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REVIEW OF THE IMPLEMENTATION OF THE RECOMMENDATIONS AND DECISIONS  
ADOPTED BY THE GENERAL ASSEMBLY AT ITS TENTH SPECIAL SESSION

Study on the economic and social consequences of the arms race  
and military expenditures

Report of the Secretary-General

1. By resolutions 40/150 and 41/86 I, the General Assembly requested the Secretary-General to bring up to date, with the assistance of a group of qualified consultant experts appointed by him, the report entitled Economic and Social Consequences of the Arms Race and of Military Expenditures, 1/ taking into account the significant developments that have taken place since the preparation of that report. The General Assembly subsequently requested the Secretary-General to submit the study to the Assembly at its forty-third session.
2. Pursuant to those resolutions, the Secretary-General has the honour to transmit herewith to the Assembly the study on the economic and social consequences of the arms race and military expenditures.

\* A/43/50.

1/ A/37/386 (United Nations publication, Sales No. E.83.IX.2).

ANNEX

Study on the economic and social consequences of the  
arms race and military expenditures

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FOREWORD BY THE SECRETARY-GENERAL

The present report is the fourth in a series carried out by the United Nations, in response to mandates of the General Assembly, on the economic and social consequences of the arms race. It has been prepared, pursuant to resolutions 40/150 of 16 December 1985 and 41/86 I of 4 December 1986, by the Group of Consultant Experts appointed by the Secretary-General for the purpose. They have accordingly brought up to date the previous report, entitled Economic and Social Consequences of the Arms Race and of Military Expenditures, which was concluded in 1982.

The threat of nuclear war, carrying with it the possibility of the end of civilization, has long been regarded in the United Nations as the greatest peril facing the world. Moreover, especially in recent years, the repeated tragedy and suffering caused by armed conflicts fought with conventional weapons and fuelled by their ever-increasing spread and sophistication have become matters of grave concern. Since 1982, the use of chemical weapons - defined in 1948 as weapons of mass destruction - in such conflicts has been documented by the United Nations. These developments are among the obvious, direct effects either caused or made more severe by the many-faceted, dynamic and competitive arms race.

As the report of the Group makes clear, the arms race also leads to numerous economic and social phenomena even in the absence of conflict, including unsustainable military spending, excess military, as compared with civilian, production, the spread of arms production to additional countries, heavy allocations of technological resources to military research and development, transfers of armaments among alliances and to non-producing countries alike, and over-militarization in general. Although these phenomena have been somewhat curbed because of increased international indebtedness, they none the less persist.

The Group points to the fact that a number of factors mitigating this discouraging outlook have arisen in recent years. These factors include professional, in-depth analyses that have led to new, imaginative theories and thinking about ways and means of reversing the trend of military build-up. The question of industrial conversion in favour of civilian output is among the areas deserving further study. There have also been growing world-wide public expressions of concern at the elusiveness of a more secure, peaceful and equitable world in which a substantial disarmament process could proceed, and the introduction of action-oriented proposals aimed towards that goal. Most encouragingly, since the mid-1980s, the relationship between the two leading Powers has improved markedly, and their negotiations on arms limitation and in other areas have progressed to a new level. Finally, there has been a greater recognition of the implications of global interdependence and environmental fragility and a consequent increase in the openness of information and discussion about issues of both regional and general concern.

The Secretary-General expresses his appreciation to the members of the Group of Consultant Experts for the dedication with which they tackled this task, and for their successful efforts in reaching unanimity on the issues involved. It should

be noted that, owing to the complexity of the subject examined, the observations and conclusions in the present report are those of the members of the Group of Consultant Experts, and that the Secretary-General is not in a position to pass judgement on all aspects of their work.

LETTER OF TRANSMITTAL

22 April 1988

Sir,

I have the honour to submit herewith the report of the Group of Consultant Experts on the Economic and Social Consequences of the Arms Race and Military Expenditures, which was appointed by you in pursuance of General Assembly resolutions 40/150 of 16 December 1985 and 41/86 I of 4 December 1986.

The consultant experts appointed in accordance with the General Assembly resolutions were the following:

Mr. Lazhar BOU OUNI  
Professor  
University of Law and Political Science  
Tunis, Tunisia

Mr. Ján CHANDOGA  
Head of the Disarmament Division  
Federal Ministry of Foreign Affairs  
Prague, Czechoslovak Socialist Republic

(Third session)

Mr. Hendrik DE HAAN  
Professor  
University of Groningen  
Groningen, The Netherlands

Mr. Dragomir DJOKIĆ  
Deputy Permanent Representative of Yugoslavia  
to the United Nations  
New York

Mr. Constantin ENE  
Director of the Department for External Economic Relations,  
Treaties and International Organizations  
Ministry of Foreign Affairs  
Bucharest, Romania

His Excellency  
Mr. Javier Pérez de Cuéllar  
Secretary-General of the  
United Nations

Mr. Juan E. FISCHER  
Ambassador  
Alternate Permanent Representative of Uruguay  
to the United Nations  
New York

Mr. Ladislav MATEJKA  
Minister-Counsellor  
Permanent Mission of the Czechoslovak  
Socialist Republic to the International  
Organizations  
Vienna

(First and second sessions)

Mr. Adrianus MOOY  
Deputy, Fiscal and Monetary Division  
National Development Planning Agency  
Jakarta, Indonesia

(First session)

Mr. Semen N. NADEL  
Chief of Section  
Institute of World Economy  
and International Relations  
Moscow, Union of Soviet Socialist Republics

Mr. Waliur RAHMAN  
Ambassador of Bangladesh to Italy  
and Permanent Representative of Bangladesh  
to the United Nations Agencies in Rome

Mr. Christian SCHMIDT  
Professor  
University of Paris  
France

Ms. Amada SEGARRA  
Visiting Professor  
Institute of Diplomacy and International Relations, Guayaquil,  
and member of the Advisory Board on Disarmament Studies  
Ecuador

Mr. Darold W. SILKWOOD  
Chief, Defense Programme Analysis Division  
Bureau of Nuclear Weapons and Control  
Arms Control and Disarmament Agency  
Washington, D.C., United States of America

Mrs. Margaret VOGT  
Director of Studies, Command and Staff College  
Jaji-Kaduna, Nigeria

(First session)

The report was prepared between March 1987 and April 1988, during which period the Group held three sessions, the first from 16 to 20 March 1987, the second from 30 November 1987 to 11 December 1987, and the third from 11 April to 22 April 1988. The first and third sessions were held in New York and the second session at Geneva.

The members of the Group of Consultant Experts wish to express their gratitude for the assistance that they received from members of the Secretariat of the United Nations, the United Nations Institute for Disarmament Research and the specialized agencies and other organizations of the United Nations system, as well as from research institutes and universities. They wish, in particular, to thank Mr. Yasushi Akashi, Under-Secretary-General for Disarmament Affairs, Mr. William Lawler, who served as Secretary of the Group, and Dr. Raimo Väyrynen of the University of Helsinki, who served as Consultant to the Secretariat.

I have been requested by the Group of Consultant Experts, as its Chairman, to submit to you, on its behalf, its report, which was unanimously approved.

Please accept, Sir, the assurances of my highest consideration.

(Signed) Constantin ENE  
Chairman of the Group  
of Consultant Experts on the  
Economic and Social Consequences of  
the Arms Race and Military Expenditures

## INTRODUCTION

1. The present study report on the economic and social consequences of the arms race and military expenditures is the fourth of its kind undertaken by the Secretary-General since 1971 1/ with the assistance of experts appointed by him. The second and third study reports were submitted to the General Assembly in 1977 2/ and 1982 3/ respectively. A brief look at the characteristics and effects of the arms race revealed in those reports might serve as a background to the present analysis, and help to show both the continuity and the change in the arms race phenomenon occurring over the past decade.

2. The 1977 report reaffirms at the outset the established view that the threat of self-destruction as a result of nuclear war is the greatest peril facing the world. One of its central findings is that the arms race is increasingly a world-wide phenomenon and, although its intensity varies markedly between regions, few countries and no major region have stayed out of it. Among its other clear affirmations, necessarily in brief summary, are the following:

(a) The competition in armaments between the major military Powers is by far the most important, dangerous and resource-consuming aspect of the world-wide arms race, and its principal driving force. All significant new developments in armaments spread from this competition to the rest of the world, and it is more intense than the sizes of the arsenals suggest because it is primarily a qualitative competition;

(b) The qualitative momentum of the arms race generates insecurity and negatively affects the possibilities for disarmament; this is because the decisive factor is to seek means of defeating the most advanced weapons and corresponding defences, thus creating a rapid rate of obsolescence in military technology. The appropriate criteria for progress in disarmament must therefore include measures to limit the qualitative arms race;

(c) The population explosion, food crises, devastating natural disasters and war have exacerbated the problems of eradicating poverty, improving human welfare and creating industrialization and growth, bringing these problems to a crisis stage in many parts of the world; claims in these areas compete with military claims. The vast benefits that could result from even trifling cuts in military expenditures and the reallocation of some of the funds thus saved are obvious;

(d) The arms race also exerts a profound and direct influence on politics, economics and society. In some cases, pressure or interference by outside Powers imposes narrow policy choices that may run counter to national aspirations. In other cases, armed forces become a decisive influence in internal politics as well as on civilian activities. The arms race in this context constitutes a threat to democratic processes;

(e) The most important feature of the arms race is that it undermines international security by creating a constant risk of war engaging the largest

Powers, including nuclear war, and an endless series of wars at lower levels, hindering the development of an atmosphere which downgrades the role of force in international relations.

3. Although many findings of the 1977 report retain their validity during the period covered by the 1982 report, significant changes are found in both the socio-economic and politico-strategic contexts. Thus the more recent report reaffirms once again that nuclear self-destruction remains the greatest peril facing the world and that effective security cannot be achieved by further armaments. It also identifies the following developments:

(a) World military spending data show faster increases from 1978 to 1981 than in the corresponding years preceding the 1977 report;

(b) The international political climate has become exceptionally grave. The 1980s started with severe set-backs to the process of détente that had developed in the 1970s;

(c) Hotbeds of crisis in various parts of the world have been exacerbated by increasing tensions and the confrontational postures of the leading participants in the arms race, as conflicts to determine, capture and control areas of influence continue;

(d) The early 1980s inherited a situation of stalemate in disarmament negotiations;

(e) Global economic prospects for the 1980s remain intimately linked with progress in disarmament;

(f) The line dividing the tactical from the strategic - and the conventional from the nuclear - arsenals of the major military Powers has been further eroded by innovations at the forefront of military technology;

(g) A major redeeming feature has been the growing public awareness of the danger of war, particularly nuclear war, and the public reaction to the growing application of science and technology to the military sector. The implications of this are, to a large degree, beyond the public's understanding and influence, especially because of information withheld from it.

4. The present report reveals a continuity of similar negative effects of the arms race, but a greater degree of change than that which occurred between the periods examined in the two earlier reports. It finds that in the mid-1980s, the arms race among the major military Powers, particularly in the nuclear field, was continuing in the context of the modernization of weapons and arsenals, despite the improvement during the past three years in the dialogue between these Powers and in the international atmosphere. Advances in military technology are still running ahead of the process of disarmament negotiations, and politico-strategic considerations continue to hinder improvements in the global economic situation. Socio-economic development remains in competition with claims of the military on human and material resources. At the same time, there are now more refined

ingredients for increasingly nuanced understandings of the requirements for peace, security and disarmament. Some forward-looking attitudes have emerged, as well as feelings of the possibility of progressive modification of the traditional behaviours of States and peoples and talk of social progress, improved human welfare and more rational security arrangements at lower levels of armaments. These new attitudes are reflected in a broad range of recent studies, General Assembly resolutions and other proposals which encourage or attempt precise analysis of the short-term and long-term political, economic, social, environmental and other implications of arms production and acquisition, military technology and armed conflict, both nuclear and conventional.

5. The present report draws generously on relevant analyses and empirical evidence of these developments:

(a) While world military spending has continued to rise, the pattern of growth has changed, owing mainly to the deteriorating economic situation and consequent mounting indebtedness, which have imposed many constraints that affect in particular the developing countries, which can least afford them. The ongoing increase in military spending has thus been almost entirely in the industrialized world and in specific areas of tension or actual armed conflict;

(b) The ongoing conflicts that are taking place in various parts of the world - whether or not with outside involvement - have grown more intense and tragic, despite continuing efforts to find solutions. Fuelled with ever more destructive weapons, they have become more bitter and costly both in material and human terms. In some cases, there remains a grave danger of still higher intensity and wider involvement. For the first time, the use of chemical weapons in such armed conflicts has been confirmed and documented by the United Nations. In addition, the resort to terrorism has increased;

(c) Further technological innovation and/or modernization have been implemented or are planned by the most militarily significant States, and some incipient advances may still further obscure the line, in terms of military effectiveness, between conventional and nuclear weapons systems. The military use of research and development and the rapid pace of change in military technology are being more widely recognized, not only as having marked effects on strategy and tactics, but also as having net negative effects on economic strength and social progress - and hence also on international security, in its broadest sense - particularly in the long term;

(d) There has been a significant change in the international political climate, evidenced in particular by the relations between the Union of Soviet Socialist Republics and the United States of America, which have been improving since the late 1984-early 1985 period, and especially following their Geneva summit meeting in November 1985; in their joint communiqué adopted at that meeting, the leaders of the two Powers agreed that a nuclear war cannot be won and must never be fought; 4/

(e) In the disarmament field, there have been increasingly constructive forums and more intense negotiations at all levels. The negotiations between the

Soviet Union and the United States on their intermediate- and shorter-range nuclear missiles have been successfully concluded and, once the relevant Treaty is ratified, the implementation of the destruction of these categories of nuclear missiles to the zero level will get under way. There are also substantive ongoing bilateral negotiations on the reduction of strategic offensive weapons, on space arms and on explosive nuclear testing. At the multilateral level, disarmament negotiations have continued throughout the period. They are narrowing differences and slowly edging towards agreement on a comprehensive convention on chemical weapons;

(f) Information on the technical and economic aspects of the arms race has evolved, making it possible for the broader implications of military spending and technological advance to be increasingly examined by the general public. This has further increased pressure in industrial countries for governmental accountability for complex, costly technologies and projects with regard to their net security and socio-economic relevance. Underlying this is the continuing public awareness that there can be technological accidents and that nuclear weapons continue to be a threat to the future of mankind.

Global economic and social prospects for the 1990s remain linked to perceived improvements in the international security situation, which, in turn, could permit significant progress in the field of disarmament. This will require governmental decision makers to take better account of the world's human, natural and material resources, and to direct human endeavour accordingly. The participants in the International Conference on the Relationship between Disarmament and Development, held from 21 August to 11 September 1987, reaffirmed by consensus in the Final Document of the Conference, the commitment to allocate a portion of the resources released through disarmament for purposes of socio-economic development, with a view to bridging the economic gap between developed and developing countries. But the participants in the Conference also emphasized non-military threats to security, acknowledging "a growing recognition that both overarmament and underdevelopment constitute threats to international peace and security", in that mass human rights violations and poverty, illiteracy and squalor, which retard genuine socio-economic development, also create tension and strife. 5/

\* \* \*

6. Since 1978, when the General Assembly adopted without a vote the Final Document of its tenth special session, the first special session devoted to disarmament, 6/ which remains valid, the Secretary-General has conducted a large number of studies pertaining to several specific aspects of the arms race and disarmament. Among the subjects covered have been nuclear weapons, the reduction of military budgets, the relationship between disarmament and development, confidence-building measures, international security and disarmament, conventional weapons, concepts of security, and deterrence. 7/ Such studies should be viewed as sincere endeavours to provide more information on disarmament and related issues.

7. While a number of aspects of the arms race and its effects may be examined in topical studies, the present one and its predecessors are the only ones consisting of omnibus surveys of the various and evolving consequences of the arms race and

military expenditures, and are carried out with a view to revealing their most recent implications. In updating the 1982 report, in accordance with General Assembly resolutions 40/150 of 16 December 1985 and 41/86 I of 4 December 1986, the Group of Experts assisting the Secretary-General hopes that their findings will serve to highlight the harmful effects of the arms race on world peace and security, the economy and the social welfare of States.

8. Chapter I of the present report describes the dynamics of the arms race. The main emphasis is on the economic and the technological implications of the various categories of armaments and forces that constitute the arms race, the thrust of the motivations and machinery behind them, and the various costs and commerce that they involve. Chapter II provides an assessment of the natural, economic and human resources devoted to the arms race in a world of finite resources, with a view to examining the net implications of policy decisions in various circumstances, economies and societies. The economic development and social welfare implications of military outlays are analysed in chapter III, including their impact on economic development, on human resources, on technology, on inflation, on financial flows and indebtedness, and on socio-cultural conditions; the impact of industrial conversion in favour of civilian activities is also considered. Chapter IV, which analyses the international consequences of the arms race, considers its comprehensive implications, including those which are non-military, for society at the international, regional and national levels, including the choices and priorities open to governmental decision makers. Chapter V summarizes the findings of the Group of Experts and puts forward some recommendations aimed at reducing and reversing the negative consequences of the arms race, while avoiding consequent counter-productive effects.

## CHAPTER I

## DYNAMICS OF THE ARMS RACE

A. Nature of the arms race

9. The international arms race is a complex and multidimensional phenomenon that escapes any easy explanation; it is characterized essentially by the dynamics of reciprocal actions between competing States and unilateral actions by them, aimed at increasing their military power. Its most important feature is, however, that "it undermines national, regional and international security", as has been pointed out in previous editions of the Economic and Social Consequences of the Arms Race and of Military Expenditures. 8/ The arms race is an interactive, world-wide phenomenon, in which the largest military Powers and various actions and responses amongst them play a central role; it also has regional and local manifestations. This was recognized in the earlier reports in the statement that, although the intensity of the arms race "varies markedly between regions, few countries and no major region have stayed out of it". 9/ The arms race also has a multidimensional character in that it contains political, economic, technological and, most important, security elements. The cause-and-effect nature of the security element is reflected in the connection between the arms race and inter-State rivalries. This means that international tensions, disputes and conflicts provide reasons for acquiring new and more weapons, while the acquisition of weapons in turn exacerbates difficult relationships and conflicts. Even more important, the arms race involves the risk of war, including nuclear war, engaging the largest Powers.

10. The arms race, however, is also largely a result of deliberate political decisions made by States in their quest for security or power, or both. In this context, from the domestic perspective, these decisions are necessitated and justified by international tensions and regional or global conflicts. Moreover, as already noted, the national armaments programmes of major Powers interact, leading to competitive decisions on acquisition and to a process of escalation, often on the basis of worst-case scenarios, in the effort to safeguard a State's relative national security. Similarly, in the regional context, such decisions derive from perceived threats of military intervention or of external interference in internal affairs.

11. The dynamics of the arms race is far from a new phenomenon; it has operated, at least, throughout the entire period since the Second World War. In the 1980s, the threat of nuclear war - whether due to accident, miscalculation or even as a calculated strategy - has persisted. This predicament facing mankind was recognized also in the 1982 report, and remains today.

12. The decade of the 1980s had, until near its mid-point, witnessed a deterioration of the international atmosphere. The relations between the Soviet Union and the United States, and between many of their allies as well, were affected by tensions. These were created, in part, by the development and deployment of new weapons, both nuclear and conventional, which were perceived by the adversaries as threatening instruments that could be used for initiating, sustaining or escalating warfare. Technological developments made the problems of

politics and the assessment of intentions more difficult by further blurring the distinction, in terms of verification and military efficacy, between conventional weapons and weapons of mass destruction, particularly nuclear weapons. Yet the difference between the two is, and should be, kept clear in view of the huge difference in their destructive power and in the long-term socio-environmental hazards of their use.

13. Since the middle of the 1980s, there has been an improvement in the international political atmosphere. The Soviet Union and the United States have successfully negotiated a bilateral treaty eliminating two categories of nuclear weapons, entitled, "Treaty between the United States of America and the Union of Soviet Socialist Republics on the Elimination of Their Intermediate-Range and Shorter-Range Missiles". 10/ It pertains to those missiles whose range is between 1,000 and 5,500 kilometres and between 500 and 1,000 kilometres. On 10 December 1987, in a joint statement issued at the end of the summit meeting between Ronald Reagan, President of the United States of America, and Mikhail Gorbachev, the General Secretary of the Central Committee of the Communist Party of the Soviet Union, the two leaders stressed that the Treaty was historic both for its objective - the complete elimination of an entire class of United States and Soviet nuclear arms - and for the innovative character and scope of its verification provisions. The reduction of strategic nuclear weapons is also under negotiation, as is the question of arms in outer space. Bilateral negotiations have been started towards further limitations on nuclear testing. Multilateral arms-limitation negotiations, in particular those dealing with chemical weapons, have been further intensified. This new international spirit of co-operation should further strengthen confidence, both globally and regionally, and lead to concrete progress towards a significant limitation of armaments and, as a consequence, a reduced risk of war and an enhancement of international security.

#### B. Military expenditures

14. Military expenditures are a rough measure of how much of its resources each and every country devotes to protect its national security. The escalation of world military spending can be seen in the simple fact that, while the 1982 report mentioned a global figure for 1981 of \$550 billion to \$600 billion as the current level of military effort, the figure for 1985, at current prices, has been put at \$850 billion to \$870 billion.

15. For several reasons, these figures on military expenditures are far from accurate. Some countries do not provide figures that cover all their military expenditures. Furthermore, there are some objective difficulties in comparing national military data. The main difficulties are differences in the pricing systems due to the different economic systems and the transfer of military expenditure data denominated in national currencies to one common currency: the dollar. World total figures for 1986 are not available in World Armaments and Disarmament, the Yearbook of the Stockholm International Peace Research Institute (SIPRI), 11/ because the current information on Soviet and Chinese military spending is not sufficient and reliable enough to make accurate estimates of the world total military expenditures, and not all military expenditures are shown in the budgets of other countries. Therefore it is not possible to offer a precise

figure for the world total. The figures in the following three tables are only an indication of the development of military expenditures and they give only a very rough picture of the total resources devoted to the military sector derived from earlier SIPRI data. Global military expenditures, estimated at constant prices, have continued to increase (see table 1 below for details). As a matter of fact, the world gross domestic product (GDP) increased from 1980 to 1985 at an annual rate of 2.4 per cent, while the corresponding increase in military expenditure was 3.2 per cent per annum. <sup>12/</sup> This means that a higher relative share of the world's limited resources has been absorbed by the arms race during the 1980s than ever before. Since the Second World War, world-wide military expenditures have increased, in real terms, between four and five times. They consume some 6 per cent of total world output. <sup>13/</sup> If the trends described above were to continue, the global figure of \$1,000 billion could possibly be reached, at present prices and in the absence of significant arms limitation, before the end of this century. This means that a similar estimate made in the 1982 report could prove not to be far-fetched. <sup>14/</sup>

16. That report documented in detail how global military expenditures have been growing during the period since the Second World War, and how their distribution between individual regions and countries has been highly unequal. This reflects the economic and military asymmetries characteristic of the present world system. To ensure comparability, the criteria used in the earlier reports are also used in the present one as well. Recent figures, at 1980 prices and exchange rates, are as follows:

Table 1. Military expenditures in selected groups of countries, 1976-1985

(Percentage of world total and billions of dollars  
at 1980 prices and exchange rates)

	1976	1979	1982	1985
Six main military spenders <sup>a/</sup>	71.2	70.8	68.4	70.4
Other industrialized countries	14.6	14.3	14.1	13.9
Developing countries	14.2	14.9	17.5	15.7
World total (percentage)	100.0	100.0	100.0	100.0
World total (billions of dollars)	511.5	561.9	615.1	663.1

<sup>a/</sup> The six main military spenders, in alphabetical order, are China, France, the Federal Republic of Germany, the Union of Socialist Soviet Republics, the United Kingdom of Great Britain and Northern Ireland and the United States of America.

17. The share of the industrialized countries other than the six main military spenders has been essentially stable over the past 10 years. The relative position of the leading military spenders gradually declined until the early 1980s, when it began to move upward again as a consequence of the tense international situation and military preparedness programmes undertaken. Otherwise, the spending patterns of the main military spenders have not experienced any major deviations from earlier trends, except for the People's Republic of China, which reallocated a part of its military manpower and financial outlays to support its programme of economic modernization. The military expenditures of developing countries had been growing, in both absolute and relative terms, ever since the 1960s but, since the early 1980s, they have declined. The figures in table 2 suggest that the relative shares of different categories returned in 1985 to the situation that prevailed in 1979. In order to go beyond these observations, an analysis of the expenditure data is needed.

Table 2. Rates of growth of military expenditure, 1976-1985

(Percentage average annual increases of real expenditure)

	1976-1979	1979-1982	1982-1985
Six main military spenders	2.3	1.9	3.7
Other industrialized countries	2.9	2.8	2.3
Developing countries	3.0	9.1	-0.9
World	3.3	3.2	2.6

The military expenditures of industrial countries have continued to grow. Among the main spenders, a lower rate of growth in 1979-1982 can be observed, however. A new upsurge occurred again after 1982 in this group of countries and continued until the end of the period under scrutiny. A major change also took place in the military spending of developing countries between 1982 and 1985. Its negative growth rate reflects, in the first place, the decline of export prices and the deepening of the global debt crisis. These have reduced the ability of many developing countries to strengthen their military forces and, in particular, to import weapons. The decrease in their export income and consequent dwindling of their foreign reserves and arms imports have been very significant factors in the decline of their military expenditures.

18. The close association between developments in the world economy and military spending in developing countries becomes obvious when one explores the growth rate patterns of the latter in the oil-exporting countries. From 1976 to 1979, the

military expenditures of those countries grew by an unremarkable 2.6 per cent per annum, but surged up to 10.6 per cent per annum during the years of the so-called second oil crisis in 1979-1982. From 1982 to 1985 the situation was reversed: the military spending of oil-exporting countries declined at a rate of -1.8 per cent per annum. In fact, this decline was significantly greater than in the rest of the developing countries, where the military expenditures, while declining in percentage of global military expenditures as shown in table 1, remained almost constant from 1982 to 1985, as revealed in table 2. The decrease in oil prices and export revenues has thus been a major factor in the deceleration of military allocations and arms imports in the oil-exporting countries.

19. The economic constraint is, however, only one of the factors affecting the decisions to allocate domestic resources for military expenditures and arms imports. Political aspirations, various influences of the major Powers, ongoing international tensions and conflicts, perceptions of external threats, domestic instability, and natural phenomena have also continued to have a bearing on spending decisions. In order to obtain a more nuanced view of the factors that seem to affect military spending decisions, a regional breakdown may be of some value, with growth rates calculated separately for each of the main regions (see table 3).

Table 3. Rates of growth of military expenditure by region, 1976-1985

(Percentage average annual increases of real expenditure)

	1976-1979	1979-1982	1982-1985
North America	1.8	6.9	7.3
Europe	2.0	1.8	2.2
Middle East	0.3	10.9	-1.7
Far East <sup>a/</sup>	8.7	8.2	4.2
South America	2.7	19.6	-7.3
Africa	4.4	1.7	-2.9
South Asia	3.2	8.1	5.5
Central America	12.9	8.3	4.3

<sup>a/</sup> Excluding China and Japan.

Military expenditures have continued to grow in Europe and North America, where the two major alliances face each other, and they are by far the highest in those regions. Moreover, their rates of growth accelerated during the 10-year period under scrutiny. The rest of the regional breakdown confirms the existence of various processes regulating the growth and decline of military spending, particularly in developing countries. The exhaustion of financial resources has an

almost immediate impact, in comparison with the previous levels of spending, on overall public expenditures, but on military expenditures as well. For instance, external indebtedness in South America obviously accounts for much of the indicated decline. In South America, the widespread return towards constitutional forms of government in the majority of countries has also brought about a reordering of priorities in favour of social and economic development, thus contributing to a gradual reduction of the military burden. In Africa, it is mostly the widespread natural and social crises which, because of the resultant scarcity of resources, have effectively halted and reversed any trends towards increases in military outlays. In some African countries, the growth of external debt has also contributed to curbing the growth of military expenditures. In Central America, the pervasive regional conflicts, in which external Powers have become involved, have fostered increases in military spending in spite of economic crises. In South Asia, continuing tensions and conflicts and pervasive overall instability, in part influenced by external involvement, have precluded the reduction of the military burden. In the Far East, covering in this classification both North-East and South-East Asia, the continuing subregional tension or conflicts, in particular in the Korean peninsula and in Indo-China, have helped to foster the continued accumulation of weapons in the arsenals of the main protagonists.

20. Political and military tensions are not always the overriding factor in accounting for the changes in military budgets. The Middle East is an example of a region where economic constraints have brought about a decrease in military spending in spite of serious and continuing confrontation between the States in the area. However, the resolution of military conflicts and political instabilities remains essential for any reliable and long-lasting arrangement for reducing significantly the military burden of countries involved in conflict.

21. The scrutiny of relative military burdens, expressed as the percentage of GDP allocated to military expenditures, reveals huge differences between individual countries. <sup>15/</sup> Although not in every case, the militarily significant States have, on the average, higher relative military burdens than other industrialized countries. An average member of the military alliances, for instance, excluding the two major Powers, allocates 3 to 4 per cent of its GDP for military purposes, while an average neutral country allocates 2 per cent. Among developing countries, the relative military burden may vary between zero and, in exceptional cases, 25 per cent. It is often close to zero in the poorest countries, which simply are not able to fund a military build-up, higher in semi-industrial countries, which may have embarked upon the development of their own armaments industry, and highest in countries involved in ongoing wars. It is not only external influences and involvement in external conflicts, but also domestic turmoil, that tend to push the relative military burden upwards. The point that high military burdens can be a consequence of domestic instability is validated by the empirical finding that the military hostility in the immediate geographical region and the degree of ethnic cleavage within a nation comprise the two most powerful factors in explanation of the share of a State's GDP that is allocated to military expenditures. <sup>16/</sup>

C. Nuclear weapons

22. The nuclear revolution has increased the destructive power of military weapons to a new order of magnitude; the present stockpile of nuclear weapons contains over 1 million times the explosive power of the Hiroshima bomb. Quantitatively, it is believed that there is a total, over all, of at least 50,000 nuclear explosive warheads of all types in the world. The nuclear revolution has also created the military artifacts of the technological age, including strategic submarines, bomber aircraft and missiles carrying nuclear warheads. Until nuclear weapons are eliminated, they will continue to be a threat to civilization.

23. The nuclear-arms race has both a quantitative and a qualitative dimension. The quantitative arms race can be measured by several indicators, such as the number of delivery vehicles and warheads, while the qualitative arms race is manifested in the technological modernization of weapons. Nuclear weapons are heavily concentrated in the arsenals of the two leading military Powers, whose competition has fuelled the strategic arms race. In other words, the vertical proliferation and sophistication of nuclear weapons have dominated over their horizontal proliferation to an increased number of States. In the quantitative measurement of the strategic forces of the Soviet Union and the United States, the numbers of launchers and warheads are the most relevant measures. In 1986, the distribution of launchers - ICBMs (inter-continental ballistic missiles), SLBMs (submarine-launched ballistic missiles) and heavy bomber aircraft - and of warheads was as shown in table 4.

Table 4. Strategic nuclear weapons of the Soviet Union and the United States, 1986

	<u>Launchers</u>		<u>Warheads</u>	
	<u>Soviet Union</u>	<u>United States</u>	<u>Soviet Union</u>	<u>United States</u>
ICBMs	1 398	1 017	..	2 117
SLBMs	922	648	..	5 760
Bombers	160	324	..	3 343
Totals	2 480	1 989	10 000	11 220

Source: The Soviet data were obtained from Pravda, 23 January 1987; the United States figures have been derived from SIPRI Yearbook, 1986, pp. 72-73.

The strategic picture provided by table 4 has been relatively stable since the late 1970s, except for an increase in the number of strategic warheads, which has continued to grow up to the time of writing. Since the early 1980s, a most

important development has been the addition to the arsenals of the great Powers of large numbers of strategic cruise missiles carrying nuclear warheads. As of the autumn of 1986, the United States had 120 B-52 bombers equipped with strategic air-launched cruise missiles, potentially containing a total of 2,400 warheads. <sup>17/</sup> By the same time the Soviet Union had equipped a total of 53 heavy bombers to carry strategic nuclear cruise missiles. <sup>18/</sup> In overall quantitative terms, it is evident that an approximate strategic parity effectively prevails between the Soviet Union and the United States. In addition to strategic weapons, the two leading military Powers have many other types of nuclear weapons in their arsenals, ranging from intermediate-range weapons through tactical nuclear weapons to battlefield nuclear artillery shells.

24. The three other nuclear-weapon Powers - China, France and the United Kingdom - have also continued to expand and modernize their nuclear arsenals, and these also contain various types of weapons. China is reported to have about 20 ICBMs and 26 SLBMs, with one warhead each. Some 100 of its bombers appear to have a clear-cut strategic capability. France has a minimum of 80 SLBMs, carrying altogether 160 warheads. The United Kingdom has 64 SLBMs, all equipped with two warheads, bringing the total number of strategic warheads to 128. All three nuclear-weapon States have active plans to modernize further their nuclear forces over the next 10 to 15 years. <sup>19/</sup> China continues to develop its nuclear-weapon capability, including its SLBM component, and seems also to be heading towards a multiple independently targetable re-entry vehicle (MIRV) capability. France has at present a fleet of six strategic nuclear-powered ballistic missile submarines (SSBNs), which it has started to equip with multiple-warhead M-4 missiles. The United Kingdom has modernized its Polaris submarine-launched ballistic missiles, deployed in four SSBNs, by the introduction of the Chevaline re-entry system. The net result of these and future developments indicates an increase in the sophistication and number of nuclear warheads controlled by the three secondary nuclear-weapon Powers.

25. The continued growth of nuclear weapons, whether through vertical or horizontal proliferation, is of concern to all. Halting or reversing this growth will depend upon the faithful implementation by States of all of the provisions of the Treaty on the Non-Proliferation of Nuclear Weapons (non-proliferation Treaty) and of relevant provisions in other international treaties. These provisions include further measures of nuclear disarmament as well as the obligation to facilitate the fullest possible exchange of technology to meet the development needs of non-nuclear countries as regards access to and the use of nuclear technology for peaceful purposes. The Group of Experts noted the appeal of the Third Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons to all States regarding the universality of the Treaty.

26. The modernization of nuclear weapons is based on technical innovations which require the testing of nuclear explosives and their delivery vehicles. Nuclear-weapon tests are also said to be needed to maintain and confirm the reliability of existing warheads. Over time, the pace of nuclear explosive testing has increased slightly: in the period from 1971 to 1975, 190 tests were estimated to have been conducted, while between 1976 and 1980, 225 were carried out, and in the period from 1981 to 1985, there was a further slight increase to 240 estimated

nuclear tests. 20/ According to its official national information, the Soviet Union conducted 76 nuclear tests during the period from 1981 to 1985. 21/ During the same period, according to SIPRI, the United States was estimated to have carried out 83 tests, China 3 tests, France 38, and the United Kingdom 6. 22/ The Soviet Union initiated and, from August 1985 to January 1987, adhered to a unilateral moratorium on all nuclear explosive testing. It was not joined by the United States, which continued testing, particularly as a part of its strategic modernization programme, or by any of the other nuclear-weapon States.

27. Negotiations for a comprehensive test ban were, practically speaking, dormant during the period from 1981 to 1986, both at the bilateral level and, despite the question appearing each year on the agenda of the Conference on Disarmament at Geneva, at the multilateral level. The pressure to conclude a comprehensive test-ban treaty has increased in various international forums, however, and, in particular, several non-nuclear-weapon countries have taken concrete initiatives to urge the nuclear Powers to work towards a comprehensive test ban by, *inter alia*, offering to make seismic facilities available on their terrain for the verification of such an agreement. Following several rounds of exploratory discussions that started in mid-1986, during the autumn of 1987 the Soviet Union and the United States agreed to undertake negotiations on a stage-by-stage approach towards a test ban, starting with the elaboration of improved verification related to two previous bilateral treaties between them, known as the threshold test-ban Treaty (1974) and the peaceful nuclear explosions Treaty (1976), with the aim, as a first step, of permitting their ratification. The two States then expect to seek further limitations on testing in parallel with reductions in strategic weapons, leading to the ultimate objective of the complete cessation of nuclear testing as part of an effective disarmament process. 23/ The actual negotiations commenced on 9 November 1987 at Geneva.

#### D. Military use of outer space

28. In addition to civilian applications, the space environment has long been used for military purposes in two major contexts, namely, satellites for verification of agreements and other reconnaissance, including targetting information, and satellites for communications and other, similar functions. Thus, the question of the prevention of an arms race in outer space hinges on the possible introduction of weapons into that environment. This is already precluded for nuclear and other weapons of mass destruction by various international agreements, in particular the 1967 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (outer space Treaty) and the 1979 Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (Agreement on celestial bodies), although other instruments are also relevant, including the 1972 bilateral Treaty on the limitation of anti-ballistic missile systems (ABM Treaty).

29. With advancing space technology, however, by the early 1980s the possibility of introducing high-explosive and anti-satellite weapons in various forms into space led to initiatives from various quarters in the United Nations to preclude such developments, including a draft treaty by the Soviet Union that would ban the

stationing of weapons of any kind in outer space. 24/ The general Western approach was rather more specific, focusing primarily on anti-satellite (ASAT) weapons systems. Since 1982, the Conference on Disarmament has had an item on its agenda entitled, "Prevention of an arms race in outer space". Despite the continued existence of differing views and approaches on the issue, the General Assembly, during the 1980s, has generally been able to amalgamate diverse draft proposals into single resolutions on the question, which have been adopted by overwhelming majorities.

30. The potential economic and social consequences of any further militarization of outer space, should preventive efforts fail, would focus on the enormous costs and possible destabilizing effects as well as on the negative effects on global security of an arms race in that environment. Current controversy on the matter involves numerous technical, legal and procedural considerations, among them the relevance of space weapons in ongoing research on strategic defence systems, most notably the United States Strategic Defense Initiative.

#### E. Chemical and bacteriological (biological) weapons

31. The particular concern with chemical and bacteriological (biological) weapons arises from their extraordinarily lethal effects on living matter, which led to their categorization in 1948, along with nuclear weapons, as weapons of mass destruction. During the period since the previous report, the continuing importance of the 1972 Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction (biological weapons Convention) was reaffirmed by its parties at their Second Review Conference on the operation of the Treaty, which was held in 1986. Virtually all of the disarmament efforts in this subject area since the advent of that Treaty have dwelt, however, on the search for a corresponding international instrument covering the chemical weapons aspect of the question. These endeavours have been spurred in recent years, in part by growing evidence of the proliferation of these relatively easily produced weapons to additional countries and in part by the clear documentation by the United Nations of their actual use in ongoing armed conflict. 25/

32. Since 1982, when the Soviet Union submitted the basic elements of a future instrument in the Conference on Disarmament, and also since 1984, when the United States proposed a draft treaty, the multilateral negotiations on this matter have markedly intensified, and, following the summit meeting of the leaders of the Soviet Union and the United States, late in 1985, they have also included a complementary bilateral element. By the end of 1987, the detailed work of the Conference on Disarmament had registered considerable progress. In general, it was understood that, by the new instrument, all chemical warfare agents would be destroyed (thus precluding diversion to other uses); all chemical weapons should be declared, this to be verified upon the entry into force of the convention; and there would be verified closure and elimination of production facilities. Still not resolved were questions surrounding: the possibility of clandestine production; on-site inspection by challenge; the size, composition and order of destruction of stocks; the international implementation mechanism; industrial

control arrangements; and technological and economic assistance. In all, there have been encouraging progress and good will in the continuing multilateral negotiating process, which appears to have brought an agreement within reach, and the ongoing bilateral contacts should further enhance this prospect. But at present, the possibility of further use of these weapons in armed conflict persists.

#### F. Conventional weapons

33. Conventional forces consume the bulk of the world's military spending. This is not due primarily to the military expenditures of the non-nuclear-weapon Powers, but to the fact that, even in the nuclear-weapon States, conventional forces absorb some 80 per cent of all military spending. This means, in concrete terms, that the analysis of the socio-economic consequences of the arms race and of much of its social effects has to do with conventional weapons and forces. This requirement is enhanced by the fact that all the wars since the Second World War, exceeding 150 in number, have been waged by conventional forces; these have caused, according to various estimates, well over 20 million casualties, mostly in developing countries. <sup>26/</sup> Even now, the fourth most destructive war in the course of this century in terms of the number of its casualties is being waged essentially by the use of conventional weapons.

34. While the distinction between conventional weapons and nuclear weapons remains clear-cut, the relationships between these two classes of weapons are in many ways interlinked. The security and defence policies of non-nuclear-weapon States are affected by the global strategies of Powers possessing nuclear weapons. In the cases where these Powers are involved, their conventional forces and their strategies are perceived against the backdrop of the nuclear-weapon factor. In Europe in particular, the introduction of nuclear forces has created a need to prepare for more rapid mobilization, thus having an effect on the potential escalation of military crises. Therefore, attention continues to be focused on ways to reduce the risk of war in Europe and to create a more stable security environment.

35. As already noted, technological advances in conventional weapons have been great in terms of their military efficacy. In particular, a whole array of guided weapons have emerged which can hit various targets with a very high degree of reliability, while minimizing unwanted collateral damage and the extravagant consumption of explosives. On the other hand, the various technologies and resultant weapons systems involved are complex, very expensive and highly demanding in terms of training and maintenance. Hence, these advances are often not appropriate for developing countries or at certain lower levels of conflict. In general, where applied, they have not obviated the unexpected, but they have served to increase the level of violence and overall destructiveness of conventional armed conflict, both in the offence and the defence. Military research and development towards still more advanced weapons continues, however, as discussed below.

36. The effective reduction of the economic burden of military spending clearly requires the limitation of conventional forces, including limitation in the qualitative sense. A regional approach is often perceived as appropriate in

efforts aimed at inducing States to reduce their conventional forces in a verifiable and mutually acceptable manner. The reductions may concern military matériel, deployments, personnel and expenditures. 27/ In the European context, several efforts have been made to negotiate troop reductions between the military alliances and to develop confidence- and security-building measures to enhance stability and the pre-conditions for the limitation of conventional and chemical as well as nuclear arms. In the case of confidence- and security-building measures, tangible progress has been made both in the Final Act of the Conference on Security and Co-operation in Europe (CSCE) of 1975 and in the Final Document of the first phase of the Conference on Confidence- and Security-building Measures and Disarmament in Europe, which was agreed upon in Stockholm in September 1986. Since 1986, the need for the two major military alliances to reach more concrete results in the limitation of their conventional forces in a broader forum has become apparent. A forum to meet this recognized need is being developed by the States concerned.

#### G. Military research and development

37. The momentum, direction and cost of the present arms race are greatly affected by the increasing technological sophistication of weapons systems. They become more accurate, versatile and effective. This development makes the weapons more usable by military criteria, but also more prone to technical deficiencies and even breakdowns. The versatility of weapons systems also fosters political suspicions about their real, as opposed to their declared, intended functions in a crisis. Technological progress is at the heart of the arms race, in both the nuclear and the conventional areas. Technical innovations, be they civilian or military, are products of large private and public research institutions and industries, which have to be productive in order to survive in a world of competition. The urge to innovate in an industrial system is a necessary pre-condition for the qualitative arms race to continue unabated. The technological impulse alone, albeit important, is not, however, a sufficient pre-condition for the continuation of the arms race: it requires deliberate political decisions as well.

38. Global expenditure on military research and development (R and D) in current dollars in 1980 amounted to more than \$35 billion, accounting for roughly one quarter of all expenditure in R and D at the time. 28/ Real expenditures on military R and D increased more rapidly from 1980 to 1984 than military expenditures in general. 29/ It is very difficult to reach generally agreed figures in the area of global R and D expenditures, especially those which are for military purposes, because of the lack of comparable definitions, incomplete methods of estimation and the secrecy involved. It has been suggested, however, that the global military R and D had increased to about \$80 billion in current dollars in 1985, 30/ representing, in real terms, an approximate 80 per cent increase over 1980.

39. World military R and D is more confined to a smaller number of countries than any other military resource, reflecting a pattern of heavy concentration of high technology. It has been estimated that the six leading spenders on military R and D are responsible for a minimum of nine tenths of the world's military R and D expenditures. 31/ The relative impact of the military component in

national R and D systems varies considerably from one country to another, even within this group of six countries. The national organization of military R and D and its links with the rest of the national research system also show considerable variation. 32/ Military R and D has been closely linked with technological revolution in the countries extensively involved in it. On the average, it relies much more on scientific and engineering skills than on general manufacturing activities. The three most research-intensive sectors, i.e., missiles and spacecraft, electronics, and aircraft, all contain a substantial military component. In other research-intensive sectors, the military factor is less conspicuous, but plays a certain role in ordnance and accessories, professional and scientific instruments, and engines and turbines. 33/ Military R and D and overall technological development cannot be dissociated from each other.

40. Military R and D shapes the arms race and society in many different ways. It creates an increasing demand for resources, both financial and human. It contributes to the complexity of weapons systems. Instead of single weapons, the present military establishments of leading Powers rely on complex systems, or "families of weapons", which are integrated by electronic communications and control links. Such technological development not only transforms military establishments, but also calls for more comprehensive and self-sufficient institutional arrangements. At the upper end of the spectrum, it can even reduce the possibilities of human control, since some battle decisions may be made rapidly by high-speed computers. This may increase the risk of war by accident or miscalculation.

41. The exploratory research programme of the United States, called the Strategic Defense Initiative (SDI), is an illustrative example of new tendencies in this upper spectrum of military R and D activities. It is a major project, which has mobilized a large part of the American scientific community to perform research on its individual subprogrammes. While SDI is a complex group of technical programmes, it also has a political dimension. It has been contended that the "size and duration of this effort imply the creation of enormous vested interests against programme changes". 34/ In general, for any country the bureaucratic and technological momentum behind comparably complex main weapons systems for a country engaged in military R and D tends to create vested domestic interests, which make them difficult to disband even if this is desired. Legitimate arguments for dropping such projects, once they become embedded, may include the recognition of economic necessity, impracticality, negative security or stability implications, or the advent of better alternative systems to meet the original military requirement; but all of these tend to generate counter-arguments from the supporters of the original programme.

42. As a general trend, R and D expenditures account for an increasing share of the total costs of new weapons systems. Such expenditures are not dependent on the number of weapons produced, but are determined rather by the technological concept and the institutional arrangements underpinning the R and D work. This situation has two consequences: unit costs are increased and, as a corollary, a smaller number of weapons can be produced for a given sum of money than before. R and D expenses are a central factor in the rise in costs in the military sphere, not only because of the development costs, but also because of the higher rate of obsolescence in the military sector in comparison to the civilian one. Therefore,

to cut down unit costs and their impact on prices, arms-producing countries have actively promoted weapons exports as a means of increasing production runs. The present pattern of arms production requires exports, which are constrained, however, both by domestic political factors and by the slackening of demand abroad. While the latter is mainly due to economic factors in the recipient countries, the evolution of their political considerations also has a limiting effect. This reflects a change from the late 1970s and early 1980s.

#### H. Arms industry and production

43. The international armaments industry is concentrated and hierarchically organized. The bulk of arms production is controlled by a small group of countries and, as a rule, the more technologically sophisticated the weapons system, the fewer the producers. The hierarchical pattern exists in both the developed and some developing countries and in the global system as a whole. The leading arms producers are found in the two military alliances and are not only producing for their national needs, but also for their allies and other customers. In general, the existence of a large military to provide an adequate market, combined with sufficient national income and a sizeable population to support the necessary infrastructure, is necessary for a State to produce major weapons systems over the long term, as well as to achieve the requisite quantity and sophistication of the product. <sup>35/</sup> In addition to these factors, one should note the need for a sufficiently high level of technological development. It has also been observed that the availability of foreign exchange is an important pre-condition for the development of an armaments industry. <sup>36/</sup> Foreign exchange is needed in order to acquire arms, initially through importation, and, once domestic production has started, to support it through the import of foreign components and materials.

44. The hierarchical pattern and the internationalization of arms production are interrelated. Industrial market economies have, as a rule, developed their own domestic arms industries, although in the smaller countries their scope and autonomy are limited. Exports of arms and military technologies are often extensive, and account for a sizeable share of domestic production. In Western Europe in particular, a transnational network of co-production agreements has emerged in an effort to pool resources and to use them more rationally. In the centrally-planned economies, there is also extensive arms production, but the degree of transnational co-production and the export of weapons systems are more limited. Among developing countries, arms industries are concentrated in a relatively small - although growing - number of countries. Most of them rely on imports, except perhaps for the production of small arms and munitions. The leading arms producers among the developing countries have also become exporters in their efforts to support the cost of the industrial infrastructure, to increase production runs and to reduce unit costs. With few exceptions, the process of internationalization in the armaments industry covers only the industrial countries and the few leading producers among the developing countries.

45. After the decision has been made to start the domestic production of arms, there are several stages on the way to an indigenous production capacity. Imported arms are maintained domestically, licensed production is started in domestic facilities, imported components are assembled locally, components are

produced at home, mostly out of imported inputs and, finally, these inputs, raw materials and intermediate products become mainly of domestic origin. These stages are usually complemented by various sub-contracting and co-production arrangements, which may be part of compensatory commercial agreements known as "offsets". 37/ The process is asymmetric in that it starts from the military industries of industrialized countries, dominated by a few major companies, and penetrates into the incipient armaments industries of the industrializing countries that make the decision to embark upon domestic production. These countries implicitly accept new forms of dependence on the technological inputs of leading industrial countries. Domestic production, although based to a degree on imported raw materials and intermediary inputs, is conceived by new producers as an assurance against arms embargoes posing a potential threat to their national security.

46. Military industry reaches into several aspects of standard civilian industry in significant ways, but also constitutes a semi-autonomous subsystem in the industrial system of production. 38/ In market economies, this subsystem is more closely tied with the public sector than with industries outside it, as the military sector is in fact the sole purchaser of its products. This special relationship is conducive to the emergence of interest coalitions between the military institutions, legislators and arms manufacturers. These coalitions and the special nature of the military industry make competition imperfect, and the usual standards of efficiency and productivity do not always apply to the production of arms. In market economies, efforts have been made recently to foster competition among the prime contractors for major weapons systems. 39/ Governments may still shelter arms manufacturers against foreign take-overs, but generally push them towards greater competition with each other in order to increase their efficiency and to reduce macro-economic arms production costs.

47. In every country involved, whether a market or a centrally-planned economy, the existing military industry is a central part of the defence base. The degree of mobilization of this base is defined by two, potentially contradictory, requirements: the seriousness of the perceived military threat and the national economic capacity to sustain the costs of accelerated military production. Economic and resource factors are always a constraint on increased arms production, independently of the perceived threat. However, such a constraint operates differently in different types of economic systems. In a market economy it is adjusted primarily by fiscal policy; in a planned economy it is adjusted by the State as the pivotal planning agent in charge of apportioning resources between the civilian and military sectors. A distinguishing feature of the military industry, particularly in planned economies, is the central role of the State in the allocation of raw materials, technical knowledge and skilled manpower. 40/ In all major industrial Powers, both in market and planned economies, the production of arms and military technology have some specific economic consequences. That is why any analysis of macro-economic performance and industrial development that does not consider the impact of the military industry is at best deficient and, at worst, misleading.

48. The overwhelming proportion of arms production has been and remains in industrialized countries. The lack of suitably compiled global data and the problem of precisely defining armaments make the estimation of its value extremely difficult, but it can be said that the global value of arms production amounted to

some \$200 billion current dollars in 1986. One of the changes in the structure of the international armaments industry over the past decade and a half has been the emergence of a selected group of active arms producers in a number of developing countries. It has been estimated that, while in 1970 the total value of indigenous arms production, at constant 1975 prices, amounted to \$68 million, the corresponding figure for 1984 was \$635 million - both small amounts indeed in the global picture, but showing significant growth. 41/ Similarly, the value of licensed production of weapons in developing countries was costed, at constant 1975 prices, in 1970 at \$274 million and in 1984 at \$1,147 million. The rate of growth of arms production in the relevant developing countries was not evenly spread over the period indicated, but was rapid throughout the 1970s, and came to a virtual standstill in the 1980s. In addition, in the 1970s the rate of growth of indigenous arms production in general in those countries was more rapid than that of licensed production. 42/

49. The costs are quite high for any country entering into the military industry. In order to embark upon arms production, the country must have a relatively strong manufacturing sector. Traditionally, domestic arms production has been designed as a strategy for the substitution of imports and for economic and industrial development. 43/ More recently, newly industrializing countries, relying on export-led industrial growth, have deliberately started to develop military production as a part of their manufacturing sector. In one study, the countries involved as of the beginning of the 1980s are divided into four categories on the basis of their overall record in the manufacture of arms. The first category comprises those large or relatively advanced countries which have a diversified and sizeable production of arms. The second group includes a similar small number of countries producing in most, but not all, categories of weapons systems. The third group also produces in several categories, but does not have substantial capacity for indigenous development. Finally, in the fourth group, comprising a larger number of developing countries than the others, there are some isolated projects, but no comprehensive arms industry. 44/ According to the same analysis, 29 countries outside Europe and North America are considered to have at least some indigenous arms production. That leaves about 100 developing countries that have no indigenous arms production worthy of mention.

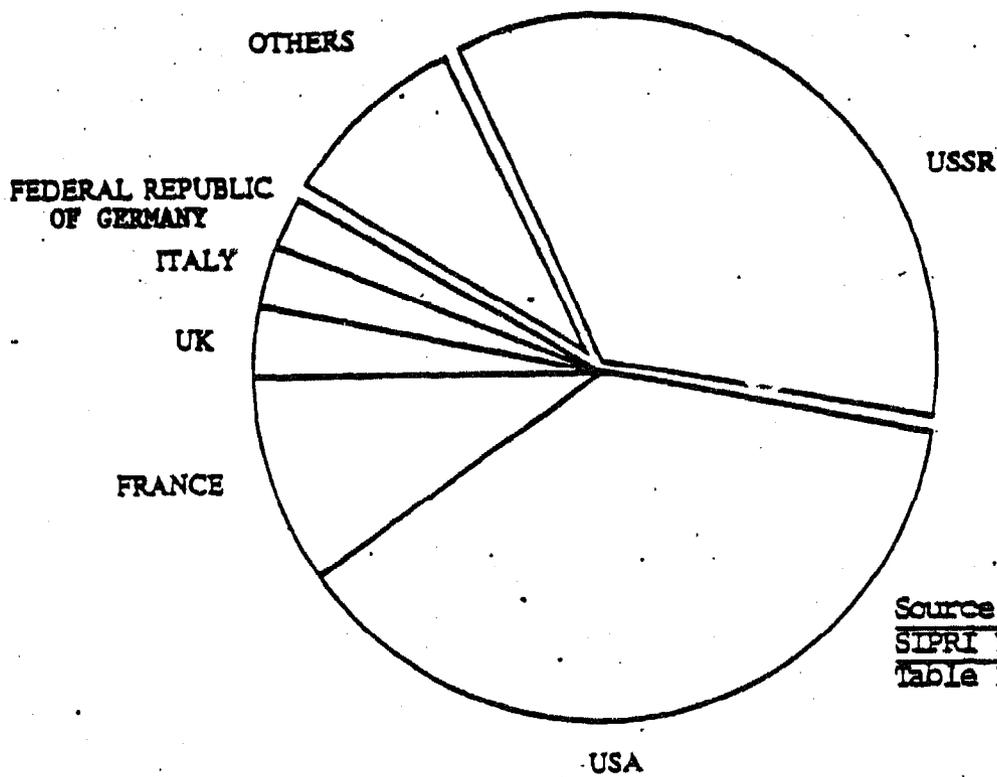
50. There are two basic strategies for the development and procurement of arms: self-sufficiency and international co-operation. Security considerations call for a self-sufficiency that is supposed to be achieved, with the support of the State, by establishing national production facilities and by utilizing foreign military technology and hardware indigenously. This strategy has been pursued, in particular, by planned and import-subsidizing economies, although it is undermined by the escalation of costs and the rapid pace of technological progress. In very few, if any, countries is the domestic arms market big enough to support a self-sufficient military industry; hence, integration with the world market, in terms of both exports and imports, is increasingly a necessity. Global technological advancement, pushed forward by major Governments and by transnational corporations, is so rapid that any purely national effort to develop and produce weapons systems lags behind in the light of ever-advancing military R and D. For that reason, arms-production strategies based on self-sufficiency and indigenous production lost their appeal in the 1980s, while those based on international co-operation in the production of arms became increasingly dominant. 45/ On the

other hand, in major weapons systems, the continued internationalization of research, development and procurement is to a great extent imposed on the national actors by the increasingly integrated global market-place, since these actors must keep up with the ongoing modernization process.

### I. Arms transfers

51. International arms transfers cover a great variety of transactions in which both governmental and non-governmental actors are involved. It is almost impossible to establish the full extent of arms transfers owing to the lack of information and differences in criteria and in the methods of compiling statistics. Furthermore, the determination of prices of weapons transferred is a difficult task because the arms trade is often managed politically rather than conducted in a competitive market. The value of arms transfers in a given year also depends on whether the estimate is based on agreements concluded or on actual deliveries. Estimates have been made, however, on the annual value of international arms transfers. It has been suggested, for example, that, in 1986 at current prices, the total value of arms transfer agreements between industrial countries and developing countries amounted to \$29.2 billion. That is well below the peak years of 1980 to 1982, when (adjusted to 1986 prices) the annual value of agreements was in the vicinity of \$58 billion. <sup>46/</sup> In the period from 1981 to 1985, some two thirds of the international arms transfers went to developing countries, with suppliers' individual shares varying from 44 to 96 per cent of their total deliveries. <sup>47/</sup> However, major arms suppliers also delivered considerable amounts of weapons and military technology to their allies and, in a few cases, to neutral countries. Such deliveries often reflect an effort to standardize the weapons systems within the alliances and may be associated with collaborative transnational projects to develop and procure weapons systems for common consumption or for export. In recent years, the role of private arms traders, as well as various types of intermediaries, has increased. They have entered the market in the hope of private gain by delivering weapons to States embroiled in wars. A concomitant of this tendency has been an increase in various types of clandestine arms deals. In both cases, the nature and means of international arms transfers have become more complicated and the problem of the responsibilities of the parties involved in the transactions has been clouded by uncertainty. A very approximate picture of the main arms suppliers in the international transfers of major weapons can be illustrated by the following figure.

Figure I. SHARES OF WORLD EXPORTS OF MAJOR WEAPONS, 1978-1982



Source: derived from  
SIPRI Yearbook 1983,  
Table II.1, p. 269

Source: "Study on conventional disarmament" (A/39/348), para. 70.

52. To obtain a more dynamic picture, one should observe the pattern of rise and decline in the real value of international arms transfers. Arms transfers grew quickly in the middle and late 1970s, and especially in the period from 1979 to 1980, as the increase in oil prices transferred purchasing power to oil-exporting countries. This, together with the prevalence of inter-State conflicts in the Middle East, has resulted in about one half of all the transfers of major weapons to developing countries ending up in that region, while the rest are quite evenly divided between South and Central America, North Africa, sub-Saharan Africa, South Asia and the Far East and Oceania. 48/ Since the early 1980s, the real value of international arms transfers has decreased, primarily because of the world-wide economic recession, the growing indebtedness of most developing countries, and declining oil prices, which have of necessity reduced the demand for weapons. 49/ The choice between military needs and civilian priorities is now more delicate than in the latter half of the 1970s. While the decisions taken vary from one country to another, in many of them, both military and civilian projects have been cut back. As a consequence, the arms imports of many developing countries have stagnated, especially in large parts of Africa and Latin America, and their share of total imports of major weapons has been gradually decreasing. 50/ For exporters, the golden period of easy sales of the late 1970s and early 1980s has ceased to exist.

53. The shrinking of the international arms market has, however, helped the traditional leading suppliers to recapture their previous market share, which had started declining by the late 1970s and into the early 1980s. This proportional decline evolved while, year by year, newly industrializing arms producers were increasing their arms supplies to other developing countries. Available data show that this trend has stopped and, since the mid-1980s, has even reversed, notwithstanding some exceptions. In some cases, the supplies involved were re-exports of arms purchased from industrialized countries, but most often they originated from a small group of new arms producers among developing countries. 51/ In real terms, these arms deliveries amounted annually to some \$50 million in the latter half of the 1970s and to over \$200 million during the first half of the 1980s. 52/ In some cases, this sudden growth of arms exports was due to the ability of new producers to turn out rugged and reliable weapons systems, such as armoured vehicles and trainer aircraft, which were more suitable to the local conditions than the highly sophisticated, technology-intensive weapons produced by leading industrial countries. Most developing countries do not have sufficient infrastructure and skilled manpower to operate and maintain technically advanced weapons. For that reason, scores of technical experts have to be contracted from the countries of origin to perform these tasks. Modern weapons systems are, in other words, artifacts of another technological culture and often cannot be transplanted to a different socio-cultural environment without both practical and symbolic frictions.

54. In any event, in the late 1970s and in the early 1980s, the overall demand for military hardware was rising rapidly. Governments started rearmament programmes and non-producing countries increased their imports. The aircraft industry was particularly burgeoning. At the current time, the situation is changing. Budget deficits are constraining the growth of military budgets and governmental orders for aircraft and other major weapons systems are levelling off. This has led, together with growing development costs, to an increase in the unit costs, reducing

further the production runs of weapons systems. This means that the military industry, and the aircraft industry in particular, are facing, over the next few years, a period of readjustment. The trend towards concentration will continue, and the need to pool resources with other military contractors will increase. This will probably happen in both the domestic and the transnational contexts. Diversification into non-defence products, targeting at particular military niches, and a drive to restructure exports will be virtually inevitable responses of the arms manufacturers to the situation they are facing. 53/

55. The high technology content of major modern weapons systems means two different but related things: only a few countries can produce and supply such weapons and even they must be able to export arms because they must recover at least a part of their development costs. The technological and economic imperative to export is accompanied by domestic political pressures, associated with employment in arms production facilities or with foreign policy objectives. In such circumstances, the limitation of conventional arms transfers is not regarded, by many Governments, as a desirable goal.

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56. From the foregoing assessment of the dynamics of the arms race in its various aspects, it can be seen clearly that it continues to be a global phenomenon. In its nuclear aspect it remains a threat to civilization, and in all of its manifestations an extremely complex, multifaceted problem, working against global peace and co-operation and generally hindering the enhancement of security and social welfare in all categories of States in all regions. This is still the case despite the many changes and new trends related to the characteristics of the arms race that have emerged since the period covered by the corresponding 1982 United Nations expert report. Among these changes is a clearer recognition of the fact that in the existing world of sovereign States peace and security are still unattained goals, and each State in one way or another has to provide for both its security and its other needs. This leads inevitably to the Governments of those States having to make deliberate decisions as to the application of limited resources to military security, on the one hand, and to civilian priorities, on the other.

57. The re-evaluation of the nuclear-arms race indicates that it has perhaps seen the "top of the mountain" reached and the beginning of a slow, still dangerous, downward path in terms of total numbers of nuclear weapons. This is evidenced by the conclusion of the bilateral Treaty between the United States of America and the Union of Soviet Socialist Republics on the Elimination of Their Intermediate-Range and Shorter-Range Missiles, as well as the tenor of their ongoing bilateral negotiations, particularly those through which they are seeking verifiable reductions in their strategic nuclear weapons. Yet, crucial issues remain unsolved in terms of questions posed by, inter alia, qualitative modernization among the secondary nuclear-weapon States, the possibility of horizontal nuclear proliferation, and the continuation of nuclear testing.

58. As to consequences of the other aspects of the arms race, ranging from its influence in:

Advancing military technology, thus making weapons ever more sophisticated;

Greatly intensifying and prolonging regional armed conflict, constantly increasing casualties and adding to such conflict the use of chemical weapons;

Increasing the costs and the dispersal of technologically advanced, increasingly destructive conventional weapons;

Creating the demand for an immense research and development effort;

Negatively affecting economic growth, international indebtedness and possibilities for improved social development and human well-being;

Changing the patterns seen in the armaments industry and arms transfers;

the picture has not shown any clear net improvement. But in all of these aspects, changes have clearly occurred through the mid-1980s, with steps forward in one place, steps backward in another. There is little evidence of change, however, in terms of the military desire for modern arms or of the governmental will to sell them.

59. For instance, at the global level, constant dollar military expenditures have continued to increase. In places where they have declined, this appears to have been due primarily to necessity dictated by economic decline and indebtedness. Military R and D and resultant technical advances continue to divert, at least in the short term, ever larger numbers of scientists from civilian activities and greatly increase the unit costs of weapons. This in turn gives an increased incentive for exports as a means both of increasing production runs and of limiting the effect of these cost increases. And, although arms transfers have decreased, except in areas of conflict and in the context of private transactions, this too reflects changes necessitated more by economics than it does a by-product of improved international relations. In sum, it must still be said that the arms race has a self-perpetuating, dynamic characteristic of its own.

## CHAPTER II

### RESOURCES AND THE ARMS RACE

60. The arms race requires several different types of inputs, ranging from natural and human resources to sophisticated technologies and financial assets. National military institutions and individual weapons systems mix these inputs in widely different ways. Hence any generalizations on the nature and magnitude of resources absorbed by the arms race are subject to uncertainties and require constant re-evaluation. It is obvious, however, that the arms race is a significant factor in the diversion, both nationally and internationally, of resources that might otherwise be available for social welfare and economic development. As most of the world's resources are scarce, there is a continuing competition between civilian and military priorities. Because of the changing nature of the arms race over time, its demand on different types of resources has not been at all constant. Technologies and human skills to apply them have become increasingly relevant for the development of modern weapons, while the requirement for minerals and other traditional natural resources has relatively diminished. In fact, for a number of them, cheaper and more durable substitutes have been created in laboratories. In addition, differences in the character of national military establishments over time have made the quality of resources and the efficiency of their use more important and their quantity less so. The military establishments are, in other words, keeping pace with the overall economic and technological development of societies.

#### A. Natural resources

61. Natural resources are extensively consumed by the arms race and military production. Even though the importance to the military of individual raw materials varies considerably, there is no doubt that there is a close connection between the national and international resource systems, on the one hand, and national military requirements on the other, as explored in great detail in the previous report. <sup>54/</sup> This relationship is, however, most complex and varies over time. Any serious effort at the analysis of the military aspects of overall resource allocation and consumption has to recognize the many aspects and kinds of resources and of their sources, costs, qualities and kinds of usage - in other words, the many factors that constitute resource systems. In such systems, physical and biological factors interact with social and economic organizations and developments over time, which, in turn, define the resource allocation strategies applied. The social organization of resource systems that shapes these strategies is also subject to change through the introduction of new policies.

62. The military factor in the use of natural resources is one characteristic of the present system affecting the overwhelming majority of countries. Especially pertinent in this connection are the multilevel relationships in the arrangements for production, allocation and utilization of national resources both within and between nations and, consequently, the significance of national resource endowments. The patterns of national consumption of resources are highly

asymmetric, with the less developed countries generally using lower levels by far. 55/ The military use of natural resources further reinforces these asymmetries, as their consumption and, in many cases even more so, their sources and their production, are strongly concentrated. It is not at all exceptional for as few as three countries to account for one half or more of the known reserves, production and exports of a given mineral. Such a high concentration of mineral supply hints at monopolistic behaviour and oligopolistic arrangements in the form of export cartels and other marketing and market-sharing deals. 56/

63. Concentration in the supply of strategic natural resources translates into the dependence of consumers of these resources upon their suppliers. In various analyses of the dependence issue, the vulnerability of highly industrialized countries is often stressed. Such a dependence is said to be especially critical because of the need of those countries to obtain strategic natural resources to maintain their quantitative edge in the military realm. The dependence of the leading market economies on external sources of particular natural resources is indeed a fact that has become more and more evident over time. The resource endowment of the Soviet Union is more comprehensive in this regard than that of other countries, including the United States. In fact, the Soviet Union is reported to be dependent on the import of only a few minerals. 57/

64. This dependence on the external supply of strategic minerals has often given rise to quite exaggerated conclusions, however, suggesting that the developing world has gained control over a strategic artery of the industrialized countries. Closer inspection reveals that, in the overall group of some 35 strategic minerals, the developing countries have significant control, i.e., more than two thirds, of the strategically significant reserves, only in bauxite, cobalt, lithium, columbium, tantalum and tin. 58/ In addition, it should be observed that only a few developing countries are in a position to control the reserves and production of the minerals that fall within the strategic group. In fact, the great majority of developing countries are heavily dependent on the import of natural resources, often more heavily than the developed countries. The low level of consumption of these resources by developing countries has meant that their vulnerability to external supply disruptions has not become a major international issue, however, whether such disruptions are a result of the inability to pay or of the political reluctance of the supplier to deliver. The only manifest exception is oil. In this case, non-oil-producing developing countries have been more strongly affected by the efforts of the oil exporters to gain higher prices than industrialized countries.

65. While sufficient coal used to be recovered indigenously in most countries, oil, since becoming the most widely used fuel, has had to be imported from other regions, in particular from the Middle East. As the industrial growth of the United Kingdom, and later on of the United States, became increasingly dependent on oil imports from that region, it was defined as possessing strategic importance. The dependence of most industrial societies on foreign sources of oil in both their civilian and military operations has increased the need to protect those sources and the relevant international trade and transportation routes against any incursions by adversaries. Naval strategies and other ways of projecting military force have been considerably influenced by the oil needs of the modern industrial society. 59/ Many developing countries have also become highly dependent on oil

imports. Because of their overall economic vulnerability and military weakness, however, developing countries seldom resort to unilateral military efforts to alleviate their predicament. While every military machine is dependent on the availability of oil, the absolute amounts needed in industrial countries are many times greater than in developing ones and may therefore elicit more drastic political and military actions.

66. The scarcity of non-renewable raw materials, energy and land create tensions and conflicts. Such a scarcity is not so much natural as man-made; it is a consequence of the unsustainable forms of development. According to the World Commission on Environment and Development, unsustainable development pushes individual countries up against environmental limits and thus major differences in environmental endowments or variations in usable land and raw materials may precipitate and exacerbate international tensions and conflicts. 60/ Such conflicts are already a reality. In developing countries, they may have a territorial aspect in that the direct dependence of man on land and water, and their harvests, have pushed national or subnational collectives into rivalries with one another. In many civil wars and border wars, resource scarcities have been a catalyst of hostilities. Industrial countries do not, as a rule, have similar mutual tensions over resources, and certainly not to the same degree. None the less, sometimes the resource factor can be discerned as a motivation for their external interventions and even their military strategies. Such interventions may often jeopardize rather than secure the availability of oil and raw materials. Stability of supply could be better assured by the development of long-term relations rather than military coercion and intervention. This consideration has not, however, reduced the importance of oil as a lever of foreign policy in either producer or consumer nations. 61/ While the international competition for resources generates tensions, it seldom leads directly to major cross-border resource wars. 62/ More often States conduct low-level internal conflicts with indigenous peoples in efforts to expand or extend the production of oil and minerals, including uranium, to those peoples' traditional lands. Such efforts, intended to promote individual gain and ensure supplies, may threaten both the future of indigenous populations and the ecological balance. Thus the need of civilian and military industries for energy sources and raw materials creates complex chains of impact, extending into both the international system and local societies. As a consequence, an interconnected, transnational resource system has emerged. The requirement of military security has been used as an argument for the maintenance of national control in this transnational system. Such control is manifested in a variety of political and contractual arrangements between producers and consumers, in stockpiling policies, and in the development of synthetic and other alternatives.

67. The military consumption of natural resources, as already suggested, is not immune to technological progress. Historically, economic growth has demanded ever more raw materials in order to keep the machine of production going. The dependence on raw materials and the intensity of their use correlates with the level of income and the historic time and pattern of industrialization. This means that, in the future, the consumption of general-use metals will increase, in relative terms, more rapidly in developing countries than in the industrial world. One of the exceptions appears to be aluminium, which is less amenable to being replaced by substitutes than most other metals and continues to be needed also by

the industries of developed countries. Hence aluminium and other light and specialty metals reserves will attract transnational mining companies for many years to come. 63/ These general tendencies in patterns of consumption will also be felt in the military industries. Those located in most industrialized countries will need, in relative terms, less heavy general-use metals and larger quantities, and more kinds of, specialty metals. Various critical metals may not be needed in any great amounts, but even the small amounts required may be difficult to obtain. Accordingly, the military use of natural resources is becoming increasingly a qualitative issue, and its political and strategic implications are bound to become more subtle than in the past. In some cases, no precise statistics on production and trade of specialty minerals are available.

68. The traditional pattern of military industrialization relied on the availability of such general-use metals as iron, copper, nickel and cobalt. The dislocations and inequities in their production, consumption and trade, as noted, have generated competition and tensions as well as politico-military strategies to secure their continued supply, and the possibility of resource wars between producers and consumers has typically made it logical to advocate conservation, increased equity in, and optimal use of, natural resources as measures leading towards a more stable and peaceful world. 64/ Those remedies are, of course, still valid, but they have had to be modified somewhat by the fact of the new trends. The shift sometimes to the use of rare specialty metals in the construction of weapons systems has already made State-based strategies for supplying necessary raw materials less relevant than before. The volatility of the international metals market has started to have an impact of a new kind on the operation of military industries. This is due, among other things, to the fact that some specialty metals have, because of the lack of information on their production and the expectation of economic gain, become objects of international speculation. 65/ The development of long-term strategies for controlling supply has thus become more complex: the monetary value of transactions to the supplier may be quite small, yet even a small amount of the metal may be technically pivotal for the industry.

#### B. Human resources

69. Military industries and establishments consume human resources by employing different kinds of manpower. Measurement of the extent to which the labour force is employed by the military sector is not easy. International comparisons of the effects of the military on employment pose further problems. 66/ Military employment covers several different types of activities ranging from the obvious involvement of conscripts, volunteers and career professional personnel on active duty through employees of military industries to researchers and engineers involved in military R and D. That is why, together with the inadequacies of data and the difficulties of comparison, any estimates concerning the overall military-related employment provide only rough magnitudes rather than exact numbers. Such estimates of the military use of manpower are accordingly rarely unanimously accepted, but they provide, at the least, an indicator of the extent to which human resources are devoted to military purposes. The previous report estimates that some 70 million people are employed in military activities world wide. Among them are 3 million scientists and engineers and 5 million production workers. 67/ This estimate of the total magnitude of human resources absorbed by the arms race is in substantial

agreement with a more recent estimate by the International Labour Organisation (ILO) that military-related employment varies in the range of 60 million to 80 million people world wide. The ILO estimate of the total number of production workers has, however, become higher, at 8 million to 10 million, accounting for 0.3 per cent of the world labour force. In industrialized countries, the share of the labour force supplying goods and services for military purposes is usually higher than in developing ones, ranging, in the former, from 1.8 to 2.7 per cent of the total. 68/

70. The ILO study points out that the number of personnel employed by the national defence establishments is, as a rule, fairly well known. Thus the United States Arms Control and Disarmament Agency has been able to estimate the total size of the world's armed forces at 29.0 million in 1984, while it had been 27.1 million 5 years earlier and 25.9 million 10 years earlier. According to the same source, the number of troops in the developed part of the world in 1984 was 11.0 million and in the developing part, 18.0 million. While this number has been practically unchanged in developed countries since 1974, it has increased in developing countries by 2.7 million troops. The growth has been most conspicuous in Latin America, Africa and the Middle East. In relative terms, the industrialized countries are, however, much more militarized than the developing countries: in 1984, the respective overall shares in the armed forces of the total populations were 0.98 and 0.49 per cent, although there were, of course, large differences from one country to another. In both cases, the relative burden of military manpower had slightly decreased over the most recent 10 years. 69/ In order to obtain a more precise picture of the extent of human resources involved in the military establishments, the number of reservists and paramilitary forces should also be taken into account. Comparisons of active and reserve components of the armed forces also provide an idea of their military functions and characteristics. The neutral countries of Europe are known to have large reserves relative to the numbers in their active duty forces (eightfold is an estimate), while in the countries that are members of the North Atlantic Treaty Organization (NATO) and of the Warsaw Treaty Organization, the active element is almost as strong as the reserve one: 1:1.6 and 1:1.4, respectively. 70/

71. Strictly speaking, there is no such thing as the military industry, in that in actual practice it draws upon several different branches of the national and international production systems. A basic distinction can be made between governmental defence employees, working either in military units or in military-related institutions, as opposed to employees in private or State-owned facilities producing goods and services for the military. The situation in a major military Power, the United States, can be illustrated by table 5. The extent of public military employment in the United States has remained essentially constant, although a slight increase can be discerned during the first half of the 1980s. Major changes have taken place, however, in the direct and indirect industrial employment of the labour force for military purposes. Since the changes in the United States appear to be applicable, at least to a certain degree, to other major industrial countries, they merit further analysis. The United States figure of 2.2 million people employed by the military industry in 1980 can be compared with a total of 1.51 million employed in arms manufacturing in the United Kingdom, France, the Federal Republic of Germany and Italy combined. 71/

Table 5. Military-related employment in the United States, 1977-1985  
(thousands)

	1977	1980	1985
Armed Forces	2 133	2 041	2 151
Federal civilian	1 263	1 243	1 322
Arms production	1 913	2 214	3 207
Total	5 309	5 498	6 680

Source: David K. Henry and Richard P. Oliver, "The Defense Buildup 1977-1985: Effects on Production and Employment", Monthly Labor Review, 1987, No. 8, p. 8.

72. Defence-generated jobs in the United States increased considerably from 1980 to 1985, owing, primarily, to its military modernization programmes. In relative terms, the share of military employment in the total employment figure increased from 5.3 to 6.0 per cent, and that of manufacturing from 6 to 9 per cent. In absolute terms, in manufacturing overall, employment decreased from 1980 to 1985 by almost 1 million jobs; this was cushioned, however, by the increase of 600,000 jobs in military industries. These jobs were created mainly in industries in which civilian orders declined considerably during the economic slowdown of the early 1980s, such as shipbuilding and aerospace. As a consequence, the dependence of these and several other industries on military contracts increased greatly. For instance, in the aircraft and parts industry of the United States, military-related employment rose from 30 per cent in 1980 to 60 per cent in 1985, while in shipbuilding, the corresponding increase was from 50 to 85 per cent. <sup>72/</sup> This information suggests that the military modernization programmes in the United States - and no doubt in other countries as well, albeit to a lesser degree - have not only increased employment in military industries, but have incidentally propped up ailing "smokestack" industries as well, during this period.

73. In the long-term perspective, an internal shift in military-related employment in industrial countries has also occurred. This is a trend from governmental employment to military-related industrial and services employment. In the United States, this change has been accompanied by the reduction of jobs generated by each 1 billion dollars of military demand, from 92,000 in 1972 to 85,000 in 1983 (the latter figure, incidentally, compares with an estimate of more than 93,000 jobs created by 1 billion dollars of non-military public spending). <sup>73/</sup> This observed trend towards less labour-intensiveness is due to the higher productivity and technology-intensiveness of the military-related services (R and D) and, in particular, of production of durable goods for final military demand on the one hand, as compared with more labour-intensive governmental employment in non-military-related institutions on the other. In the United

States, 48 per cent of military expenditure in 1984 went to buy durable goods as compared with only 8 per cent of non-military expenditure. Thus, while the share of durable goods in the GDP overall has declined, in military production it has continued to increase. This means that, in the United States economy, the heavy manufacturing of durable goods is now more dependent on military spending than before. The share of military spending in total final demand in 1983 was a high 10.6 per cent in durable goods and 4.4 per cent in services, but only 1.4 per cent in construction and 1.3 per cent in non-durable goods. 74/

74. A commonly accepted - yet still very approximate - estimate is that military R and D consumes 20 to 25 per cent of the global R and D budget and 10 to 15 per cent of the military expenditures of the two major Powers. The employment effect of military R and D is apparently in the same order of magnitude: of 3 million scientists and engineers working in scientific laboratories, some three quarters of a million, or 25 per cent, are pursuing military objectives in their work. 75/ Both the absolute and the relative figures are very high, and seem even more so when it is recognized that the scholars and engineers are recruited from the best educated and most talented pool of experts.

### C. Technology

75. Technology is a resource created by innovation. It is an integral part of the economic and political fabric of societies. That is why the development of physical processes and instruments also produces new political, social and psychological conditions as a part or consequence of a significant technological change. In a historical perspective, technological change has become increasingly scientific, complex and embedded in the national economic division of labour. In the origins of this process, the geographical and social scale of activities has expanded as a consequence of new technologies in transportation and communication. This expansion has been accompanied by the concentration of social influence in a small number of centres and an increase in the number of forms of hierarchical authority. Technology has long been embedded in both the expansion and concentration of power in international action. 76/ Military technology has been part and parcel of this historical development. Various waves of colonial expansion and control were underpinned by the most modern communication and weapon technologies of their time. The atomic bomb is also a product of technical knowledge and organization, which has brought the potential expansion of power and of destruction to its ultimate limits.

76. A critical issue is the relationship between the military and civilian paths of developing new technologies. There is little quarrel among the experts that the allocation of all available resources to the civilian R and D effort would be the most effective way of promoting economic development and competitive capacity in the international market. Such a solution is seldom feasible, however. International constraints and domestic interests almost always require the allocation of resources to the pursuit of security. Thus, the great majority of nations opt simultaneously for both military and civilian paths in developing their technology. The issue is the relative balance and the nature of the relationship between these two paths. In this regard, complex, differing tendencies can be discerned. On the one hand, military competition between the major Powers creates

specific technical requirements as to the performance and quality of weapons systems and their components. Such a tendency towards overspecialization and complexity leads to militarily specific technologies and expertise which have few if any applications in the civilian sphere. There are, however, on the other hand, only a few technologies in the military industry that are completely military-specific. The problem is rather one of the degree to which the military performance criteria hinder the transfer of knowledge and technology from the military to the civilian sector. 77/ A general conclusion is that the advanced specific technologies, organization and funding patterns of the military R and D process establish significant barriers to the operation of a civilian spin-off effect. This problem is aggravated by the secrecy of military R and D, particularly at its most advanced level. 78/

77. The tendency towards overspecialization and complexity in military technology is accompanied by the existence of interchangeable civilian and military technologies. It may be argued that the interchangeability has increased with the advances in the electronics, computer and communications industries. It has been pointed out, for example, that military electronics is an area in which links to the civil sector tend to be strong and, as weapons systems include more electronic equipment, the similarities between the production of weapons and that of civilian goods increase. 79/ In the electronics industry, the push behind technical progress in the 1950s and the 1960s emanated from military contracts. Military demand overshadowed civilian demand until the revolutionary advances in consumer electronics of the 1970s. The expansion of the civilian market then cut back prices and created a more symmetric relationship between the military and civilian applications. In the electronics and computer industries, military innovations have often been the catalyst of the broader application of the same technologies. As a consequence, in such new industries, the relationship between military and civilian applications tends to be different from that in more traditional fields of research and production. This conclusion should not, however, be pushed too far. Military technology still has several peculiar features - the need for back-up systems, for example - which preclude interchangeability with civilian technology in cases where built-in redundancy is specifically designed to resist battle damage, permit continued operation with battle damage, and enhance, for instance, the possibility of crew escape and survival if the weapons system is destroyed. Furthermore, there are signs in the new industries that military authorities, dissatisfied with civilian products, are initiating new specific projects for military applications of electronics and computer technologies. 80/ As a matter of fact, in leading industrial Powers in particular military intelligence and communications are relying on advanced technologies often designed solely for specific strategic uses. Such communications networks are separated from civilian communications in order to enhance not only their technical, but also their political reliability. Thus military communications are increasingly creating an invisible world of their own. 81/ A similar situation exists with regard to many aspects of space and space-related technologies.

78. The investment of human and financial resources in military R and D is not unrelated to the international economic position of States. Major Powers spend a disproportionate share of the world's military R and D funds. It is, however, misleading to consider their national investment in military research, development and procurement as a main cause behind patterns of domestic economic growth and

decline over time. It is generally agreed, though, that the civilian path of R and D would produce more commercial benefits in the world market. That route normally provides more flexibility in adjusting to new market situations and explicitly incorporates the factors of price and consumer preferences into its operation. The demand for the specific products of military R and D is limited, by comparison, in both the domestic and the international markets. Heavy reliance on such technologies is an omen of a future relative decline of a nation in the international economic system. Concentration on civilian and interchangeable civilian/military technologies, however, creates better opportunities for improving competitiveness and increasing market shares. 82/

79. The positive correlation between the level of technology and the level of military power is an aspect of the hierarchical nature of international relations. Among developing countries, only those that are semi-industrial have sufficient resources and infrastructure to embark upon the construction of an indigenous military industry. Moreover, the establishment of a domestic military R and D system and arms industry is not, as a rule, possible without the importation of producer goods and technical knowledge; thus it creates technological dependencies. Such dependencies tend to polarize domestic economic and social systems in any country, but particularly so in developing countries: the global tendency of unequal development is thus implanted in the national systems as well. 83/ This is evidenced by the policies of several arms-producing countries that are aimed at increasing the domestic component in military industries and building them more explicitly on domestic-resource endowments. Such a strategy seldom permits entry into the military markets of industrial countries - which are more or less closed at any rate - but it does allow arms exports to other developing countries, which often prefer systems that are more simple than those typically exported by the leading military Powers. Imports, rather than domestic production, of arms are favoured by many developing countries, which acknowledge that, for them, a resources-based development strategy is more appropriate than a manufacturing-based strategy. A resources-based strategy does not deny the need to establish an indigenous capital goods industry, but it aims to limit and control primary technological dependencies and to focus on a rational exploitation of domestic human and natural resources. 84/ Those countries opting for such a strategy are potential customers for weapons produced by other developing countries following an industrial path of development. It is not inconceivable that the emerging economic division of labour among developing countries will create new patterns of international exchange between industrial products, including weapons on the one hand and natural resources on the other. Such an exchange already exists, primarily between industrialized and oil-exporting countries.

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80. An analysis of the utilization of resources by the arms race shows clearly that it competes for natural, financial, human and technological resources that might otherwise be available for social welfare and economic development. Because these resources are not unlimited, choices must be made as to the degree of emphasis to be placed on their military and civilian applications in both individual countries and the international context. Technological resources, including their human input factor, have increased in importance for the military

in recent years, relative to natural resources. Military establishments have accordingly kept pace with the overall economic and technological development of societies.

81. The relationship between natural resources and the military aspects of their consumption is complex at both the national and the international level. In part, this is because strategic minerals, including some key ones, are unevenly concentrated. This leads simultaneously to requirements for external supplies and to possibilities for monopolistic behaviour trends among suppliers. Oil is particularly important to industrial societies for both military and civilian use, but also to many non-oil-producing developing countries. Scarcity and the non-renewable characteristics not only of oil but of many natural resources create tensions, including conflicts. Sometimes these involve indigenous peoples; at other times they lead to some form or degree of external intervention. It must, however, be noted that modern substitutes have been developed for some formerly critical minerals. Aluminium and small amounts of specialty metals are still essential, for example, giving rise to speculative financial activities.

82. Some 60 million to 80 million people world wide are in military-related employment, of which some 29 million in 1984 were in the world's armed forces. Of these, 11 million were in developed countries, and 18 million were spread among the much larger number of developing countries; at the same time, the developed countries remained much more militarized, employing in their forces, in relative terms, approximately twice the proportion of their populations. The military industry draws upon many branches of national and international production systems, requiring, in industrialized countries, large numbers of skilled workers. Between 1980 and 1985 non-military public spending clearly would have been able to create more jobs, however, than the prevailing levels of military spending. Return of these funds to the civilian sector would have been effective in creating new jobs. Moreover, military R and D consumes some 25 per cent of the global R and D budget and employs a similar percentage of scientists and engineers.

83. Technological progress creates new psychological, social and political conditions, particularly through innovations in transportation and communications. In this context, military technology in pursuit of security has kept pace; that is, nations tend to develop military and civilian technologies simultaneously. The question thus becomes one of apportionment and spin-off effects. While the latter are hindered in many cases by the specific nature of military requirements, this is not the case in all areas, for example, electronics. As to the R and D involved, it has been shown that the civilian path produces more benefits, particularly so in the world market as a whole. Considerable infrastructure as well as imports of both raw materials and components are required for a country to embark upon the development of a military industry. Thus, dependency on existing producers arises. Several among a modest but growing number of significant new arms-producing countries aim at progressively increasing the domestic component of their output; these producers are often able to export rugged, reliable lower-technology military products to developing countries. These factors are leading to new patterns of international trade in arms.

## CHAPTER III

## MILITARY OUTLAYS AND SOCIO-ECONOMIC DEVELOPMENT

A. General considerations

84. The relationship between disarmament and development has been widely accepted for a long time. Many scholars believe that there is an inextricable linkage between military spending and development. At the same time, there are others who believe that these concepts must be qualified, in the sense that sustained economic growth can occur only in a secure environment, requiring an adequate defence establishment. They also argue that disarmament by the industrialized countries and development in the developing ones are not directly related. The relationship between disarmament and development, which is the one most referred to, is regarded as positive. While a high level of military effort absorbs scarce resources from alternative civilian uses, disarmament could readily provide a new pool of resources that would not otherwise be available: resources released through disarmament can be used to promote social and economic development. The linkage between military spending and development is thus regarded as largely negative: extensive military spending is seen as undermining the economic basis of growth and development, thus contributing to economic stagnation. And even though some types of military spending can make a positive economic contribution in the short term in some economies, it is generally not as positive as most types of civilian public spending and its ensuing long-term economic impact is almost invariably negative.

85. These negative consequences of over-armament are succinctly stated in the Final Document of the International Conference on the Relationship between Disarmament and Development:

"The continuing arms race is absorbing far too great a proportion of the world's human, financial, natural and technological resources, placing a heavy burden on the economies of all countries and affecting the international flow of trade, finance and technology, in addition to hindering the process of confidence-building among States. The global military expenditures are in dramatic contrast to economic and social underdevelopment and to the misery and poverty afflicting more than two thirds of mankind. Thus, there is a commonality of interests in seeking security at lower levels of armaments and finding ways of reducing these expenditures." 85/

86. One should be careful in drawing conclusions on the empirical relationship between military spending and development. This relationship varies from one group of countries to another and over time within each group. General categories such as developed and developing countries or market and centrally planned economies are useful in disaggregating the international system into sub-systems where the relationship between military efforts and development can be properly scrutinized. However, such categories are still crude and there may be considerable internal variation among the countries of the various categories. Furthermore, the umbrella concepts of "military effort" and "development" can be made operational by several different indicators. In the case of development, such indicators as investment,

economic growth, socio-economic equity and satisfaction of basic needs can be used. The correlation of such variables with indicators of military effort yields a set of results whose range of variation is probably quite large. Bearing these caveats in mind, any findings on the relationship between military effort and development have to be interpreted with care and in their proper contexts. 86/

87. Military expenditure data are usually too inaccurate to permit their analysis for reliable spatial and temporal comparisons. Therefore they cannot capture satisfactorily the real extent of military forces, in terms of weapons procurement and personnel, nor can they measure the economic effect of the military sector. In order to complete the partial information they can provide, various indicators have been proposed, corresponding to both of those considerations. Some of these are based on numbers of military personnel and others on the military share of gross national product (GNP). The GNP method, in spite of its numerous deficiencies, seems, at present, the least objectionable indicator when the purpose is to find a quantitative estimate of the defence burden in individual countries to permit rough comparisons. 87/

88. A traditional economic interpretation of this indicator is supported by the analytical concept of opportunity costs. The opportunity cost of military spending simply expresses how many units of other spending alternatives (such as education, health or social welfare) must be given up to create one additional unit of defence, or how many units of such alternatives could be created by giving up one unit of defence. Such reasoning presupposes that military spending is a substitute for social and other expenditures and computes the effect of an increasing or declining amount of military expenditures in terms of their possible alternatives. This method can be used in different ways. One of the simplest is to apply it to decision-making on different types of spending in governmental budgets, at least if the various possibilities can be treated as substitutes. This exercise should be considered in the light of the beneficial objective that could be achieved by redirecting a given amount of military outlays for alternative social purposes.

89. A very general picture of how the total amount of resources has been allocated for military and particular non-military objectives usually regarded as important can be obtained from a statistical breakdown of national governmental budgets between various objectives (see table 6). Because of the acknowledged general nature of this picture, the very rough divisions it portrays and the vast number and variety of programmes and activities necessarily grouped in the right-hand column, it is not useful for any detailed analysis. However, some observations on it are interesting and appear to corroborate other sources. Military allocations have increased in relative terms from 1978 to 1984 in industrial countries, while they have decreased - also in relative terms - in developing countries. A key question here is whether the military spending was a substitute for, or a complement to, civilian expenditures in the period 1978-1984. A conclusive answer cannot be discerned, as any change in a total governmental budget may affect the mechanisms of allocation between military and civilian spending. However, the possibility of a trade-off in industrial countries between military and civilian public spending is suggested by the information in the table. More detailed research has revealed a tendency for military expenditures to affect negatively the

satisfaction of basic human needs, but has also revealed that such a tendency is not invariable. <sup>88/</sup> One must also keep in mind that social objectives, such as health care, education and housing, can also be fulfilled from reductions in expenditures outside the military field, for example, in lower-priority governmental projects and in private consumption.

Table 6. Allocation of governmental budgets between military, selected non-military and other purposes a/  
 (Percentage)

	<u>Defence</u>		<u>Social security</u>		<u>Health</u>		<u>Education</u>		<u>Other purposes</u>	
	1978	1984	1978	1984	1978	1984	1978	1984	1978	1984
Industrial countries	13.5	15.0	37.7	36.8	11.2	11.5	5.1	4.0	32.5	32.7
Developing countries	15.4	13.4	16.1	16.1	4.4	4.2	10.8	9.8	53.3	56.5
World	13.9	14.6	33.3	32.6	9.6	9.8	6.4	5.3	36.8	37.7

Source: Data taken from Government and Finance Statistics Yearbook, vol. 10, (Washington, D.C., International Monetary Fund, 1986).

a/ It should be borne in mind that, owing to concurrent fluctuations in GNP among both industrial and developing countries as well as globally, a percentage change up or down does not necessarily indicate a corresponding absolute change.

#### B. Impact on economic development

90. The pivotal dispute as to whether military spending encourages or prevents economic growth has now been largely resolved. For most countries, there is a trade-off between military spending and socio-economic development. <sup>89/</sup> Although the initial purpose of military spending is to provide for defence needs, recent research supports the contention that, in the short run, some types of military spending, once they have been given a political priority, stimulate demand and hence employment in military-related industries in certain economies and foster other economic activities. Over the long term, the budgetary opportunity costs of defence, however, become greater and more apparent. For example, in the short term, if there is excess capacity or insufficient demand, military spending can have a multiplier effect by generating the required effective demand; but in the longer term, it may make growth suffer considerably by crowding out productive

investment. 90/ The opportunity costs of military spending can be explored both by looking across nations or at development over time within individual nations. These two approaches tend to yield different results.

91. Analyses over time of industrial countries indicate that in several periods economic growth has coincided with an increasing military burden. 91/ The direction of causality in such studies between military spending and economic growth, however, remains unclear and, in addition, there are many confounding factors in the relationship between economic growth and military spending in individual countries. 92/

92. Several studies on the long-term effects of military spending covering a cross-section of industrial countries have uncovered and stressed the pivotal importance of productive investment. Usually, military expenditures have a positive impact on manufacturing output owing to the governmental purchase of capital goods for the armed forces. On the other hand, military expenditure has been high and investment low, for example, in the countries members of the Organisation for Economic Co-operation and Development (OECD) during most of the period since the Second World War. A causal relationship between high military effort and low investment may be assumed here, because military spending inevitably and directly reduces the amount of capital available for investment. The declining rate of investment undermines, in turn, the basis of economic growth, leading to its deceleration. Another effect is the tendency of military production to absorb resources that could be used to promote export-led growth. Thus there is a substitution effect between military spending, on the one hand, and investment of a kind that promotes productive capacities and, as a consequence, overall economic growth, on the other. 93/ Such a negative relationship between military expenditures, on the one hand, and capital formation and aggregate economic growth rates, on the other, clearly holds true for most of the countries in the OECD area. 94/

93. A substitution effect between investments for military production and civilian development exists also in centrally planned economies. Their need to strengthen the defence infrastructure and maintain a reliable economic, scientific and technical balance has called for a considerable economic effort. The impact has been the allocation of capital resources to the development of military branches of industry and to the establishment and maintenance of an industrial, scientific and technical basis to ensure the production of complex, technologically advanced modern weapons systems. Accordingly, their military programmes have created comparably heavy economic burdens and have channelled human, financial and natural resources away from productive uses and narrowed the investment base in the civilian sector over most of the post-war period. 95/ Other research has observed some of these trade-off effects in various consumer programmes, in particular housing construction and the production of durable consumer goods, both of which have been hindered. However, it has also been noted that in typical centrally planned economies the social security system has been effectively sheltered against fluctuations in military spending. 96/

94. While the existing pool of economic resources in developed countries softens the adverse impact of the military effort on welfare, it is often pointed out that in developing countries the impact of military spending is not only heavier but is more critical on welfare than on growth. 97/ On the other hand, the marginal conception of the opportunity costs of military spending discussed above is not very dependent on the level of national income. This helps to explain why, regardless of their current levels of development, all societies engaged in a steadily high or increasing military effort are pre-empting resources that could, and otherwise would, be utilized for civilian productive ends. 98/ This observation is borne out by several empirical studies concerning the relationship between military spending and economic development among developing countries. According to these studies, the relationship between military expenditures and economic growth, however, varies according to the level of development in these countries: for countries with the highest income the association may even be positive, while for middle- and low-income countries it becomes progressively more negative. 99/ The positive short-term results of military spending, as a form of public spending, derive from modernization effects, including technical progress and the creation of new demand. These effects are often overshadowed, however, by military spending, resulting in negative allocations in other respects. It adversely affects the rate of saving and, as a consequence, curtails investment indispensable for growth and development. 100/ Accordingly, the pivotal mechanism in the impact of the arms race, that is, the suffocation of investment for social and economic development, clearly exists in both developed and developing countries and appears to be worse in the least developed ones involved.

95. The marginal changes in military spending in both developed and developing countries are engendered by a variety of factors. Among them, the involvement of countries in internal and external wars has an obvious marked effect on the military burden. The control of the Government by the military also appears to lead to a higher level of spending than is found in countries under civilian rule. 101/ The long-term opportunity costs of high military spending, whatever the reasons, are almost invariably negative: the adverse allocation effects cannot be balanced by any variety of positive consequences for any considerable length of time. There is, however, considerable national and regional variation. 102/ The budgetary opportunity costs of a high level of military effort are obviously highest in countries that are also undergoing an economic crisis for other reasons and can thus ill afford additional costs incurred from military programmes.

### C. Impact on human resources

96. Military employment is not an effective solution to the problem of unemployment. The relationship between military spending and employment is, however, complex and has to be placed in an appropriate context for its meaning to be fully grasped. A difficulty in this regard is that the situation varies considerably from one country to another and from one industry to another. The very definition of military employment is not necessarily easy. Besides the employment in military institutions themselves, various forms of military-industrial employment have to be considered. For example, attention should not be paid only to major military contractors, because the neglect of

sub-contractors would distort the picture. The sub-contractors and the parts suppliers employ, as a rule, fewer professional and technical staff, and more production workers than the main contractors. 103/ This situation has not been changed by the fact that independent contractors, at least in the United States, have left the defence market. This tendency has been balanced out by the effort of major military contractors towards vertical integration, that is, the effort to extend their direct control over sub-contractors. They have also increased their procurement of components from other countries, especially those components which can be produced by standardized processes and, as a consequence, by less skilled workers. 104/ This transnationalization of the armaments industry, including sub-contracting, further complicates the direct measurement of the effects on employment of military production. Nowadays, weapons systems mix human, financial and technological inputs from a variety of countries and sectors of their economies. Although military-related employment to some extent is spreading world wide under the aegis of transnational corporations, the core research, development and production processes are retained under national control, particularly in cases in which critical technologies are concerned. 105/

97. In general, evidence from national studies does not support the idea that high military spending is necessary for full employment. On the contrary, military spending may contribute to unemployment by reducing public expenditures in labour-intensive sectors. This is due to the tendency of military spending to provide fewer industrial jobs than alternative modes of employment. Such trade-offs can be best explored by rather specific models focusing on individual industries or regions or even specific weapons programmes. 106/ A specific approach to the employment effects of military spending would tie the issue more closely to the problem of conversion - the changeover, discussed below, of military industry to the production of civilian goods and services - which is not only a national, but also a local concern. On the other hand, general cuts in armaments and armed forces could release resources for civilian purposes, either by reallocating them through the State budget or by reducing taxes and generating employment through greater private investment and consumption.

98. With regard to the end-purpose of production, military versus non-military production does not in itself determine the effects on employment: these effects are dependent on other factors. That is why defence-dependent industries, such as shipbuilding and ordnance, may create as many jobs as, or even more jobs than, non-defence-dependent industries such as the production of motor vehicles. However, the general tendency is for establishments dependent on military contracts to employ fewer persons per unit of money invested in them. This is due to two different factors. In major industrial countries there is, first, a relative employment effect in switching from governmental employment in the armed forces and military administration to employment in the production of military hardware and services. Thus, from the employment point of view, the shift from governmental jobs to industrial and other related occupations reduces the number of employment opportunities. However, by the second factor, this shift creates better-paid jobs and otherwise privileged groups of workers and professionals. The importance of military-related jobs for the aggregate employment is, in other words, that in relative terms it decreases employment: it may also make it more costly. 107/

99. In the military industries, as in civilian industries, the employment effect is dependent on the technology- and capital-intensiveness of the production processes. The time of industrialization is a factor. In the old industries, such as shipbuilding and the metals industry, military production may have a role in protecting jobs. Government funding of military contracts may help these industries to survive. Otherwise they could be undermined and ultimately destroyed by international competition in productivity and effectiveness. On the other hand, such a politically motivated allocation of resources may slow down the emergence of new entrepreneurial industrial branches in which qualified engineers and a skilled labour force would be needed to ensure that the civilian market is not conquered by foreign competitors. Thus, the structural effects of allocating scarce resources to military spending may indeed have counterproductive consequences in leading industrial countries. Military spending in such a case affects the growth of productivity indirectly by the negative long-term impact it can have on investment and technology policies. 108/

100. As a rule, the employment requirement is smallest in technology- and knowledge-intensive military industries, including the production of aircraft, communications equipment and missiles. 109/ In comparison to "smokestack" industries, these industries are new. Shifts from the old to the new may cause employment problems that could be aggravated by the strong and still growing tendency of military production to favour the new technologies. It is a well-known fact that the employment requirements of alternative public spending are higher in numerical terms than those in military spending. 110/ That is why the release of resources from the military sector would improve rather than weaken the employment of the national labour force. It should be borne in mind, however, that military employment is quite heavily concentrated both by region and by occupation. This is another factor that would create practical obstacles, though not insurmountable ones, in the effort to convert the labour force from military to civilian activities. Such obstacles have to be squarely faced, however, because both structural changes in the military industries and agreements on arms reductions call for measures of readjustment. In this context, a political constraint in market economies on the creation of new public-sector employment opportunities should be kept in mind. If the expansion of public employment is not politically feasible, alternative employment would have to be created, either in the new industries or in the service sector where there is still a demand for more labour. The most constructive arrangement would be to transfer the highly skilled labour force of the military industry to advanced civilian production, where it would not only be of direct benefit to the economy nationally, but would also contribute to the national capacity to compete in the international market, thus providing a long-term benefit.

#### D. Impact on technology

101. Technological advances in the civilian sector in aeronautics, electronics, computer science and space research, as well as in the chemical and biological fields, have obvious military applications. In this sense there is no question that the development of civilian technology makes an extensive contribution to the military industries. In present conditions, the military use of R and D is, as a

matter of fact, inconceivable without the existence of the civilian infrastructure for research, development and production. Most civilian technologies are dual technologies in that they have potential applications in the military sector as well.

102. It is also obvious that a corresponding reverse relationship exists, but it is somewhat more complex as many of the military technologies are specific in terms of their end use and do not readily have civilian applications. This has traditionally led to the conclusion that the spin-off effects of military R and D are at best limited and sometimes non-existent. 111/ This conclusion, though justified, may have to be modified in the present conditions. This is primarily because of the new prevalence of electronics, biotechnology, chemical engineering and other new technologies in industrial products. The need for the application of output in these fields in all modern production systems tends to blur the borderline between civilian and military applications of a given technology. 112/ That is to say, they have come to differ more in their end purpose than in their intrinsic technological character.

103. Any discussion of the spin-off effects of military R and D must accordingly distinguish between the civilian contributions to purely military products and to dual technologies. The latter have obviously spread more effects to the civilian sector than the purely military R and D efforts. It has also been suggested that large exploratory military R and D projects, whose military objectives are only loosely defined, have more likely spin-off effects than the development of weapons systems defined within strict parameters. 113/ The question of spin-off effects has two distinct aspects. Firstly, there is the specific aspect, which pertains to the spill-over of technical knowledge from the development of an individual weapons system to civilian applications. Secondly, there is a general aspect to the spin-off effect, which must be left to be judged by individual States. Ultimately, the question is whether the direction of national technological development is dictated by the needs of defence or by the needs of development. Various national studies suggest that the growth of military, space and nuclear industries is, in part, an unintended consequence of overall modern technological growth. Yet, there is also a clear-cut political and military element in the expansion of those industries, which, accordingly, is not necessarily shaped to enhance the well-being and social improvement of peoples or even to enhance security itself. 114/ Given that the security of nations can be adequately guaranteed, the needs of the people would be better served by reallocating military R and D funds, both in developed and developing societies, to civilian purposes.

104. Military R and D, as pursued by the major Powers, has expanded from small development projects into mega-projects, which may swallow tens of billions of dollars. They integrate several kinds of research institutions and thousands of scholars and engineers in order to pursue either a specific weapons system or only a loosely defined military concept. The social and economic benefits of such mega-projects are debated. Their defenders argue that the results of, for instance, the strategic defence initiative (SDI) programme outlined in chapter I can be commercialized to expand markets and generate profits for a broad spectrum of industry. There is, indeed, little doubt that various mega-projects benefit the companies most closely involved in them in the short term, as the State infuses an abundance of resources into those companies.

105. The large-scale national consequences of military projects is a more complex issue. It has been pointed out, with justification, that military secrecy hampers the effective transfer of technical knowledge from the military to the civilian sphere. In addition, military R and D puts its main emphasis on the performance of a technology. As already noted, the performance criterion and the need for redundancy have particular relevance in the military environment, where a given weapons system has to try to compete and survive against adversarial systems, but these criteria are secondary issues in the civilian consumer market, where price is a major consideration. 115/

#### E. Impact on inflation

106. It is often assumed that military expenditures are one of the salient causes of inflationary pressures. The relationship between military expenditures and inflation is, however, not easy to gauge. It can be made clear by the application of the three standard concepts of the theory of inflation: cost-push inflation, demand-pull inflation and monetary inflation. The cost-push theories of inflation assume that there are characteristics of military production that autonomously push towards higher rates of inflation. One such characteristic is the oligopolistic nature of the military market and the common use of non-competitive contracting practices that give the leading arms manufacturers a chance to charge prices that an open market could not bear. 116/ The rapidly growing costs of weapons technologies in the international arms market are also inflationary and result both from the structure of the military industry and from the qualitative nature of the arms race. This suggests that a further reason for cost-push inflation may be the prevalence of performance criteria in evaluating weapons technologies and in deciding on their acquisition. One must, however, keep in mind that the increase of production costs inherent in the development of new weapons systems is not identical to inflation. The dynamics of the arms race is the cause of the production of different and more advanced weapons that are not identical to previous ones. While this is actually product improvement, the emphasis on performance and technical quality in the military competition with adversaries none the less makes the ever rising cost of specific weapons technologies a further issue. These combined factors make it virtually certain that the costs associated with new programmes will be high. 117/

107. If military expenditures are increased without an equivalent reduction in other official or private expenditures, and especially so when production capacity is fully utilized, an upward pressure on price levels will prevail. There is evidence that, in some periods, rises in military expenditures were not compensated either by increases in taxes in order to reduce private expenditures, or by reductions of other governmental expenditures. This normally leads, mutatis mutandis, to inflation and certainly so if there is full employment. The same is true when budget deficits, which are usually in part the result of high military spending, are not financed out of domestic savings, but rather by increases in money supply or imports of capital. The increased money stock will then inevitably force up prices. These demand-pull and monetary aspects of inflation are very general in nature. They apply to all categories of expenditures, irrespective of whether they are official or private, military or civilian.

108. In industrialized countries the rate of increases in production costs, whether by a combination of concepts of inflation or through product improvement, has been much more rapid in the military sector than in the economy as a whole. This has created specific military problems. Together with the emphasis on military performance, these problems have made it impossible to produce aircraft or any other high-technology weapons systems in the same numbers as before. Quantitatively, each generation of aircraft, for example, is manufactured both at higher programme costs and in fewer numbers than its predecessor. This is a squeeze that is difficult to avoid. On the other hand, as noted, arms manufacturers have been trying to retain at least some of the economies of scale by increasing the export of weapons. During the 1980s this has become increasingly difficult because of the declining demand for weapons among developing countries. 118/ The rising cost of military production is difficult to compensate for except through reorganizing and cutting back military spending or spending elsewhere in the economy. These solutions are difficult to implement, however, either because of political obstacles or because of the perceived economic irrationality of reducing employment and consumption in an already deteriorating economic situation.

109. On the basis of the arguments described in the previous paragraph, it is clear that if States increase their military spending without taking compensating measures in other parts of the economy, then inflationary pressures will prevail. 119/ Moreover, the rise in the cost of the production of new weapons systems tends to be an impetus for a general inflationary process. For some States, developed and developing, there is evidence that in some periods the increase in military spending was one of the factors directly responsible for inflation. One cannot say, however, that it was the only cause of the process, because a direct comparison with the situation in the absence of such an increase is not possible on an individual case basis.

#### F. Impact on financial flows and indebtedness

110. The escalation of budget deficits in recent years has been a central problem in many developed and developing countries. These deficits have been brought about by a multitude of factors, including the volatility of currency markets, changes in the world market prices of petroleum and other commodities and domestic economic policies. In most countries, military programmes have not been a central ingredient in the expansion of budget deficits. The situation varies, however, from one country to another, defying any easy generalization. In leading military Powers there are examples of how the combination of extensive military programmes and lenient taxation policies have contributed to a fiscal crisis. This suggests a major incompatibility in governmental policy. In the long term, the deficits cannot be financed without debt, which has to be funded from both domestic and international sources.

111. In the case of developing countries, most of the debt has to be sustained from foreign sources. Since the mid-1970s, these sources have been more and more often consortia of private international banks instead of public international organizations. In all countries, and in particular in developing countries,

deficit financing creates inflationary pressures, which, in turn, give rise to further needs to borrow from abroad. Domestic arms production requires, in order to reach a take-off point, the infusion of considerable public money into the infrastructural facilities and the development of weapons systems and for this reason it tends to add to budget deficits. Arms imports contribute, in turn, to a negative trade balance, thus adding further to a need to borrow. Especially in the early stages of indigenous arms production, the need to import weapons remains. In addition, arms-producing countries have to purchase from abroad intermediary inputs that are not available from domestic suppliers but that are needed in the production process. These two types of military efforts, arms manufacturing and arms imports, although they are by no means the main causes of external indebtedness, contribute to the deterioration of this economic phenomenon. Import-intensive arms production and arms purchases have thus increased the external debt burden and brought about trade-offs with other possible uses of scarce resources.

112. The expansion of arms sales in the 1970s was largely financed by credits from supplier countries. The international arms market has from that time onwards been characterized by increasingly intense competition between the major suppliers. In order to succeed in that competition, some supplier countries have allocated large export credits, up to as much as \$5 billion, to the most lucrative customers. By the end of the 1970s, more than one half of all arms imports into developing countries were being financed by export credits. It has been suggested that the opportunity costs of military credits amount to 20 to 30 per cent of all inflow of real debt to developing countries. In the absence of arms supplies, the net transfers of debt would have been smaller by that proportion by the late 1970s. 120/ This figure may be compared with the estimate that the total accumulated military debt amounted, in the period 1972-1982, to \$86 billion, accounting for some 15 per cent of the total debt of developing countries in 1982. The expansion of debt was due to the increase in arms transfer credits from an annual figure of \$2 billion to \$3 billion in the early 1970s to some \$10 billion in the early 1980s. 121/

113. Heavy military spending may have also structural effects contributing more indirectly to the growth in external indebtedness. Military expenditures undermine, by reducing investment and R and D, the foundations of export orientation in the national economic strategy. This results in a lopsided economy that has to be propped up by importing capital to finance both the governmental deficit and the effort to enliven the export economy. Budget deficits tend, in other words, to reduce resources available for private investment or to permit maintenance of this investment, while external debt tends to grow. In both cases, the end result is an increase in external indebtedness, either through deteriorating export performance or through an outright increase in foreign borrowing. Thus, military expenditures, as a component of budget deficits, undermine the efforts to ameliorate the economic dilemma to which they have themselves contributed. 122/ Such a structural dilemma and the efforts to resolve it create social costs, particularly for wage earners, who may even be mobilized against a Government that is simultaneously applying austerity measures. The efforts of a civilian Government to resolve the foreign debt crisis may, in other

words, foster political instability resulting from the social consequences of such austerity measures, making the transition from a military to a civilian Government very difficult. 123/

114. The impact of arms acquisitions on external indebtedness varies considerably, however, from one country to another. In countries with abundant foreign exchange, military expenditures are not necessarily a major constraint on civilian public spending and economic growth. On the other hand, in countries with scarce foreign exchange the constraints on the establishment and maintenance of a viable arms industry are formidable and can be managed only by borrowing more and more. Furthermore, in such countries, the availability of funds for investment is a significant determinant of economic growth. 124/

115. The squeeze caused by external debt is felt especially by those countries which have based their economic strategy on the export of commodities. The debt crisis of the 1980s has been associated with the fall of commodity prices and the simultaneous rise of interest rates during the first half of the 1980s; in order to obtain foreign exchange to service their debt, the commodity exporters have saturated the international market, although the demand has been sluggish. Moreover, they have experienced increased protectionist measures in trying to expand their exports and even competition among exports within the economies employing the same strategy. While indebted countries may have exported more of their commodities, their aggregate export revenues may none the less have declined. In this way, the debt crisis has aggravated the commodity problem; simultaneously there has been a paralysis of international action to solve it. 125/ In these circumstances, those developing countries which had formerly tried to finance their arms purchases by commodity exports have now faced particularly severe problems of structural adjustment and debt service. This is one of the reasons why they have recently reduced their arms imports.

116. The international credit squeeze provides a partial explanation of declining arms transfers from industrial to developing countries. Scarce foreign exchange resources have made it difficult to maintain those excessive levels of imports of military weapons and equipment. Some analyses suggest that in order to circumvent this obstacle, the trade partners have resorted to various types of counter-trade. In general, the preference for barter is not, however, necessarily due only to the scarcity of foreign exchange. It may also reflect an entrenched governmental policy in favour of counter-trade no matter how scarce or abundant the coffers of foreign resources are. As a matter of fact, counter-trade has often been favoured because of the political, economic and technological commonalities it fosters between the sellers and the buyers. 126/ In general, however, reductions in imports of armaments have been positive in many indebted countries because of the reordering of priorities connected with the return to democratic régimes.

117. Indigenous arms production and arms imports have contributed to external indebtedness, but its main causes usually lie elsewhere. Such causes include the reduction in certain types of capital imports, increases in capital flight in some countries, high interest rates, and the expenses of servicing the debt itself. In 1976-1983 Latin American countries alone paid \$173 billion to service their external debt. 127/ The year 1982 was the turning-point in Latin America's

financial position. In 1973-1981, the net transfer of economic resources to Latin American countries amounted to \$10.2 billion. In 1979-1981, the net transfer of resources was still positive, at the rate of 13 per cent of the value of exports. In 1982-1984, however, the negative transfer of resources hovered around 25 per cent of exports and significantly drained the economic resources of the South American continent. The net transfer of resources from Latin America was a negative \$18.9 billion in 1982 and increased to the vicinity of \$30 billion annually in the years 1983 to 1985. 128/

118. The magnitude of the problem facing the Latin American Governments was increased by the convergence of both internal and external policies of stabilization and adjustment policies. The efforts to overcome internal economic disequilibria, caused by inflation and recession, became associated with the transition to constitutional government in several Latin American countries. The restoration of the domestic economic equilibrium was an important concomitant of such a transition. It had to be implemented, however, in the context of external pressures to overcome external disequilibria, associated with deficits in the balance of payments. Instead of gradually reallocating resources to ameliorate external disequilibria, swift measures to cut back public expenditures, especially in social programmes, were required by international economic institutions and were largely implemented, in the absence of viable alternatives, by the Governments of the indebted countries. 129/

119. In comparison with the Middle East, the relative burden of arms imports to Latin America has been smaller. The Middle East has been, in effect, the leading importer of arms during the past two decades or so. Oil revenues or external military aid have helped the countries of the region to sustain high levels of arms purchases. So far in the second half of the 1980s, the oil revenues of Middle East countries have declined, however, reducing their capacity to import arms and other advanced technologies. In other words, arms imports cannot take place any more with economic impunity. In this circumstance, however, the Gulf war has been waged in part by external funding.

#### G. Impact on socio-cultural conditions

120. Technological innovations in general and in the military industry in particular create new social, political and psychological conditions. Hence technology cannot be separated from the economic and political structure of societies. Modern weapons systems involve huge economic and organizational arrangements mobilizing and pooling resources from many sectors of society. In the course of their implementation, such weapons projects easily develop an identity and justification of their own. That is one of the reasons why it becomes difficult to slow them down or stop them.

121. Major weapons systems are expressions of the technological culture existing in the countries involved in the arms race. This is, in particular, the case in the major military Powers. The idea of industrial and technological progress is deeply embedded in the public culture and policy of most societies in the search for modernity. Advanced military technologies are often considered expressions of

modernity and progress in industrial societies. 130/ Yet, at the same time, such destructive technological systems are a sign of contradictions in modernity. Established security policies, which are supposed to be rational and prudent, have often produced irrational and injudicious results by undermining international and collective security arrangements. This contradiction is due to the tension that has developed, under the influence of new weapons, between the security of States and global security. It has been stated that "with contemporary military technology, the pursuit of security by States for their citizens increasingly implies the insecurity of all human beings. The more security is defined in terms of the interests of the citizens of States, the more it is undermined for people globally". 131/

122. Security provided by the State is part and parcel of present international relations. Accordingly, weapons systems are justified by those holding to the doctrine of deterrence as defensive weapons intended as credible either for retaliation or for a direct defence of the national realm. On the other hand, major weapons systems have, by being symbols of national power and prowess, political functions. Military projects communicate, intentionally or not, political values, intentions and objectives that other nations perceive in their own diverse ways. Because of cultural and political factors, these differences in perceptions add an element of uncertainty and unpredictability to military relations between States. Furthermore, such perceptions may be different among political leaders and the general public, thus giving rise to public debate and even to demonstrations.

123. As a matter of fact, the decisions to develop and deploy modern weapons systems are often controversial national issues. They elicit within nations both support and opposition; they both unite and divide the nations involved. This kind of contradiction reflects the historical opposition that has appeared between the search for military security and the advocacy of peace. Both of these approaches can be construed as reactions against insecurity and both of them suggest means, albeit different ones, by which it can be removed. Historically, the dominant response to violence and insecurity has been the strengthening of the political and military machinery, that is, the State, to protect the citizens against internal disorder and external threat.

124. At the present juncture of history the question is asked increasingly as to whether the State can provide, in the age of long-range nuclear weapons, an adequate framework to assure the security of the national territory and its inhabitants. Nuclear weapons have underlined the discrepancy between the available means of, and the nature of challenges to, national security. Efforts have been made to alleviate this problem by reasserting the central role of the State in providing for security. Similarly, for some countries, the doctrine of deterrence, in particular nuclear deterrence, has become a pivotal instrument in safeguarding national security and reassuring the public of its adequacy. However, such a solution for meeting security needs is extensively questioned in many countries. Polls suggest that public opinion is divided between those who consider security issues primarily within the framework of deterrence and defence capabilities and those who couch them in terms of disarmament, development and broad humanitarian concerns. These two opinions do not always concur and, in effect, they clash more and more frequently.

125. This clash appears in different ways - in mass media, public debate and education. Traditionally, security and human community have converged through the State. New forms of insecurity, both international and subnational in their character, put this convergence into question, challenging the efficacy of the deterrence doctrine and the entire concept of a State-centred security policy. One way of alleviating this contradiction is through a more comprehensive definition of the concept of security and the reconceptualization of the role of the State. Such a redefinition should take into account both traditional, military-related security concerns and novel challenges to the State-centred approach. These issues have their psychological dimensions also: the arms race creates both anxiety and resistance, both escapism and protest. Living with nuclear weapons, whether they threaten or protect, has introduced entirely new dimensions into the individual's experience of insecurity. Psychologists have stressed, however, that there are ways out of this predicament, beginning with increasing the common elements of experience on opposite sides and generating new forms, reciprocities and commitments to mutual security. Increasing reciprocity in the relations between adversaries is particularly important since it creates the basis for sustained co-operation. Initiation of and investment in co-operative endeavours suggests that this or that party is serious in its intentions. It has been recognized that any costs incurred by the other side in making moves to build trust enhance its commitment to building a long-term co-operative relationship because there are costs already incurred in the expectation of future gains. 132/

126. A pervasive characteristic of military establishments is their tendency to secrecy, justified by the need to withhold strategic information from adversaries. Secrecy is a building block in the permanent enemy images developed by the parties in international conflicts. In fact, secrecy and image reinforce each other and create a chain of perceptions that it is difficult to break up. Secrecy is also associated with the concentration of power in the military sphere. The practice of military security is often defined as being outside the realm of democratic control and public debate. There is, in other words, a tension between the requirements of military security and those of political democracy. Individual societies have tried to solve this tension in different ways. In such efforts the role of the mass media is often central, inasmuch as it is able both to justify arms expenditures and weapons decisions and to transmit information and opinions critical to them. In this sense, there is a deep-seated dualism in the role played by the mass media in the arms race. 133/

127. Problems of national security are not isolated from other spheres of social life. That is why their relationships and trade-offs deserve a well-informed public debate in which the requirements of secrecy are reduced to their appropriate proportions. Such a debate and the ensuing evolution of a critical public opinion within nations would also tear down walls of ignorance and prejudice between nations. It would also reduce secrecy and stereotyped enemy images and enhance confidence. Genuine confidence cannot be created in an atmosphere of excessive secrecy and distorted information; it requires more openness and communication in the vital areas of security. In addition to openness, confidence-building presupposes concrete measures to restrain the use of force and to reduce, through disarmament, military capabilities. Confidence-building is thus a perceptual

political process that has to be accompanied, in order to be credible, by concrete measures to contain military power. Confidence among nations follows, thus, both from intranational and international conditions and policies.

128. The military establishment and the civilian society are often regarded as two separate subsystems of society, which, however, in reality intermingle with each other. True, the interpenetration of the military and civilian subsystems may sometimes take quite strong forms; the military coup d'état and the abolition of the army by the civilian Government are the extreme examples. Usually, their interpenetration is less drastic, however, and assumes less visible forms. As a matter of fact, in most peacetime societies there is another society, a "shadow society", which is activated during a crisis. In constructing such a society, the military and civilian authorities do not usually rival, but rather co-operate with each other. This co-operation obviously has less influence on public opinion than the more visible manifestations of militarization, including new weapons systems and military parades. Yet, the invisible linkages cannot but affect the social and cultural aspects of the societies involved.

129. The impact of the arms race on youth and its attitudes deserves special mention. For older generations, who have experienced a major war themselves, the development and deployment of weapons may be a part of the "normal order of things", even though their own experience may also elicit sustained opposition to the arms race and war. Such opposition is, in most cases, due to the horrors and destruction of war. For the younger people, modern weapons, in particular the weapons of mass destruction, are more symbols of the insanity and irrationality of the world in which they have to learn to live. By marching against new weapons, young people demonstrate at the same time against other threats and injustices that they have seen in the global and national societies. The arms race is for them a part of the more complex syndrome of maldevelopment that one has either to try to ameliorate or to forget. In that way the arms race has repercussions on public opinion, especially that held by the young people, reaching beyond its immediate consequences for national and international security. This is one reason why the effects of the arms race should not be weighed in narrow military or economic terms; rather, its impact on the totality of social and cultural relations in a society should be explored.

#### H. Impact on conversion

130. An analysis of the relationship between military outlays and socio-economic development could not be considered complete without including an examination of the question of the effects of reduced military effort in the apportionment of governmental budgets. It has already been generally indicated that economic consequences of the arms race can be altered by arms limitation and disarmament, that is, by quantitative cut-backs and qualitative restrictions in national military capabilities. Industrial and certain other forms of conversion are the methods by which such changes are implemented in the national and local contexts. That is why conversion is an indispensable part of any effort, not only at arms limitation and disarmament, but also at constructive reallocation of resources in favour of civilian activities.

131. Conversion has political, economic and technical dimensions. Politically, conversion is a strategy for developing alternative uses for resources consumed by the arms race and ensuring that the implementation of these alternatives is properly managed. Conversion thus requires measures both at the national and at the local level. As disarmament has implications for national and international security, it cannot be promoted solely on its own merits. The conclusion that conversion cannot be viewed in isolation from the entire system of international relations seems to be commonly accepted. This is because its implementation depends on the political will of States and their readiness to take concrete measures on arms reductions and disarmament regarded as enhancing international security. Thus the conversion from a military to a civilian economy is, in the first place, a political problem. 134/ The recognition of the political dimension of conversion should not lead to neglect of its economic and technical aspects, however, and it is these aspects that are examined in this section. Concrete plans and, more important, actual experience in the implementation of conversion, if it is given a political chance, would add to its credibility and help convince decision makers and the general public alike of the practical feasibility of arms reductions.

132. Unilateral measures to curtail the military burden, and hence to initiate a conversion process, can be taken by any State. In the real, global political sense, however, disarmament has to be started by the major Powers on the basis of mutual, verifiable agreements to reduce armaments and eliminate particular military capabilities. Progress in this context would not only lead to conversion from a military to a civilian economy in those Powers, but should also enable medium and small States to start reducing and converting their own military capabilities. Thus, a conversion plan developed for Sweden, for example, was predicated on the pre-condition that international disarmament negotiations would gradually produce results over a 25-year period. Under such conditions, Sweden would also be able to decrease the amount of its resources devoted to defence without jeopardizing its security. 135/ Any assumption concerning the time span during which conversion would become a feasible political option is, of course, tentative. The present advances in the East-West dialogue on arms limitation suggests, however, that conversion strategies may be needed at an early stage in such a time-frame. In some cases the positive impact of reducing military expenditures could only operate in the medium or long term. National and local plans to develop alternative uses for natural, technical and human resources absorbed by the arms race are becoming part and parcel of the hope for progress towards a less militarized and more peaceful world.

133. In order to be effective, conversion planning has to be adequately specific, that is, it has to deal with relevant individual industries and companies. Their special characteristics, such as dependence on military sales, crucially affect the nature and feasibility of the conversion process. Apart from national planning, in market economies the ability and willingness of corporate management and the trade-union leadership to take risks and venture into conversion planning is critical for its successful implementation. This presupposes, however, perseverance over the period of the several years that are needed for new technology projects, production plans and marketing strategies to mature. 136/ Scholars from socialist countries often point out that in a centrally planned

economy conversion is easier to implement, as the instruments for putting the conversion plans into effect are already at hand. They do not deny, however, that market economies are also capable of converting their military economies to civilian use. Conversion is said to be facilitated by the fact that it would be carried out by steps, which would give time for planning and learning. 137/

134. In the United States and other market economies there has been some experience in converting individual military bases and industrial plants to civilian uses in the process of redirecting resources. 138/ While converting military bases is considered a governmental responsibility, the conversion of the military industry is usually seen in market economies in the context of a more or less spontaneous process of economic restructuring and updating involving new products and the development of new production processes and the diffusion of others. For this reason responsibility for conversion rests largely with industry rather than with national or municipal authorities. The situation would be different, however, in the case of conversion associated with significant arms reduction. The military industries and companies concerned could not in this eventuality be expected to be able to solve the problems of conversion alone. The experience of aircraft companies in diversifying to civilian production lines indicates that these problems are not always easy to solve. For these and other reasons, a public policy of conversion, including such measures as tax relief, retraining of workers and investment support, is needed. 139/ Such a policy is made feasible by the fact that the financial means now devoted to the military could be used to promote the civilian economy.

135. Macro-economic studies of the adjustment problems encountered in the course of the conversion process show that in small and less militarized countries such problems are, as a rule, limited. A relatively simple programme of national countermeasures is enough to compensate for any loss of employment or decline in the national product. This is borne out in several studies on individual countries. A study in Norway, for example, concluded that a 15 per cent reduction in military spending without any countermeasures would lead to a loss of 0.8 per cent of total employment and in the case of complete disarmament to a loss of 5.6 per cent. Serious problems of adjustment may be felt in companies and communities heavily dependent on military contracts and employment, but they can be alleviated by domestic countermeasures. In Sweden, the progressive reduction of the defence budget by one half from 1990 to 2015 would necessitate the annual removal of 1,430 employees from the defence industry and the armed forces payroll. The need for re-employment would indicate that less than 1 per cent of the total Swedish labour force would be affected over this 25-year period. The problem is manageable, although retraining and special measures for the production facilities most specialized in military goods would be needed. 140/ Calculations carried out relating to other countries would seem to show that conversion would be generally feasible provided that international circumstances would permit its implementation.

136. The conversion of the labour force has traditionally been a central concern in conversion planning because of both its economic relevance and its political sensitivity. Recently, the technological aspects of conversion have assumed greater significance, however. This is due to the increasingly pivotal role of research, development and technology in the economic competition between companies

and nations. Huge military technology projects are considered instruments of competitive power and prestige. That is why conversion is not confined to teaching the R and D personnel new knowledge and skills, but also has to apply these skills in a practical way in new fields. <sup>141/</sup> The conversion process is, in other words, increasingly linked with the national and corporate technology policies, which have to develop alternative, competitive civilian projects.

137. In view of the technology-intensiveness of military production there can be special problems in converting engineers and other skilled manpower to work in civilian industries. It must be recalled, though, that in new fields of technology - such as the electronics, optical and space industries - the conversion of the skilled labour force should not be an insurmountable problem. Temporary difficulties in the conversion process are dwarfed by the potential benefits that the alternative use of resources, previously consumed for military purposes, would bring about. Such alternative uses would include large-scale projects for the development of new sources of energy, the improvement of transportation and the reconstruction of aging cities as well as projects directly associated with education, health and welfare. Such projects could also be carried through by transnational corporations, thus contributing to the strengthening of mutual interests and international understanding.

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138. In the light of the preceding analysis, it is evident that disarmament would have positive economic and social consequences as it would release added resources for civilian uses. Whatever positive economic contribution that military spending might provide in the short run, it is not as beneficial as most types of non-military public spending. That the arms race absorbs far too great a proportion of resources and hinders international commerce, co-operation and confidence-building in a world where two thirds of the population live with the manifest problems of underdevelopment has been recognized in many international colloquiums, including the 1987 International Conference on the Relationship between Disarmament and Development. Yet the effects of that relationship are complex, varying among countries and over time, depending on many factors, including indicative factors such as meeting minimum security needs, amount of investment, growth rates and satisfaction of basic needs. Examination of military expenditures in terms of military capabilities and lost opportunity costs leads to the view that using the GNP criterion and focusing on marginal budgetary opportunity costs provides the best overall measurement tool for evaluating both the politico-military consequences and the opportunity costs of military spending.

139. Keeping this in mind, an examination of the apportionment of governmental budgets in 1978 and 1984 shows that military allocations have increased relatively in industrial countries and decreased relatively in developing countries. Looking at other allocations suggests the possibility of a trade-off in favour of social benefit, at least in the former group, but also that increased apportionments to social welfare do not automatically follow reductions in developing countries, at least in an era of economic decline, when those countries have a host of urgent

problems. Other research supports the indication that military expenditures affect negatively the satisfaction of basic needs, and that overall economic decline necessitates both military and civilian spending cuts.

140. In most countries, whether centrally planned or market economies, there exists a potential for trade-off between military spending and socio-economic development. As to its effect on opportunity costs, military spending creates an initial stimulation of demand and employment, but then crowds out productive investment, negatively affecting growth. Investment is of pivotal importance, and a causal relationship between high military spending and low investment may be assumed: the former reduces available capital for the latter. Moreover, military production absorbs resources that could otherwise support export-led economic growth. In developing countries it has been empirically shown that these effects are heavier, and indeed progressively more so, in lesser and least developed countries.

141. It has also been shown that military employment is not an effective solution to unemployment. Although complex factors should be taken into account in this area, some general discoveries are that: military contractors are extending control over sub-contractors; military-related employment is spreading under transnational corporations; military spending tends to be less effective in reducing unemployment than public spending in more labour-intensive sectors; and, in general, military establishments employ fewer persons than civilian ones per unit of investment money. Sometimes, military production protects jobs in old "smokestack" industries. In so doing, it diverts employment from new industries - which in any case require less employment - but also from internationally competitive, labour-intensive civilian governmental activities or non-governmental production and from the services industry.

142. The relationship between military spending and inflation is that the oligopolistic and non-competitive practices of the military market induce price increases that the open market could not bear. Also, the military emphasis on performance leads to high prices, not identical to inflation. However, any increase in military spending without corresponding reductions in other public or private spending will create general upward pressures on prices. And, as noted, the high costs of military hardware increase the incentive to export arms.

143. Clearly, advanced civilian technologies have potential military applications. Many military technologies, however, are militarily specific as to end use. The traditional conclusion is that spin-off effects of military R and D are limited. However, it must be noted that an increasing number of technologies have dual uses and analyses in this area must take this into account. Ultimately, the question is whether defence needs or development needs dictate technological development. Large, major-Power research projects help the companies involved in them, but the performance and secrecy criteria they involve are secondary in the civilian market. All in all, once national security is adequately assured, human needs would be better served by focusing R and D funding on civilian endeavours in both developed and developing countries.

144. Although there are wide variations in individual cases, military programmes, particularly in recent years, have contributed heavily to unbalanced financial flows and indebtedness. The infrastructural requirements for domestic arms production have increased this trend, but heavy military spending in any form undermines export performance by reducing available resources for export-oriented investment. Export credits as compensation for arms sales further aggravate the situation, especially in countries dependent on the export of commodities in a difficult or declining market. Consequently, barter arrangements have emerged, fostering political, economic and technological commonalities between trade partners. The overall indebtedness problem resulting from the flight of capital for these various reasons, together with internal economic disequilibrium, has been particularly severe in Latin America. Governments there have had to implement swift cut-backs in public expenditure. In the Middle East, the leading arms importing region, the arms inflow has continued and the Gulf war has been supported in part by external funding. Amidst declining oil revenues, however, this is not taking place with economic impunity.

145. Technology and the military industry create new social, political and psychological conditions, which could lead to national security policies that might undermine global security. In some instances, this has given rise to protests against policies, even within States. Thus there arises a need for a co-operative relationship, reciprocity and trust between advocates of, for instance, nuclear deterrence and those of commitments to security. Openness of information could help to build confidence and understanding between advocates of such diverse doctrines. The mass media, nationally and internationally, and military-civilian intermingling have roles to play in overcoming protests and clashes between Governments and the public, and between different elements of the public such as the older generations and youth.

146. A more constructive and beneficial allocation of resources could be found through the process of conversion from military to civilian goods and services and this in itself, if carried out over a considerable length of time and in a well planned way, with the co-operation of Governments and industry at both the local and the national levels as well as at the global level during a disarmament process, would not create either undue unemployment or other labour-force difficulties.

CHAPTER IV

INTERNATIONAL CONSEQUENCES OF THE ARMS RACE

147. The previous chapters of the present study address the problems of the impact of the new spiral of the arms race and of the effects of military expenditures in a society that is more complex than that of five years ago. The present chapter focuses on the implication of the arms race for international relations and for the present economic and social conditions in the interdependent world. The arms race has a definite effect on the relations between States, influenced by military and strategic considerations. It also influences the international economic situation, which is characterized by financial, monetary and trade instability, and aggravates global problems, the adverse effects of which few nations have been able to escape.

148. The framework for international security is provided by the system of collective security and the purposes and principles laid down in the Charter of the United Nations. Genuine and lasting peace can be created only through the effective implementation of the above-mentioned security system and by the speedy and substantial reduction of arms and armed forces, as well as by international agreements leading ultimately to general and complete disarmament under effective international control.

149. During the period under review, bearing in mind the rapid developments in the world, especially in the nuclear military field, as well as the need to maintain peace, two new concepts of international security have emerged:

The concept of common security is based on the belief that genuine security can be achieved only on the basis of co-operation and co-ordination among all States, including those considered adversaries. Economic, social and ecological vulnerability is a challenge calling for new and comprehensive approaches to the problems of national and international security. This idea, suggesting new elements in the concept of security, has been developed both by the Independent Commission on Disarmament and Security Issues (Palme Commission) and the World Commission on Environment and Development (Brundtland Commission). They both advocate the notion of common security involving the extension of the scope of national and international security to non-military fields.

The concept of the comprehensive system of international peace and security requires joint efforts of all the participants in international relations, without exception, in the crucial, essential for international security and interrelated areas of disarmament, peaceful settlement of crisis and conflicts, economic development and co-operation, preservation of the environment, and promotion and protection of human rights. 142/

150. The military expenditures of the major Powers affect the functioning of the world economy. The previous reports in the present series have stressed the way in which the arms race contributes to economic discrimination and hinders the smooth exchange of commodities, technology, capital flows and services. This is, in particular, the case with critical technologies and strategic materials that are used in the military industries. It is not uncommon for the trade in such

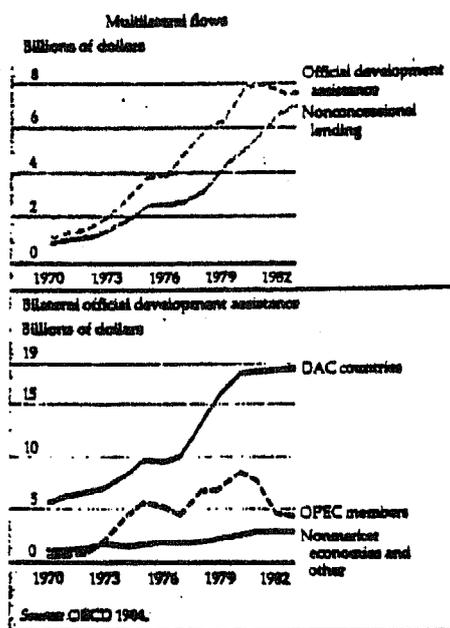
technologies or materials to be embargoed for fear the adversary might derive military gains from access to them. 143/ The military competition is thus accompanied by political efforts to control economic transactions having potential military applications. In other words, the arms race tends to generate both political and economic conflicts, thus increasing tensions in international relations and frictions in the functioning of the world economy.

151. Military spending has a bearing, among other things, on the extent of capital investments and the nature of technological innovation. Military spending also has an impact on the balance of international trade and capital flows, on global inflation and on the indebtedness of nations. It influences the outflow of resources from the nations participating in the arms race, although its precise impact on the balance of payments is difficult to determine. In other words, military expenditures can engender imbalances, fluctuations and bottle-necks in the world economy and in that way undermine its stability. One can presume that almost any nation participating in the arms race would have a better balance in its external flow of resources had it refrained from a high level of military spending. 144/ The conversion of military industries to civilian production accordingly would have not only domestic but also international consequences.

152. In the world economy there is a possibility of trade-off between the allocation of funds to military purposes and their transfer to benefit development efforts in developing countries. Although the direct transfer of resources released by disarmament for development purposes might not always be feasible at the present juncture, there is a link at the national level between these two categories of spending. This is because disarmament would expand the pool of national resources from which decision makers could choose to transfer funds to development projects. In addition, disarmament would improve the political atmosphere and thus provide a better basis for international co-operation. The need to consider seriously the dividend of disarmament is made clearer by the fact that both bilateral and multilateral capital flows to developing countries have stagnated since the late 1970s, as can be seen from figure II.

153. It is true that official development aid flows are governed predominantly by considerations of political and military ties between donor and recipient countries. For some donor countries military and strategic considerations are an important motivation for providing development aid. As a consequence, these countries do not give priority to the urgent development needs of the recipient countries. It is important to mention that many developing countries already have little access to the international money and capital markets and that often they cannot attract direct investments from transnational corporations. Private investors are reluctant to invest their capital in regions having political and military tensions. Moreover, in general, private capital or investments by State-owned companies flow primarily to those countries which enjoy the political support of the donor countries. Military and strategic considerations, therefore, cause a distortion in the free flow of private capital and the transfer of technology: this may provide a predominant disadvantage for the developing countries.

Figure II. NET RECEIPTS OF OFFICIAL FLOWS, BY SOURCE, 1970-1983



Source: World Development Report 1985 (Washington, D.C., World Bank, 1985), p. 97.

154. The resources released by disarmament would have urgent uses in the efforts to eradicate hunger and poverty, eliminate illiteracy and protect children from the double dangers of physical violence and underdevelopment. A world-wide consciousness has emerged that the arms race competes with development for finite resources. Not only does this affect particularly the satisfaction of urgent social needs at the national level; it also affects the availability of means to meet these needs through international action. A recent study provides staggering information in this respect: world military expenditures equal the aggregate income of 2.6 billion people of the 44 least developed countries. <sup>145/</sup> The phenomenon can be further illustrated by comparing international social allocations to education, health, housing, nutrition and the like, with military expenditures. For example, the United Nations Educational, Scientific and Cultural Organization (UNESCO) estimates that child immunization throughout the world against six diseases would require only \$300 million per year, that is, the amount the world now spends for military purposes in three hours. And in four hours the world spends, for military purposes, the present budget of the United Nations Children's Fund (UNICEF) for two years - \$500 million. <sup>146/</sup> As a consequence of the spread of international violence and underdevelopment, the refugee problem has become increasingly acute. It has been estimated that in 1986 the number of refugees was about 12 million. <sup>145/</sup> Armed conflicts, fostered by the arms race, also cause extensive suffering and the dislocation of people, a high proportion of them children.

155. The analysis in the present report amply shows that military spending contributes to the fragmentation of the national production structure and to the erosion of long-term prospects for economic development. Military spending has particularly deleterious effects on the rate of productivity improvement, thus decreasing a nation's competitive ability in the international economy. Instances of decline of economic efficiency of nations are not, of course, solely due to military production, but in such declines it has an obvious causal factor. 147/ Although the impact of military expenditures on overall economic performance varies from one country to another, the negative end result appears to have similarities in all of them. 148/ High levels of military spending thus have effects on economic allocations between nations in the world economy; as a rule, those most deeply involved in the arms race tend to bear the most adverse economic consequences. This may even mean that extensive current military expenditures weaken, because of their negative economic effects, a nation's ability to invest in military security in the future.

156. This analysis hints also at political implications of heavy military spending through its economic consequences. By eroding the underlying economic capabilities and the full potential dynamism of nations, such spending tends to contribute to their decline in international power. Military spending may, in other words, be a double-edged sword; in the short term, it may increase the military power of a nation, while in the long term it will have adverse effects, because investment and innovation in the civilian sectors of the economy tend gradually to dry up. In fact, historical evidence suggests that the over-extension of national resources on military spending is counterproductive in economic terms. As a consequence, a policy of national extension, together with the needs of the military and administrative apparatus, brings about economic stagnation. This leads, in turn, to a decline in relative international economic power, and then to the erosion also of relative political and military capabilities. 149/

157. In addition to shaping the distribution of power among the nations, extensive military spending is intertwined with political relations between them. The arms race implies the use of force and the threat of its use and, as a consequence, erodes one of the essential principles of the Charter of the United Nations. The arms race also contributes to tensions and suspicions; it creates in its various forms permanent enemy images and security dilemmas that are difficult to eliminate. The arms race thus fosters both fear and insecurity, which run counter to any security-enhancing effects it may have. The previous report provides a very vivid testimony as to the way the process of military build-up contributes to the deterioration of the international political atmosphere. Ultimately, the escalation of the arms race can lead to open military hostilities and, potentially, to the use of nuclear weapons. 150/

158. The military efforts of States and of military alliances are designed to provide for elemental safety against external threats and, in that way, are intended to contribute to national security. On the other hand, such efforts do not necessarily produce the desired results since they tend to invite both quantitative and qualitative countermeasures of a military nature by potential adversaries. Such countermeasures may include the acquisition of nuclear weapons and other weapons of mass destruction, further aggravating the various national

security problems. If there is any lesson to be drawn from history since the Second World War, it is the evident inability of unilateral military efforts and of weapons of mass destruction to assure security on a viable and long-term basis. Dependence for national security on the decisions and actions of other States, in particular on those of the leading military Powers, is, however, a political fact of life today. That is why, in any realistic analysis, security can be safeguarded only by genuine international and regional co-operation that includes potential military adversaries.

159. The imperative of international security requires both a more effective resolution of international disputes by peaceful means and the verifiable limitation and reduction of both nuclear and conventional weapons as well as the implementation of measures of disarmament. The United Nations has a special role, along with various regional organizations, in aiding in the settlement of disputes by peaceful means. That role could and should be enhanced by the pursuit of a more peaceful and equitable international system. This would require the strengthening of the United Nations peace-keeping and peace-making capacity and, at the same time, the economic and social reconstruction of the various crisis regions torn by military hostilities. The strengthening of existing regional security arrangements and the establishment of new ones would also enhance security and in so doing it would undoubtedly promote both economic co-operation and development. In the long term, neither of these is conceivable without the political and military stability produced by the effective settlement of international disputes, the implementation of verifiable arms limitation agreements and the lowering of regional tensions.

160. The Conference on Security and Co-operation in Europe (CSCE) is an example of a regional security undertaking that covers not only political and military, but also economic, environmental and humanitarian issues. Similar initiatives are gradually being developed in the specific circumstances of individual regions with the purpose of outlining security strategies and giving impetus to regional security régimes. <sup>151/</sup> Regional security can seldom be strengthened without the contribution of major military Powers. Their contribution is, as a rule, a necessary but not a sufficient condition for the resolution of regional security problems. That is why co-operation between the major Powers and their agreement on the limitation and reduction of arms are important not only for their mutual relations, but also for international security in general. The local, regional and international dimensions of security are most often interlinked.

161. National defence capabilities have been and remain the main factor in protecting a country against external threats. It is, however, in the best interests of every State that no one should try to obtain its security at the expense of the other States. Military build-ups beyond a certain point neither enhance security nor produce economic benefits; their effects may be, in fact, quite the opposite. Military capabilities are relatively inefficient in safeguarding the nation against economic pressure, for example. The settlement of disputes by global and regional agencies and through arms-limitation agreements is the most effective way of coping with direct military threats to security. When successful, these instruments can also produce tangible economic benefits by reducing the costs of defence spending and, ultimately, those of war. Of course, the verification of arms limitation agreements by national or international means

may be quite expensive. Yet these costs would be small in comparison with the economic burden that the unhindered continuation of the arms race would impose on mankind as a whole.

162. National economies are becoming increasingly vulnerable to external pressures. Nations usually aim at balanced economic development, avoiding too strongly asymmetric dependencies on the world market, but this aim can be achieved only to a limited degree. The vulnerability of national economies, due to their rapid rate of internationalization and growing mutual interdependence, may be managed by developing stable and equitable forms of co-operation between them. It may be argued that international security can be best assured in a world in which national economies are in internal and external balance and where international co-operation does not create asymmetric patterns of dependencies and vulnerabilities. This is an approach to world development by which all nations would have an equal right to benefit and it would also strengthen international peace and security.

163. The world's increasing economic interdependence and the fragility of the biosphere make challenges to national security more and more complex. They also make it more urgent that these challenges be dealt with effectively. This fact of modern society calls not only for novel solutions to the economic and ecological problems themselves, but also for new ways of defining the national security problem. Neither in developing nor in industrialized countries can security be dissociated from the economic and social reality, internal and external. In other words, economic and politico-military aspects of security are intertwined in all groups of States. Thus, the Panel of Eminent Personalities in the Field of Disarmament and Development suggests that "equal emphasis should be placed on the positive results of disarmament as well as the requirements of security". 152/ Development and security are not alternatives to each other, but may be made compatible by adopting a broader political perspective than hitherto. 153/

164. The complex relationship between disarmament, development and security has been thoroughly explored in the Final Document of the International Conference on the Relationship between Disarmament and Development, as follows:

"Security is an overriding priority for all nations. It is also fundamental for both disarmament and development. Security consists of not only military, but also political, economic, social, humanitarian and human rights and ecological aspects. Enhanced security can, on the one hand, create conditions conducive to disarmament and, on the other, provide the environment and confidence for the successful pursuit of development. The development process, by overcoming non-military threats to security and contributing to a more stable and sustainable international system, can enhance security and thereby promote arms reduction and disarmament. Disarmament would enhance security both directly and indirectly. A process of disarmament that provides for undiminished security at progressively lower levels of armaments could allow additional resources to be devoted to addressing non-military challenges to security, and thus result in enhanced overall security." 154/

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165. The framework for international security is provided by the system of collective security as laid down in the Charter of the United Nations. In recent discussion, the notions of common security and comprehensive security have been developed to respond to the increasingly complex international environment in which security has to be safeguarded.

166. The arms race and, particularly, major Power military expenditures have global economic effects, especially on trade in certain critical technologies and materials. Military spending also affects global inflation and indebtedness, creating or aggravating imbalances in the world economy. Although the direct allocation of resources released by disarmament to development projects might not always be feasible, a disarmament process would increase the resource pool from which decision makers could make their choices. Political considerations often affect, however, the flow of both development aid and private capital to recipient countries.

167. High military spending has deleterious effects also on productivity improvement, to the future economic detriment of the economies of the higher spenders. By causing a decline in investment and innovation, military spending may lead to economic stagnation, a relative decline in economic power and a concomitant decline even in military power. Military spending also tends to have adverse effects on the balance of payments.

168. A world-wide consciousness of the trade-off between the arms race and development has been increased by the staggering discrepancy between the sums devoted to the military and to the welfare of vulnerable persons. The refugee problem is another example of the way in which the arms race indirectly contributes to a socio-political problem and erodes the possibilities of its solution.

169. While a national defence capability remains a requirement, it is in the interest of all that it be limited by mutual agreements. Beyond a certain point, military capabilities have security effects opposite to those intended and they cannot effectively protect against economic pressures. Strengthened regional instruments and verifiable arms limitation agreements carrying many potential benefits would cost very little in comparison with continuation of the arms race.

170. National economies are witnessing a rapid rate of internationalization and growing interdependence. Such interdependence, together with the overall fragility of the biosphere, demands broader consideration of the security problem. The economic and politico-military aspects of security are intertwined for all States and must take into account the reality of social and ecological vulnerability.

## CHAPTER V

### CONCLUSIONS AND RECOMMENDATIONS

171. In addition to the conclusions provided in individual chapters, the foregoing analysis leads to several general observations. During the 1980s the arms race has continued, in particular in its qualitative aspect, unabated, in fact expanding in scale and accelerating in pace. This development has been most conspicuous in the case of nuclear weapons, and calls for their reduction and ultimate elimination. The arms race accounts, overall, for about 6 per cent for the world's output, and much more in some critical areas. The ongoing development of technology has transformed the military environment and brought about a variety of political and socio-economic consequences. As the burdens of the arms race vary considerably from one country or group of countries to another, the economic and social consequences are different and defy any easy generalization. On the other hand, the arms race, as a global phenomenon, has a bearing on the security and development of each and every nation. The arms race phenomenon has become increasingly interconnected, both across national boundaries and across its functional divides, such as its military, political and economic aspects. Qualitative and quantitative expansion of the arms race has a negative impact on international relations and their stability.

172. The present study shows that military expenditures have extensive social and economic consequences. Economic effects are most pronounced in leading military spenders, and in particular in those areas of their economies which are dominated by modern science and technology, which is a key factor in the present arms race. The negative long-term consequences of military expenditures overshadow any positive short-term effects. Therefore, military expenditures, contributing to economic stagnation and structural dislocation, influence the economic and political future of main spenders and their mutual relations, shaped by competition for control over modern technologies. In the developing countries, too, there exists a choice between the urgent need to stimulate economic development, on the one hand, and military spending on the other. The social and cultural consequences of the arms race are visible in every country involved in it, affecting both the allocation of resources and the political atmosphere in their societies. The social effects are most deeply felt by the underprivileged, whose basic needs are not met because of the lack of adequate resources, some of which are absorbed by the arms race. There is a genuine trade-off between the allocation of national resources to military purposes and the ability to solve global social problems. The Group of Experts underlines the need to consider this trade-off in making policy decisions in this respect.

173. As conventional weapons and armed forces consume the bulk of the world's military expenditures, their limitation and reduction are also increasingly relevant. Apart from social priorities, the need to reduce conventional weapons can be justified by other considerations as well. The conventional arms race extends from global to regional and local levels, feeding tensions and conflicts, which kill civilians and soldiers alike and constitute a threat to human rights.

174. The efforts to stop the arms race, in particular in its nuclear aspects, are a sign of the widespread pursuit of a more secure and liveable world. This desire for a world in which military force would be effectively constrained was stressed in the Final Document of the Tenth Special Session of the General Assembly, the first special session devoted to disarmament, held in 1978:

"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." 155/

To achieve these objectives, States and their political leaders should consider taking effective action to curb the arms race and start real disarmament both by bilateral and multilateral agreements and by national measures of self-restraint. A long-term perspective should also include determined action aimed at the cessation, through negotiations, of the applications of technological innovations, which sustain the arms race.

175. The intensification of the arms race has given rise to new political perceptions both among the general public and among policy makers. It has been realized that nuclear war can serve no conceivable purpose; there would be no victor in a nuclear conflagration. Therefore, the prevention of nuclear war has a high priority in the efforts to assure the survival of mankind. To contribute to this objective, States should settle their disputes exclusively by peaceful means and take steps towards general and complete disarmament under effective international control. The growing public perception of the diminishing political and military utility of nuclear weapons has facilitated first steps in this direction. Accompanied by effective verification procedures, the Treaty between the United States of America and the Union of Soviet Socialist Republics on the Elimination of their Intermediate-Range and Shorter-Range Missiles (INF Treaty) has opened a new path towards deep reductions in strategic nuclear weapons. This is a significant political development, one that promises, especially if supported by the limitation and reduction of other nuclear weapons and of conventional weapons, to enhance the security of all countries.

176. As stressed in the Final Document of the International Conference on the Relationship between Disarmament and Development, in 1987, disarmament, development and security are comprehensive phenomena. For this reason the relationships between them are often complex and are difficult to describe in a simple manner. It has become clear, though, that security has to be defined as a broad concept. A comprehensive notion of security includes many development issues as relevant components of safety from threats to the survival, integrity and well-being of humankind. In this sense, equitable development contributes to both national and international security. Disarmament has to contribute to both security and development. In addition to making such a direct contribution, disarmament can also facilitate a reallocation of human and national resources to prepare the way for further development efforts. These developments could strengthen the basis of security.

177. Distortions in international economic relations, including the problems of commodity prices and indebtedness, add urgency to the need for co-operation between developed and developing countries. Industrialized countries should assume a greater responsibility in fostering development co-operation in the context of official development assistance. With progress in arms limitation and conflict settlement, the political attention of the international community should be shifted more effectively to problems of underdevelopment, insecurity and ecological deterioration. Such a re-evaluation of priorities should be accompanied by the rebuilding of international multilateral institutions and co-operation, both global and regional. High military spending in some developing countries and requests for higher development aid are competing priorities.

178. The Group of Experts emphasizes that the promotion of international action both for disarmament and for development calls for a more effective United Nations. Co-operation in the overall strengthening of the Organization should pave the way for the improvement and enhanced functioning of multilateral international institutions in general. Efforts in this direction should be directed at improving their effectiveness as sources of information for all nations in the study of the arms race and in the field of arms limitation and disarmament, as well as for the detailed analysis of the information gathered for these purposes. The United Nations family of organizations should thus assume an improved role in harmonizing the views and interests of States and in encouraging their adoption and implementation of positive, action-oriented policies. The United Nations, in addition to its role in the consideration and negotiation of international arms limitation agreements, could also offer to contribute to their verification and compliance. The early settlement of disputes, inspired by the United Nations, would help preclude the use of force in international relations and hence of resources for armed conflict and destructive purposes, which are clearly inimical to development efforts. Such settlement of disputes, together with the promotion of co-operation between States, would reduce the motivation to initiate and sustain arms build-ups. Accordingly, the total effect of co-operative efforts by States to improve understanding, to solve inter-State disputes and to end conflicts would not only be their contribution to peace and stability, but, as a consequence, they would also reduce the consumption of scarce resources by the military and permit at least their partial reallocation for social and economic development, particularly of developing countries. Even in the event of hostilities, the development aspect does not become irrelevant. The specialized agencies of the United Nations, regional organizations, such as the Organization of African Unity (OAU), and some non-governmental organizations can contribute to the reconstruction and rehabilitation processes. Also, in addition to separating the parties to an armed conflict United Nations peace-keeping forces have, in some cases, provided, and they could continue to provide, health care to local peoples and assistance in the rebuilding of their communities.

179. The United Nations system has wide-ranging knowledge and experience in several issue areas. This expertise could be more effectively utilized in the study of complex linkages between disarmament and development. More concretely, specialized agencies of the United Nations could carry out practical studies on how disarmament could contribute to development in their respective areas of competence.

180. There is a growing need for enhanced international co-operation to protect and ensure the future of the global commons, ranging from oceans through polar regions to space. The need to combine the requirements of security, economic development and ecological balance in the global commons has become increasingly obvious. Therefore States should co-operate in efforts to promote international security, economic development and ecological balance.

181. The arms race continues to have extensive social and economic consequences both in developed and developing countries. And while the efforts towards the limitation of nuclear, chemical and conventional arms and armed forces are aimed at the enhancement of international and national security, the social and economic implications of such efforts should not be neglected. Instead, systematic advance evaluation of the socio-economic impact of the arms cuts and the preparation of plans for conversion from military to civilian uses would facilitate the process of disarmament. As a matter of fact, research on the social, economic and technological consequences of negotiated arms reductions should be expanded in both the academic and the policy-making communities.

182. Conversion is a critical factor in the implementation of political decisions to reduce weapons and to dismantle their production facilities. In order to be successful, efforts at conversion must address in a pragmatic manner the relevant economic and technological issues in order to find solutions. This requires, in turn, the involvement of the people affected in the local process of conversion. This process has a macro-economic dimension, which can be managed only at the national level. To explore this in greater depth, national studies on the feasibility and extent of conversion have been undertaken in some countries. Such studies can provide useful information for political and economic decision-making and should be encouraged. The United Nations could lend an international dimension to the study of the conversion of resources from military to civilian uses by appointing a group of experts to explore this issue in depth.

183. In general, the public perception of the arms race and its consequences is a critical link both in the definition of the present situation and in the efforts to eliminate the danger of war. In this regard, non-governmental organizations are important intermediaries in articulating people's opinion and transmitting it to the process of policy-making. One segment of youth takes an active part in the anti-war movement. The other segment does not yet realize the full danger of a nuclear war for humankind. Therefore the United Nations, in the framework of its World Disarmament Campaign, should consider a programme of information especially focusing on young people, aimed at their better understanding of the content and consequences of the arms race and the potential consequences of nuclear war.

184. Military expenditures, in particular by the major Powers, have obvious consequences for the functioning of the world economy, affecting, inter alia, international trade and capital flows, the transfer of technology and the international financial system. In the light of these multifaceted international economic consequences of the arms race, the recommendation made by the Panel of Eminent Personalities in the Field of Disarmament and Development, under the auspices of the United Nations, is most relevant. They call for "periodic assessments of the impact of world-wide military spending on global economic

prospects, bearing in mind the emerging supply and demand-side constraints on economies at different levels of development". 156/ Similarly, the International Conference on the Relationship between Disarmament and Development concluded in its Final Document that "the United Nations should continue to undertake, on a regular basis, analysis of the impact of global military expenditures on the world economy and the international economic system". 157/

185. A pertinent example of the impact of military expenditures on international economy is provided by the budget deficits, which, in many countries, are due to extensive military spending. These deficits tend to increase the volatility of international economic relations, affect interest rates and steer international financial flows. Given the manifold repercussions of military expenditures on the stability and growth of the world economy, more research in this area would be valuable. There is rather solid evidence concerning the impact of military spending on the development of national economies in terms of their growth rates, capital investments and employment. There seems to be much less reliable knowledge on the interrelationship of military allocations and the international economic processes. Therefore, the Group of Experts recommends that the United Nations support studies on the effects of military expenditures on international trade and finance. More research is also needed on the impact of arms reductions on the economies concerned as well as on their indirect effects on the economies of other countries.

186. A necessary condition for public accountability of the socio-economic burden of the arms race is full openness of information about the magnitude of military spending. At present it is impossible to give a reliable figure of the global military expenditures or even of the military spending by some major participants in the arms race. Therefore the Group of Experts strongly endorses the relevant statement of the International Conference on the Relationship between Disarmament and Development:

"An improved and comprehensive data base on global and national military expenditures would greatly facilitate the study and analysis of the impact of military expenditures on the world economy and the international economic system. To this end, the broadest possible number of States should provide objective information on their military budgets to the United Nations according to agreed and comparable definitions of the specific components of these budgets. In this connection, the work under way in the United Nations for a systematic examination of various problems of defining, reporting and comparing military budget data should be intensified." 158/

187. The previous reports as well as many General Assembly resolutions underline the fact that the activities of the United Nations relating to military budgets, including the collection of the military expenditure data and enhancement of their reliability and comparability, should be continued and intensified. Until appropriate international agreements on their reductions are negotiated, national policies of self-restraint in military expenditures should be encouraged. In this respect it is important that the international system for the standardized reporting of military budgets introduced in 1980 should ensure the objective comparability of military expenditures and desirable that the largest number of

States possible should make use of it. It is advisable that this reporting system should make use of national accounting systems. Reliable figures on military expenditures are not only necessary for analysis of the real military burden, but are also an important element in the negotiation and conclusion of verifiable agreements on its reduction.

188. The arms race continues to have a divisive effect on the world, furnishing the means for transgression of the fundamental provisions of the Charter of the United Nations and undermining international security and conditions for the international co-operation that is urgently required in all the relevant fields underlined by the present report. In this sense, the fulfilment in good faith of the principles of the Charter is both essential and complementary to the process of disarmament and the further release of resources for the needs of development. All these joint efforts are indispensable to reinforce and consolidate collective security, the principles of which are fundamental and irreplaceable instruments established by the Charter for the preservation of international peace and security.

#### Notes

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

2/ A/32/88/Rev.1, Economic and Social Consequences of the Arms Race and of Military Expenditures (United Nations publication, Sales No. E.78.IX.1).

3/ A/37/386, Economic and Social Consequences of the Arms Race and of Military Expenditures (United Nations publication, Sales No. E.83.IX.2).

4/ See text of the Soviet Union-United States joint statement issued at Geneva on 21 November 1985, contained in document A/40/1070.

5/ Final Document of the International Conference on the Relationship between Disarmament and Development (United Nations publication, Sales No. E.87.IX.8), para. 20.

6/ General Assembly resolution S-10/2 of 30 June 1978.

7/ Issued first as documents and then published under the following titles as United Nations publications, with sales numbers, as follows:

Comprehensive Study on Nuclear Weapons (A/35/392) (Sales No. E.81.I.11);

Reduction of Military Budgets (A/35/479) (Sales No. E.81.I.9);

Reduction of Military Budgets (A/40/421) (Sales No. E.86.IX.2);

The Relationship between Disarmament and Development (A/36/356) (Sales No. E.82.IX.1);

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Comprehensive Study on Confidence-Building Measures (A/36/474) (Sales No. E.82.IX.3);

Study on Conventional Disarmament (A/39/348) (Sales No. E.85.IX.1);

Concepts of Security (A/40/553) (Sales No. E.86.IX.1); and

Study on Deterrence (A/41/432) (Sales No. E.87.IX.2).

8/ A/37/386, para. 7.

9/ Ibid., para. 1.

10/ See USSR-US Summit, Washington, December 7-10, 1987: Documents and Materials (Moscow, Novosti Press Agency Publishing House, 1987), pp. 115-132.

11/ SIPRI Yearbook, 1986 (Oxford, Oxford University Press, 1986), pp. 210-211.

12/ United Nations publication, Sales No. E.87.IX.8.

13/ A/37/386, para. 25.

14/ Calculated from data provided in SIPRI Yearbook, 1986, pp. 233-237.

15/ These conclusions are based on statistics provided in SIPRI Yearbook, 1987 (Oxford, Oxford University Press, 1987), pp. 173-177.

16/ Robert M. Rosh, "Ethnic Cleavage as a Component of Global Military Expenditures", Journal of Peace Research, vol. 24, No. 1 (1987), pp. 21-30.

17/ Information based on The Military Balance 1986-87, p. 222.

18/ This is the official Soviet figure, obtained from Pravda, 23 January 1987.

19/ For further information, see SIPRI Yearbook, 1987, pp. 24-37.

20/ Calculated from SIPRI Yearbook, 1986, p. 129.

21/ Taken from Pravda, 13 March 1987.

22/ SIPRI Yearbook, 1986, p. 129. According to this source, it was estimated that the Soviet Union had conducted 113 tests in the period from 1981 to 1985.

23/ A/43/58, annex, sect. I.

24/ United States, Department of State Bulletin, vol. 87, No. 2128 (Washington), p. 39.

Notes (continued)

25/ See the following documents of the Security Council of the United Nations: S/16433; S/17127 and Add.1; S/17911 and Corr.1 and Add.1 and 2; and S/18852 and Corr.1 and Add.1.

26/ A/39/348, Study on Conventional Disarmament (United Nations publication, Sales No. E.85.IX.1), paras. 55 and 56. These and other issues pertaining to conventional weapons are discussed in detail in the various chapters of the Study.

27/ Ibid.

28/ A/37/386, para. 58 (d).

29/ Joint Declaration by the Panel of Eminent Personalities in the Field of Disarmament and Development (United Nations publication, Sales No. E.86.IX.5), para. 3.

30/ SIPRI Yearbook, 1986, p. 299.

31/ Ibid., pp. 299 and 302.

32/ For a systematic comparison of the organization of military R and D in three leading spenders, see Raimo Väyrynen, "Military R and D and Science Policy", International Social Science Journal, vol. 35, No. 1 (1983), pp. 61-79.

33/ See "Survey: High Technology", The Economist, 23 August 1986, p. 8.

34/ See Harvey Brooks, "The Strategic Defense Initiative as Science Policy", International Security, vol. 11, No. 2 (1986), p. 181. The data covering the period 1983-1986 show that the leading five out of 20 SDI contractors were Lawrence Livermore National Laboratory (\$725 million), General Motors (\$529 million), Lockheed (\$521 million), TRW (\$354 million) and McDonnell Douglas (\$350 million): see Science Digest, August 1986, p. 53.

35/ See Stephanie Neumann, "International Stratification and Third World Military Industries", International Organization, vol. 38, No. 2 (1984), p. 186.

36/ See Robert E. Looney and P. C. Frederiksen, "Profiles of Current Latin American Arms Producers", International Organization, vol. 40, No. 3 (1986).

37/ For a systematic analysis of various forms of industrialization in the armaments industry, see, for example, Helena Tuomi and Raimo Väyrynen, Transnational Corporations, Armaments and Development (London, Gower, 1982). Concerning offset agreements, see Stephanie Neumann, "Offsets in the International Arms Market", World Military Expenditures and Arms Transfers 1985 (Washington, D.C., United States Arms Control and Disarmament Agency, 1985), pp. 35-40.

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38/ See, e.g., Christian Schmidt, "Alternative Approaches to Defense Industry", in National and Financial Resources for Development, vol. 2, S. Berner and L. Taylor, eds. (London, Macmillan, 1987).

39/ Concerning the United States case, see William J. Weida and Frank L. Gertcher, The Political Economy of National Defense (Boulder, Westview Press, 1987), pp. 123-124. For a perceptive, in-depth study of the United States arms industry, see Jacques S. Gansler, The Defense Industry (Cambridge, Mass., MIT Press, 1981). On the French case, see Pierre Dussauge, L'industrie française d'armement (Paris, Economica, 1986).

40/ See, for example, David Holloway, "The Soviet Union", in The Structure of Defence Industry, Nicole Ball and Milton Leitenberg, eds. (New York, St. Martin's Press, 1983), pp. 50-80. This book also contains studies of arms industries in, for instance, the United States of America (Judith Reppy), France (Edvard A. Kolodziej), the Federal Republic of Germany (Michael Brzoska) and Italy (Sergio A. Rossi).

41/ See Michael Brzoska and Thomas Ohlson, "Arms Production in the Third World: An Overview", in Arms Production in the Third World, Michael Brzoska and Thomas Ohlson, eds. (London, Taylor and Francis, 1986), pp. 7-33.

42/ Ibid.

43/ See Helena Tuomi and Raimo Väyrynen, op. cit. For a case study on the arms production in an import-substituting economy, see Ron Ayres, "Arms Production as a Form of Import-Substituting Industrialization: The Turkish Case", World Development, vol. 11, No. 9 (1983), pp. 13-23.

44/ For details, see Herbert Wulf, "Developing Countries", in The Structure of Defense Industry, Nicole Ball and Milton Leitenberg, eds. (New York, St. Martin's Press, 1983), pp. 310-343. Arms production in individual third world countries is explored, for example, in Michael Brzoska and Thomas Ohlson, op. cit., 1986, and Emerging Powers: Defense and Security in the Third World, Rodney W. Jones and Steven A. Hildreth, eds. (New York, Praeger, 1986).

45/ Herbert Wulf, op. cit., pp. 328-336; and Michael Brzoska and Thomas Ohlson, op. cit., pp. 281-285.

46/ See Richard F. Grimmett, "Trends in Conventional Arms Transfers to the Third World by Major Supplier, 1979-1986" (Washington, D.C., Congressional Research Service, 1987).

47/ SIPRI Yearbook, 1986, p. 324.

48/ Ibid., p. 325.

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49/ Ibid., pp. 323-327. The decline of global arms transfer is corroborated by another source, which estimates that in 1985 the global value of arms transfers, expressed in constant 1983 United States dollars, was \$27 billion in comparison to \$40.3 billion in 1984. The arms imports of developing countries declined from \$32.3 to 20.3 billion; see World Military Expenditures and Arms Transfers 1986 (Washington, D.C., U.S. Arms Control and Disarmament Agency, 1987). For a further analysis of the consequences of this decline, see Christian Schmidt, "Les marchés internationaux d'armement en question", Chroniques S.E.D.E.I.S., vol. 36, No. 11 (1987), pp. 392-399.

50/ SIPRI Yearbook, 1986, pp. 325-326.

51/ See Michael T. Klare, "The State of the Trade: Global Arms Transfer Patterns in the 1980s", Journal of International Affairs, vol. 40, No. 1 (1986), pp. 7-12.

52/ Michael Brzoska and Thomas Ohlson, op. cit., 1986, pp. 30-31.

53/ See, for example, "Defense Aerospace", Christian Science Monitor, 24 April 1986, pp. B 1-7; and "Planemakers are Flying in a Nasty Wind", Business Week, 8 June 1987, pp. 62 B-D.

54/ A/37/386, paras. 63-78.

55/ For an outline of a resource system framework along these lines, see Kenneth Ruddle and Dennis A. Rondinelli, Transforming Natural Resources for Human Development: A Resource System Framework for Development Policy (NRTS-22/UNUP-469) (Tokyo, The United Nations University, 1983).

56/ See Helge Hveem, "Minerals as a Factor in Strategic Policy and Action", in Environmental Factors in Strategic Policy and Action, Arthur H. Westing, ed. (Oxford, Oxford University Press, 1986), pp. 60-64.

57/ For details see Helge Hveem, op. cit., p. 61; and A/37/386, para. 73 and tables 5 and 6.

58/ Ibid. The data shown in table 6 still pertain.

59/ For a background analysis, see Erik Solem and Antony F. G. Scanian, "Oil and Natural Gas as Factors in Strategic Policy and Action: A Long-Term View", in Environmental Factors in Strategic Policy and Action, Arthur H. Westing, ed. (Oxford, Oxford University Press, 1986), pp. 38-54.

60/ See A/42/427, pp. 290-295.

61/ See Alexander A. Arbatov, "Oil as a Factor in Strategic Policy and Action: Past and Present", in Environmental Factors in Strategic Policy and Action, Arthur H. Westing, ed. (Oxford, Oxford University Press, 1986), pp. 21-37.

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62/ For further details, see Al Gedicks, "The New Resource Wars", Raw Materials Report, vol. 1, No. 2 (1982), pp. 8-13. The conclusion that the mineral factor does not usually provoke war is supported by a detailed study of Mats Hammarström, Securing Resources by Force: The Need for Raw Materials and Military Intervention by Major Powers in Less Developed Countries (Uppsala, Department of Peace and Conflict Research, Uppsala University, 1986). Hammarström investigates United States, British and French military interventions in developing countries. He discovers a positive, albeit a modest, correlation between interventions and mineral dependence only in the case of one of these Powers. In other cases, the correlation is negligible or non-existent.

63/ Fernando Gonzalez-Vigil, "New Technologies, Industrial Restructuring and Changing Patterns of Metal Consumption", Raw Materials Report, vol. 3, No. 3 (1985), pp. 11-31.

64/ See, for example, Arthur H. Purcell, Resource Optimization and World Peace, Occasional Paper 30 (Muscatine, Iowa, The Stanley Foundation, 1982).

65/ See "Major Profits from Minor Metals", The Economist, 23 August 1986, p. 65.

66/ See Jacques Aben and Ron Smith, "Defence and Employment in the United Kingdom and France: A Comparative Study of Existing Results", in Peace, Defence and Economic Analysis, Christian Schmidt and Frank Blackaby, eds. (London, Macmillan, 1987), pp. 384-398.

67/ Economic and Social Consequences of the Arms Race and of Military Expenditure (A/37/386), para. 58 (e).

68/ Paper entitled "Disarmament and Employment" submitted to the International Conference on the Relationship between Disarmament and Development by the International Labour Organisation (A/CONF.130/PC/INF/15), para. 2.

69/ See United States Arms Control and Disarmament Agency, World Military Expenditures and Arms Transfers, 1986 (Washington, D.C., 1987), pp. 59-62.

70/ William J. Weida and Frank L. Gertcher, The Political Economy of National Defense (Boulder, Westview Press, 1987), pp. 147-149.

71/ See Michael Brzoska, "Economic Problems of Arms Production in Western Europe", in Militarization and Arms Production, Helena Tuomi and Raimo Väyrynen, eds. (London, Groom Helm, 1983), pp. 67-69.

72/ David K. Henry and Richard P. Oliver, "The Defence Buildup 1977-1985: Effects on Production and Employment", Monthly Labor Review, 1987, No. 8, pp. 6-9.

73/ See Rebecca Blank and Emma Rothschild, "The Effect of United States Defence Spending on Employment and Output", International Labour Review, vol. 124, No. 6 (1985), pp. 689-693.

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