. 12(4).

118 Kyoto Protocol, Art. 12(7).

119 Warbrick and McGoldrick, note 104 at 458.

120 Kyoto Protocol, Art. 4.

121 Ibid.

joint emissions of two or more States must not exceed the total sum of their allocated emissions under the Protocol.¹²²

Costs and The Provision of Finance

Costs of Climate Change

The net costs of climate change include market impacts, non-market impacts and adaptations costs.¹²³ One of the difficulties about determining the costs of climate change is that there is great uncertainty¹²⁴ about estimates of non-market impacts which can include damage to ecosystems and human health.¹²⁵ A range of estimates is available in order to assess damages from a rise in temperature of 2–3⁰ C.¹²⁶ Generally these estimates suggest the amount is a few per cent of world GDP but these estimates are much higher for damage to developing countries as a proportion of their GDP.¹²⁷

Adaptation measures may be required by Asia Pacific States to deal with floods as well as in other areas to cope with droughts and water scarcity. Adaptation to sea-level rises could be very expensive and some countries may need extra assistance.¹²⁸ These measures could place a severe financial burden on developing countries which have limited resources.¹²⁹

The overall level of costs will also depend upon the timetable for emission reductions, transfer of technology, general consumption habits and adoption of policies. For instance it is preferable that policies to replace plant and equipment (when they are no longer economically viable) with more energy efficient equipment are introduced early. If efficient replacements are not encouraged there could be greater costs to the community.¹³⁰ Provided that developed countries fulfill their requirements under the Convention particularly in regard to the provisions concerning the transfer of technology and the provision of new and

122 Kyoto Protocol, Art. 4(1).

123 Note 1 at 27.

124 See generally on the issue of the economic dimensions of climate change S. Nilsson and D. Pitt *Protecting the Atmosphere: The Climate Change Convention and its Context* (Earthscan Publications Ltd, London: 1994) 101; P. Read *Responding to Global Warming* (Zed Books Ltd, London: 1994).

125 Note 1 at 27.

126 See M. Grubb *The Kyoto Protocol: A Guide and Assessment* (Earthscan Publications Ltd, London: 1999) 160 – “Economic Consequences of Kyoto Commitments”.

127 Note 1 at 27.

128 Ibid at 28.

129 Note 13 at 13, 27.

130 Note 1 at 28.

additional finance then this action could encourage other countries such as India and China to agree to GHG limitation targets.¹³¹

The Global Environment Facility

The Global Environment Facility (GEF) is a finance institution established in 1991 to act as a financial mechanism.¹³² This facility assists the implementation of the FCCC, the 1992 Convention on Biological Diversity,¹³³ and the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer.¹³⁴ As far as the FCCC is concerned, the GEF acts under the instructions and in accordance with the guidance of the COP.¹³⁵ The only countries which are eligible for funding for climate change programs are developing countries which are parties to the Convention.

Controversy over the GEF emerged because the developing countries considered that financial assistance for environmental problems should not be regarded as overseas development assistance. These countries argued that the funds should not be totally controlled by the North and that the decisions of the GEF were not open and democratic.¹³⁶ The GEF had been severely criticised on the basis of its structure and the types of projects that are funded. These views reflected the common but differentiated responsibilities of States where the historical degradation of the environment by the developed countries was taken into account. Eventually the North and South came to an agreement that the GEF be accepted as an interim financial mechanism for the Conventions provided that it was restructured.¹³⁷

The COP 4 decided that the restructured GEF should be the financial entity of the FCCC¹³⁸ and it will review the operation of the GEF every four years.¹³⁹ It noted the difficulties that developing countries were having with the provision of financial resources such as the uncertainty arising over the application of the concept of incremental costs, the availability of resources and the problems with the GEF project cycle.¹⁴⁰ After reviewing the concerns of developing countries and

131 P.G.G. Davies "Current Developments Public International Law" (1998) 47 *International and Comparative Law Quarterly* 446 at 461-462.

132 UNEP/GCSS.IV/2 (21 April 1994).

133 (1992) 31 ILM 818.

134 (1987) ILM 1550; *Operational Strategy of the Global Environment Facility* (The Global Environment Facility, Washington: 1996)

135 FCCC, Art. 11.

136 Bodansky, note 101 at 539.

137 FCCC, Arts 11, 21; Convention on Biological Diversity, arts. 21, 39.

138 Note 77, Decision 3/CP.4 at 8. See Note 106 Decision 8/CP.5.

139 Ibid, Decision 3/CP.4 at 8.

140 Ibid, Decision 2/CP.4 at 5.

noting the attempts made by the GEF to take these concerns into account, the COP 4 set out its guidelines.

The COP 4 also decided that the GEF should (in accordance with the Convention)¹⁴¹ provide funding to developing countries (especially to particularly vulnerable countries) for adaptation measures.¹⁴² These adaptation measures necessitate short, medium and long term strategies which can be divided into three stages.¹⁴³ The first stage is planning to consider the potential impacts of climate change and ascertain the particularly vulnerable countries or regions. Once these countries or regions are identified then in the medium or long term, stage two measures aim to cover capacity building to prepare for adaptation measures, and stage three includes measures to promote adaptation including insurance and other measures.¹⁴⁴ The COP 4 decided that the GEF should provide funding to assist developing countries to comply with other requirements under the Convention, including to identify their technology needs,¹⁴⁵ to meet the costs of national communications,¹⁴⁶ and to support capacity building.¹⁴⁷

There is provision for new and additional financial assistance to developing countries based upon the terminology found in the FCCC¹⁴⁸ and in the Biological Diversity Convention.¹⁴⁹ These funds are to meet the costs of the implementation of the Conventions and to enable developing States to receive benefits from technology transfer. The results of the implementation of this provision have been questioned as to whether in fact funding after the introduction of these conventions has been “new and additional”.¹⁵⁰ The problem remains as to how to determine the financial obligations of the developed States (which are parties to the FCCC) and this depends upon the interpretation of the terms “additional” and “incremental”. Even though the terms additional and incremental have been used in some recent major environmental agreements¹⁵¹ there has failed to be any agreement on the amount of money to be transferred to developing States and how these finances

141 UNFCCC, Art 4(4) and 4(8).

142 Note 78, Decision 11/CP.1. See also Note 106, Decision 8/CP.5.

143 *Ibid*, Decision 11/CP.1 para 1 (d) (i) at 36.

144 *Ibid*, Decision 11/CP.1 para 1(d)(ii) at 37.

145 Note 77, Decision 2/CP.4. para 1(b) at 5-6.

146 *Ibid*, Decision 2/CP.4 para 1(d) at 5-6.

147 *Ibid*, Decision 2/CP.4 para 1(g) at 5-6. See Note 106, Decision 10/CP. 5.

148 FCCC, Art. 4(3); Kyoto Protocol, Art. 11(2).

149 Convention on Biological Diversity, Art. 20(2).

150 A. Jordan and J. Werksman, “Financing Global Environmental Protection” in Cameron, Werksman and Roderick, note 102 at 247-255.

151 Montreal Protocol, Art. 10 as amended by the London Adjustments and Amendments to the Montreal Protocol on Substances that Deplete the Ozone Layer; and Non-Compliance Procedure (1990) 30 ILM 537; FCCC, Art. 4(3); Kyoto Protocol, Art. 11; Convention on Biological Diversity, Art. 20 (2).

should be deployed.¹⁵² The terms used in the FCCC and in the Biological Diversity Convention¹⁵³ are “new and additional finance” which are not defined in these conventions thus leaving them open to different interpretations.¹⁵⁴ The COP 4 has encouraged the GEF to ensure that the assessment of incremental costs will be clarified.¹⁵⁵ These issues need to be resolved more speedily in order to ensure that the funding and technology transfer provisions of the FCCC and the Kyoto Protocol can be implemented.

Transfer of Technology

The Kyoto Protocol also reaffirms the commitments of the parties under the FCCC that they shall cooperate in the transfer of environmentally sound technologies (ESTs).¹⁵⁶ These ESTs include mitigation technologies and adaptation technologies.¹⁵⁷ The transfer of technology is an important issue of equity for developing countries because it can enable them to avoid the use of out-of-date dirty technologies which can be harmful to the environment¹⁵⁸ and to achieve sustainable economic growth with reduced GHG emissions.¹⁵⁹ Agenda 21 defines environmentally sound technologies as follows:

Environmentally sound technologies protect the environment, are less polluting, use all resources in a more sustainable manner, recycle more of their wastes and products, and handle residual wastes in a more acceptable manner than the technologies for which they were substitutes.¹⁶⁰

152 Jordan and Werksman, note 150 at 248.

153 FCCC, Art. 4(3); Convention on Biological Diversity, Art. 20(2).

154 Jordan and Werksman, note 150 at 250, who note:

The texts of the Climate Change and Biodiversity Conventions do not clarify the meaning of additionality, and merely use the umbrella term “new and additional finance”. If “existing flows” is to be the baseline, then what is “additional” can only be calculated on the basis of what a donor would have done had they not entered into an international agreement or pledged to support an international fund. The absence of definition opens up an enormous opportunity for conflicting interpretations and expectations.

155 Note 77, Decision 2/CP.4 para 3(c) at 7.

156 Kyoto Protocol, Art. 10(c).

157 See “Extracts from the Secretariats Technical Paper on Barriers and Opportunities Related to the Transfer of Technology” FCCC/TP/1998/1 at <www.unfccc.de/program/technology/techdoc/aseextrac.pdf> (30 May 2000) at 1. Mitigation refers to processes to reduce greenhouse gas emissions; see FCCC, Art. 4(1)(c). Adaptation measures reduce the impacts of climate change and include coastal zone management, water resources and agriculture, FCCC, Art. 4(1)(e).

158 Phillippe Sands *Principles of International Environmental Law* Vol 1 (Manchester University Press, Manchester: 1994) 742.

159 Tata Energy Research Institute “Framework for Improving the Diffusion and Implementation of environmentally sound Technologies and Know-how under the UNFCCC: Perspectives from the Asia-Pacific Region” at <www.unfccc.de/program/technology/techdoc/teri.pdf> (24 June 2000) at 5.

160 *Agenda 21: Programme of Action for Sustainable Development* (United Nations Publications, New York: 1992) 252, para 34.1.

Capacity building forms part of the introduction of these technologies so that training of peoples in the use of these technologies is included in the transfer.¹⁶¹ The 1992 Rio Declaration on Environment and Development refers to the need to strengthen capacity-building when transferring and adapting new technologies.¹⁶² The COP 4 also supports the provision of capacity building for developing countries¹⁶³ and the supply of finances to these countries for capacity building.¹⁶⁴ This was affirmed in the COP5.¹⁶⁵

There was considerable controversy between the North and South during the negotiations of the FCCC and Convention on Biological Diversity on the issue of technology transfer. Generally developing countries were in favor of technology transfer provisions and developed countries were apprehensive, especially if they were required to ensure that the private sector transferred technology.¹⁶⁶ The result of these negotiations has been the insertion in these conventions of the recognition of the importance of the transfer of technology to ensure adequate protection of the environment and for developed countries to provide financial resources to assist this transfer.¹⁶⁷ The participation of developing countries in the carrying out of their commitments under this Convention depends upon the effective implementation by the developed countries of their commitments related to financial resources and the transfer of technology.¹⁶⁸

The FCCC refers to the responsibility of developed country Parties to “facilitate and finance” the transfer of environmentally sound technologies particularly to developing Parties.¹⁶⁹ In addition there is provision that “the developed country parties shall support the development and enhancement of endogenous capacities and technologies of developing country parties.”¹⁷⁰ Article 10 of the Kyoto Protocol

161 Ibid, para 34.3.

162 (1992) 31 ILM 874; Principle 9 states:

States should cooperate to strengthen endogenous capacity-building for sustainable development by improving scientific understanding through exchanges of scientific and technical knowledge, and by enhancing the development, adaptation, diffusion and transfer of technologies including, new and innovative technologies.

163 Note 77, Decision 4/CP.4 para 3-4 at 12.

164 Ibid, Decision 2/CP.4 para 1(g) (i) at 6.

165 Note 106, Decision 10/CP.5 and Annex “List of Capacity-Building Needs of Developing Country Parties”.

166 Bodansky, note 101 at 523; Lyle Glowka, Françoise Burhenne-Guilmin, and Hugh Synge *A Guide to the Convention on Biological Diversity* (IUCN, Gland: 1994) 84. See also G. Verhoosel “International Transfer of Environmentally Sound Technology: The New Dimension of an Old Stumbling Block” (1997) 27 *Environmental Policy and Law* 470 at 471-472 who distinguishes the New International Economic Order and the negotiations at UNCTAD of an International Code of Conduct on the Transfer of Technology from the provisions on transfer of technology in international environmental agreements.

167 FCCC, Arts 4(5), 12(3); Convention on Biological Diversity, Arts 12, 16, 17, 18, 19.

168 FCCC, Art. 4(7).

169 FCCC, Art. 4(5); see also Art. 4(1)(h).

170 FCCC, Art. 4(5).

states that parties, taking into account their common but differentiated responsibilities shall cooperate to take steps to facilitate and finance the transfer of environmentally sound technologies in the public domain and to enable the transfer of those held in the private sector.¹⁷¹ These provisions are set out in general terms and will be elaborated upon by the COP to indicate how the technology transfer will occur.¹⁷²

The Asia-Pacific Economic Cooperation Forum (APEC) could provide a multilateral framework for technology transfer in this region.¹⁷³ This could be promoted through Economic and Technical Cooperation (Ecotech) which covers a variety of capacity-building activities including the use of technology and the promotion of environmentally sound growth.¹⁷⁴ Another means of attracting investment and technology transfer is through joint implementation projects which could be developed through APEC.¹⁷⁵

The Subsidiary Body for Scientific and Technological Advice when carrying out the consultative process to consider issues related to technology transfer has prepared a Draft Report of the Asia and Pacific Workshop on the transfer of technology consultative process which recognised:

that the Asia and the Pacific region comprises a large number of countries with a diverse range of environmental, geographic, economic and social characteristics. It contains a combination of some rapidly emerging economies with substantial private sectors ... as well as some of the least developed countries in the world.¹⁷⁶

This report summarises the proceedings in five sections:

- Technology needs and technology needs assessments
- Technology information
- Overcoming the barriers to the transfer of technology
- Building capacity for the development and transfer of technology
- Suggested possible elements of a framework.¹⁷⁷

171 Kyoto Protocol, Art. 10(c); Art. 10(e) refers to capacity building .

172 See note 106, Decision 9/CP.5 (5) where the aim is to adopt decisions on actions under the FCCC, Art. 4(5) by the sixth session; also Kyoto Protocol, Art. 3 (14). See also Bodansky, note 101 at 530; and note 77, Decision 4 4/CP.4 at 11-14.

173 Woo, note 114 at 5.

174 "Introduction - APEC's Three Pillars" at <www.apecsec.org.sg/fora/introduction/introduction.html> (6 July 2000).

175 Daniel C. Esty "Sustaining the Asia Pacific Miracle" (1998) 3 *APJEL* 307 at 320.

176 Draft Development and Transfer of Technologies Status of the Consultative Process: Report of the Asia and Pacific Regional workshop on the transfer of technology consultative process, Cebu, Philippines, 17-19 January 2000 FCCC/SBTA/2000/INF.2 at <www.unfccc.de/program/technology/techdoc/cebufr.pdf> (6 July 2000) at para 11.

177 *Ibid* at para 13.

Some of the main issues considered in this report are discussed in the following paragraphs. Developing countries within the region considered that EST's should address basic human needs and be compatible with "nationally determined socio-economic, cultural, environmental and sustainable development priorities".¹⁷⁸ The transfer of technology would also need to be adapted to suit the specific needs of individual countries within the region.

As far as technology information is concerned the use of the internet was not considered appropriate as the sole means of information exchange because many small and medium-sized enterprises do not have access. So, in some areas, other methods such as newsletters could be employed.¹⁷⁹ The establishment of a clearing house for technology information which could provide for information collection, storage and dissemination was also proposed.¹⁸⁰

Barriers to the transfer of technology include "insufficient linkages between technology research and development agencies and the development assistance agencies in developed countries."¹⁸¹ In developing countries there are problems because of insufficient capacity to support imported technologies.¹⁸² Another difficulty is the lack of regional capacity to adapt the imported technologies to local conditions and in some least developed countries there is a lack of understanding of technology needs.¹⁸³ There are also political, economic and financial barriers to the transfer of technology.

In order to address these barriers it was considered that efforts should be made to consider the main concerns from the perspective of developing countries and to develop joint research and development activities.¹⁸⁴ In addition governments need to promote private sector trade and investment and to create an enabling environment to facilitate the transfer of technology.¹⁸⁵ The participants at the workshop also recognised the importance of the private sector as a means for the transfer of technology. Small and medium size enterprises can play a role in the transfer of technology in developing countries. To improve this role, assistance could be provided to enable them to adopt cleaner technologies.¹⁸⁶

In order to build capacity for the development and transfer of technology the participants recognised that these activities include "needs assessments,

178 Ibid at para 15.

179 Ibid at para 25.

180 Ibid at para 29.

181 Ibid at para 35.

182 Ibid.

183 Ibid at para 36.

184 Ibid at para 42.

185 Ibid at para 47.

186 Ibid at para 53.

prioritisation, planning, implementation, monitoring and evaluation.”¹⁸⁷ This includes the transfer of hard technologies (equipment and products) and soft technologies (experience and skills) technologies. Capacity-building activities which are more successful to achieve effective technology transfer are those which improve existing endogenous capacities and technologies.¹⁸⁸ Useful ways for building capacity are demonstration and pilot projects.¹⁸⁹ There were many suggestions for possible actions such as the development of one-stop technology transfer shops¹⁹⁰ and the development of programs to respond to technology priorities in developing countries.¹⁹¹

Assessment of the Implications of the Kyoto Protocol for the Asia Pacific

In the Asia Pacific there are many States which are vulnerable to climate change. Of even more concern, many small island States and other countries with vast low-lying coastal areas or arid areas are likely to be extremely vulnerable to the impacts of climate change.¹⁹²

The progress of international measures taken to stabilise GHG emissions will be of particular importance to these States because there is a greater probability of adverse impacts occurring as a result of climate change as GHG emissions increase.¹⁹³ Currently the Kyoto Protocol has not yet entered into force and the emissions targets are set in this Protocol at an overall average reduction of about five per cent. There will have to be greater reductions because it is likely that increases in GHG emissions from developing countries may offset this initial five per cent reduction of GHGs.¹⁹⁴ The IPPC recommends that a 50 per cent to 70 per cent reduction from the present time would be required in order to stabilise carbon

187 Ibid at para 60.

188 Ibid at para 62.

189 Ibid at para 63.

190 Ibid at para 74.

191 Ibid at para 77.

192 See FCCC, para 19: “Recognizing further that low-lying and other small island countries, countries with low-lying coastal, arid and semi-arid areas or areas liable to floods, drought and desertification, and developing countries with fragile mountainous ecosystems are particularly vulnerable to the adverse effects of climate change.”

193 Note 1 at 3; also see the discussion in Vivian Markovich and David Annandale “Sinking Without a Life Jacket? Sea Level Rise and the Position of Small Island States in International Law” (2000) 5 *APJEL* 135–154.

194 There will be differences between developing States as to their capacity to limit GHGs. However there is likely to be increasing pressure on the more developed of these States (such as China and India) to take on responsibilities to limit GHGs. See Warbrick and McGoldrick, note 104 at 460.

dioxide levels.¹⁹⁵ In the future there will need to be negotiations for reductions and it is probable that pressure will be placed upon the more advanced developing countries to contribute to emission reduction timetables.

At the Ninth Ministerial Meeting in 1997, APEC ministers endorsed the pledge that APEC economies carry out their part to implement global commitments: "In this context, Ministers recognised the importance of effective action to deal with global emissions of greenhouse gases".¹⁹⁶ This issue has also been considered by the APEC Energy Ministers in their "Joint Statement on Clean Energy and Sustainable Development" on 12 May 2000. The ministers recognised the importance of improving energy efficiency, using energy systems with low-carbon emissions, attracting private investment in energy technology and promoting regional development of clean energy technology.¹⁹⁷ They also "recognized that sustainable energy development policies are integral elements of any strategy to reduce greenhouse gas emissions."¹⁹⁸

The development of policies incorporating climate change considerations and adaptation measures will be necessary. There are complexities in the decision-making process because of the uncertainties in predicting the long term effects of climate change and the time lag between the emissions and their effects. The types of adaptation measures which could be useful include more efficient uses of fresh water resources, and monitoring systems to predict floods and drought. Important procedures for adaptation include the acquisition of knowledge about improved varieties of crops and planting and cultivating procedures to make the most of changes to climate. Other adaptation measures which can reduce the risks of health problems are technologies which provide adequate housing, air conditioning, vaccinations and clean water.¹⁹⁹ New technologies in these areas could be more readily available and transferred to those nations that will need to utilise them.²⁰⁰ Capacity building will also need to be introduced to enable effective transmission of new technologies.

One of the main difficulties for the Asia Pacific is the need to begin policies and measures aimed at adaptation to climate change. These measures may be delayed because of the lack of infrastructure, capacity building and finances to deal with

195 Note 1 at 15.

196 APEC Ninth Ministerial Meeting, Vancouver, Canada (21-22 November 1997) at <www.apecsec.org.sg/virtualib/minismtg/mtgmin97.html> (9 June 2000) at 6.

197 APEC Energy Ministers Joint Statement on Clean Energy and Sustainable Development, San Diego, Ca, USA (12 May 2000) at <www.apecsec.org.sg/virtualib/minismtg/cleanenergy.html> (9 June 2000) at 2.

198 *Ibid* at 3.

199 Note 1 at 13.

200 *Ibid* at 14.

issues of adaptation. The costs of climate change and adaptation measures are likely to be high. Indeed, some small island nations could find the cost of providing adequate adaptation measures prohibitive.²⁰¹ There will need to be procedures in place for possible migration of people both within a country and internationally because storms and/or floods could pose a risk to the survival of people and their culture.²⁰² For these reasons the measures for transfer of technology and financial assistance need to be implemented as soon as possible. This will enable more effective adaptation measures as well as some potential costs savings. Finally in this region, climate change considerations should be included in policies and decisions concerning development, the use of resources and the financing of infrastructure.²⁰³

201 Ibid.

202 Ibid at 12.

203 Ibid at 14.

