Disarmament and Development

Thought and Action to Date
Towards a Conceptual Framework
Four Position Papers:
Graciela Chichilnisky
Bert V.A. Röling
Nicole Ball - Milton Leitenberg
Ulrich Albrecht

Dick A. Leurdijk
Elisabeth Mann Borgese

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Foundation Reshaping the International Order (RIO)
P.O.Box 299, 3000 AG Rotterdam, The Netherlands
telephone: 31(10) 116181, telex: 22530 bouwc nl

The Foundation Reshaping the International Order (RIO), a non-profit organization, was founded in 1975 to stimulate discussion of the RIO Report and in the belief that new initiatives designed to increase understanding and discussion of a New International Order are urgently required. The goal of the Foundation is to promote a widening and deepening dialogue on the creation of a more equitable international order, a precondition for a world in which a life of dignity and well-being becomes the inalienable right of all mankind. In pursuing this goal the Foundation is committed to making a substantive contribution to the preparatory process for the International Development Strategy for the 1980s, the period in which the New International Order must take concrete shape. In seeking to make this contribution The Foundation will advocate courses of action, attempt to initiate innovative processes and to mobilize ideas and networks. It will systematically draw upon the ideas and knowledge of others and, in doing so, attempt to distill that which is most relevant, to integrate that which could or should be brought together, and to transmit the resulting products both to the appropriate audience and at the appropriate time during the preparatory process. This necessarily implies a commitment to active cooperation and interaction with others.

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Whilst the Foundation is indebted to the Netherlands government it alone is responsible for the contents of this document

Preface

Disarmament and development have in the past been treated as two separate subject areas. Each one has been pursued in its own right, at the political level as well as in terms of research. This was, for instance, reflected in two separate UN Resolutions for the 1970s, one calling for the Disarmament Decade and the other for the Second Development Decade. At the research level, disarmament has been incorporated as an integral part in only a few 'world order studies' published in the 1970s; in the RIO Report 'arms reduction' was covered in one of the ten major sections each of which was devoted to one major problem area.

Although it is generally recognized that both disarmament and development deserve highest priority at the world level, relatively little research has been done on their mutual relationship, compared to the extensive research devoted to each of them separately. Thus relatively little is known on the qualitative as well as the quantitative nature of the relationship.

The aim of the RIO Foundation's Disarmament and Development project is to contribute to action-oriented research in the field: not through new fundamental, empirical research but through synthesizing already available research results into an 'integrated vision'. The project, thus, is executed in close cooperation with other institutes, such as the Stockholm International Peace Research Institute (SIPRI) and Pugwash. 'Outside specialists' are invited to prepare 'position papers', dealing with Disarmament and Development as a whole, but from different perspectives. Other specialists are invited, through a special mailing list, to comment on the project's documents. Finally, the project receives the assistance from an Advisory Committee which is composed as follows:

S. Brucan (Romania): Professor of Political Science, University of Bucharest;
A. Garcia Robles (Mexico): Permanent Representative with the CD, Geneva;
C.R. Gharekan (India): Permanent Representative with the UN, Geneva;
H. de Haan (The Netherlands): Professor of International Economic Relations, University of Groningen;
Elisabeth Mann Borgese (Canada): Chairman, Planning Council, International Ocean Institute, Malta;
M. Mihajlovic (Yugoslavia): Ministry of Foreign Affairs, Beograd;
Inga Thorsson (Sweden): Under Secretary of State for Disarmament, Member of Parliament.

The members of the Committee, which thus far met on 18-19 December, 1978 and 4-5 March, 1979, serve in a personal capacity.

The present report is organized as follows:

In Part I an attempt is made to provide an overview of completed or ongoing relevant activities in the field of Disarmament and Development, as briefly introduced in chapter 1. Chapter 2 is devoted to the intergovernmental system. It contains development references in the major disarmament resolutions and agreements and disarmament references in major development resolutions. The UN General Assembly Special Session on Disarmament is discussed and the relevant UN studies in the 1970s are reviewed. Chapter 3 deals with the activities of non-governmental organizations and some 'world order studies' published in the 1970s. Their findings with regard to the arms race and disarmament are briefly reviewed.

Part II investigates the possibility of new approaches. First, in chapter 4, some conclusions are drawn from the project's four position papers. All seem to agree that a systemic framework for significant contribution to both disarmament and development in their interaction is still to be constructed. It is then argued, in chapter 5, that dual-purpose technologies, because of their potential for massive destruction as well as large-scale development, may offer a basis for a new approach. The role of dual-purpose technologies is examined in the context of a New International Order, providing an institutional framework for conversion from warlike to peaceful purposes. Part II closes with some recommendations for action.

Part III contains the four position papers commissioned by the RIO Foundation. Graciela Chichilnisky deals with the role of arms production and trade in North-South relations. Bert Röling's paper approaches the problems from the angle of military and economic security. Nicole Ball and Milton Leitenberg deal with the relationship between disarmament and development. Ulrich Albrecht finally, deals with the problems of conversion from warlike to peaceful purposes and raises questions of political feasibility. Together, the four papers provide the elements for a conceptual framework for Disarmament and Development.

This report is meant as a first contribution to the ongoing dialogue on Disarmament and Development in the context of a New International Order. Any reaction to its contents will be most welcome.

Dick A. Leurdijk
Elisabeth Mann Borgese
June 1979

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Part I: Thought and Action to Date

1. Introduction to Part I

Ever since the founding of the United Nations, the disarmament-development relationship has been referred to. Thus the Charter itself of the United Nations establishes that the maintenance of international peace and security is the primary purpose of the Organization (Art. 1) and that it should be promoted "with the least diversion for armaments of the world's human and economic resources" (Art. 26). A first UN report on the *Economic and Social Consequences of Disarmament* (1), published in 1962, was followed in the same year by a resolution entitled *Declaration on the Conversion to Peaceful Needs of the Resources released by Disarmament*. (2) Five years later, at its twenty-first session, a draft resolution, never put to a vote, proposed that the General Assembly should

- appeal to the Governments of all States to give consideration to allocating a small proportion of their annual military expenditures to the campaign against world illiteracy under the auspices of the United Nations Educational Scientific and Cultural Organization (UNESCO) within the framework of the United Nations Development Decade;

- invite the Governments of all States to study the possibility, as a first step towards general and complete disarmament under international control, of undertaking to forego any increase of military expenditures beyond their present level and thereafter to reduce them by a stated amount of percentage each year, with a view to allocating the annual savings therefrom to the objectives of the United Nations Development Decade;

- invite Governments of the developed countries to conduct the necessary studies of the detailed aspect of the economic consequences of collateral and partial measures of disarmament, with a view to developing the information, plans and policies for the diversion of the savings from such measures to the support of the United Nations Development Programme, bearing in mind the imperative needs of the developing countries. (3)

At its 1969 session, the General Assembly considered an agenda item 'One day of war for peace', proposing an appeal to Governments to devote one day's military expenditure under their annual budgets to 'easing the suffering of mankind'. After some discussion, the Assembly adopted Resolution 2526 (XXIV) on the subject, inviting "Member States to designate each year a 'peace day' devoted to the study of the effects that any disarmament measures might have on economic and social development" and requesting them "to consider on that occasion, in the event that effective disarmament measures release additional resources, the possibility of using those resources in the light of the

objectives of the Second United Nations Development Decade." (4)

During the Disarmament and the Second Development Decade the United Nations held one special session on disarmament and two on development. The call for the establishment of a New International Economic Order (NIEO), the emphasis on economic interdependencies, on the scarcity of resources and ecological stress, have provided a new frame of reference for Disarmament and Development. The economic dislocations of the 'seventies have led to an extension of the traditional concept of security, which now includes also 'economic security' together with 'military security'.

In the 'seventies, a study was completed on *Economic and Social Consequences of the Armaments Race and its Extremely Harmful Effects on International Peace and Security*. Throughout this study it was stressed that the two most important goals of the international community which the members of the UN are committed to pursue vigorously - each in its own right - are in fact intimately linked. (5) The re-allocation of funds obtained through disarmament to development is considered one of the main issues in the context of *The Objectives of the New International Economic Order*. (6) And, according to the Committee for Development Planning, "the single most massive obstacle to development support is the worldwide expenditure on national defence activity." (7) Peace, security and economic and social development have become 'indivisible'. (8)

But also outside the UN system the importance of the disarmament -development relationship and its implications are stressed increasingly. The *RIO Report (Reshaping the International Order)* (9) designates disarmament as one of the ten major problem areas. The *World Order Models Project (WOMP)*, 'an analytic, holistic and ethical framework for the study and promotion of a just world order', integrates peace, economic well-being, social justice and ecological balance in its value system. (10)

The existence of a relationship between disarmament and development thus is widely recognized, providing a broad basis for further studies.

2. The Intergovernmental System

2.1 Introduction

Resolution 2602 E (XXIV), declaring the 1970s as Disarmament Decade, clearly states the relationship between disarmament and development:

"...Believing that the diversion of economic resources and energy, human and material, from peaceful economic and social pursuits to an unproductive and wasteful arms race, particularly in the nuclear field, places a great burden on both the developing and the developed countries" and,

"Believing that the security and the economic and social well-being of all countries would be enhanced as progress is made towards the goal of general and complete disarmament,"

recommends

"that consideration be given to channelling a substantial part of the resources freed by measures in the field of disarmament to promote the economic development of developing countries, and in particular, their scientific and technological progress."

Resolution 2626 (XXV), proclaiming the Second United Nations Development Decade, starting from January 1, 1971, lays equal stress on this interrelationship:

"The success of international development activities will depend in large measure on improvement in the general international situation, particularly on concrete progress towards general and complete disarmament under effective international control. ...Progress towards general and complete disarmament should release substantial additional resources which could be utilized for the purpose of economic and social development, in particular that of developing countries. There should, therefore, be a close link between the Second United Nations Development Decade and the Disarmament Decade."

2.2 References in major resolutions and agreements

This 'close link' was re-emphasized in a number of subsequent resolutions and agreements. Development references in major disarmament resolutions and agreements and disarmament references in major development resolutions are listed on the next two pages. The development references stress, in the first place, the economic wastefulness of the arms race; secondly, they urge a re-allocation of funds and resources released through arms reduction, for development purposes; and, thirdly, a number of

Development references in major disarmament resolutions and agreements

Treaty of Tlatelolco, 1967/1968
...., give rise to an inescapable necessity that nuclear energy should be used in that region exclusively for peaceful purposes, and that the Latin American countries should use their right to the greatest and most equitable possible access to this new source of energy in order to expedite the economic and social development of their peoples.

Non-Proliferation Treaty, 1968/1970
Affirms the principle that the benefits of peaceful applications of nuclear technology, including any technological by-products which may be derived by nuclear-weapon States from the development of nuclear explosive devices, should be available for peaceful purposes to all Parties to the Treaty,....

Resolution 2749 (XXV), 17 December 1970
Declares that the sea-bed and ocean-floor, and the subsoil thereof, beyond the limits of national jurisdiction, shall be reserved exclusively for peaceful purposes ...

Resolution 3093 A (XXVIII), 7 December 1973
Recommends that all states permanent members of the Security Council should reduce their military budgets by 10 per cent from the 1973 level during the next financial year; appeals to .... allot 10 per cent of the funds released .... for .... assistance to developing countries ....

Resolution 31/68, 10 December 1976
Deplores the meagre achievements of the Disarmament Decade in terms of truly effective disarmament and arms limitation agreements,and the detrimental effects on world peace and economy of the continuing unproductive and wasteful arms race, particularly the nuclear arms race .... Calls upon member states and the Secretary-General to intensify their efforts in support of the link between disarmament and development, ...

Resolution 31/75, 10 December 1976
... recognized that states accepting effective non-proliferation restraints have a right to full access to the peaceful uses of nuclear energy, and underlines the importance of all efforts to increase the availability of energy, particularly for the needs of the developing countries of the world.

Resolution 32/80, 12 December 1977
Calls upon member states .... to intensify their efforts in support of the link between disarmament and development envisaged in the .... resolution on the Disarmament Decade, so as to promote disarmament negotiations and to ensure that the .... resources freed .... are used to promote economic and social development, particularly in the developing countries.

Convention on Environmental Modification, 1977/
Realizing that the use of environmental modification techniques for peaceful purposes could improve the interrelationship of man and nature ....
Desiring to prohibit effectively military .... use of environmental modification techniques .... to eliminate the dangers to mankind from such use.

Disarmament references in major development resolutions

Resolution 2626 (XXV), 24 October 1970
States, in para 5 of its Preamble, that the success of international development activities will depend in large measure on improvement in the general international situation, particularly on concrete progress towards general and complete disarmament under effective international control, ... Progress towards general and complete disarmament should release substantial additional resources which could be utilized for the purpose of economic and social development, in particular that of developing countries. There should, therefore, be a close link between the Second United Nations Development Decade and the Disarmament Decade.

Resolution 3176 (XXVIII), 17 December 1973
States that the resources that may be released as a result of effective measures of actual disarmament should be used for the promotion of the economic and social development of all nations. The release of resources resulting from those measures should increase the capacity of developed countries to provide support to developing countries in their efforts towards accelerating their economic and social progress.

Resolutions 3201 and 3202 (S-VI), 1 May 1974
The Declaration and Programme of Action in the Establishment of a New International Economic Order contain *no* reference to disarmament.

Resolution 3281 (XXIX), 12 December 1974
Adopts and proclaims a charter of economic rights and duties of states, which in Article 15 provides that all states have the duty to promote the achievement of general and complete disarmament under effective international control and to utilize the resources freed by effective disarmament measures for the economic and social development of countries, allocating a substantial portion of such resources as additional means for the development needs of developing countries.

Resolution 3362 (S-VII), 16 September 1975
The General Assembly, ()
Conscious that the accelerated development of developing countries would be a decisive element for the promotion of world peace and security,
Recognizing that greater co-operation among States in the fields of trade, industry, science and technology as well as in other fields of economic activities, based on the principles of the Declaration and the Programme of Action on the Establishment of a New International Economic Order and of the Charter of Economic Rights and Duties of States, would also contribute to strengthening peace and security in the world, ...

Resolution 3470 (XXX), 11 December 1975
Deplores the wastage of resources in expenditures on armaments, particularly nuclear armaments; calls upon member states and the Secretary-General to intensify their efforts in support of the link between disarmament and development, so as to promote disarmament negotiations, and to ensure that the human and material resources freed by disarmament are used to promote economic and social development, particularly in the developing countries.

them stress the development potential of certain resources and technologies ('dual-purpose' technologies) which should be enhanced by international cooperation while their destructive potential must be controlled and eliminated.

The disarmament references likewise stress the importance of disarmament to development and the relationship between the two. In particular, they postulate the *duty* of States to promote the achievement of general and complete disarmament under effective international control, urge that the resources freed by effective disarmament measures be utilized for the economic and social development of countries, allocating a substantial portion of such resources as additional means for the development needs of developing countries. They express the conviction, on the other hand, that economic development, in turn, will make a major contribution to the attainment of international peace and security. Greater co-operation in the fields of trade, industry, science and technology as well as in other fields of economic activities, based on the principles of the *Declaration and the Programme of Action on the Establishment of a New International Economic Order* and of the *Charter of Economic Rights and Duties of States*, it is assumed, would also contribute to strenghtening peace and security in the world.

2.3 Relevant UN Studies

A list of relevant UN studies published or initiated in the 1970s is given below.

Economic and Social Consequences of the Arms Race and of Military Expenditures, A/8469/Rev.1 (United Nations publication, Sales No. E.72.IX.16), New York 1972.

Disarmament and Development, Report of the Group of Experts on the Economic and Social Consequences of Disarmament, ST/ECA/174 (United Nations publication, Sales No. E.73.IX.1), New York 1972.

Reduction of Military Budgets of States Permanent Members of the Security Council by 10 percent and Utilization of Part of the Funds Thus Saved to Provide Assistance to Developing Countries, A/9770/Rev.1 (United Nations publication, Sales No. E.75.I.10), New York 1975.

Reduction of Military Budgets. Measurement and International Reporting of Military Expenditures, A/31/222/Rev.1 (United Nations publication, Sales No. E.77.I.6), New York 1977.

Economic and Social Consequences of the Armaments Race and its Extremely Harmful Effects on World Peace and Security, A/32/88, 12 August 1977. Report of the Secretary-General, prepared with the assistance of consultant experts.

A new study on the relationship between disarmament and development has been initiated by the Secretary-General to investigate - within the context of a NIEO - utilization of resources for military purposes; economic and social effects of a continuing arms race and of disarmament measures; and redeployment of resources from military to economic and social development purposes.

The Study on the *Economic and Social Consequences of the Arms Race and of Military Expenditures* (1972) restates, on the basis of up-to-date statistical data, many of the major points made by previous documents. The first thing that must be concluded about the consequences of the arms race, the study notes is that "the threat of ultimate disaster it has generated is by far the most dangerous single peril the world faces today - far more dangerous than poverty or disease, far more dangerous than either the population explosion or pollution - and it far outweighs whatever short-term advantage armaments may have achieved in providing peoples with a sense of national security." Considering the opportunities lost as a consequence of the arms race, the report states that economic aid has suffered and that enormous social problems lie ahead for all countries. Public services, health, education, housing, and the protection of the environment - a task which becomes ever more urgent, and one which has to be faced not only on a national but on an international scale if a tolerable physical environment is to be assured for tomorrow - all need the resources which the arms race consumes. The arms race must be stopped not only because of the immediate perils it holds for us all, but because the longer it continues, the more intractable the problems of economic growth, social justice and the environment will become. A halt in the arms race and a significant reduction in military expenditures would help the social and economic development of all countries and would increase the possibilites of providing additional aid to developing countries. The study concludes that there would be no insuperable technical difficulties in ensuring the redeployment of the released resources to peaceful uses, for example, manpower, food, clothing, transport, fuel and products of the metal and engineering industries. Budgetary action to raise civil demand will be enough to induce redeployment of these resources either to investment or to consumption, public or private. Other resources, for example, nuclear weapon plants and military aircraft and missile plants, may not be readily transferable.

The study stresses the importance of research and development, which need special consideration. The world's expenditure on research and development has grown tremendously since the Second World War, but a very large part of the effort has been military. These research and development resources, when diverted to peaceful uses, might have a great impact on development. A large and imaginative increase in peaceful research and development budgets will be required if all, or even a large part of the research and development manpower employed on military work is to find peaceful research and development work. There is a vast range of problems in the developing countries and there are huge sophisticated resources absorbed by military research and development in the developed countries. The range of possibilities of transfer appears to be extremely wide.

Five years later, the study on the *Economic and Social Consequences of the Armaments Race and its Extremely Harmful Effects on World Peace and Security* (1977) comes to basically the same conclusions. What emerges with particular force is the multipli-

city of these consequences, not only in the field of security proper but in all aspects of civic live. The social, political, technological and industrial options of countries are affected by their participation in the arms race. Many of the major problems faced by the world community, problems of development, economic imbalance and inflation, pollution, energy and raw materials, trade relations and technology, are enlarged and exacerbated by the arms race. Progress in other areas such as health, education, housing and others is delayed owing to lack of resources.

This recent study also emphasises that the question of the relationship between armament and disarmament, on the one hand, and other aspects of social, economic and political development on the other, has received all too little attention in the past and requires in-depth treatment. It is remarkable, the authors point out, that recent studies of the future of the world economy, analyses relating to the establishment of a new international economic order and the United Nations conferences on a variety of contemporary problems which have been held in recent years have in most cases omitted consideration of the implications of the arms race altogether, despite its obvious and massive implications in each of these cases. From every point of view it would be an advantage if in such studies and analyses and in the elaboration of programmes and recommendations the consequences of and for the arms race were specifically considered. Both aspects of the problem need to be taken into account: on the one hand, the volume of resources consumed in the arms race and the socially constructive uses to which they could be put; and on the other hand, the social, political, economic and institutional processes, both domestic and international, whereby changes in military policies and the course of development in other fields mutually affect each other.

In particular, the study points out, provisions to ensure that measures of armaments limitation are so designed that they do not impede the transfer of technology for peaceful ends and other similar provisions must be an integral part of disarmament measures.

This points to the need for a comprehensive scheme in which partial measures would find their place and, supplementing each other, would add up to a coherent strategy. Thus the report calls for the elaboration of an over-all plan, persuasive in concept and workable in application, a Strategy for Disarmament, as it were. To realize such a strategy improvement of the machinery of the United Nations in this direction appears to be necessary if the World Organization is to fulfill its task in the field of disarmament, the study concludes.

2.4 UNGA Special Session on Disarmament

On June 30, 1978, the Tenth Special Session of the General Assembly devoted to Disarmament adopted in Resolution S-10/2 a Final Document re-iterating the relationship between development

III. RESOLUTION ADOPTED ON THE REPORT OF THE *AD HOC* COMMITTEE OF THE TENTH SPECIAL SESSION[3]

S-10/2. Final Document of the Tenth Special Session of the General Assembly

The General Assembly,

Alarmed by the threat to the very survival of mankind posed by the existence of nuclear weapons and the continuing arms race, and recalling the devastation inflicted by all wars,

Convinced that disarmament and arms limitation, particularly in the nuclear field, are essential for the prevention of the danger of nuclear war and the strengthening of international peace and security and for the economic and social advancement of all peoples, thus facilitating the achievement of the new international economic order,

Having resolved to lay the foundations of an international disarmament strategy which, through co-ordinated and persevering efforts in which the United Nations should play a more effective role, aims at general and complete disarmament under effective international control,

Adopts the following Final Document of this special session of the General Assembly devoted to disarmament:

FINAL DOCUMENT OF THE TENTH SPECIAL SESSION OF THE GENERAL ASSEMBLY

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I. INTRODUCTION

1. The attainment of the objective of security, which is an inseparable element of peace, has always been one of the most profound aspirations of humanity. States have for a long time sought to maintain their security through the possession of arms. Admittedly, their survival has, in certain cases, effectively depended on whether they could count on appropriate means of defence. Yet the accumulation of weapons, particularly nuclear weapons, today constitutes much more a threat than a protection for the future of mankind. The time has therefore come to put an end to this situation, to abandon the use of force in international relations and to seek security in disarmament, that is to say, through a gradual but effective process beginning with a reduction in the present level of armaments. The ending of the arms race and the achievement of real disarmament are tasks of primary importance and urgency. To meet this historic challenge is in the political and economic interests of all the nations and peoples of the world as well as in the interests of ensuring their genuine security and peaceful future.

2. Unless its avenues are closed, the continued arms race means a growing threat to international peace and security and even to the very survival of mankind. The nuclear and conventional arms build-up threatens to stall the efforts aimed at reaching the goals of development, to become an obstacle on the road of achieving the new international economic order and to hinder the solution of other vital problems facing mankind.

5. The Members of the United Nations are fully aware of the conviction of their peoples that the question of general and complete disarmament is of utmost importance and that peace, security and economic and social development are indivisible, and they have therefore recognized that the corresponding obligations and responsibilities are universal.

10. Although the decisive factor for achieving real measures of disarmament is the "political will" of States, especially of those possessing nuclear weapons, a significant role can also be played by the effective functioning of an appropriate international machinery designed to deal with the problems of disarmament in its various aspects. .....

..... The last section of the Final Document, section IV, has been prepared with that end in view.

II. DECLARATION

11. Mankind today is confronted with an unprecedented threat of self-extinction arising from the massive and competitive accumulation of the most destructive weapons ever produced. Existing arsenals of nuclear weapons alone are more than sufficient to destroy all life on earth. Failure of efforts to halt and reverse the arms race, in particular the nuclear arms race, increases the danger of the proliferation of nuclear weapons. Yet the arms race continues. Military budgets are constantly growing, with enormous consumption of human and material resources. The increase in weapons, especially nuclear weapons, far from helping to strengthen international security, on the contrary weakens it. The vast stockpiles and tremendous build-up of arms and armed forces and the competition for qualitative refinement of weapons of all kinds, to which scientific resources and technological advances are diverted, pose incalculable threats to peace. This situation both reflects and aggravates international tensions, sharpens conflicts in various regions of the world, hinders the process of détente, exacerbates the differences between opposing military alliances, jeopardizes the security of all States, heightens the sense of insecurity among all States, including the non-nuclear-weapon States, and increases the threat of nuclear war.

16. In a world of finite resources there is a close relationship between expenditure on armaments and economic and social development. Military expendi-

[3] For the report of the *Ad Hoc* Committee, see *Official Records of the General Assembly, Tenth Special Session, Annexes*, agenda items 9, 10, 11 and 12, document A/S-10/23.

tures are reaching ever higher levels, the highest percentage of which can be attributed to the nuclear-weapon States and most of their allies, with prospects of further expansion and the danger of further increases in the expenditures of other countries. The hundreds of billions of dollars spent annually on the manufacture or improvement of weapons are in sombre and dramatic contrast to the want and poverty in which two thirds of the world's population live. This colossal waste of resources is even more serious in that it diverts to military purposes not only material but also technical and human resources which are urgently needed for development in all countries, particularly in the developing countries. Thus, the economic and social consequences of the arms race are so detrimental that its continuation is obviously incompatible with the implementation of the new international economic order based on justice, equity and co-operation. . . . . .

35. There is also a close relationship between disarmament and development. Progress in the former would help greatly in the realization of the latter. Therefore resources released as a result of the implementation of disarmament measures should be devoted to the economic and social development of all nations and contribute to the bridging of the economic gap between developed and developing countries.

III. Programme of Action

43. Progress towards the goal of general and complete disarmament can be achieved through the implementation of a programme of action on disarmament, in accordance with the goals and principles established in the Declaration on disarmament. The present Programme of Action contains priorities and measures in the field of disarmament that States should undertake as a matter of urgency with a view to halting and reversing the arms race and to giving the necessary impetus to efforts designed to achieve genuine disarmament leading to general and complete disarmament under effective international control.

66. Effective measures can and should be taken at the national level and through international agreements to minimize the danger of the proliferation of nuclear weapons without jeopardizing energy supplies or the development of nuclear energy for peaceful purposes. . . . .

68. Non-proliferation measures should not jeopardize the full exercise of the inalienable rights of all States to apply and develop their programmes for the peaceful uses of nuclear energy for economic and social development in conformity with their priorities, interests and needs. All States should also have access to and be free to acquire technology, equipment and materials for peaceful uses of nuclear energy, taking into account the particular needs of the developing countries. International co-operation in this field should be under agreed and appropriate international safeguards applied through the International Atomic Energy Agency on a non-discriminatory basis in order to prevent effectively the proliferation of nuclear weapons.

69. Each country's choices and decisions in the field of the peaceful uses of nuclear energy should be respected without jeopardizing their respective fuel cycle policies or international co-operation, agreements and contracts for the peaceful uses of nuclear energy, provided that the agreed safeguard measures mentioned above are applied.

70. In accordance with the principles and provisions of General Assembly resolution 32/50 of 8 December 1977, international co-operation for the promotion of the transfer and utilization of nuclear technology for economic and social development, especially in the developing countries, should be strengthened.

71. Efforts should be made to conclude the work of the International Nuclear Fuel Cycle Evaluation strictly in accordance with the objectives set out in the final communiqué of its Organizing Conference.[8]

73. All States which have not yet done so should consider adhering to the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction.

75. The complete and effective prohibition of the development, production and stockpiling of all chemical weapons and their destruction represent one of the most urgent measures of disarmament. Consequently, the conclusion of a convention to this end, on which negotiations have been going on for several years, is one of the most urgent tasks of multilateral negotiations. After its conclusion, all States should contribute to ensuring the broadest possible application of the convention through its early signature and ratification.

76. A convention should be concluded prohibiting the development, production, stockpiling and use of radiological weapons.

77. In order to help prevent a qualitative arms race and so that scientific and technological achievements may ultimately be used solely for peaceful purposes, effective measures should be taken to avoid the danger and prevent the emergence of new types of weapons of mass destruction based on new scientific principles and achievements. Efforts should be appropriately pursued aiming at the prohibition of such new types and new systems of weapons of mass destruction. Specific agreements could be concluded on particular types of new weapons of mass destruction which may be identified. This question should be kept under continuing review.

78. The Committee on Disarmament should keep under review the need for a further prohibition of military or any other hostile use of environmental modification techniques in order to eliminate the dangers to mankind from such use.

79. In order to promote the peaceful use of and to avoid an arms race on the sea-bed and the ocean floor and the subsoil thereof, the Committee on Disarmament is requested—in consultation with the States parties to the Treaty on the Prohibition of the Emplacement of Nuclear Weapons and Other Weapons of Mass Destruction on the Sea-Bed and the Ocean Floor and in the Subsoil Thereof,[10] and taking into account the proposals made during the 1977 Review

80. In order to prevent an arms race in outer space, further measures should be taken and appropriate international negotiations held in accordance with the spirit of the Treaty on Principles Governing the Activities of States in the Exploration and Use of

[8] See A/C.1/32/7.
[10] Resolution 2660 (XXV), annex.

Outer Space, including the Moon and Other Celestial Bodies.[11]

89. Gradual reduction of military budgets on a mutually agreed basis, for example, in absolute figures or in terms of percentage points, particularly by nuclear-weapon States and other militarily significant States, would be a measure that would contribute to the curbing of the arms race and would increase the possibilities of reallocation of resources now being used for military purposes to economic and social development, particularly for the benefit of the developing countries. The basis for implementing this measure will have to be agreed by all participating States and will require ways and means of its implementation acceptable to all of them, taking account of the problems involved in assessing the relative significance of reductions as among different States and with due regard to the proposals of States on all the aspects of reduction of military budgets.

94. In view of the relationship between expenditure on armaments and economic and social development and the necessity to release real resources now being used for military purposes to economic and social development in the world, particularly for the benefit of the developing countries, the Secretary-General should, with the assistance of a group of qualified governmental experts appointed by him, initiate an expert study on the relationship between disarmament and development. The Secretary-General should submit an interim report on the subject to the General Assembly at its thirty-fourth session and submit the final results to the Assembly at its thirty-sixth session for subsequent action.

95. The expert study should have the terms of reference contained in the report of the *Ad Hoc* Group on the Relationship between Disarmament and Development[13] appointed by the Secretary-General in accordance with General Assembly resolution 32/88 A of 12 December 1977. It should investigate the three main areas listed in the report, bearing in mind the United Nations studies previously carried out. The study should be made in the context of how disarmament can contribute to the establishment of the new international economic order. The study should be forward-looking and policy-oriented and place special emphasis on both the desirability of a reallocation, following disarmament measures, of resources now being used for military purposes to economic and social development, particularly for the benefit of the developing countries, and the substantive feasibility of such a reallocation. A principal aim should be to produce results that could effectively guide the formulation of practical measures to reallocate those resources at the local, national, regional and international levels.

97. The Secretary-General shall, with the assistance of consultant experts appointed by him, continue the study of the interrelationship between disarmament and international security requested in Assembly resolution 32/87 C of 12 December 1977 and submit it to the thirty-fourth session of the General Assembly.

IV. Machinery

113. While disarmament, particularly in the nuclear field, has become a necessity for the survival of mankind and for the elimination of the danger of nuclear war, little progress has been made since the end of the Second World War. In addition to the need to exercise political will, the international machinery should be utilized more effectively and also improved to enable implementation of the Programme of Action and help the United Nations to fulfil its role in the field of disarmament. In spite of the best efforts of the international community, adequate results have not been produced with the existing machinery. There is, therefore, an urgent need that existing disarmament machinery be revitalized and forums appropriately constituted for disarmament deliberations and negotiations with a better representative character. For maximum effectiveness, two kinds of bodies are required in the field of disarmament—deliberative and negotiating. All Member States should be represented on the former, whereas the latter, for the sake of convenience, should have a relatively small membership.

115. The General Assembly has been and should remain the main deliberative organ of the United Nations in the field of disarmament and should make every effort to facilitate the implementation of disarmament measures. An item entitled "Review of the implementation of the recommendations and decisions adopted by the General Assembly at its tenth special session" shall be included in the provisional agenda of the thirty-third and subsequent sessions of the General Assembly.

118. The General Assembly establishes, as successor to the Commission originally established by resolution 502 (VI) of 11 January 1952, a Disarmament Commission, composed of all States Members of the United Nations, and decides that:

(*a*) The Disarmament Commission shall be a deliberative body, a subsidiary organ of the General Assembly, the function of which shall be to consider and make recommendations on various problems in the field of disarmament and to follow up the relevant decisions and recommendations of the special session devoted to disarmament. The Disarmament Commission should, *inter alia*, consider the elements of a comprehensive programme for disarmament to be submitted as recommendations to the General Assembly and, through it, to the negotiating body, the Committee on Disarmament;

120. ..... The Assembly welcomes the agreement reached following appropriate consultations among the Member States during the special session of the General Assembly devoted to disarmament that the Committee on Disarmament will be open to the nuclear-weapon States, and thirty-two to thirty-five other States to be chosen in consultation with the President of the thirty-second session of the Assembly; that the membership of the Committee on Disarmament will be reviewed at regular intervals; that the Committee on Disarmament will be convened in Geneva not later than January 1979 by the country whose name appears first in the alphabetical list of membership; .....

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30 June 1978

[11] Resolution 2222 (XXI), annex.
[13] A/S-10/9, annex.

and disarmament. The continued arms race, the Document states, constitutes a growing threat to international peace and security and to the very survival of mankind. The nuclear and conventional arms build-up threatens to stall the efforts aimed at reaching the goals of development, to become an obstacle on the road of achieving the new international economic order and to hinder the solution of other vital problems facing mankind. The members of the United Nations are fully aware of the conviction of their peoples that the question of general and complete disarmament is of utmost importance and that peace, security and economic and social development are indivisible, and they have therefore recognized that the corresponding obligations and responsibilities are universal.

In a world of finite resources, the Document suggests there is a close relationship between expenditure on armaments and economic and social development. Military expenditures are reaching ever higher levels, the highest percentage of which can be attributed to the nuclear-weapon States and most of their allies, with prospects of further expansion and the danger of further increases in the expenditures of other countries. The hundreds of billions of dollars spent annually are in sombre and dramatic contrast to the want and poverty in which two thirds of the worlds population live. This colossal waste of resources is even more serious in that it diverts to military purposes not only material but also technical and human resources which are urgently needed for development in all countries, particularly in the developing countries. Thus the economic and social consequences of the arms race are so detrimental that its continuation is obviously incompatible with the implementation of the New International Economic Order based on justice, equity and cooperation. Consequently, resources released as a result of the implementation of disarmament measures should be used in a manner which will help to promote the well-being of all peoples and to improve the economic conditions of the developing countries.

The Final Document which consists of an Introduction, a Declaration, a Programme of Action, and a section Machinery, covers a number of topics of which the following are directly relevant to the present RIO study and dealt with, in some detail, in Parts II and III of this Report.

Disarmament and Development: Security

The adoption of disarmament measures should take place in such an equitable and balanced manner as to ensure the right of each State to security and to ensure that no individual State or group of States may obtain advantages over others at any stage. At each stage the objective should be undiminished security at the lowest possible level of armaments and military forces. While stressing the importance of negotiations on nuclear disarmament measures, the balanced reduction of armed forces and of conventional armaments, the Document also recommends negotiations on the limitation of international transfer of conventional weapons which, however, should take into account the inalienable right to self-determination and independence of peoples under colonial

or foreign domination and the obligations of States to respect that right. The need to ensure balance at each stage and undiminished security of all States is stressed throughout.

Peaceful and Military Uses of Nuclear Energy
Non-proliferation of nuclear weapons is a matter of universal concern, the Document states. Measures of disarmament, however, must be consistent with the inalienable right of all States, without discrimination, to develop, acquire and use nuclear technology, equipment and materials for the peaceful use of nuclear energy and to determine their peaceful nuclear programmes in accordance with their national priorities, needs and interests, bearing in mind the need to prevent the proliferation of nuclear weapons. International cooperation in the peaceful uses of nuclear energy should be conducted under agreed and appropriate international safeguards applied on a non-discriminatory basis. All States should have access to and be free to acquire technology, equipment and materials for peaceful uses of nuclear energy, taking into account the particular needs of the developing countries. International cooperation in this field should be applied through the International Atomic Energy Agency on a non-discriminatory basis in order to prevent effectively the proliferation of nuclear weapons.

Environment
The Committee on Disarmament should keep under review the need for a further prohibition of military or any other hostile use of environmental modification techniques in order to eliminate the dangers to mankind from such use.

Oceans
In order to promote the peaceful use of and to avoid an arms race on the seabed and the ocean floor and the subsoil thereof, the Committee on Disarmament is requested - in consultation with the States Parties to the Treaty on the Prohibition of the Emplacement of Nuclear Weapons and Other Weapons of Mass Destruction on the Seabed and the Ocean Floor and the Subsoil Thereof, and taking into account the proposals made during the 1977 Review Conference of the Parties to that Treaty and any relevant technological developments - to proceed promptly with the consideration of further measures in the field of disarmament for the prevention of an arms race in that environment.

Outer Space
In order to prevent an arms race in outer space, further measures should be taken and appropriate international negotiations held in accordance with the spirit of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies.

International Machinery
While pointing to the dangers ahead and to the very little progress towards disarmament made since the end of the Second World War, the document stresses that existing international machinery should be utilized more effectively and also improved to enable

implementation of the Programme of Action and help the United Nations to fulfil its role in the field of disarmament. Two kinds of bodies are required in the field of disarmament: a deliberative and a negotiating body. The first of these functions is to be performed by a *Disarmament Commission*, composed of all States Members of the United Nations. The second function is to be performed by the *Committee on Disarmament* which, according to the decision of the Tenth Special Session, shall be open to the nuclear-weapons States and, in addition, the thirty-two to thirty-five other States to be chosen in consultation with the President of the Thirty-Second Session of the General Assembly. This membership is to be reviewed periodically.

Additional topics
A number of States contributed papers and proposals to the Conference. A partial list of these is included in paragraph 125 of the Final Document. In the context of the present report the following are of particular relevance:

- Memorandum from France concerning the establishment of an International Satellite Monitoring Agency;

- Memorandum from France concerning the establishment of an International Disarmament Fund for Development;

- Proposal by Costa Rica on economic and social incentives to halt the arms race;

- Proposal by Mexico for the opening, on a provisional basis, of an *ad hoc* account in the United Nations Development Programme to use for development the funds which may be released as a result of disarmament measures;

- Proposal by Sri Lanka for the establishment of a World Disarmament Authority.

Proposals for the establishment of an International Disarmament Authority or Agency or Organization had been made previously by other States, e.g., Sweden and The Netherlands, and most recently again, by The Netherlands. A Working Paper introduced by The Netherlands in the Preparatory Committee for the Special Session of the General Assembly Devoted to Disarmament on 5 April 1978 (A/AC,187/108) outlines the purposes and the structure of the proposed Organization. It would supervise the implementation of new disarmament and arms control agreements, e.g., on chemical and nuclear weapons, work out procedures for on-site inspections and carry out such inspections; and it would organize Review Conferences provided for in the various agreements or treaties. The Organization would consist of a plenary Conference, meeting periodically, a Board headed by an Administrator and including a technical staff.

2.5 Conclusions

While the arms race continues unabated and the targets of the

development strategies of the 'sixties and 'seventies keep illuding us on receding horizons, yet there are a number of factors at work, convergently and concurrently, which change our perceptions of both disarmament and development and tend to redirect studies and action. Our growing awareness of systemic intedependencies, the nature itself of modern technologies and their dual-purpose applicabilities, the very concurrence in time - albeit incidental - of Disarmament and Development Decades: all this forces the international community to think in terms of relating disarmament and development issues: in terms of the need that "provisions to ensure that measures of armament limitation are so designed that they do not impede the transfer of technology for peaceful purposes and that such provisions must be an integral part of disarmament measures. While negotiations on traditional measures of disarmament and control must continue, the call for a 'new conceptual framework', a 'new disarmament strategy' has been issued by the United Nations. Both development and disarmament discussions are being extended to new, 'unconventional' areas such as the oceans, the atmosphere, and outer space, and to 'unconventional' technologies such as nuclear, biochemical and other technologies. As the scope of national and international security is being extended from 'military' to 'economic' security, the issues of disarmament and development are reflected from a new angle, revealing new relations which, however, can become meaningful and operational only within the context of a New International Economic Order.

The new emphasis on linking disarmament with development in the framework of a New International Economic Order has the potential of a breakthrough. If it is to be translated into a programme of action, however, machinery is needed transcending the departmental and specialized structure of the UN family of organizations. A beginning has been made with the appointment by the Secretary General of an *Ad Hoc Group on the Relationship between Disarmament and Development*, in accordance with General Assembly Resolution 32/88.

The Machinery proposed in the Final Document of the Tenth Special Session does not yet reflect this need. Its mandate is, as heretofore, Disarmament by itself. While a super-agency on Disarmament and Development would obviously not be practical, some thought might be given to the establishment of a joint committee of members both of the proposed International Disarmament Authority and the Department for Development. One might also consider the possibility of creating a dual-purpose (disarmament-development) institutional framework *in limited functional or geographic areas*.

3. The Non-Governmental System

3.1 Non-Governmental Organizations (NGOs)

The assessments, ideas and proposals emerging from the non-governmental sector are not essentially different from those in the intergovernmental sector. Just as their governmental counterparts, the NGOs have devoted more time and energy to development and disarmament separately than to the study of both in their interaction.

Non-governmental activities relating to the *International Development Strategy for the 80s and Beyond* are being coordinated on a large scale by the International Foundation for Development Alternatives (IFDA). The potential role of the NGOs in this field was summarized by IFDA's President,Mark Nerfin, as follows: (11)

"...., there is no reason to leave exclusively to governments and intergovernmental machineries the elaboration of the strategy for the future... It is time to give the 'third system' a better chance to have its voice heard in the debate.

Individuals and institutions outside the United Nations system are in a privileged position to endeavour to open up new approaches, investigate new themes, and experiment with new methods of work. They could address themselves to the 'white spots' which are taboo to intergovernmental organizations..... they could formulate alternatives to the national and international conventional wisdom; and they could be more free to tackle stumbling blocks which have so far prevented the implementation of the NIEO".

The results of the IFDA-coordinated NGO projects are published - monthly - in the *IFDA Dossier* (12). Only one of the over one hundred projects, however, deals explicitly with disarmament and development.

Also in the NIO Register (13) which comprises 56 NGOs active in areas related to the New International Order (NIO), the activities or publications of only 11 NGOs have a 'major emphasis' on the arms race/disarmament.

On the *disarmament* side, an INGO Conference on Disarmament took place in Geneva on 27 February - 2 March, 1978. The 547 participants represented 85 international and 212 national organizations from 46 countries. The document adopted by the Conference and entitled "Message to the Special Session of the UN General Assembly devoted to Disarmament",contained some recommendations referring to disarmament and development:

• The diversion of science for the purposes of inventing ever more deadly weapons of mass destruction must be discontinued and States should assume the responsibility to use scientific technological achievements for peaceful purposes only.

• Explicit provisions should be made that material and human resources, presently allocated to the military sphere, be used to increase the well-being of peoples, and particularly to promote economic, social and cultural progress of less developed nations, to facilitate the establishment of the New International Economic Order.

With regard to the Programme of Action, the NGOs recommended, among other things:

• The banning of research, development, manufacture and deployment of any new weapons of mass destruction such as, for example, genetic engineering, climate and environmental modification.

• Significant and rapid reductions of the huge spending on armaments, exceeding at present one billion dollars a day, and the transfer of an important part of the financial as well as the technological resources thereby released to help developing countries, and also the re-deployment for peaceful purposes of the workers engaged in the research and production of arms.

• The adoption of measures for reducing armed forces, conventional weapons and international trade in and transfer of arms.

Twenty-five NGOs and six research institutes presented statements to the Ad Hoc Committee of the Tenth Special Session and, most recently, the United Nations Group of Experts commissioned a series of studies from non-governmental institutions on the relations between disarmament and development.

3.2 World Order Studies

Among the 8 studies compared in the RIO Foundation's report *World Order Studies* (14), only one, the *RIO Report (Reshaping the International Order)* gives to the disarmament question a place equal in importance to that of the other major areas affecting the development process (resources, trade, monetary system, etc.). Out of the other seven world studies only three make more or less cursory references to disarmament and development, i.e. the Dag Hammerskjöld Report *What Now?*, Leontief's *The Future of the World Economy*, and the Aspen Institute's *The Planetary Bargain*.

What Now? presents an analysis of the resource consumption by the arms industries and recommends a re-allocation of part of the military expenditure of the great powers to peaceful purposes.

The Leontief Report suggests that "Current rates of total savings in the developing countries can be augmented at least to a limited extent by reallocating to saving and investment channels some

of public consumption in countries in which the rate of public consumption currently allocated to non-civilian purposes is too high."

And the Planetary Bargain points out that it is in the common interests of all "that the present extravagant competition in both nuclear and conventional arms be sharply curtailed, because it absorbs far too many resources better devoted to meeting constructive needs in both developed and developing countries. Recognition of this common interest is still obscured by national passions and fears, but it is beginning to be understood by people in both the arms-selling and the arms-buying countries."

3.3 Conclusions

The non-governmental sector does not suffer from the constraints acting on intergovernmental research and policy formation. Issues with political implications, which must be treated with prudence or shunned altogether by Government representatives, can be investigated freely by non-governmental institutions where these exist. Proposals may be innovating, although they should not be so far ahead of political reality as to be irrelevant. It should not be forgotten, however, that today's 'utopianism' may be tomorrow's 'realism', and that today's 'realism' often is nothing but the projection of a past that has been dead long since. The non-governmental sector has always been able to afford to be more 'utopian', more 'idealistic' than the governmental sector. With regard to the disarmament issue, the non-governmental sector has consisted, in the past, largely of 'pacifists'. In recent decades, this sector has been fortified by the influx of a great deal of scientific competence and political expertise. Today, the non-governmental sector could be the 'think tank' for the preparation of conceptual breakthroughs.

It is rather disappointing, therefore, that the line of non-governmental thinking on disarmament and development is in fact very close to that of intergovernmental analysis and negotiation.

In Part II of this Report an attempt will be made to advance in a conceptually somewhat less traditional direction.

Notes and References

1. *Economic and Social Consequences of Disarmament*, United Nations, New York, 1962.

2. Resolution 1767 (xvii), 21 November 1962

3. Derived from: *The United Nations and Disarmament, 1945-1970*. United Nations, New York, Sales No. 70.IX.1.

4. Loc. cit.

5. *Economic and Social Consequences of the armaments race and its extremely harmful effects on world peace and security*, A/32/88, 12 August 1977.

6. *The Objectives of the New International Economic Order*, Eds. E. Laszlo et al., Pergamon/UNITAR, 1978.

7. Committee for Development Planning, report on its twelfth session, in: Official Records of the Economic and Social Council, Sixty-first Session, Supplement No. 6 (E/5793).

8. Resolution S110/2. Final report of the Tenth Special Session of the General Assembly. A/Res/S-10/2, 13 July 1978.

9. *RIO: Reshaping the International Order, Report to The Club of Rome*. Jan Tinbergen, Coordinator. New York: E.P. Dutton, 1976.

10. See: Saul H. Mendlovitz, General Introduction to *A Study of Future Worlds*, Richard A. Falk, The Free Press, 1975. Mendlovitz writes:

"To begin with, there were many persons who argued that it was impossible to deal adequately with war prevention without taking into account poverty and social injustice; that as an empirical matter, these matters were so inextricably interwoven, they should be seen as part of the definition of the problem of war prevention. More importantly, however, it became increasingly clear that while peace, in the sense of the elimination of international violence, might have a very high priority with individuals in the industrialized sector of the globe, economic well being and social justice received a much higher rating in the Third World."

11. Marc Nerfin, *A New UN Development Strategy for the '80s and Beyond: The Role of the 'Third System',in Partners in Tomorrow, E.P. Dutton, New York.*

12. *IFDA Dossier*, Secretariat: 2, Place du Marché, Ch-1260, Nyon, Switzerland.

13. *NIO Register: Register of Institutes and Organizations active in areas related to the New International Order (NIO)*. Rotterdam: Foundation Reshaping the International Order (RIO), October 1979.

14. *World Order Studies; World Order Studies, Policy making and the New International Order*. Dick A. Leurdijk. Rotterdam: Foundation Reshaping the International Order (RIO), February 1979.

Part II: Towards a Conceptual Framework

4. Four Position Papers: Summary and Analysis

4.1 Introduction

The RIO project on Disarmament and Development is a collective effort, enlisting the cooperation of a number of organizations, institutions, and individual experts.

To initiate this process, four position papers have been commissioned:

- *Disarmament in the context of the international order*, Graciela Chichilnisky (Department of Economics, Columbia University, New York, USA).

- *Disarmament and development: the perspective of security*, Bert Röling (Professor of International Law, Groningen University, The Netherlands).

- *Disarmament and development: their interrelationships*, Nicole Ball and Milton Leitenberg (Center for International Studies, Cornell University, Ithaca, USA).

- *Disarmament and development: a reconversion process*, Ulrich Albrecht (Free University, Berlin, FRG).

They are reproduced in Part III of this Report. Besides presenting the personal contributions of the authors to this project, the papers provide an excellent overview of the current state of research on the problems of disarmament and development, as well as a useful selected bibliography.

The present chapter presents a brief summary and analysis of these position papers, highlighting the points particularly relevant to our own research.

4.2 Arms Production and Trade and North-South Relations

Graciela Chichilnisky's paper reveals some stark facts and figures on arms trade, the relations between arms trade and commodity prices, the transfer of military technologies and their impact on development patterns.

With regard to the arms trade flow there has been a massive shift from North-North to North-South. The data on foreign military sales orders indicate that, between 1950 and 1974, North-South trade increased by 400 percent while trade within the North decreased about 30 percent. There are undoubtedly a number of complex reasons that may account for this trend. It should be kept in mind, e.g., that decolonialization was just at the initial

stage at the beginning of the period under consideration.

The increased North-South trade brings numerous 'advantages' to the North, among them: improvements in the balance of payments (in the case of arms trade with the oil exporting countries); the creation of jobs in the weapon-manufacturing states (each billion dollars worth of arms sales creates 47,000 jobs); increase in direct and indirect political influence; and increased dependence of the arms buyer on spare parts, technology, and a wide range of other products.

That the volume of arms acquisition by the South should be correlated with the level of commodity prices would appear rather natural, since it is the commodity export that provides the exporting country with the foreign exchange needed to acquire the weapons. The statistics provided in the paper are nevertheless quite interesting and reveal concrete links between the old international order (post-colonial extraction economy), and the arms race.

While,theoretically, the arms trade to the South should bring to developing countries 'advantages' in the form of the transfer of advanced technology and benefits from increased domestic activity, employment, etc., the paper shows how, in practice, such advantages do not materialize and the net impact of the arms trade on internal development is negative. On this point the paper, as well as the other position papers, differs sharply from the Emile Benoit school of thought.(1) Chichilnisky ascribes the negative impact to the very nature of the technologies transferred. The combination of very advanced technolgies with backward technological sectors and cheap labor re-inforces a duality in the economy, producing a deterioration of growth and of distribution of income within the developing countries. This is a point that deserves most serious attention.

4.3•Impact on Social Structure

Chichilnisky's argument is, in fact, resumed in the Nicole Ball-Milton Leitenberg paper. Weapons import and/or domestic arms construction are important factors in maintaining an inequitable status quo by increasing the dependence of Third World countries on the industrialized world, it is argued. One way this occurs is by contributing to a capital-intensive industrialization pattern which makes it difficult to channel resources into more labor-intensive enterprises. The role which military establishment, military expenditures, arms trade and production have played in undermining social and economic development certainly needs further study. While stressing that the relationship between military expenditures, economic growth and social development are not yet well understood, the authors establish a diametric opposition between a 'growth theory' that postulates an eventual 'trickling down' of benefits including those of arms trade and arms production, and the requirements of a New International Economic Order, with its emphasis on basic human needs and self-reliant, particularly rural/agricultural development.

It is clear, however, that the social and economic implications of high technologies for developing countries, or, in more general terms: the role of science and technology for disarmament and development, in the context of a New International Economic Order, need further study.

As far as *developed countries* are concerned, the authors point to evidence that military expenditures act as a brake on economic growth. Special reference is made to the nuclear build-up, the need for arms reduction in this field and for a diversion of capital for investment and man-power for scientific research and development from the military to the civilian sector. "More specifically, it has been suggested that military industries in industrialized countries absorb much of the capacity of precisely those sectors - transport machinery, machinery, chemicals, electronics - which are most dynamic in terms of export."

The paper makes it quite clear, finally, that arms reduction, whether in developed or in developing countries, would not automatically result in social or economic development. "The re-allocation of resources is a political matter which depends on the political priorities of governments."

4.4 Security, Development and Disarmament

Bert Röling's paper proceeds from an analysis of the concepts of 'security', 'development' and 'disarmament' to an examination of the impact of disarmament on development, of development on disarmament and, finally, of development and disarmament on security.

With regard to 'security', the narrower concept of military or 'weapons security' is contrasted with the emerging extended concept of 'interest' or 'economic security'. The extended security concept is bound to play an important role in questions of disarmament and development, Röling points out.

In this context it may be interesting to note the following: Recently the United States earmarked a force of 100,000 troops, including 40,000 combat soldiers, for use in the defense of US economic interests in 'sensitive areas'. The Navy, Marine Corps and Air Force also are developing contingency plans for quick military reaction to situations in strategically important areas. One such contingency, it is emphasized, would be interference in the area's oil shipments to the United States and Western Europe. (2)

The paper distinguishes two concepts of *development*: economic growth for an elite, on the one hand; social and economic emancipation of the broad masses, on the other. These concepts have different impacts on disarmament and security. An elite may need more military power at its disposal and might therefore seek stronger links to arms industries and trade. On this point, Rölings findings are close to those of Ball-Leitenberg.

Röling's definition of *disarmament* comprizes different aspects and concepts. One is 'disarmament' in the literal sense: and Röling readily admits that there has been preciously little progress in this direction, the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction (1972) being the only postwar disarmament treaty. 'Arms control', with the agreement on a 'ceiling', is another concept: the SALT negotiations are a case in point. Thirdly, there are also measures of 'non-armament', of the type of the Treaty on the Prohibition of the Emplacement of Nuclear Weapons or Other Weapons of Mass Destruction on the Sea-Bed and the Ocean Floor and in the Subsoil Thereof (1972): a prohibition, not of something in existence, but of something not yet in existence.

His analysis of the impact of disarmament on development reaches similar conclusions as those reached by Ball-Leitenberg. Drawing particular attention to the role of science and technology, he notes "that, at present, the cream of human intellect is working in the field of arms research, and could be better employed in research on development problems, alternative energy sources, and environmental pollution and depletion issues." "It is essential", he adds, "that more research be done on the impact of military matters on development. Current interest usually focuses upon the impact of the transfer of technology. It is generally recognized that technology brings with it accompanying values and patterns of conduct, models of organization, and ways of behaviour, if not an all-encompassing ideology. This applies to military as well as to civilian technology."

The compatibility of disarmament with security depends on the concept of security. "Unwillingness to accept substantial disarmament is strongly connected with the desire to protect national interests through military power. In other words, the future of disarmament is problematic as long as the superpowers and other prominent nations maintain military forces to provide for national security, and this national security is defined as all-out security.... As long as policy is based on all-out interest security, there is no chance of achieving disarmament."

The impact of development on disarmament is seen, again in agreement with the other papers, to be ambiguous. Development implies economic growth which, generally, leads to more arms expenditure, local arms races, the introduction of sophisticated weapons, the probability of more military dictatorships, and increased tension between developing countries, among other things.

Ambiguous, thus, also the impact of development on security. Röling distinguuishes between development as a *process* and development as *attainment*. Development as process is likely to cause tensions and conflicts and to contribute to the arms race. Development as attainment may increase security. Attainment, however, can come only in the context of a New International Economic Order based on institutionalized world cooperation, which is necessitated by the very nature of modern technology itself.

"Technology also calls for global cooperation and organization in civil fields, especially as it has itself caused many of the problems related to the environment, pollution and depletion. The prevention of pollution (of international rivers, the oceans, the air and the soil) requires global decision-making. The acceptable distribution of scarce resources will only be possible upon the basis of world cooperation. Indeed, the struggle for scarce materials will be one of the most significant features of the coming decades. Vital interests, or rather interests which are considered as vital, are at stake here. Thus transnational units of decision-making are needed in several fields, but they will only be feasible if the gap between the rich and the poor is bridged in an acceptable way."

In the meantime, "the rich members of the United Nations simply refuse to abdicate their privileged economic condition, and thus adapt their weapons systems to safeguard the existing economic order. All talk about substantial disarmament is idle prattle as long as it is assumed that the maintenance of existing economic privileges is a military responsibility."

4.5 Conversion

The last paper, by Ulrich Albrecht, deals with the role of *conversion* in relation to disarmament and development, as perceived by different schools of thought.

The main object, in economic terms, is to devise policies apt to consolidate the goal of disarmament with the economic goals of growth, monetary stability, full employment and foreign trade balance.

In the framing of such policy far more than the arms sector of the economy is involved. "Resources will not be transferred directly from the arms sector to development-oriented activities. More complicated substitution patterns are likely to come into force....Hence, a much larger segment of the economy comes under consideration than simply that portion directly involved in military production." Just how large this segment is, is very hard to determine, whether one looks at the problem in terms of the number of industrial enterprises directly or indirectly involved or in terms of employment. With regard to Third World countries, "transparency of the role of the military element in national economic life is virtually absent". But even in developed countries the picture is far from clear.

"While it appears not too difficult to produce an empirical assessment of the 'hard core' of more or less pure military industries (estimated to provide one-quarter of all military production), the large fringe of semi-military producers which produce goods with both military and civilian applications, is extremely difficult to delineate. In a state of underutilization of capacity, idle capacity in this sphere is a major concern for policy planners."

The distinction between 'core' industries and dual-purpose 'fringe' industries sheds some new light on an approach that will be developed in the following sections of this report.

Albrecht's study continues with a description of various analytical tools for economic conversion of capital, labor or technological processes and comes to the conclusion that "conversion by now is deemed to be economically feasible and that political analysis does not rule out this prospect." On this, he points out, Marxists as well as liberal economists of all shades agree. "On this background conclusions should be sought with respect to the question which social forces should be envisioned as promoting disarmament, what the time scales for their efforts are, and how their aspirations should be institutionalized."

4.6 Conclusions

The four position papers provide a basis for further study and action. Approaching the problems of disarmament and development from different angles, the authors come to common conclusions:

- Arms industries and trade, on the one hand; underdevelopment on the other, are structural elements of the existing economic order, within and between States;

- Disarmament and development become possible only in the context of a New International Economic Order;

- There are a number of important gaps in current research on Disarmament and Development, among which are the following:

- the impact of technologies on social structure and, vice versa, the impact of social structure on the choice of technologies;

- the role of high-level technology (machinery, chemicals, electronics, nuclear technology) in military industries and its impact on economic growth in developed countries;

- the relationship between military expenditures and the transfer of military technologies, economic growth, and social development in developing countries;

- the causal relationship between military expenditures and inflation;

- the impact of a New International Economic Order on the concept of security;

- country case studies, in a regional and global context;

- the 'conversion' of dual-purpose industries, which constitute three fourths of the arms industry in the broadest sense.

This list, extrapolated from the papers, obviously, is far from complete; nor was it the task or intention of the authors to

draw particular attention to the gaps in research. All of the subjects listed are relevant to the approach developed in the following chapter. At the end of that chapter an additional list will be proposed.

5. Science and Technology for Disarmament and Development

5.1 Introduction

Ulrich Albrecht has drawn attention to the "large fringe of semi-military producers, which produces goods both with military and civilian applications", a 'fringe' that covers three fourths of all military production.

Dual-purpose technology, in the broadest sense, occupies a wide range of the spectrum. All of science and technology, in fact, can be directly applied either to the arms race or to development for peaceful purposes and 'converted' from one to the other purpose. "There is no longer any distinction whatever between basic research which may have military relevance and that which does not", Leitenberg points out. (3) "This is not because science has changed, but because military requirements have."

Analogously, as Röling reminds us, capital and labor as such are 'dual-purpose agents', readily 'convertible' from one purpose to the other.

Thus the spectrum is rather diffuse at one end, tapering out of sight. At that end, it may include anything: knives or bicycles, medicines or food and clothing, depending on their use for either worker or soldier. At the other end of the spectrum, however, there is a set of industries and technologies, which is in fact responsible for the worst of the weapons of massive destruction. It provides the nonconventional sector of the arms race, extending into outer space and the deep seas. The technologies employed are transnational in their effects. Since they have an economic development potential, all countries stress their inalienable right to access to these technologies for peaceful purposes. Even in their peaceful application, however, these technologies, if unregulated and unmanaged, can cause damage, almost as catastrophic as their planned diversion for military purposes.

It is on this category of dual-purpose technologies that this report is focused. Dual-purpose technologies in this report thus means technologies

- applicable to the construction of weapons of massive destruction;
- having an economic development potential or being important for peaceful uses;
- implying environmental hazards even in their peaceful uses; and
- transnational in their effects.

The most important technologies in this category are

- nuclear technologies;
- chemical and biological technologies;
- aero-space and satellite technologies;
- marine technologies;
- environmental modification technologies;
- electronic and computer technologies; and
- laser technologies.

While the international community has not yet taken full stock of the tremendous warmaking potential of electronic and computer technologies, a beginning at least has been made towards international regulation of all other dual-purpose technologies in this category. A tabulation of the actual and potential military and peaceful uses of these technologies would be a useful instrument for advancing this development.

The expansion of science and technology into systems with an economic development potential and, at the same time, a massive destruction potential spanning the globe, has invalidated the traditional, single-purpose approach to disarmament by itself, economic development as a self-contained concept, environmental protection as such. The very fact that, in view of their economic development potential, these technologies cannot be 'prohibited', has fundamentally transformed the disarmament problem and added a new dimension where disarmament and development converge. If the technological system we are dealing with is dual-purpose, our way of coping with it must be dual-purpose. The institutional framework for containing, regulating, managing and developing it must be dual-purpose.

5.2 Nuclear Technologies

Developments in Sweden, in Austria, in the United States, the Federal Republic of Germany and other countries, increasingly indicate that atomic reactors may not have much of a future. It is quite conceivable that atomic energy production may have to be abandoned as hazardous and uneconomical. This, however, would not put an end to nuclear research and technology for peaceful purposes. The list of peaceful uses of nuclear technologies, including nuclear medicine and the uses of isotopes, remains long. Nuclear technology, a Promethean bequest, remains a dual-purpose technology *par excellence*, and must be dealt with accordingly.

The dual aspect of mass destruction and economic development potential of nuclear technology was fully understood at the very beginning of the Atomic Age. To cope with this unprecedented situation, the Lilienthal-Baruch Plan provided for an international regime for the management of nuclear technology including all stages, from mining through production and waste recycling.

The importance of lodging responsibility for both disarmament and development in one single institution was recognized. "Since the exploitation of atomic energy for peaceful purposes neccesitates operations which are, in the initial stages, identical with those needed to make atomic energy available for destructive

purposes", Bernard Baruch said (4), "both of these functions.... should be assigned to the same agency. Furthermore, an international agency with responsibilities for fostering the beneficial uses of atomic energy as well as responsibilities for preventing its misuse, will be more effective, constructive, and workable than if it has merely duties of inspection and policing. The activities of such an agency might even result in establishing beneficial patterns of international cooperation of a new and hopeful kind."

The International Atomic Development Authority, as conceived by Lilienthal-Baruch, would have been the first international resource management institution and, in this respect, a forerunner of the International Seabed Authority which is under discussion today. Its powers and functions, with regard to the management of nuclear resources and technologies, would have been even more sweeping than those proposed, more timidly, for the Seabed Authority today. For the Atomic Development Authority would have had the power to obtain and maintain complete and exclusive control or ownership of all uranium, thorium and other material which may be the source of atomic energy, wherever present (5) in potentially dangerous quantities, whether in raw materials, by-product, processed or other form; to acquire, construct, own, and exclusively operate all facilities for the production of U-235, plutonium and such other fissionable materials as may be specified by the Authority, and to maintain supplies of fissionable materials adequate to fulfull the purposes of the Authority; to have the exclusive right of research in the field of atomic explosives.

Obviously, at that time, the USA, not only had the monopoly on nuclear technology; it also controlled the votes in the United Nations. The Authority, hence, was to be established under US hegemony and control, which is precisely why it could not happen. This, however, does not detract from the validity of the principles for the management of a technology for both disarmament and development.

History has shattered the great design, but bits and pieces of it keep surfacing. The dual-purpose character of nuclear technology is enshrined today in a number of Treaty provisions and resolutions, urging, on the one hand, the limitation, control and final elimination of nuclear weapons and, on the other, international cooperation in the promotion of the peaceful uses of nuclear technology, under international safeguards,control and, at least partially, management.

Thus the Euratom Treaty provides for Euratom property rights to nuclear resources. That this principle, in the present circumstances, does not work out in practice, is another question.

The Non-Proliferation Treaty stresses, in Article IV, that nothing in this Treaty shall be interpreted as affecting the inalienable right of all the Parties to the Treaty to develop research, production and use of nuclear energy for peaceful purposes; and

that all the Parties to the Treaty undertake to facilitate, and have a right to participate in, the fullest possible exchange of equipment, materials, and scientific and technological information for the peaceful uses of nuclear energy. Parties to the Treaty in a position to do so shall also co-operate in contributing, alone or together with other States or international organizations, to the further development of the applications of nuclear energy for peaceful purposes, especially in the territories of non-nuclear-weapon States Parties to the Treaty, with due consideration for the needs of the developing areas of the world.

The Non-Proliferation Treaty Review Conference went one step further in recommending some measure of common management. The Final Declaration issued by the Conference recognizes

"that regional multinational nuclear fuel cycle centres may be an advantageous way to satisfy, safely and economically, the needs of many States in the course of initiating or expanding nuclear power programmes, while at the same time facilitating physical protection and the application of the IAEA safeguards and contributing to the goals of the Treaty."

Fourty States from the First, Second and Third World met in Washington D.C., in October 1977 and initiated an International Nuclear Fuel Cycle Evaluation (INFCE), a huge project that picks up a number of bits and pieces of the Lilienthal-Baruch design. The participants in the project still are convinced that nuclear energy for peaceful purposes should be made widely available because of the urgent need to meet the world's energy requirements. They are also convinced that effective measures can and should be taken, at the national level and through international agreements, to minimize the danger of the proliferation of nuclear weapons without jeopardizing energy supplies or the development of nuclear energy for peaceful purposes. They stressed that special consideration should be given to the specific needs of and conditions in developing countries. While INFCE was to be a technical and analytical study and not a negotiation, the participants expressed the hope that the International Atomic Energy Agency will play an active role in the conduct of the project at all levels. "The participants acknowledge in this connection the dual responsibility of the IAEA in promoting and safeguarding nuclear activities."

In outlining the technical and economic scope of the project and the methods of work, the Final Communiqué of the Organizing Conference time and again refers to "multinational or regional fuel cycle centers or similar arrangements", " multinational or international mechanisms guaranteeing timely deliveries in case of delays or cut-off of supplies", and "international control of separated plutonium (including storage under the auspices of the IAEA and related availability criteria)."

If the spectre of the military uses of nuclear technology is to be banned, the peaceful uses of nuclear technology must be managed internationally for the benefit of all mankind, with par-

ticular consideration for the needs of developing countries.

What form this international management system may take in the future may depend, partially, on the future of atomic energy itself. Should atomic energy production become a major economic factor (particularly in the form of nuclear *fusion* reactors), the IAEA might be restructured and strengthened as an Atomic Development Authority, endowed with regulatory and managerial capacity and the responsibility of coordinating and integrating regional networks such as Euratom. Such an Atomic Development Authority could become a major instrument for, and part of, a global energy production and distribution system which is needed for world development in a New International Economic Order. Alternatively, the regulatory and control functions could be split off and entrusted to an International Disarmament Agency. Experience at the national level (e.g. in the US), however, points in the opposite direction. This question needs further study.

2.3 Chemical and Biological Technologies

The use of chemical and bacteriological (biological) methods of warfare was prohibited by the Geneva Protocol of 17 June 1925. 103 States have signed the Protocol, the latest two being Jordan and Uruguay (January and April, 1977).

In spite of this, however, the arms race in chemical and bacteriological weapons has continued unabated. Since the science and technologies applicable to the manufacture of these weapons are diffuse, penetrating a large sector of industrial production; since they are not very costly and at hand's reach for almost any country, control of military uses, on the one hand, international cooperation in the advancement of peaceful uses, on the other, are even more difficult to achieve than in the case of nuclear technology.

A Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction was, nevertheless, adopted and opened for signature in London, Moscow, and Washington on 10 April 1972. It entered into force on 26 March 1975 and has been signed by 118 States. A Review Conference is due five years after entry into force.

The Convention - the only real disarmament agreement adopted since World War II - fully recognizes the dual-purpose character of biological technologies. States Parties to the Convention undertake never in any circumstances to develop, produce, stockpile or otherwise acquire and retain microbial or other biological agents, or toxins, whatever their origin or method of production, of types and in quantities that have no justification for prophylactic protection or other peaceful purposes; weapons, equipment or means of delivery designed to use such agents or toxins for hostile purposes or in armed conflict. States Parties to the Convention undertake to destroy, or to divert to peaceful purposes, as soon as possible but not later than nine months

after the entry into force of the Convention, all these items.

There are no provisions for inspection or enforcement, except that if any State suspects another State of violating the Convention, it may lodge a complaint with the Security Council of the United Nations. Each State Party undertakes to cooperate in carrying out any investigation which the Security Council may initiate on the basis of such complaint, and to provide or support assistance, to any Party which so requests, if the Security Council decides that such Party has been exposed to danger as a result of violation of the Convention.

At the same time the Convention provides (Article X) that States Parties undertake to facilitate, and have the right to participate in, the fullest possible exchange of equipment materials and scientific and technological information for the use of bacteriological (biological) agents and toxins for peaceful purposes. The Convention shall be implemented in a manner designed to avoid hampering the economic or technological development of States Parties to the Convention or international cooperation in the field of peaceful bacteriological (biological) activities, including the international exchange of bacteriological (biological) agents and toxins and equipment for the processing, use or production of bacteriological (biological) agents and toxins for peaceful purposes in accordance with the provisions of the Convention.

There is no Treaty machinery of any kind. The lack of effective mechanisms for complaint procedures has been deplored occasionally, and may be a subject for the Review Conference.

Although an enormous amount of effort has gone into the attempt to ban chemical warfare, no tangible progress has been made since the adoption of the Geneva Protocol in 1925. A draft convention was submitted by nine socialist States in 1972, a Japanese draft convention in 1974, and a British one in 1976. The Non-Aligned members of the Committee of the Conference on Disarmament (CCD) made their proposal in a Working Paper (CCD/400). A number of informal meetings with experts produced valuable background material, including the "Compilation of materials on Chemical Weapons from CCD Working Papers and Statements 1972-1976", of 11 March 1977. The United States and the Soviet Union have been conducting bilateral talks since 1976 but, so far, have not reached any results. A Group of 21 States has been established by the CCD to facilitate parallel negotiations in the Committee and between the two superpowers. The Group has now proposed the establishment of an ad hoc committee to elaborate a new Draft Convention. This proposal has met with the opposition of both the USA and the USSR.

Recently, the Federal Republic of Germany and the UK have experimented with a new 'confidence-building' working method: i.e. they, unilaterally, opened their countries to verification measures by organizing tours of inspection of their major converted chemical weapons plants and other chemical plants for

groups of experts and diplomats from other nations. The issue of verification in fact, is seen as one of the major obstacles on the path to an agreement. It touches on most sensitive questions of national sovereignty and industrial property rights.

Verification would comprise various types of on-site inspection such as chemical analytical methods or toxidity tests as well as so-called 'non-intrusive methods', such as the phosphorus-accounting system, and the remote-sensing systems, including the use of satellites. Verification, it is generally agreed should be performed by national and international means combined.

Through the decades of negotiation on a Treaty to ban chemical weapons, three major recognitions have surfaced.

First, it has been generally recognized that - as e.g. the Delegation of Japan formulated it - it may not be possible at all "for any chemical agents available for weapons purposes to be prohibited outright without hindering the peaceful uses of that agent." The dual-purpose character of chemical technologies has been clearly established, and, as the delegate of a developing country, Kamanda Wa Kamanda of Zaire recently put it (Press Release DC/797), "Zaire was deeply preoccupied by the problem of chemical weapons. As a developing country Zaire believed that the resources to be released as a result of disarmament could be used in solving the socio-economic problems of the Third World."

Therefore, secondly, the need has been stressed, especially by developing countries, to couple prohibitory measures with provisions dealing with the peaceful uses by stipulating that States parties to the future Convention should cooperate in contributing to the further development and application of scientific discoveries for peaceful purposes.

Thirdly, the convergence of environmental protection and development measures and disarmament measures in the field of chemical and biological technologies was noted. *Multi-purpose monitoring* systems, embodying an entirely new type of science policy, an entirely new approach to resource inventorying and management, and a new combination of national and international measures and structures, would serve at one and the same time disarmament, development and environmental protection.

This convergence was stressed, e.g. by Alva Myrdal in 1973 (6):

"In a similar, although less direct way, the Environmental Conference acts as a primer to our task to ban chemical means of warfare. It has raised to a high pitch - in the form of self-incrimination no less than accusation - expressions of concern about the fiendish treatment Man gives to Nature and to his own condition for survival. Pollution and poisoning with chemical substances has been placed in the foreground. It is stated in the solemn Declaration of Principles agreed upon that 'the discharge of toxic substances... in such quantities or concentrations as to exceed the capacity of the environment to render

them harmless, must be halted in order to ensure that serious or irreversible damage is not inflicted upon ecosystems". Advocating a system of national laws and regulations, based on interdisciplinary decision-making, to control civilian production, which should be internationally registered and published, she commented, "such measures of national self-discipline, with a fair degree of international prodding ....would anyway probably come to be called for in relation to environmental protection against damage from chemical agents as I have ventured to suggest before."

5.4 Aero-Space and Satellite Technologies

The peaceful uses of outer space are regulated by the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, which entered into force on 10 October 1967. It has been signed by 113 States. The Treaty provides that the exploration and use of outer space, including the moon and other celestial bodies shall be carried out for the benefit and in the interest of all countries, irrespective of their degree of economic or scientific development, and that outer space shall be the province of all mankind. It guarantees to all States freedom of exploration and scientific research and free access and establishes that outer space, including the moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty by means of use or occupation or by any other means.

At the same time the Treaty prohibits the establishment of military bases, installations and fortifications, the testing of any type of weapons and the conduct of military manoeuvres on celestial bodies. No objects carrying nuclear weapons or any kind of weapons of mass destruction are to be placed in orbit around the earth, but the use of military personnel for scientific research or other peaceful purposes is explicitly permitted. The obligation of use for exclusively peaceful purposes is restricted to the moon and other celestial bodies and does not apply to the use of outer space as such.

An Agreement on the Rescue of Astronauts, Return of Astronauts and the Return of Objects Launched into Outer Space (1968); a Convention on International Liability for Damage Caused by Space Objects (1972); and a Convention on Registration of Objects Launched into Outer Space (1975) complete the existing legal framework.

There is no reference to the development of the economic potential of outer space. There is no Treaty machinery, no beginning of an institutional framework for participation in the management and sharing of benefits of the use of outer space. Although there are two international organizations (INTELSAT and INTERSPUTNIK) and a large number of UN Specialized Agencies (ITU,WMO, FAO, WHO, UNESCO, IMCO, INMARSAT), intergovernmental organizations (ICAO, ASTRA), regional organizations (ESA), and non-governmental organizations (ISCU) which are involved in one way or another in space activities, there is as yet no global agree-

ment on rules to govern telecommunication by satellites; no rules exist to govern the use of earth resource satellites.

In the meantime, technological developments are overtaking the more slowly evolving space law. The economic potential of the Earth Resources Technology Satellites (ERTS) is impressive. As Peter Jankowitsch put it (7),

"....Among the other uses of ERTS images are geological surveys, off-shore and on land. Oil companies are among the big users of this technique. While no oil strikes have thus far been reported that could be specifically attributed to information supplied by satellite, geologists expect such finds within a short time. In searching for other minerals, prospecting from space has already produced actual discoveries."

"Other experiments with ERTS indicate that the satellite could make an important contribution to a worldwide survey of food production. Greater accuracy would lead to more efficient planning in all aspects of commodity processing and distribution, and tend to force down prices."

Weather satellites have revolutionized the state of the art of weather forecasting, with enormous economic benefits and saving of human lives. Communication satellites are doing the same to telecommunication, information, data storage and retrieval, and education.

"The significance of a satellite system for a developing country is that a modern, highly capable communications system can be installed without the need for intermediate development of extensive land-based facilities and real estate for cable or microwave links." (8)

Besides the benefits accruing directly from the uses of space craft, there are 'spin-off' benefits: innovation in different fields where technology developed for space programmes can be applied. The adoption of the systems approach and new management methods are relevant to a far wider sphere.

Satellite technologies, however, clearly are dual-purpose technologies, where military and civilian technologies inextricably overlap.

Testifying before the Committee on Science and Technology of the US House of Representatives (January 1978) on the US LANDSAT programme, Howard Kurtz, President of War Control Planners Inc. pointed out :(9) "Do 'eye in the sky' satellites involve 'military' or 'civilian' policy? One of the emerging satellites will contain instruments which will measure the temperature of the surface water of the oceans, hundreds of miles below, to within a fraction of a degree. This will be of added value for *civilian* seastate and weather forecasting. But this same instrument at the same moment will be able to detect the faint trail of slightly warmer water rising to the surface, heated by the friction of

the propellor of a silent nuclear submarine, against the surrounding water, leaving a telltale trail of warmer surface water to mark the path of this *military* submarine. *From here on out 'military technology' and 'civilian technology' increasingly will overlap*....Satellites monitoring crops along national borders, simultaneously will be monitoring troop movements across that border. Satellites monitoring pollution of rivers from sewage or oil spills, also will detect pollution of the same river from production of nuclear or other weapons." The US LANDSAT, Kurtz stressed, covers the entire Earth in eighteen days, garnering information and forwarding it to US computers. Only 1.8 percent of its time is spent over US territory, however, "98.2 percent of the time this American LANDSAT is gathering and storing information from areas that are foreign to the United States."

The use of spy satellites (in no way contravening the Outer Space Treaty) naturally has triggered off an arms race in ASAT (anti-satellite systems). Killer satellites, equipped with powerful laser beams are already able to 'blind' the spy satellites. The USSR presently is reported to be testing laser and charged particle beams which could be carried either by the ASAT satellites themselves or fired from other platforms. In the US, prototype laser beam weapons are expected to be ready for use in the '80s. In the meantime, conventional explosives are quite adequate to destroy hostile satellites. The hunter/killer satellite, again, in no way violates the Outer Space Treaty as it now stands.

Alarmed by the dual-purpose applicability of space technologies and the expansion of the arms race into outer space, the Delegation of Italy recently introduced a working paper in the Committee on Disarmament (CD) (10), in which it proposes a review of the regime established under the Outer Space Treaty to include explicitly measures to prohibit the launching and stationing in orbit, or anywhere in outer space, of *all* weapons, not merely nuclear weapons and other weapons of mass destruction. Such a ban, the document suggests, could be embodied in an Additional Protocol to the Treaty of 1967.

The most advanced and detailed proposal to use outer space and satellite technology for peaceful purposes was introduced by the Delegation of France in the Ad Hoc Committee of the Tenth Special Session. (11)

The French paper notes that the progress space technology has made in the field of earth observation satellites constitutes a new development in international life. Satellites, particularly those of a military type, have already attained a very high level of precision in their observation capability, and further progress will undoubtedly be made. At present the information secured by means of such satellites is collected by two countries which have the greatest experience in space technology and are in a position to make observations of the surface of the earth at such places and for such observation periods as they choose. The satellites available to those two countries, moreover, play an important role in the verification of their bilateral disar-

mament agreements.

France considers, the paper continues, that, within the framework of current disarmament efforts, this new monitoring method should be placed at the service of the international community. A *satellite monitoring agency*, as a Specialized Agency of the United Nations, should become an essential adjunct to disarmament agreements and to measures to increase international confidence and security by providing interested parties with information that they were entitled to demand. The Agency would be responsible for collecting, processing and disseminating information secured by means of earth observation satellites. Membership would be open to any State Member of the United Nations or of a Specialized Agency. The decision-making and deliberative bodies of the Agency would include at least a plenary organ and a restricted organ having balanced representation of all regions of the world. It also would have the personnel required for the accomplishment of its tasks, including, in particular, qualified technical personnel to process and analyse the data collected by observation satellites, as well as machinery for the settlement of disputes. To that end, the French paper suggests, an arbitration committee would be established, and arrangements for its composition and operation would be incorporated in the statute of the Agency.

Since developing countries would have a right to participate in the work of the Agency on a equal footing, training in satellite management, data processing and analysing becomes essential. The UN is already conducting seminars in data processing and analysis. The establishment of the Agency would heighten the need for such training. It would thus serve both disarmament and development.

5.5 Marine Technologies

A global satellite monitoring system could and should be complemented by regional arrangements. The Resolution of the Tenth Special Session of the General Assembly of the United Nations calls for the establishment of peace zones or seas of peace, such as first proposed for the Indian Ocean, in other ocean basins, such as the Mediterranean, the Caribbean, the Gulf, etc. The demilitarization of such zones could most effectively and most economically be monitored by satellite. The system could be made still more economical if the multi-purpose potential of the technology were fully utilized and the function of monitoring were to be extended from the military to include pollution, the movements of living resources, the enforcement of regulations, the movements of ships and rescue operations. Regionalized monitoring services, furthermore, need and should not be restricted to satellites. As the Dutch working paper points out, observation by satellite cannot provide all the information necessary to verify disarmament agreements. Satellite observation, therefore, should be combined with other methods. And there is a great variety of methods, already existing or in the making. Leitenberg (12) mentions the following: "Bottom-mounted acoustic

surveillance systems may soon be mounted on seamounts or table-guyots in mid-ocean. The United States NR-1 and the Dolphin are precursors of the next generation of United States ballistic missiles and 'hunter-killer' nuclear submarines, and are reported to have depth capabilities of 6,000 to 10,000 feet. The United States DSSP (Deep Submergence System Project) and DSRV (Deep Submergence Rescue Vehicles) programmes are essentially for the development of vehicles and equipment to inspect, install, repair or serve bottom-mounted surveillance or weapon systems. ASWEPS (Anti-Submarine Warfare Environmental Prediction System) has peppered the ocean surface and depth with various sensor and buoy systems. The United States plans one atmosphere-manned bottom station in the coming years at depths of 1,000 feet and more. Project Rocksite hopes to adapt techniques for dry tunnelling under the sea to great depths from under the continental land mass itself." All these are dual-purpose or multi-purpose technologies: transferring the second-strike (and some of the first-strike!) capability of the superpowers from land to sea, making the oceans the hub of the balance of terror; applicable, at the same time, to peaceful uses, to regional cooperation in the control and management of economic zones. Especially in developing regions, regionalized surveillance and monitoring systems offer the only solution to the problems arising from the extension of national jurisdiction over vast economic zones which most individual (developing) nations are not in a position to control. Clearly, the adoption of such systems would be a contribution both to disarmament and development.

5.6 Environmental Modification Technologies

The Convention on the Prohibition of Military or Any Other Hostile Use of the Environmental Modification Techniques (ENMOD Convention) establishes that "Each State Party to this Convention undertakes not to engage in military or any other hostile use of environmental modification techniques having widespread, long-lasting or severe effects as a means of destruction, damage or injury to any other State Party." "Environmental modification techniques",as defined by the Convention, means any technique "for changing - through the deliberate manipulation of natural processes - the dynamics, composition or structure of the earth, including its biota, lithosphere, hydrosphere and atmosphere, or of outer space."

At the same time, "The provisions of this Convention shall not hinder the use of environmental modification techniques for peaceful purposes....The State Parties to this Convention undertake to facilitate, and have the right to participate in, the fullest possible exchange of scientific and technological information on the use of environmental modification techniques for peaceful purposes. States Parties in a position to do so shall contribute, alone or together with other States or international organizations, to international economic and scientific co-operation in the preservation, improvement and peaceful utilization of the environment, with due consideration for the needs of the developing areas of the world."

Environmental modification technologies cover a wide range of techniques, from cloud-seeding and rain-making to the deviation of hurricanes, from changing the courses of mighty rivers to the melting of the polar ice caps, from the creation of vast inland seas to the unleashing of earthquakes and tidal waves. So great are the dangers inherent in environmental modification technologies that a number of experts are of the opinion that they should be prohibited rather than internationalized. A prohibition, however, would meet with great difficulties; for the science and technology of weather forecasting are inextricably connected with those of weather modification, and peaceful and military uses are indistinguishable.

There is, furthermore, a distinct possibility that the earth's climate is changing due to a combination of natural and man-made (unintentional) causes. Whether the long-term trend is towards cooling or warming (green-house effect) has not yet been established with any degree of certainty. Whichever way the change is going, however, the transitional period appears to be characterized by instability: droughts, floods, earthquakes and other catastrophies. A shortening of the growing season has been noticed regionally, and in coming decades mankind may be faced with famines, mass migrations and attendant disturbances. In such a situation the application of environmental modification technologies for peaceful purposes may be called for on a large scale to save lives and maintain peace.

It is clear, however, that such application could not be left to the discretion of the few countries which presently possess the requisite science and technology. It is equally clear that existing international machinery (WMO) and the provisions of the Convention are inadequate to cope with the requirements arising from such a situation. All research on meteorological conditions and environmental forecasting and modification techniques must be declassified and integrated in a restructured and strengthened system of international cooperation. Only international management of peaceful uses can prevent deviation of these technologies for military and war-making purposes.

5.7 International Control and Management

Negotiations on, and developments related to, the dual-purpose technologies as defined in this report, are at different stages and have taken different courses. There are, however, some basic features their international control and management appears to have in common:

- The use of dual-purpose technologies is to be restricted to peaceful purposes only.
- International cooperation in their peaceful uses is to be strengthened.
- The benefits accruing from their peaceful uses are to be shared among all countries, regardless of their economic and scientific status, and with particular regard to the needs of developing countries.

• Their peaceful uses must be subject to sound environmental policy.

The restriction of the use of dual-purpose technologies to 'peaceful uses only' implies their declassification, and a combination of national and international controls and monitoring systems. Roman-law proprietary concepts are inapplicable to technologies in this category. Technologies in this category cannot be appropriated in the strict sense in which appropriation includes the right to use and to misuse (*jus utendi et abutendi*). They can be *managed* in accordance with established standards and rules, but they can*not* be *owned*.

'International cooperation in their peaceful uses' has institutional implications, which have to be studied for each case. In relation to each of the dual-purpose technologies under consideration, there is an acknowledged need for *institutional innovation*.

'Benefits accruing from their peaceful uses are to be shared among all countries', means their *participation in decision-making and management*, in the context of a New International Economic Order. The days when industrialized countries could hope to manage technologies themselves 'in the interest and for the benefit of all countries, with particular regard to the needs of developing countries' are over. The Lincolnian principle of governance by the people and for the people must now be translated to the international plane and the equitable participation of developing countries in the management of these technologies must be ensured if developing countries are to benefit therefrom.

Considering the devastating damage that can be inflicted on the environment by the dual-purpose technologies even in their peaceful uses - far transcending the boundaries of the nation-State - the mamangement of their peaceful uses must be subject to international agreed *environmental standards and rules of conduct*.

These basic features of international control and management of dual-purpose technologies, however arrived at, are strikingly comparable to if not even identical with the basic components defining the legal and economic content of the concept of the Common Heritage of Mankind. A short description of the origin and content of this concept are, therefore, given on the next page.

A full discussion of the legal and institutional implications of applying a common-heritage type regime to dual-purpose technologies - *continuing and accelerating a trend already in course* - would be a significant step in a redimensioning of the role of Science and Technology for Disarmament and Development in the context of a New International Economic Order.

What is proposed here, obviously is not a technological solution ('technological fix') of problems which are essentially social

The Common Heritage of Mankind

It is only in the Law of the Sea that the concept of the Common Heritage of Mankind has been spelled out with its five attributes: non-appropriability; restriction to exclusively peaceful uses; shared management; benefit sharing and due regard to environmental policy and conservation. The oceans are our great laboratory for the building of a new order based on the concept of the Common Heritage of Mankind.

Next to ocean space and marine technologies, it is outer space and satellite technology that bids most imperiously for the status of common heritage. The Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space defines Outer Space as 'the common province of mankind', and the astronauts as the 'envoys of mankind'. No treaty had ever used such language, but the concept remained in the realm of the poetic.

The 'common province of mankind' is, nevertheless, one of the legitimate ancestors of the Common Heritage of Mankind. While technological evolution advanced, revealing ever more clearly the economic potential of outer-space technology and its impact on development as well as on sovereignty and on international organization - making the Treaty of 1967 obsolete - the Common Heritage concept is now returning to its ancestral home in Outer Space.

During a recent meeting of the Committee on Peaceful Uses of Outer Space, the Netherlands Delegate, Willem Riphagen, expressed his Government's opinion that the natural resources of the moon and other celestial bodies were the common heritage of mankind. No State would have sovereignty, permanent or otherwise, over such resources *in situ*, and their appropriation should not be subject to the rule of 'first come, first served'. Some form of international management in their exploitation would be needed.

The Common Heritage concept, furthermore, is to be applied not only to the extra-terrestrial resources, but to the products of space activity in general. As Riphagen pointed out in the same statement, international practice has evolved in the direction of "application of the concept of the common heritage of mankind to the products of space activities. This means that the *information gathered by satellites, e.g. on earth resources, on pollution, on weather, or on military activities, is common heritage.*" (13)

To assure the common-heritage status of this technological knowledge, the technology itself must be subject to a shared management system. The Arusha Symposium of African States (January 30 - February 4, 1978), in preparation for UNCSTD proposed that "it must be accepted universally, for a start, that technological knowledge is the common heritage of mankind."

The application of this principle to technology will have far-reaching effects on national and international patent laws. However, a fair share of benefits to technological inventors is not imcompatible with the concept of common heritage. E.g., an investor in seabed mining can participate in the *use* and *management* of these resources, with the assurance of a fair return. Though the issues involved are complex, there are areas where *technological imperatives have already forced upon the international community an approach towards a common-heritage regime.*

and political. Quite on the contrary, it is a political and institutional solution to the problems engendered by these technologies.

What is proposed is not to foist inappropriate macro-technologies on poor developing countries who would be better served by appropriate alternative technologies. Nuclear technologies, environmental modification technologies, space technologies, it can be pointed out, cannot and should not have priority in the development strategies of poor countries where, as is well known, the introduction of capital-intensive sophisticated technology may distort the development process, heighten dependence on the industrialized countries and reinforce the infrastructures of a dualistic economy within the developing country.

Over-emphasis on 'appropriate' or 'intermediate' or 'labor-intensive' technologies, however, is controversial. Developing countries often, and rightly, reject it as paternalistic. There are sectors in the economies of developing countries which unequivocally demand highly sophisticated, capital-intensive technologies. Natural gas, e.g., cannot be liquified by 'intermediate' technologies. If a developing country producing natural gas is not to depend on the mercy of foreign companies, these capital-intensive technologies, with the requisite scientific-technological infrastructures, must be transferred. In some sectors (e.g., communication), 'phase-skipping' is far more economical in technological evolution than would be 'recapitulation', i.e. the step-by-step repetition of the technological evolution experienced by 'older' industrialized countries, (e.g. the introduction of air traffic before the building of a road-infrastructure; the introduction of satellite communication in developing island or archipelagic countries before the establishment of a network of wires and cables).

High technology does *not create* a social and economic order. It merely re-inforces it. If a capital-intensive high technology is owned by a foreign company or indigenous élite monopolizing or expatriating profits while failing to create employment or other social goods, such a technology obviously does not enhance development. If the *same* technology is *socially owned*, and the pay-offs of its greater productivity are re-invested either in industrial diversification or in the building of social infrastructure in the service sector (schools, hospitals, roads, etc.) in either case creating employment and raising and distributing income, then, indeed, this technology does contribute to the development process.

International cooperation in the management of the peaceful uses of dual-purpose technologies, at the same time, is the most efficient if not the only way to prevent their diversion to military and war making purposes. It would be a *real contribution* to disarmament negotiations: in some of the *key areas* where these are presently concentrating.

The proposed field of action is clearly circumscribed and con-

crete, and beginnings, conceptually and in terms of negotiations, have already been made. Here something practical and constructive can be done, in the direction of 'complete and general disarmament under effective international control', which, by itself has remained, and is bound to remain, an elusive and utopian goal.

5.8 Future Action

There are, in the fiendish arsenal of chemical warfare, chemical agents which, taken singly, can cause no harm. It is only in combination that two or more of these chemical agents can reach the goal of death and destruction.

Metaphorically speaking, and switching from the negative goal of death and destruction to the positive one of peace and a new international economic order, disarmament and development may be considered as two such chemical agents which, taken singly, are ineffective, but in their combination, may have explosive results.

All aspects of this combination or interaction need further study, at the conceptual level, at the empirical/statistical level, as well as in terms of ongoing negotiations. There may be, for instance, constructive ways of combining the Dutch proposal for a Disarmament Agency with the French one for a Satellite Monitoring Agency or of integrating the results of the forthcoming UN Conference on Science and Technology for Development and of the forthcoming Third General Conference of UNIDO with those of the Tenth Special Session and the preparations for the next Development Decade. This might be an effective way to prepare for the 1982 UNGA Special Session on Disarmament which undoubtedly will have an agenda item on Disarmament and Development. Non-governmental organizations can, and must, play an active role in this preparation.

Some topics for further research are tentatively listed in Chapter 4 of this report. An additional list - or plan of work can be extrapolated from chapter 5. This plan would have three major components:

The first would be an analytic description and definition of the dual-purpose technologies. This should include *scientific* background, and a description of the present state of the art for each one of them, including charts listing both their peaceful and military uses, for the past and present as well as for the foreseeable future (potential uses). Next to the scientific and technological aspects, and their impact on warfare and peaceful development, their *economic* aspects should be examined, especially with regard to peaceful uses (cost/benefit analyses, etc.). Closely related to these economic aspects are questions of the *social* impact of these technologies, both in developed and developing countries. Here, some of the issues listed in Chapter 4 should be raised. The *environmental* implications of each of the technologies should be examined, and standards, rules of conduct, and enforcement methods should be discussed. Possibili-

ties of *conversion* and of *diversion* should be analysed.

The second major component would be a discussion of the principles of management of the peaceful uses of dual-purpose technologies. The concept of 'peaceful uses' is relatively recent in international affairs, and has not yet been clearly defined. For example: does it include participation by the military for peaceful purposes? Management of peaceful uses will, in each case, be shared by States, regional organizations and bodies with global responsibility. The share of responsibility at each level will vary, according to the technology in question. It is likely, for instance, that management responsibility will be globally centralized to higher degree in the case of outer-space technology and environmental modification technology than in the case of the more diffuse biological and chemical technologies where national activity will have a relatively greater weight in the balance of national/international interaction. The principle of international *benefit-sharing* has been discussed most explicitly in connection with marine resources and technologies and the new Law of the Sea. Its application to other technologies, including questions of technology transfer, training and the creation of required scientific and social infrastructure, requires much further study. Reference has already been made to the *environmental* aspects of dual-purpose technologies. These need to be considered also in the context of the principles of management.

The third major component of the plan of work should deal with the *institutional implications* of the management of the peaceful uses of dual-purpose technologies. Historical precedents, whether abortive (e.g. the Baruch/Lilienthal Plan), effective (e.g. the Schuman Plan, which gave rise to the EEC: originally conceived on the basis of the principle that integration of the peaceful uses of the coal and steel industries would for ever prevent their diversion to warlike purposes), or still in a stage of negotiation (e.g. the Seabed Authority) should provide a starting point. The institutional implications of the management of the peaceful uses of dual-purpose technologies should then be considered in relation to the restructuring of the UN. A reassessment of the role of Science and Technology, including its interlinkages with other problem areas or questions of international concern, in the context of a New International Order (NIO) should conclude the plan of work. A NIO which would make these interlinkages meaningful, because it would be based on justice, equity and international cooperation. A NIO which, furthermore, would provide a framework for conversion from military to peaceful uses.

Notes and References

1. Emile Benoit, *Defense and Economic Growth in Developing Countries*, Lexington, Mass.: Lexington Books, 1977.

2. International Herald Tribune, April 13, 1979.

3. *The dynamics of military technology today*, by Milton Leitenberg, International Social Sciences Journal, Vol. XXV. No. 3, 1973.

4. Memorandum submitted by the US Representative on the Atomic Energy Commission, Bernard M. Baruch, on July 5, 1945.

5. It is interesting to note that these resources were *not* located in an area 'beyond the limits of national jurisdiction' as stipulated for common-heritage resources in the Law of the Sea negotiations. They could be located anywhere. They were to be 'beyond the limits of *functional* national jurisdiction.'

6. Alva Myrdal, statement before the CCD, Geneva, 1973.

7. Peter Jankowitsch, *International Cooperation in Outer Space*.Occasional Paper II. Muscatine, Iowa: The Stanley Foundation, 1976.

8. *The United Nations and Outer Space*, United Nations, New York, 1977.

9. Policy Perspectives for Committee on Science and Technology, US Hearings on Future US Space Programs, January 24, 25 and 26, 1978. Howard G. Kurtz, President, War Control Planners, Inc. Reproduced in *Checkpoint*, a Network Newsletter for People Concerned with Future Civilized Global Systems. Vol. VI, No. 1, February 1978.

10. Document CD/9

11. A/S110/AC.1/7, 1 June 1978

12. Leitenberg, loc.cit.

13. A/AC.105/C.2/SR 290, March 1978.

14. *Science and Technology for Development; African Goals and Aspirations in the United Nations Conference*. Report of a Symposium held in Arusha, Tanzania, Jan. 30-Feb. 4, 1978. Published by the Tanzania National Scientific Research Council, Dar Es Salaam, Tanzania.

Part III: Four Position Papers

Disarmament in the Context of the International Economic Order
by Graciela Chichilnisky

1. Introduction

This paper focuses on an economic aspect of the disarmament question: the international market of armaments. I shall explore the thesis that arms trade is an increasingly important factor in North-South economic relations, that it affects not only international trade patterns, but also, through trade, domestic patterns of economic development.

Research assistance for this work was provided by Michael de Mello at Columbia University. In addition to the statistical sources in the references I shall be drawing as well on the results of a UNITAR study on technology, domestic distribution and North-South relations. (1)

2. North-South arms trade

Several indicators point to the increasing importance of armament trade in the North-South context. The main exporters of armaments have been the North: the US, USSR, U.K. and France, accounting for 90% of total exports. (2) In particular, according to the US Arms Control and Disarmament Agency, between '65 and '74 the US alone delivered just under 50% of all arms traded in the international market. (3) The US share of arms exported to the third world was even bigger, accounting for 53% of all arms acquired by underdeveloped countries since the Second World War. (4)

The US Department of Defense has produced a set of figures which shows a dramatic shift of trade from within the North towards North-South trade. Between 1950 and 1965 arms trade within the first world countries (measured by foreign military sales orders, denoted FMSO) amounted to 13.1 billion US dollars (in 1970 prices) FMSO third world countries in the '50-'65 period was 6.31 billion. First world FMSO between 1965 and 1974 amounted to 8.99 billion US dollars (in 1970 prices); FMSO to the third world in that period was 27.63 billion US dollars. (5)

The data indicates that North-South arms trade in real terms (1970 prices) increased 400% from the first to the second period, while the trade within the North decreased about 30%. At present approximately three quarters of total global arms trade is North-South trade. This dramatic increase of armament exports from the North to the South occured within an increase of 240.4% in the volume of world trade (6) between the period '50-'65 and the period '65-'74. Therefore, the absolute as well as the relative size of the arms market increased in the international market and, within this enlarged market, North-South arms trade dramatically increased also.

We shall concentrate in this paper on the trade of arms which is only a part of all arms transfers, including military aid, foreign military sales credit (denoted, FMSC) and military assistance programs. A reason for concentrating on the *market* as opposed to *non-market* transfers is that the relative importance of armament trade to other transfers has drastically increased from the period '50-'65 to the period '65-'75. For instance, for the US, which is the source of 53% of total arms exports to the South, total non-market transfers in '50-'65 to third world countries amounted to 18.314 billion while US market transfers (FMSO) came to 2.719 billion. In contrast to the period '50-'65, total US non-market transfers to third world countries in the period '65-'74 were 6.079 billion, while US market transfers were 25.566 billion in current yearly prices. (7)

North-South armament flows are therefore increasingly taking place through the international market. While the political aspects of armaments flows should not be ignored, this supports our position that the armament question should be studied also in economic terms, through its effects on the international market.

3. Arms trade and commodity trade

There exists at present sufficient statistical information to link increases in export of commodities from the South with increases in arms exports from the North. One instance in which commodity export increases are clearly linked with increased arms imports is, of course, that of the OPEC Persian Gulf States. Foreign military orders from Persian Gulf States rose from $861 million in 1972 to $6.5 billion in 1974, coinciding with the OPEC four-fold increase in oil prices of 1973, which increased in an estimated $16 billion, the US oil import bill (all figures in current yearly prices). (8)

In the case of Iran, the cumulative total arms orders in the 25 year period from 1950 to 1975 amounted to 10.3 billion US dollars, while in the two year period '74 and '75 they amounted to 6.5 billion. The same figures are 7.2 billion for '50-'75 and 3.9 billion for '74-'75 for Saudi Arabia. (9)
The advantages to the US of selling arms has been rationalized very candidly, for instance, in a report to the US House of Representatives, Committee on International Relations, *US Arms Sales to the Persian Gulf*. (10) The report's conclusions can be summarized by pointing to four advantages: improvements in balance of payments (especially with respect to oil import bills), the creation of jobs in the US (it is calculated by the Committee report that each billion dollars worth of arms sales creates 47,000 jobs), increase in direct and indirect political influence, and increased dependence of the arms buyer on US parts, technology, and a wide range of other US products.

The same economic arguments cannot be made, however, for the South, which consists mostly of buying countries (even though certain third world countries are starting to export arms them-

selves, accounting at present for about 6% of total exports. (11) The corresponding arguments which are usually presented for possible economic advantages of the arms trade to the South are the transfer of advanced technology, and benefits from increased domestic activity generated by trade in general, such as derived employment, etc.

The South, as a buyer, trades commodities for arms. Leaving aside the well known case of oil/arms exchange that we just discussed, we shall focus now on other, lesser known, relationships between commodity exports and arms imports. We shall, in particular, discuss certain effects of technology transfers associated to arms trade, and of commodity export led policies that are associated with increased arms imports by the South. I will draw on the results of export led policies of the UNITAR study on technology, domestic distribution and North-South relations which are summarized in a later section of this paper.

Statistical correlations have been found in the UNITAR study between commodity prices and exports and levels of military expenditures, which cover a wide range of Southern exports: for coffee Colombia, Ivory Coast and Haiti are analyzed; for copper Chile, Zambia and Zaire; for sugar Cuba, India and the Philippines and for natural rubber, Malaysia. We shall discuss here, only as an example, the case of one commodity, cocoa, in which a correlation between commodity prices and exports and levels of military expenditures from the South can be detected.

The data for military expenditures used in the cocoa study were obtained from SIPRI, because as an institution funded by the Swedish Parliament it may have less of an interest or a committment to geo-politics than government funded agencies from the exporting countries. Prices for commodities are of two types: 'spot' or 'cash' prices and 'futures' prices; here 'cash' prices of commodities will be used, as published by the Commodity Research Bureau, Inc., N.Y. in their Commodity Yearbook. Proportions of exports are as from: *The Economist: The World in Figures*, London: Economist Intelligence Unit (1976). Figures of military expenditures are in US millions constant 1975 price and exchange rates.

Cocoa prices are among the most volatile in commodities markets. (12) Ghana has traditionally been the world's largest exporter of cocoa beans. In 1974 it derived 63% of its exports from cocoa. Its military expenditure was cut from $46 million in 1962 (military expenditure had been rising since 1956) to 32 million in 1966. From 1962 to 1966 the price of cocoa dropped from an average of 20.8¢ to 17.2¢.

Brazil is a cocoa exporter, but it depends on many other commodities and even manufactures exports so its trade patterns are less easily analyzed in statistical terms. A more easily analyzable case is that of the Republic of Cameroon, which depended on cocoa for 28% of its total exports in 1974. From December of 1963 to July of 1965 the price of cocoa dropped substantially

from 26¢ per pound to 11.8¢ per pound. The Republic of Cameroon in the three years following its independence increased its military expenditure from 18 million to 28 million in 1962. In '63, '64 and '65 its expenditure dropped to 23 million. In 1966 its expenditure rose and has continued rising ever since. It is interesting to note that Cameroon derived 25% of its exports in 1974 from coffee. Coffee prices were also dropped, rather drastically from '55 to '65, and then went up again.

A fourth case is the Ivory Coast. In 1965 the Ivory Coast was the third largest exporter of cocoa with 126,400 metric tons. In 1965 its military expenditure was 20 million US dollars. It dropped to 19 million in 1966 and rose again to 21 million in 1967. The average price of cocoa rose from 17.2¢ in 1965 to 24.6¢ in 1966.

A fifth case is Nigeria, which, before the oil bonanza, relied on the export of primary products such as cocoa, palm nuts and oil, and rubber for its exports. Nigeria's military expenditure had slowly risen to $68 million in 1965. In July of 1965 the spot price for cocoa beans in NY was 11.8¢ per pound, the lowest since 1946 (when the exchange reopened after WWII). The price had been dropping consistently since January of 1964 when it was 26.7¢. The average dropped 26.5% from 1964 to 1965. Nigeria's military expenditure dropped from 68 million in 1965 to 58 million in 1966, a 14% decrease in real terms. Military expenditure rose to 201 million in 1967, increasing to 570 in 1970 (as a result of the Eastern states' attempt at seceding to form Biafra).

The above five country cases show a link between the price and volume of the exports of one commodity, cocoa, and armaments imports. Similar correlations were also present in the other studies for coffee, copper, sugar and natural rubber.

4. Trade patterns, technologies and the North-South debate

I shall next explore the effects of arms trade on North-South development and on domestic patterns of development.

The significant changes that took place in arms trade in the last decade, which were discussed above, necessarily affected the functioning of the international market which is a central subject of the North-South debate. I refer here not only to the official levels of North-South negotiations, which take place in governmental contexts or at the level of international organizations and which concentrate on North-South market negotiations, but also to a less official, non-governmental form of the North-South debate. (13) It is, for instance, by now a standard Northern prescription that liberalized, larger international markets, increase overall trade; will produce gains for all. (14)

Preferential trade for Southern goods, indexing and targets, are, of course, also a prescription of representations of Southern governments within the official North-South debate. Both parts in the official N-S debate, therefore, sponsor forms of export led growth for the South. The expression 'export led growth'

refers to a wide range of export promotion policies including subsidies, preferential tax treatment, foreign exchange, tariffs on intermediate inputs (e.g., capital goods) for the production of the export good, repatriation of profits for international capital, etc. The underlying economic thinking is based on the advantages of international division of labor, and on 'gains from trade' theories. Increases in exports are also viewed as spurring increased economic activity and employment, and thus growth, within the exporting economy.

There is, however, another tradition, originated within Latin American development thinking (starting with the work of R. Prebisch at CEPAL) which questions the reliability of overall gains from trade, especially when the traders are of very different characteristics and levels of development, and this I consider a better basis for understanding some aspects of what has happened with arms trade and other goods, postwar. Our own work with UNITAR has strong resonances with this alternative tradition. Our results show that in contrast to more orthodox economic trade thinking, certain export led policies can have damaging effects for the South. The combination of very modern technologies together with backward technological sectors and very cheap labor is shown in the North-South UNITAR model to combine and produce negative effects of export led policies on the economies of the South. This is especially true when the goods exported are either basic consumption goods (consumed by the bulk of the population) or else the production of the export goods diverts productive resources from the production of basic consumption goods. These negative effects of trade inlcude worsening of terms of trade to the South and, also, lower total revenues from trade accruing to the South as the volume of trade increases; worsening of the distribution of income and decreased growth also occurs within the South when such export led policies are promoted.

Two aspects of the effects of increased North-South arms trade deal directly with the conditions shown in the UNITAR North-South model to produce deterioration of growth and of distribution of income within the South with increased trade. One of them is the *types of technologies* which are being transferred with the arms sales. Such technologies are such that they can only increase duality in the economies of the South: they are much more capital intensive and they require certain skills which are foreign to the skills of the majority of the domestic population. As a result, more duality in the production system arises, and, as we discussed above this is one of the conditions under which increased exports from the South has adverse effects on North-South terms of trade, and on the South's growth and income distribution. Since increased arms trade must also increase exports of commodities, the negative outcomes on the South, just described, will follow.

5. Conclusions

We have shown here that arms trade is an increasingly important

element in North-South relations. Not only has the importance of arms trade increased dramatically in the international market during the last decade, but arms trade has also become relatively more important in value than other transfers of arms such as aid, credits, etc. Arms transfers are therefore increasingly affecting the international market. Furthermore, there has been a dramatic shift in arms trade from within the North towards the North-South trade in the last two decades. North-South arms trade accounts currently for two thirds of all arms trade and this proportion is increasing rapidly: between '73 and '75 the value of weapons transferred to the South rose 40% annually, and in the year 1975 to 1976 it increased another 20%. (15) The effect of these shifts in arms trade on the international market is therefore of importance in shaping other aspects of North-South trade. Since international market arrangements are at the core of North-South negotiations the analysis of arms trade is a key variable in the North-South debate.

It is shown here that increased North-South arms trade has the effect of producing more duality in the economies of the South, because of the technologies and skills associated with arms, and the implied employment and use of resources.

Based on North-South trade results of the UNITAR study of technology, domestic distribution and North-South relations, the effects of an increase in commodity exports from the South associated with increased arms imports by the South is explored. Together with the dualism induced by arms trade on the Southern economies, the export led policies that accompany the increase in arms trade is shown to deteriorate the distribution of income, and also to hinder the growth of the South. One effect of the increased North-South arms trade is to shape or reinforce development patterns within the South that increase duality, deteriorates income distribution, and hinders overall growth. To the extent that increased prices of commodities exported by the South, and, in general, export led policies of commodities by the South are compensated by increased arms sales (as is shown in the UNITAR study), the case for attaining more North-South equality, and of promoting growth in the South through export led policies is further undermined.

In addition to the works quoted in the footnotes the following were consulted

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2. SIPRI, *The Arms Trade with the Third World*, SIPRI, London, Paul Elek, Ltd. 1971.

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2. SIPRI, *World Armaments and Disarmament, SIPRI Yearbook - 1976*, p. 16.

3. U.S. Arms Control and Disarmament Agency, *World Military Expenditures and Arms Transfers 1966-1975*, Washington D.C.: U.S. Printing Office, 1976, p.73. The Soviet Union followed with 28%.

4. *Ibid*, p. 73.

5. The precise figures in current prices are: from 1950 through 1965, for the first world, were 5.647 billion and for the third world, 2.79 billion; from 1965 to 1974, 8.653 billion US dollars for the first world (Western Europe inclusive of Greece, Spain and Portugal but exclusive of Turkey, Japan, Australia and New Zealand) and 26.566 billion US dollars for the third world (Africa, Latin America and Asia, exclusive of the PRC, North Korea and North Vietnam).
Source: U.S. Department of Defense, *Foreign Military Sales and Military Assistance Facts*, Washington, D.C., 1975, pp. 14-15.
We used an average of UN price deflator for 'world trade' (exports) that uses 1970 as a base year as in UN *Statistical Yearbook - 1977*, for formulating the figures in the text.

6. Figured by using International Financial Statistics as quoted in *Direction of International Trade* and *Direction of Trade*, Washington, D.C., The International Monetary Fund, Annual and Monthly.

7. U.S. Department of Defense, *Foreign Military Sales and Military Assistance Facts*, December 1977 and November 1975, Washington D.C., Data Management Division, Comptroller, DSAA, 1976 and 1978.

8. Department of Defense, *op cit*, Michael T. Klare, "The Political Economy of Arms Sales", in *Bulletin of the Atomic Scientists*, November 1976, p.11-18, and *International Petroleum Encyclopaedia 1975, 1976, 1977 and 1978*. Sales to Iran have a further dimension:
"Oil barter arrangements among Iran, Ashland Oil Company and U.S. aerospace manufacturers are being actively negotiated". *Aviation Week and Space Technology*, Vol. 105, No. 6, p. 22, August 9, 1976.
The barter exceeds by a large amount recorded sales and orders "10.2 billion in '72-'76". "Oil-for-Weapons Barter Spurred" in Vol. 104, No. 20, p.14, May 17, 1976 of the same journal.

9. U.S. Department of Defense, *op cit*, p. 14.

10. U.S. House of Representatives, Committee on International Relations, *United States Arms Sales to the Persian Gulf*, 94th Congress, first Session, December 1975.

11. Brazil, Cuba, Iraq, Israel, the two Koreas, Libya, Morocco, Nigeria, Singapore, Somalia, Uganda, Taiwan and PDRY. Source: U.S. ACDA, *op cit*, 1967-1976, p. 8-10. At present according to ACDA they account for 6% of total exports.

12. One need only look at a long-term chart of cocoa prices to readily acknowledge the high rate of volatility and price extremes that have characterized this commodity through the years. Price swings during a season have ranged from 40¢ per pound to 6¢. Source: "A Method of Forecasting Cocoa Prices" by William Stein in Commodity Yearbook, 1972, New York, pp. 14-20. The five largest producers in the world constituted about 80% of world production (Brazil, Cameroon, Ghana Ivory Coast and Nigeria). *Ibid.*

13. This latter, parallel North-South debate occurs at different levels and takes different froms: It takes place, for instance, within certain segments of the public opinion, and of interest groups. It includes academic and other intellectual undertakings, including literary pieces (even films and theatre plays which discuss North-South issues), and, also, certain forms of organization of more immediate economic agents such as groups that deal with natural resources; both sellers and buyers.
The less official North-South debate, however, also focuses on the functioning of the North-South trade. As an example, academic theories that explain the effects of trade on growth and on distribution give implicit endorsement to certain North-South trade policies.

14. This view is shared, for instance, by L. Klein's LINK project or by A. Krueger's study for the National Bureau of Economic Research, *Liberalization Attempts and Consequences*, Ballinger Publishers, Cambridge, Ma. 1978.
It has a long established theoretical basis on the 'gains from trade' and 'factor price equalization' theorems of international trade theory.