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QUESTION OF ANTARCTICA

**State of the environment in Antarctica and its impact
on the global system****Report of the Secretary-General**

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I. INTRODUCTION

1. In its resolution **45/78 A** of 12 December 1990 the General Assembly **requested, inter alia**, the Secretary-General to submit a report, using available data and resources, on **the state of the environment in Antarctica** and its impact on the global **system** to the General Assembly **at its forty-sixth session**.
2. In accordance with resolution **45/78 A**, the **Secretary-General**, on **27 February** 1991, addressed a note **verbale** to **Member States** and requested them to **submit**, not later than 30 May 1991, *any* pertinent **information they were** preparing to make available in pursuance of the relevant provisions of the resolution.
3. Letters **were also sent** to the relevant **specialized** agencies, programmes, organs, organisations and bodies of the United Nations system and to relevant intergovernmental and non-governmental bodies **inviting them to submit not** later *than* 15 June 1991 data, concerning but not necessarily limited to (a) the role of Antarctica as regards atmospheric **sciences**; (b) the status of global weather and climate **processes**; (c) glaciology, including data on mineral and hydrocarbon **effects**; (d) biological and physical **oceanography**; and (e) information *on* the results of scientific studies which relate to the Antarctic environment and its **ecosystems**.
4. As at 31 July 1991, replies from three Member States, including one, acting on behalf of the States Parties to the Antarctic Treaty, were **received with reference** to resolution **45/78 A** (see **annex**). These replies **have been** taken into **account in the preparation of this report**. **Relevant** information, including scientific **data**, opinions and conclusions, **has been** provided for this report by **several** specialised **agencies** and bodies of the United Nations **system** and **by** intergovernmental and non-governmental organisations with special expertise in **matters** relevant to the state of **Antarctic** environment, such as the Food and Agriculture Organisation of the United Nations (**FAO**), the International Civil Aviation **Organization** (ICAO), the International Maritime Organisation (IMO), the United Nations Environment Programme (UNEP), the United Nations Educational, Scientific and Cultural **Organization** (UNESCO), the World Meteorological Organisation (WMO), the Committee *on* Conservation of Antarctic Marine Living Resources (**CCAMLR**), the International Whaling Commission (IWC), the Scientific Committee *on* Antarctic Research (SCAR), Greenpeace International and the Fridtjof Nansen Institute, Norway. Relevant information was also drawn **from** communications received pursuant to General Assembly resolutions **38/77** of 15 December 1983 and **40/156 A** of 16 December 1985.
5. Owing to the provisions of document **ST/AI/189/Add.20/Rev.1** of 20 February 1982 which relrte to the control and limitation of **documentation**, every **effort** has been made to keep the length of **this** report within prescribed limits. **At** the same time, it should be mentioned here that **there are** considerable amounts of relevant information relating to the state of the environment in Antarctica and its impact on the global **system**. **As a**

Consequence, sacrifices in content, depth, detail and **style were clearly unavoidable**. It should also be noted that certain aspects Of the Same **issues** addressed in this report **were** also dealt with at length in the Secretary-General's reports on the Question of **Antarctica submitted to the General Assembly** at its thirty-ninth session (A/39/583) and forty-first session (A/41/722). These documents **may** be used as reference points.

II. ANTARCTICA'S **ROLE** IN THE **GLOBAL** SYSTEM

6. To the extent at present understood, **Antarctica** has an important role in the global climate **system** by acting, among other things, as one of Earth's "refrigerators", affecting the global atmosphere and ocean circulation. The formation of an Antarctic ice-sheet and **the** associated cooling process has profoundly affected global climate patterns, and the development of marine and terrestrial biota. The ice-sheet has proved to be a veritable **repository** of detailed records of past global **climate** and atmospheric chemistry, covering hundreds **of** millennia. **At the same time**, it should be noted that **this** ice-sheet also contains enough water to raise world-wide sea levels by up to **60 metres, were it all to melt. 1/**

7. Reportedly, polar seas also have a particularly important role in the exchange **of** carbondioxide (**CO₂**) between the ocean and **the atmosphere**. Reportedly, these processes are affected by sea-ice formations, thermohaline convection and biological productivity. **2/**

8. The recently discovered sharp seasonal decrease in stratospheric ozone (the so-called "**ozone hole**") over Antarctica also gives rise to the working hypothesis that there is a correlation between the release of industrially produced chlorofluorocarbons (**CFCs**) and **ozone** depletion. **At present**, various scientific studies, including some conducted from orbiting satellites, are being conducted to examine the effects of global pollution on the **Earth's ozone** layers.

9. These studies suggest a multilinear interrelationship between the Antarctic environment and the global **system**. Antarctica is not only an important venue for determining global changes but is also clearly influenced **by** them. Thus, the Antarctic environment **offers** unique opportunities for detecting changes in the Earth's atmospheric **systems**, and **for** assessing the impact of pollutants on global ecosystems. For several reasons, Antarctica **offers** favourable conditions **for** many kinds of scientific observations. These include a marked **remoteness** from anthropogenic emissions in the atmosphere and **within** the oceans, and an enhanced potential for forecasting climate changes at high latitudes. **3/**

III. ATMOSPHERE

A. General considerations

10. As noted **earlier**, atmospheric pollution in the Antarctic region is relatively limited by **a** remoteness from the **main sources** of industrial pollutants, as well as by **some** air-circulation patterns. **4/** Most scientists tend to agree that air pollution resulting from human activities in the **Antarctic is, as of now**, rather limited and **localized** in its effects. Observations over recent years reflect, however, that the Antarctic atmosphere has been disturbed by the effects of pollutants originating at lower latitudes, and particularly by industrial pollutants from the Northern Hemisphere. A marked **increase** in substances generally linked to large-scale human **activities** has been detected in the atmosphere over the continent. These substances include CO₂ (whose concentrations **seem to** follow the trend observed at a global level), man-made halocarbons (whose effect is believed to contribute to global warming and the depletion of the ozone layer), aerosols, sulphur dioxide and radioactive substances. **5/**

B. Ozone depletion

11. While comprehensive studies of ozone depletion, as mentioned above, are **still** largely incomplete; it is clear that the sharp decrease of stratospheric **ozone** observed **over Antarctica** in the austral spring during the past decade **seems to** be dramatic evidence **of** the anthropogenic influence on the Antarctic environment. Ozone decreases **of** up to 50 per cent of the 1956-1978 **average for** October, and up to 95 per **cent** locally between 15 and 20 km altitudes, have been observed in 1987, 1989 and 1990. The Antarctic ozone depletion in the spring of October 1988 was not as great as in 1985 or 1987, but it was comparable to that observed in 1983 and 1986. In 1989, *the* decline was the second most significant since that **of** 1987. In 1990, it was considerable and extended into early December. Such fluctuations are not unexpected *since* they appear to depend *on* the prevailing meteorological conditions, which vary **from** year to year. Thus, **it is** believed that the Antarctic ozone decline could be smaller in years in which **there may be** an initially significant increase in temperature within the Antarctic stratosphere. **6/**

12. A catalytic cycle **is** implicated in **the** destruction of the Earth's ozone layer. This process depends on the release of chlorine, which in turn is stimulated by solar ultraviolet radiation destroying **CFC** molecules. Atmospheric conditions *in* Antarctica, such as its extremely low temperatures, high ultraviolet radiation, and the relative isolation of the Antarctic stratosphere from mid-latitude environment (caused by the Antarctic vortex) appear to be particularly conducive in that process. **CFCs**, it should be noted, do not originate from routine Antarctic activities but are still widely used in refrigeration, the manufacture of **foam** insulation and the rendering of industrial solvents. **7/**

13. Scientific models, **based** on current understandings of the role of industrial **CFCs** in the **ozone** depletion process, indicate that the extensive **ozone** decline may not disappear until the atmospheric abundance of chlorine **is** reduced to the mid-1970s level, or below 2 parts per billion by **volume**. Reportedly, this would require a complete phase out of **the** present emissions of the fully **halogenated** chlorofluorocarbons. However, even if complete cessation **of their** use is achieved, the atmospheric abundance **of** chlorine will not decrease to 2 parts per billion by volume before the end **of** the next century. **8/**

14. In summary, global **effects** of ozone depletion are not yet fully understood, **and there** are several ongoing studies to this end. Since ozone **provides** the Earth's biological systems with a shield from hazardous solar **radiation** (especially ultraviolet radiation) the depletion of the ozone layer **may** have adverse effects on the Antarctic environment, particularly on marine life. It **has** been suggested, for instance, that **increased** ultraviolet **radiation** may affect Antarctic phytoplankton which is fundamental to the Antarctic food web. If that is to occur, one may envision **significant** repercussions throughout the aquatic environment, affecting marine flora and **fauna**.

C. CO₂ balance

15. Although the **processes** related to **ocean-atmospheric** CO₂ coupling (especially in the Antarctic region) are also not yet completely understood, **the increase** of CO₂ and methane levels in Earth's atmosphere ^{none} the less give cause for continued concern, because **of** their predominant contribution to **the** so-called "greenhouse effect", which portends a significant rise in global mean temperatures over the **next** half century. Studies **of** Antarctic ice-cores **have** revealed an increased CO₂ level in the atmosphere over the last century **from** a level of about 260 parts per million by volume (**p.p.m.v.**) before **major** anthropogenic influences ("**pre-industrial**", **before 1850**) to the present 345 **p.p.m.v.** This change may not be related only **to** the burning **of** fossil fuels. One calculation **has** indicated a "pre-industrial" level **of** 295 **p.p.m.v.** which could be the result of natural, but so far poorly understood, changes, **9/**

16. While the greenhouse effect has global implications, some mathematical models suggest **that** the warming might be disproportionately **large** at high latitudes. No scenario envisages a total meltdown **of** the Antarctic ice-sheet **which** would **have** the devastating effect of raising sea levels around the **world** by up to 60 metres. **However**, it has been suggested that even the thawing of lower levels of the ice-cap could have a significant effect on world-wide sealevels. **10/**

IV. TERRESTRIAL ENVIRONMENT

A. General observations

17. The **Antarctic** terrestrial environment appears to be particularly vulnerable to damages caused by human activities. Antarctic flora and terrestrial biota are, for the **most part**, concentrated in **a few ice-free**, mostly coastal areas. These are also **the areas most exposed** and **vulnerable to** human activities. **Owing to the harsh** Antarctic living conditions, **terrestrial biological processes** operate very slowly, intermittently, and **on a small** scale. This renders Antarctic **ecosystems** extremely fragile, easily **disrupted**, and markedly slow in the growing process.

18. At the same **time, some** scientists have suggested that the environmental impact caused by research activities in the Antarctic is often **overestimated**. They argue, for instance, that the easily destroyed land vegetation is primarily composed **of** rapidly propagating plants which **more easily renew the** plant cover and that any destruction is confined to the immediate vicinity of the impact. **Even** at the site of a scientific station (they claim), where the impact **may** be considerable, **it is extremely** localised with **a** restricted "footprint" probably much less than 1 **km²** on average. **11/**

19. Within the Antarctic there is also a natural impact **on** global terrestrial **ecosystems**. For example, the increasing populations **of** Antarctic fur seals are believed to destroy natural vegetation in areas such as Bird Island, **South Georgia**, Signy Island and even Lynch Island in the South Orkney group, **which** is a Specially Protected **Area**, aimed at preserving the grass, **Deschampsia**. **12/**

B. Impact of scientific research activities

20. The scientific and associated support activities are the main causes of direct anthropogenic environmental impact in Antarctica. Such impact **of various dimensions may be caused either:** (a) deliberately (construction activities, research-based collection of specimens; **etc.**); (b) incidentally (**e.g.**, food wastes at a station **may** cause an increase **in** the population of scavenging **birds**); and/or (c) accidentally (**e.g.**, fuel-tank ruptures).

21. Accordingly, a description of such potential impacts on Antarctic scientific activities **may include:**

(a) Habitat destruction or modification due to construction and other activities:

(b) Destruction, removal and modification of biota, **fossils, artefacts**, etc.;

(c) Modification of vital rates of biota, disturbance to production **and** growth;

(d) Modification of distribution of **biota**;

(e) Introduction of alien **biota**;

(f) Pollution by **biocides**, nutrients, radionuclides, inert materials, electromagnetic radiation, **noise**;

(g) Aesthetic intrusion)

(h) Catastrophic pollution (accidents), **13/**

22. Actual **and** potential accidents, particularly **fuel** spillage, **in** the Antarctic **seem** to elicit special concerns since they **create serious risks** for **the environment** and the global food chain. **In** 1989, for instance, an **accidental** spill of 50,000 gallons of fuel was reported at an Antarctic air base. **None the less**, the impact **of** routine scientific activities and even **that of catastrophic** pollution has been, up till *now*, relatively limited and localised.

C. Tourism

23. The types of negative environmental impact resulting from tourism are essentially correlated with human activities in **Antarctica**. Thus **far**, tourism has had a minimal adverse impact **on** the Antarctic environment since no significant tourist facilities have been constructed. Apart **from** the obvious problems that tourism **may create** for scientific **programmes**, it **may** also indirectly affect Antarctic **ecosystems**. **For** example, at the Cape Royds **Adelie** penguin rookery, a study revealed a 50 per cent reduction in the birds' breeding population **over** a six-year period. This was attributed to stress **from repeated** visits by tourists and personnel of a nearby scientific station. **14/**

V. MARINE ENVIRONMENT

A. General considerations

24. Although the **Southern** Ocean has a considerable interchange **with** three other **major oceans**, there is a marked physical delineation between them (the so-called Antarctic Convergence), which **limits** the spreading of pollutants via surface water from lower latitudes. The marine environment **there is** considered *not* only far richer, but also **more** stable than the terrestrial environment. **Because** of its vast size and dynamic activity the Southern Ocean **is** believed to have a considerable buffering capacity. However, shoreline areas, especially sheltered **bays**, **are more** liable to changes **caused** by **intrusion of** components that **are** not normally present in the Antarctic environment. **15/**

25. Although the Southern Ocean ecosystem is regarded by **scientists as** "**robust**", a major pollution incident (such as an oil spill) **might** have considerable consequences for the global environment.

B. Presence of harmful substances in the Southern Ocean

1. Hydrocarbons

26. Studies of hydrocarbons (and **other contaminants**) in the Southern Ocean have progressed as methodology **has** developed. In **most cases**, detected levels *have* been low, thus requiring **more** refined methods to **be used and more studies** to be undertaken. Sampling **research** resulting in **data** concerning **hydrocarbon concentrations** and distributions have *for the most part* **been** directed to **specific** activities rather than to generalised pollution monitoring. Thus, the emerging profile of pollutants refers primarily to coastal **areas** in the Southern Ocean. **16/**

27. As with studies of **hydrocarbons in other marine ecosystems**, **it is** sometimes difficult to determine **what is "natural"** (i.e., biogenic or autochthonous) and what represents environmental contamination, **Scientists** believe that biogenic input is likely to account **for** all but a very small fraction of the hydrocarbons present **in the ocean and its biota**. **17/**

28. Increasing levels of human activities within **the** Southern Ocean **and** on land may also contribute to hydrocarbon contamination. This may be associated with tourism and the functioning **of** permanent and temporary **research** stations and camps, and with the associated support activities. **At present, the** disposal of waste and accidental **contamination associated with Antarctic research** activity is **the** subject **of** a study by the Scientific Committee on Antarctic **Research** (SCAR). The group has detailed the waste products resulting **from** research activities and has suggested protocols **for** minimising the ill effects **of** such waste. However, accidental spillage of fuel **and** lubricants remains a risk. Clearly, this is potentially **hazardous to** vulnerable species **of** the Antarctic marine biota, such as krill. It should be noted, however, that as of now shipping and other sources **of** anthropogenic hydrocarbon contamination **within** the Southern Ocean are widely scattered. Scientists believe that local pollution in this region may be naturally dispersed under **most normal** conditions. **18/**

2. Chlorinated hydrocarbons

29. Early reports on the **occurrence** of DDT compounds in Antarctic biota furnished evidence that **Antarctica** was not spared from the world-wide dispersion of these pollutants. *Since* then, continuing research in Antarctica has supplied data confirming these early findings and has generated extensive data on **a number of** compounds other than **DDT**. **Snow**, ice and **more** recently water and air have been analysed **for** presence **of** chlorinated **hydrocarbons**. The available data base, **however**, still appears to be rather incomplete, **19/**

30. According to available information, the concentration of pesticides and other chlorinated **hydrocarbons** in the Southern Ocean area is several orders **of** magnitude lower than that in the Northern Hemisphere. It is believed that research stations are like **y** to be responsible for **some** of the local

contamination. The low level of these compounds, which have been observed in Antarctica, may derive from aerial transport and ocean currents, 20/

3. Radionuclides

31. Observations on radionuclides show unusually high levels of polonium 210 and lead-210 activity ratios in Antarctica marine biota and sea water. There are still no generally accepted explanations for these phenomena, 21/

4. Anthropogenic debris

32. Anthropogenic debris, especially non-degradable material, is associated with human presence in Antarctica, and primarily with activities related to the operation of scientific stations. In some areas, additional contamination may be attributed to activities of fishing fleets,

33. Although the volume of garbage discharged into the Southern Ocean is reportedly insignificant, there is at present no method of making comprehensive measurements. Moreover, substantial risks remain of accidents resulting in such discharges. This is a cause of deep ongoing concern. In a recent accident, an estimated 70,000 gallons of diesel oil leaked into the sea, after the shipwreck involving the ocean-going freighter, Bahia Paraiso.

C. Marine living resources and associated biota 22/

1. Whales

34. While there are no reports of any whale species having become extinct, there are no clear signs of stock recovery despite various conservation measures. According to some estimates in 1989:

(a) Only a few hundred remain of an estimated population of about a quarter of a million blue whales which fed in the Antarctic waters in the summer ;

(b) Of an original population of more than half a million fin whales, surviving numbers are probably in the thousands. Sei whale populations have probably been reduced to a similar extent;

(c) Humpback and right whales originally numbered around 100,000. Each has current populations in the low thousands

(d) The minke whale is presumed not to be substantially depleted.

2. Krill

35. With regard to krill fishing there is general agreement that at the present level of **catch** per year - less than 400,000 tons - **there is no reason** for **alarm** about existing stocks. Further, the Marine Mammal Commission has indicated that, although there is increased fishing, **it** is unlikely that krill catches have had, **or** are having, any adverse **effects** on krill **stocks or krill** predators, except possibly in certain areas. However, **concern** that the fishing **of** krill **may** have consequential **effects** on krill-dependent predators is regularly **expressed**.

36. The main problem relating to krill is that **very** little is known about **stock** dynamics and seasonal breeding. **Also**, difficulties have been met in finding reliable methods **for** estimating stock **sizes** and distribution. Thus, **it** is warned that the current **numbers for** sustainable yield may be overestimated,

3. Fish

37. Informed **observers** began to be alarmed in the early **1980s**, noting that total abundance for all fish stocks had dropped dramatically. The **stock of** **Notothenia rossii** was especially heavily overfished in 1970 and 1971 and has not recovered since. Additional concerns **were** raised **for** seals, whales, birds and **other** non-target species caught and killed incidentally during fishing or by lost and discarded fishing gear.

38. Several conservation **measures**, including a catch-reporting **system**, are *now* in **effect to** protect populations that have been depleted. These **measures** included a ban on fishing **for** the severely depleted population of **Notothenia rossii**, and a total closure of the fishery **for** **Champscephalus gunnari** through **1989**. Further **bsnr** and catch limits **were** adopted by the Commission **for** the Conservation of Antarctic Marine Living Resources (**CCAMLR**) in late 1969.

4. Seals

39. The absence of human predation has allowed seal **numbers to** regenerate. Estimates of **fur** seals on South **Georgia**, **for** instance, **grew from** 100 in the **1930s** to 150,000 by 1957, and to an estimate of over 350,000 since 1976. The reduction of **whale** populations and resulting increase in krill **may** also have contributed to the recent growth in seal numbers.

40. The Convention on the Conservation of Antarctic Seals, concluded in 1972, imposed a total prohibition on the **capture of** Ross, fur and elephant seals; and set quotas for the **crabeater**, **Weddell** and leopard seals of 175,000, 5,000 and 12,000, respectively. It also designated *three* oceanic areas as reserves and imposed other conservation **measures**.

5. Oceanic birds

41. The population dynamics of **these** birds are the subject of ongoing research as there is a dearth of information in the scientific **record**. However, the following general comments can be made *on* the basis of available **data**:

(a) While downward trends in **some seabird** populations appear to be attributed to direct or indirect effects of human activities, no decrease can be linked at present **with** commercial harvesting of them in Antarctic **waters**;

(b) The increase in **some** populations **may** be due to increased availability **of** food at **sea**. **However**, the precise nature of this is uncertain and there is evidence that populations of king penguins have increased following previous overexploitation.

VI. SCIENTIFIC RESEARCH IN ANTARCTICA AND PROTECTION OF THE ANTARCTIC ENVIRONMENT

42. It has long been known that Antarctica offers unique opportunities for research in a variety **of** disciplines which contribute to understanding problems outside the Antarctic. In recent years, it has also **come to be** accepted **that research in the Antarctic**, including the Southern Ocean and the sub-Antarctic islands, is a crucial contribution to understanding global changes. Doubtless the results of this research has implications for the future of all human activities. Antarctic scientists have made **a major contribution** to the study **of** global issues. These include ozone depletion and the possible effects of ultraviolet rays on **biota**; the increase in greenhouse gases, and their connection to climate; the ice-sheet's effects on **sea level** changes; the possible role of the Southern Ocean as regards the atmosphere and the **CO² cycle**; and the importance of **the** Southern Ocean to global atmospheric circulations.

43. In September 1986, the General Assembly of the International Council of Scientific Unions launched the International Geosphere-Biosphere Programme (**IGBP**): a Study **of** Global Change. Its main objective was to describe and understand the interactive physical, chemical and biological processes that regulate the total Earth **system**; the unique environment that it provides for **life**; the changes that **are occurring** in their **system**; and the manner *in* which they are positively or negatively influenced by human activities.

44. At **times**, existing international research programmes appear to address research problems in the Antarctica in a somewhat less than adequate manner. In order to fill some **important** gaps in this research, the Scientific Committee on Antarctic Research (SCAR) has identified four interdisciplinary research **themes**:

(a) **Detection of changes** of global importance, best observed in Antarctica, which are fundamental to **establishing** the nature **of current trends** of change and thereby providing a foundation **for** understanding the underlying processes;

(b) **Study** of processes linking the Antarctic **sea-ice**, ice-sheet and biological **systems to** the global ocean **and** atmosphere, which characterise Antarctica's relevance to global change and human activity)

(c) Use of paleoenvironmental information from Antarctic sources which provide a context for interpreting current changes **on** the 10 to 100 year **time-scale** of principal concern to the IGBP;

(d) Study of ecology in the changing Antarctic environment, to assess the impacts of climate on Antarctic biota and their possible feedback effects on climate.

VII. CONCLUDING REMARKS

45. The **increase** of scientific activities in Antarctica and **some** man-induced phenomena such as the so-called "**ozonehole**", have increased public awareness of the dangers which such human activities **may** pose to the Antarctic environment and to the global **system**. **Moreover**, speculation about possible exploitation **of** Antarctic **mineral** resources and its eventual detrimental environmental impact have **become** a source of major discussion and concern. Within the past **five** years, a number **of** positive initiatives have been taken in various forums to seek answers to questions related to protecting the Antarctic environment and its associated **ecosystems**. Discussions to this effect have, inter alia, been held within the framework **of** the Antarctic Treaty **System** and in other international forums.

Notes

1/ Report to **the** United Nations from the Scientific Committee on Antarctic Research on the State of Environment **in Antarctica**, p. 4.

2/ Ibid., p. 4.

3/ The Role of Antarctica in Global Change. Scientific Priorities for the International Geosphere-Biosphere Programme (**IGBP**). Prepared by SCAR for the IGBP, April 1989. ICSU Press/SCAR, p. 8.

4/ **Ocean and Coasta? Areas** Programme Activity Centre. United Nations Environment Programme (**UNEP**). Report on the state of the environment **in** the Antarctic, December 1989, p. 15.

5/ Ibid., pp. 15-16.

Notes (continued)

6/ WMO contribution to the report of the Secretary-General of the United Nations on Antarctic environment, pp. 4-5.

7/ See Lee A. Kimball. Southern Exposure: Deciding Antarctica's Future. World Resources Institute, November 1990.

8/ WMO contribution to the report of the Secretary-General of the United Nations on Antarctic environment, pp. 4-5.

9/ J. O. Stromberg et al. State of the Marine Environment in Antarctica. UNEP Regional Seas Report and Studies No. 12a. UNEP, 1990.

10/ A strategy for Antarctic Conservation. IUCN - The World Conservation Union, 1991, p. 21.

11/ Report to the United Nations from the Scientific Committee on Antarctic Research on the State of the Environment in Antarctica, p. 11.

12/ See Presentation by the President of the Scientific Committee on Antarctic Research (SCAR), Dr. R. M. Laws. SCAR report IV-6. January 1991, p. 10.

13/ Benninghoff, W.S. and Bonner, W. N., Man's Impact on the Antarctic Environment. SCAR, Cambridge, 1985.

14/ Oceans and Coastal Areas Programme Activity Centre. Op. cit., p. 18.

15/ Ibid., pp. 15 and 21.

16/ J. O. Stromberg et al. op. cit., p. 5.

17/ Ibid., p. 9.

18/ Ibid., p. 9.

19/ Ibid., p. 11.

20/ Ibid., p. 17.

21/ Ibid., p. 23.

22/ This part of the report reflects information including the report on the state of the environment in the Antarctic. Oceans and Coastal Areas Programme Activity Centre. United Nations Environment Programme (UNEP), December 1989. Data on whale population dynamics were also provided by the International Whaling Commission.

ANNEX

Replies from Governments

GERMANY

[Original: English]

[29 May 1991]

1. The Permanent Representative of Germany to the United Nations, acting on behalf of the States Parties to the Antarctic Treaty, presents his compliments to the Secretary-General of the United Nations and **has the honour to refer to** the Secretary-General's note of 27 February 1991 concerning General Assembly resolution **45/78 A** of 12 December 1990 on the question of Antarctica.
2. The resolution refers to the significant impact that Antarctica exerts on the global environment and **ecosystems**. The Parties to the Antarctic Treaty are aware of the need for concerted international action to protect the Antarctic environment **from** external environmental disturbances which could accelerate serious global environmental change. Being **the** countries active in the region, they have developed measures, and will continue to develop measures, to protect the fragile **Antarctic** environment from the **impact** of the limited human activity within the region.
3. Given the indispensable contribution of Antarctic **scientific research to** the global effort to predict and understand climate change, **the** Parties to the Antarctic Treaty will also continue to make **freely** available the results of their Antarctic research bearing upon the global environment as well as all other subjects. **Any State Member of the United Nations** can participate in this work by acceding to the Antarctic Treaty.

MAURITIUS

[Original: English]

[25 July 1991]

1. The **Government** of Mauritius supports the proposal to set up a United Nations-sponsored station in Antarctica for the following **reasons**:
 - (a) The present Antarctic Treaty, as an instrument **for** the conservation of the world's last remaining great wilderness, is inadequate **as** judged by its position on mineral resource activities (Convention on the Regulation of Antarctic Mineral Resource Activities);
 - (b) Only nations that are currently undertaking significant **research** activities in the Antarctic region can **become** contracting parties. A United Nations research station would increase the possibilities for scientists to carry out relevant research:

(c) **The establishment of a United Nations research station would Stop the proliferation of a large number of research stations, whose impact on the Antarctic environment is already considerable. Waste accumulation and environmental damage caused by pollution, and high concentration of buildings on King George Island is a classic example. Some stations have been constructed in breach of the Agreed Measures for the Conservation of Antarctic Fauna and Florat**

(d) **Only the United Nations can enforce the Convention on the Conservation of Antarctic Marine Living Resources and enforce regulatory mechanisms to conserve krill of the Southern Ocean for the decimated whale population.**

2. It would also **be grateful if the report on the state of the environment in Antarctica were to highlight the following issues:**

(a) **Conservation of the unique wildlife in that region;**

(b) **Stressing the negative impacts of tourism and high concentration of research stations in that region and the logistic infrastructure needed to service them, e.g. airstrips, fuel stations, etc. ;**

(c) **Some Antarctic rcsearch addresses issues fundamental to human understanding of the global environment. Ice cores hold a record of past climatic and atmospheric changes, and should be available to the scientific community of all Members of the United Nations,**

THAI LAND

[Original: English]

[5 June 1991]

1. The Government **of** Thailand is of the view that the ecological **environment** of Antarctica is fragile and could be easily contaminated by excessive exploitation.

2. The Government of Thailand supports any initiatives **or** studies aimed at the conservation and protection **of Antarctica.**

3. The **Government** of Thailand is also of the view that a comprehensive study **of** the establishment of **a** United Nations-sponsored station in Antarctica, to be prepared by the Secretary-General of the United Nations (General Assembly resolution **45/78 A, para. 5**), should also **take** into account information and the views of various non-gcvermental organisations.
