

ST/ECA/174

DISARMAMENT AND DEVELOPMENT

REPORT OF THE GROUP OF EXPERTS
ON THE ECONOMIC AND SOCIAL
CONSEQUENCES OF
DISARMAMENT



UNITED NATIONS



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and Social Consequences of Disarmament

Corrigendum

1. Page 5, paragraph 8, line 2 ✓

For conduct read control

2. Page 8, paragraph 17, last line

For technical financial read technical and financial ✓

3. Page 24, paragraph 65, line 2

For of read on

4. Page 32, headings of 2nd to 4th columns of figures

For S/ME NS/ME S/AE NS/AE read S/CG NS/CG S/AG NS/AG

Department of Economic and Social Affairs

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UNITED NATIONS

New York, 1972

NOTE

Symbols of United Nations documents are composed of capital letters combined with figures. Mention of such a symbol indicates a reference to a United Nations document.

Throughout this report, the term "billion" signifies a thousand million.

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the legal status of any country or territory or of its authorities, or concerning the delimitation of its frontiers.

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FOREWORD

This report was written by the Group of Experts on the Economic and Social Consequences of Disarmament which I appointed under the terms of General Assembly resolution 2685 (XXV). In that resolution the General Assembly requested the Secretary-General, in consultation with such advisers as he might deem it necessary to designate:

(a) To formulate suggestions for the guidance of Member States, the specialized agencies and the International Atomic Energy Agency, as well as other organizations of the United Nations system, with a view to establishing the link between the Disarmament Decade and the Second United Nations Development Decade so that an appropriate portion of the resources that are released as a consequence of progress towards general and complete disarmament would be used to increase assistance for the economic and social development of developing countries;

(b) To propose measures for the mobilization of world public opinion in support of the link between disarmament and development and thus encourage intensified negotiations aimed at progress towards general and complete disarmament under effective international control. It further requested the Secretary-General to submit a report on those questions, through the Economic and Social Council, in time for consideration by the General Assembly in 1973 at the first biennial review of the implementation of the International Development Strategy for the Second United Nations Development Decade (General Assembly resolution 2626 (XXV)).

The report will be submitted to the General Assembly, through the Economic and Social Council, in accordance with General Assembly resolution 2685 (XXV). Meanwhile, I take pleasure in commending the report of the Group of Experts to the attention of Governments, of organizations of the United Nations family, and of world public opinion. I endorse the Group of Experts' general conclusions, and I believe that their report merits serious consideration.

I should like to make special mention of the report's relevance to review and appraisal of the objectives and policies of the Second United Nations Development Decade, and to express the hope that the various

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LETTER OF TRANSMITTAL

11 August 1972

Sir,

I have the honour to submit herewith the unanimous report of the Group of Experts on the Economic and Social Consequences of Disarmament. The Group of Experts was appointed by you in pursuance of General Assembly resolution 2685 (XXV).

The consultant experts appointed were the following:

Rodrigo Botero, Executive Director, Foundation for Higher Education and Development, Bogotá, Colombia

Amado Castro, Dean, School of Economics, University of the Philippines, Quezon City, Philippines

Vasily S. Emelyanov, Corresponding Member of the Academy of Sciences of the USSR, Moscow, Union of Soviet Socialist Republics

Yoceri Kyesimira, Professor and Head of the Department of Economics, Makerere University, Kampala, Uganda

Wassily Leontief, Professor of Economics, Harvard University, Cambridge, Massachusetts, United States of America

Ladislav Matejka, Deputy Director, Research Institute for Planning and Management of National Economy, Prague, Czechoslovakia

Jacques Mayer, Director of "synthèses économiques", National Institute of Statistics and Economic Studies, Paris, France

Alva Myrdal, Minister of State, Foreign Office, Stockholm, Sweden (Chairman)

Robert Neild, Professor of Economics, Faculty of Economics and Politics, Cambridge University, Cambridge, United Kingdom of Great Britain and Northern Ireland

The report was prepared between March and August 1972. The Group of Experts held two sessions, both at Geneva, the first from 13 to 17 March 1972, and the second from 31 July to 11 August 1972. Wassily Leontief was unable to attend the first meeting, while Rodrigo Botero was unable to participate in the second meeting. The members of the Group of Experts wish to express their gratitude for the assistance which they received from members of the Secretariat of the

United Nations and of the specialized agencies and other organizations of the United Nations family.

I have been requested by the Group of Experts, as its Chairman, to submit this report to you for further consideration in the United Nations.

Respectfully yours,

(Signed) Alva MYRDAL
Chairman
Group of Experts on the Economic and
Social Consequences of Disarmament

The Secretary-General
United Nations
New York

INTRODUCTION

1. Pursuant to General Assembly resolution 2685 (XXV) on the economic and social consequences of disarmament, we were asked to suggest in the present report how a link might be established between the Disarmament Decade and the Second United Nations Development Decade and to propose measures for mobilizing public opinion accordingly.
2. We believe that these two objectives - disarmament and development - are of the greatest importance to the world community. But fundamentally they stand separately from one another. The United Nations has agreed to seek each one vigorously in its own right, regardless of the pace of progress in approaching the other. Specifically, nations have agreed that national and international efforts to promote development should be neither postponed nor allowed to lag merely because progress in disarmament is slow.
3. Some general considerations have been our points of departure:
 - (a) The main motives for pursuing disarmament are to avoid war and all its fearful consequences, to strengthen peace and security throughout the world and to foster a climate of understanding and co-operation. The achievement of these aims would create very favourable conditions for development;
 - (b) In the post-war period, and particularly in recent years, as a result of negotiations within the framework of the United Nations, in the Committee on Disarmament and also between Governments, certain treaties and agreements for the limitation of the arms race, the reduction of international tension and the improvement of the political climate have been concluded and brought into effect. However, disarmament agreements have not yet led to any reduction in military expenditure;
 - (c) In striving by the adoption of measures for disarmament, to avoid war and strengthen peace throughout the world, countries unquestionably also take into account the great economic possibilities implicit in disarmament through the redirection of resources to goals of peaceful development. This is a matter of great importance to all

countries, developed and developing alike.^{1/} Actually, while in some - mainly small - developing countries, the share of military expenditure in the total national product is not large, in other developing countries it is noticeably high. Thus, the positive effect of disarmament in the form of the diversion of domestic resources will be of very great importance to most countries, including the developing ones;

(d) The problems of achieving disarmament and of making rapid progress with economic and social development, as well as the problem of generating more aid for developing countries are essentially political. Disarmament will come only if people - political leaders, citizens and activists in political and social organizations - change the direction of the policies which have led to arms races; if they reject external policies of intervention; if they reject international competition for power and prestige expressed through military might. More aid, and other measures aimed at helping developing countries, will come only if people to a greater degree adopt and act upon internationalist values - the equality of man; the need to eliminate poverty, mass unemployment, disease, hunger and illiteracy; the desirability of bringing the benefits of science and technology to everyone;

(e) There are here two separate political objectives - disarmament and development - and two sets of political motives, one for each. The pursuit of each objective can proceed without the other, and it should proceed urgently. For instance, the United Nations targets for economic aid to developing countries should be met now, without waiting for disarmament. These two objectives can, however, be linked to each other because the enormous amount of resources wasted in the arms race might be utilized to facilitate development and progress;

(f) The blatant contrast between this waste of resources and the unfilled needs of development can be used to help rouse public opinion in favour of effective disarmament, and in favour of the achievement of further progress in development, particularly of the developing countries;

^{1/} The terms "developed" and "developing" countries, despite their vagueness, have been utilized in this report because it is the accepted usage in the United Nations. Some members of the Group feel, however, that the use of "rich" and "poor" would be more appropriate in many cases.

(g) The employment of the resources released by disarmament, especially for development purposes, is not likely to take place spontaneously; it will require concerted action on the part of the governments of the countries concerned, both developed and developing. Such a shift will be one of the major means through which the change in political ends would be expressed. Our conviction therefore is that the goals of reducing military expenditure and of furthering economic and social development are primarily a question of political will, of political co-operation and of international solidarity;

(h) We endeavour to establish more precisely what the relationships - "links" - are between disarmament measures and development prospects and, in particular to show that in case of a general reduction in military expenditure of substantial magnitude, an increase in economic aid will be required to help prevent the widening of the per capita income "gap" between developed and developing countries that would otherwise result.

In the following chapters, we deal successively with the problem of disarmament, with development prospects and needs, and with the links between disarmament and development. We suggest various ways of catering for some concrete problems. We also suggest how public opinion might be aroused along the lines outlined above so as to provide a driving force for both disarmament and development.

I. DISARMAMENT

5. Disarmament can take various forms, varying from national reductions to agreements concerning some types of weapons or some regions, to international general and complete disarmament. Without agreements between countries, disarmament is unlikely to endure.

6. So far, in the field of disarmament, several important international agreements on certain types of arms have been reached; they have been "partial" or "collateral" measures, mostly of a non-armament character. They may have forestalled increases in military spending, but they have not reduced it.

7. The magnitude of the resources used for armaments was analysed in a recent report of the Secretary-General.^{2/} World military expenditures in 1970 were roughly \$200 billion, i.e., 6.5 per cent of the gross national product (GNP) of the countries of the world. Military expenditures of the countries which provide aid for development are estimated to be approximately 6.7 per cent of their GNP, or 25 times greater than the official development assistance they provide. The major part of the world's military expenditure is made by a very small number of countries; the six main military spenders are responsible for more than four fifths of the total. The developing countries spend approximately 4.2 per cent of their GNP, or only about 7 per cent of the world total, although for some of them, the share of military expenditure in their GNP is high. If military expenditures continue to grow during the 1970s, at the same average annual rate as in the 1960s (3 per cent a year) they will reach \$280 billion (at 1970 prices) in 1980. If their

^{2/} Economic and Social Consequences of the Arms Race and of Military Expenditures (United Nations publication, Sales No. E.72.IX.16).

share in the GNP were to remain the same as in 1970, the figure would reach \$360 billion.^{3/}

8. An agreed programme for the Disarmament Decade does not exist. General and complete disarmament under effective international ^{control} ~~conduct~~ remains the main objective. Its achievement would represent a momentous political change and would release massive resources for peaceful uses. We agree with the authors of earlier studies^{4/} that there would be no insuperable technical difficulties in ensuring the redeployment of the released resources to peaceful uses.

9. Partial measures are a second best, but more of them may be introduced before agreement is reached on general and complete disarmament. Partial measures are often seen as first steps to political understanding and general disarmament, but if they are to be fully effective in this, or any other respect, it is important that they should be agreed to by all the relevant countries, i.e., by those that are, or might be, engaged in the activity that is outlawed. This is not true now. Partial measures do not always lead to reductions in military expenditures and in certain cases may result only in diverting expenditures into new directions.

^{3/} Statistics of military expenditures, gross product and official development assistance are given in annex I. These statistics are based on the sources used in the Secretary-General's report (*ibid.*). The data on military expenditures since 1960 used in that publication were obtained from the United States Arms Control and Disarmament Agency, which has subsequently revised and updated them. (See World Military Expenditures, 1971, Washington, D.C., 1972.) It is the revised and updated statistics that the Group has used in preparing the present report. The six main military spenders are China, the Federal Republic of Germany, France, the United Kingdom of Great Britain and Northern Ireland, the United States of America and the USSR. (In this report the Group has grouped China with the countries providing official development assistance.) The estimates here of actual military expenditure are subject to an unknown margin of error which, in our opinion, may be substantial (see foot-note 2 above, para. 24). The projected figures that we have prepared are simply illustrations based on assumptions.

^{4/} Economic and Social Consequences of Disarmament (United Nations publication, Sales No. 62.IX.1) and Economic and Social Consequences of Disarmament: Replies of Governments and Communications from International Organizations (United Nations publication, Sales No. 62.IX.2).

10. One measure which might help the transition from partial measures to general and complete disarmament would be an agreement to limit and reduce military budgets. Without comprehensive over-all economic limitations of this kind, arms limitation agreements expressed in terms of numbers of specific types of weapons cannot prevent an arms race in the form of expenditure on the development and production of entirely new kinds of weapons not covered by existing agreements. Because of that, the question of budgetary limitations of military expenditures deserves serious further study.

11. The most recent partial measure has been the agreement between the Union of Soviet Socialist Republics and the United States of America on strategic arms, made earlier in 1972. It limits the number and deployment of anti-ballistic missile systems and places a ceiling on offensive missiles but, since it places no limit on qualitative improvements in missiles, it does not ensure a reduction in spending. Politically, the strategic arms limitation agreement appears to be a major step towards improved relations between the Soviet Union and the United States and it should therefore reduce the risk of nuclear war. It could lead to a more important slowing down in the arms race and to greater progress towards general disarmament, if significant further steps follow.

12. In the continuing multilateral negotiations for disarmament, there are formal commitments to follow up some of the partial agreements already made with further agreements in the same field - for example, a comprehensive test ban in place of a partial test ban, a ban on the possession and production of chemical as well as biological weapons, and also the genuine demilitarization of the ocean. These commitments are an indication of both the narrowness of the original agreements and the declared desire for more action. Some of the commitments have now been on the books for many years. The items to which greatest attention is paid now are a comprehensive test ban and chemical disarmament.

13. Various proposals have been made both to widen the membership of the present multilateral negotiations, from which China and France are absent, and to put new life and direction into the negotiations by convening a world disarmament conference.

14. For the purpose of our economic analysis we have found it useful to consider, in addition to general and complete disarmament, some alternative assumptions. For example, one assumption is a 20 per cent

cut in military expenditures of all kinds. Some other assumptions are partial measures limited to particular weapons or activities as follows:

(a) A comprehensive test ban;

(b) A comprehensive prohibition of the possession and production of chemical weapons;

(c) The complete demilitarization of the sea-bed and deep-sea environment;

(d) The elimination of all foreign bases (i.e., physical installations) and the withdrawal of all foreign troops to their own countries.

II. DEVELOPMENT PROSPECTS AND NEEDS

15. The two principal aims of policies of world-wide economic and social development are the increase in the levels of living of all peoples and the reduction in income disparities both within and between countries. In particular, a very important aim in many of the poorer countries suffering from mass poverty is the reduction of mass unemployment. To achieve these aims, high rates of growth are required and, in particular, for narrowing the per capita income "gaps", a high rate of growth in developing countries; the poorer the country, the higher the rate of growth would need to be.

16. The International Development Strategy for the Second United Nations Development Decade (General Assembly resolution 2626 (XXV)) calls for a 6 per cent target rate of growth of gross output for developing countries. If population growth is held down to about 2.5 per cent, the rate of growth of income per person will be about 3.5 per cent. That this target - if achieved - would represent an increase over the 2.5 per cent rate of growth of income per person observed in the 1960s is encouraging. But the prospect is nevertheless not satisfactory. At a rate of growth of 3.5 per cent, average income per person in the developing world would rise from the 1970 level of \$200 to the level of only around \$280 (in 1970 prices) by 1980.

17. One of the basic requirements for raising a country's rate of economic growth is an increase in the volume of resources allocated annually to productive investment. In the 1970s, if the growth targets are to be met, the developing countries will have to make strenuous efforts to find ways and means of devoting a larger part of their GNP to gross domestic savings and investment than in the past. Of course, as in the 1960s, the more favourable the external environment, the more fruitful domestic efforts will be. With a few special exceptions, developing countries cannot realistically be expected to be able to provide from domestic savings alone sufficient investment to attain the necessary rate of growth rapidly. Moreover, in some of them, the effective utilization and mobilization of domestic resources often cannot be achieved without foreign technical/^{GMA} financial assistance.

18. The economic growth of developing countries will of course continue to depend still more on the contribution to their external resources made

by expansion of their exports, in particular of their exports to high-income countries. To encourage such trade expansion, developed countries must reduce the obstacles which impede exports of developing countries at the present time. In the case where imports of specific goods from developing countries would be temporarily affected during the period of transition to disarmament, special financial assistance from the advanced economies would be desirable to compensate for the corresponding loss of current foreign exchange receipts. It is also important that measures be taken in advanced market economies to avoid any slackening of over-all economic activity in the short run as a result of reductions in military expenditures.

19. At present the flow of official development assistance to developing countries - which depends on governmental decisions taken in the developed countries - amounts to only about 0.35 per cent of the gross national product of the latter countries. In order to achieve the Second United Nations Development Decade target of 6 per cent growth on average, it is estimated that official development assistance from developed countries would have to double in relative terms, that is, to increase to 0.7 per cent of their GNP.^{5/}

20. On the basis of the modest achievements of the First United Nations Development Decade, and even if growth objectives of the Second United Nations Development Decade are attained, the problem of reducing mass poverty and unemployment in the developing countries of the world still remains. More efforts therefore should be made by the world community. While, in the opinion of the Group, developing countries bear responsibility for adopting adequate measures to mobilize their own resources more effectively and for reducing income disparities, the solution of that problem would, in many developing countries, depend to a significant extent on stepped-up foreign assistance.

21. In most cases no major problem would arise as to the capacity of developing countries to absorb an increased flow of foreign assistance provided that this assistance is extended on appropriate terms. In particular, there should be a marked increase in untied grants; and, in

^{5/} Official development assistance, however, constitutes only a part of the import balance of the developing countries. The gross flow of both official and private financial resources they receive from abroad is sometimes offset by income transfer back to the developed countries and/or outflow of domestic capital.

the case of the poorest countries, possibly for the purpose of increasing consumption. Where loans are made for specific projects, absorptive capacity is still large if the terms contain a sufficiently high grant element. In this connexion, a substantial allocation of Special Drawing Rights (SDRs) to developing countries by the International Monetary Fund would represent an untied manner of increasing their claim on economic resources, since drawing rights confer benefits similar to those obtained from grants. These questions are under consideration in various international bodies.

III. THE INTERRELATIONSHIP BETWEEN DISARMAMENT
AND DEVELOPMENT

22. Disarmament would contribute to economic and social development through the promotion of peace and relaxation of international tensions as well as through the release of resources for peaceful uses.

23. In the report of the Secretary-General entitled Economic and Social Consequences of the Arms Race and of Military Expenditures,^{6/}

it is observed that:

"International suspicions and fears... damage the economic and social well being of the world by impeding exchanges between peoples whether these be of trade and flow of capital, or of knowledge and technological 'know-how'. If there were no arms race, trade and other exchanges would almost certainly be easier."^{7/}

24. The same report observed:

"... One major effect of the arms race and military expenditure has been to reduce the priority give to aid in the policies of donor countries."^{8/}

"It would take only a 5 per cent shift of current expenditures on arms to development to make it possible to approach the official targets for aid."^{9/}

25. The unanimous conclusion, presented in the same report, contains the following statement:

"... A halt in the arms race and a significant reduction in military expenditures would help the social and economic development of all countries and would increase the possibilities of providing additional aid to developing countries."^{10/}

A. The link with respect to resources in general

26. The transfer to peaceful uses of resources used in each country for military purposes will bring about greater satisfaction of civilian needs of the country. The resources thus released, sometimes referred to as

^{6/} See foot-note ^{2/} above.

^{7/} Ibid., para. 95.

^{8/} Ibid., para. 104.

^{9/} Ibid., para. 107.

^{10/} Ibid., para. 120.

the "disarmament dividend", can be redirected to raise standards of living and to promote faster growth, in particular through higher expenditures in fixed investment and in education and training of manpower.

27. In the developing world as a whole, the share of gross product claimed by military expenditure is a little more than 4 per cent;^{11/} in 17 developing countries, mostly in the regions at war in the Far East and the Middle East, the average share climbs to around 13 per cent. On the other hand in 46 countries, mainly in Africa and Latin America, the average share is only 1.5 per cent of their gross product. In some instances the armed forces are engaged in civil activities which would need to be continued and financed from civil budgets. Therefore, there will be considerable variation among developing countries in respect to the magnitude of their own "disarmament dividend".

28. In case of general and complete disarmament - and also, to a lesser extent, when the cuts in military expenditure are significant, but less than total - economic assistance granted by developed to developing countries could and should be greatly increased and would merit high priority in the allocation of released resources.

29. The higher the level of per capita income of a developed country, the stronger is the case for it to contribute to the promotion of growth in developing countries, not only through increased economic aid but also through increased international trade. Special care should be taken to facilitate imports from the developing countries and to assure for them fair terms of trade.

30. In order to take full advantage of the possibilities for development offered by the "disarmament dividend", organized actions will have to be taken by Governments as well as by the international community.

31. Many developing countries import their arms from abroad. Although many of these arms are provided as aid or on easy terms, disarmament would still release significant foreign exchange resources which could be used for the import of investment goods necessary for economic growth.

32. As disarmament is accomplished, the amount of military aid granted by the developed countries should, instead of being merely suppressed, be used for the expansion of economic aid to developing countries.

^{11/} Annex I, table 2.

33. While it would bestow great economic benefits on developing and developed countries, if the necessary policy measures were introduced, it could make an important contribution towards closing the increasing economic "gap" between them. This would also apply to situations where the cuts in military expenditures are smaller, yet significant. Since military expenditures now absorb a larger proportion of the combined GNP of the developed than of the developing countries, a general (proportional) reduction in military expenditures will increase the non-military part of the GNP of the first group of countries proportionally more than that of the second group. However, a simultaneous increase in the fraction of GNP in the advanced donor countries allocated to international development assistance could not only prevent a widening of the "gap", but contribute greatly to its closing.

34. Such a rise in the fraction of their combined GNP allocated by developed countries to development assistance would have to be larger the greater the difference between the military expenditures - expressed in percentages of their respective GNPs - of the two groups of countries.^{12/}

^{12/} A concise formulation of these relationships has been worked out by Wassily Leontief and some other members of the Group. The algebraic basis for the statements made in paragraphs 33 and 34 is as follows. Let

\underline{y} = the cut in military expenditure expressed as a proportion of military expenditure before disarmament

\underline{w} = the minimum necessary increase in assistance, taken as a proportion of the amount of assistance before disarmament, if the income gap is not to widen

M = military expenditures before disarmament

D = "disposable" GNP (i.e., total GNP less military expenditure less assistance, in the case of developed countries, and total GNP less military expenditure plus assistance, in the case of developing countries)

A = assistance transferred from developed to developing countries before disarmament

Subscripts 1 and 2 represent developed and developing countries, respectively.

If the "income gap" is to remain constant

$$\frac{D_1 + M_1 \underline{y} - A \underline{w}}{D_1} = \frac{D_2 + M_2 \underline{y} + A \underline{w}}{D_2} .$$

Accordingly, the corresponding relationship between \underline{w} and \underline{y} can be derived as follows:

$$\underline{w} = \underline{y} \frac{M_1 D_2 - M_2 D_1}{A (D_1 + D_2)} .$$

The coefficient of \underline{y} in this formula has a value of approximately unity when data for 1970 (annex I, table 1) are inserted. If all data are expressed in per capita terms, the relationships presented above are the same.

When applied to the configuration of GNP, military expenditure and development assistance estimated for 1970 (see annex I, table 1), a rough calculation shows that a 20 per cent general reduction in military expenditures, for example, would contribute not only to the satisfaction of urgent economic needs of both developed and developing countries, but also to the reduction of the economic gap between the two groups if such developmental assistance were raised globally in the same proportion or slightly more.

35. Recognizing that each donor country will want to determine its own policies for expanded economic assistance, the Group hopes that these decisions will secure an adequate increase in assistance for development.

36. The Group suggests that consideration should be given to progress in disarmament in the periodic reviews and appraisals of progress towards achieving the goals and objectives of the International Development Strategy for the Second United Nations Development Decade.

B. The link with respect to specific resources

37. Most of the resources released by disarmament, total or partial, would be readily transferable to other uses - for example, manpower, food, clothing, transport, fuel and products of the metal and engineering industries. Budgetary action to raise civil demand will be enough to induce redeployment of released resources either to investment or to consumption, public or private. Annex II presents an illustrative statistical analysis, for the economy of the United States, of the possible transfer to other uses of some of the resources absorbed by military expenditure. According to this analysis, the number of industries suffering negative impacts would be smaller when the replacement for military expenditure is assistance to developing countries than when the replacement is domestic personal consumption.

38. Some other resources, for example, nuclear weapon plants and military aircraft and missile plants may not be readily transferable. Some alternative civil uses may be found: for example, satellites and other techniques developed by the military could be used more than they are now in the search for natural resources and in international meteorological work. But only a part of the specialized resources could probably be absorbed in ways of this kind. For the rest, other industries will have to be brought into the areas where the specialized

military production has been concentrated and retraining programmes will be needed for those whose skills become redundant.

39. Regional development policies and retraining policies of the required types exist in many advanced countries. But even in some of the countries where these policies exist, for example some of the countries of Western Europe, there is often the threat of serious unemployment in particular areas when work on, for instance, a military aircraft project is completed or cancelled. The industry is often reluctant to change, and sometimes the Government places new military orders to sustain employment, thus perpetuating the arms race. To prevent this happening, the Group suggests that Governments, when placing orders for specialized military production or creating specialized plants likely to give rise to these difficulties in the event of disarmament, should make advance plans to deal with the redeployment to peaceful work of the manpower and plant (in so far as the latter is reusable).

40. Apart from catering for these areas of special difficulty, all countries might be urged to consider what would be the most valuable ways of redeploying resources from military to civil use and to consider, in particular: (a) which resources now used by the military might make a particularly valuable contribution to development in any area; and (b), in the light of such an assessment, which specialized resources would be suitable as aid or technical assistance from developed to developing countries. Planning of this kind would benefit from international co-operation.

41. The Group believes that the feasibility of making such plans should be explored now. Changes in the composition of military programmes, with no decline in total military expenditures, have already made numerous scientists and engineers redundant in some countries. Some of this unemployment could have been avoided by advance planning of links with development. The ingenuity and resourcefulness displayed in the Second World War in converting facilities to serve military purposes was impressive. To fail to devote equal ingenuity and resourcefulness to converting military facilities to serve peaceful ends, including the development needs of developing countries, would be inexcusable.

42. Research and development needs special consideration. The world's expenditure on research and development has grown tremendously since the Second World War, but a very large part of the effort has been

military. It is estimated by the Secretariat that world expenditure on research and development now amounts to \$60 billion, or about 2 per cent of world gross product, of which about \$25 billion is for military purposes. An overwhelming part of these expenditures are made in the advanced countries.

43. These research and development resources, when diverted to peaceful uses, might have a great impact on development. A large and imaginative increase in peaceful research and development budgets will be required if all, or even a large part, of the research and development manpower employed on military work is to find peaceful research and development work. It is not possible for us - or probably for anyone - to say what would be the fruits of an expansion in peaceful research and development of the magnitude which disarmament would permit. All we can say with certainty is that there is a vast range of problems in the developing countries and that there are huge sophisticated resources absorbed by military research and development in the developed countries. In order to get some idea of the possibilities of transfer, the Secretariat prepared for us a list showing fields of military research and development and, opposite each, a list of peaceful work for which the same resources might be used (annex III). The range of possibilities appears to be extremely wide. Our conclusion is that it would be useful constantly to consider what disarmament steps are in the offing, how far these may release resources and how these may best be used to promote development either at home or in the developing countries. Secondly, more concrete study may be needed of the question of how the very large research and development resources that would be freed by general and complete disarmament might be redeployed.

44. We considered what specific resources would be released for development by the four partial measures we adopted as hypotheses. We came to the following conclusions:

(a) A comprehensive test ban. It seems uncertain whether peaceful nuclear explosions will prove to be attractive economically very soon. If they do prove to be attractive economically, it is important that they should be made available to the non-nuclear weapons countries, under appropriate international arrangements. There appears to be great continuing scope for the development and application of nuclear energy; resources released by a comprehensive test ban might directly or indirectly permit an expansion of effort here. The resources involved

would not of course be nearly as great as those resulting from complete nuclear disarmament. It is estimated that complete nuclear disarmament would offer promise of additional benefits. More than 20,000 nuclear scientists and engineers would become available, some of whom could be assigned to assist the peaceful nuclear programmes of developing countries if plans for this purpose were made. If 2,000 tons of fissile material were released for peaceful purposes it would be enough to provide the initial and replacement fuel over their useful life for an installed capacity of about 100,000 electrical megawatts of thermal reactors or an installed capacity of about 500,000 electrical megawatts of fast breeder reactors. For comparison with these figures, the current estimates of the total installed capacity of nuclear power plants are 300,000 electrical megawatts in 1980 and 1,000,000 electrical megawatts in 1990;^{13/}

(b) Chemical disarmament. Biological disarmament has already released resources that are valuable for research into disease, animal and human. Chemical disarmament would add resources useful for ecologically acceptable pest control and toxicological research (see annex III). If the laboratories used for chemical (or biological) warfare work were converted to civil uses and opened up, they would not only offer first-class technical facilities but might also help to engender confidence that disarmament was being observed, the more so if international exchanges were encouraged;

(c) Demilitarization of the sea-bed and deep-sea environment. Sea-related activities of benefit to developing countries could, with appropriate planning, be stimulated by complete demilitarization of the sea-bed and deep-sea environment and by naval and other disarmament. In general, developing countries could share in the benefits resulting from better utilization and management of the ocean space, and from accelerated development of marine resources, for example under international arrangements. These benefits would be made possible by expanded programmes of research and exploration using water-borne devices and remote sensing from satellites and aircraft. Mineral exploitation of the sea-bed could be facilitated, enabling the world community to better utilize this common heritage of mankind;

(d) The elimination of all foreign bases and withdrawal of foreign troops. This measure would influence the balances of payments between the

^{13/} Estimates supplied by the International Atomic Energy Agency.

countries with troops or installations abroad and the countries where those troops or installations are sited. The nations withdrawing troops and facilities would enjoy a gain to their balances of payments and probably a reduction in their total military expenditures - though some of the troops and facilities withdrawn from abroad may be maintained at home. In the areas from which the withdrawals took place, there might be a reduction in foreign exchange earnings. This would be outweighed by the change in political conditions, the possible reductions in local military expenditures and the other developments with which this measure would surely be associated. Nevertheless, there should be an increase in non-military aid where necessary, to facilitate transfer to more normal activities.

45. The Group suggests that as large as possible a proportion of development assistance should be channelled in ways which would contribute to international co-operation in joint projects of rapidly growing importance for the world community. Apart from multilateral assistance programmes, which have advantages over bilateral programmes owing to greater acceptability in some circumstances, emphasis needs to be placed on new international undertakings, such as the establishment of an international régime for the sea-bed, projects to change regional climates and the regional internationalization of certain civil aviation services (e.g. for natural resources surveys and assistance in disasters).

IV. MOBILIZING PUBLIC OPINION IN FAVOUR OF PROMOTING DISARMAMENT AND DEVELOPMENT

46. The goals of international disarmament must constantly be kept alive in the minds of the people of the world, with the hope they raise to avert war, to strengthen peace and security between nations and to foster a climate of co-operation for progress. The Group considers that at the present stage public opinion should be mobilized mainly with a view to following up the results already achieved in the field of disarmament by new steps towards general and complete disarmament. In the continuing multilateral negotiations for disarmament, there are formal commitments to follow up some of the partial agreements already made with further agreements in the same field, for example, a comprehensive test ban in place of a partial test ban, a ban on the possession and production of chemical as well as biological weapons, and also the general demilitarization of the ocean. The Group calls upon public opinion to work for the achievement of agreements on disarmament at all levels - bilateral, regional and international. The idea of the Disarmament Decade could be utilized in such publicity endeavours, not least in order to keep public opinion concerned with obtaining real achievements before the Decade is up. If agreement is reached on holding a world disarmament conference, and if the conference is held, this would facilitate the mobilization of public opinion; and the Group hopes that such a conference would enable all countries, on an equal footing, to compare ideas concerning every aspect of disarmament.

47. Likewise, the goals of promoting economic development in order to secure social development for all people in all nations, must receive a greater share in the building of public opinion everywhere. The plans for the Second United Nations Development Decade should help to keep progress in that direction under constant review.

48. The purpose of mobilizing public opinion for both these imperative goals - disarmament and development - may be effectively served by constantly publicizing reminders of the blatant contrast between the waste of resources on armaments and the great unfilled needs of social and economic development.

49. In particular, the shocking discrepancy between world expenditures for armaments and for aid to the poorer nations should be regularly publicized.

50. In implementing such action schemes for public information, some of the more specific statements and recommendations of this report should be utilized. For example:

(a) In United Nations reports on disarmament and on development the comparison between military and civilian expenditures should be brought to the foreground;

(b) Within the framework of the periodic reviews and appraisal of progress towards achieving the goals and objectives of the International Development Strategy for the Second United Nations Development Decade, progress in disarmament should be given consideration, and considerable publicity should be given to the ensuing debate;

(c) The appeal voiced by a group of experts in 1971 in the report entitled Economic and Social Consequences of the Arms Race and of Military Expenditures^{14/} should be reiterated. The Group wants particularly to support the general recommendation: "In order to draw the attention of the Governments and peoples of the world to the direction the arms race is taking, the Secretary-General should keep the facts under periodic review".^{15/} In particular, the Secretary-General should endeavour to include, in his periodic reports to the Economic and Social Council and the General Assembly on the economic and social consequences of disarmament and of the arms race, statistics for each country, as far as they are available, showing in addition to military expenditures and their impact on social and economic development, development aid given or received. Military aid should also be recorded, both for donor and for recipient nations in relation to the statistics required above, in so far as they are available;

(d) Public discussion in international forums and within Member States should be encouraged in regard to the statement in the present report that unless disarmament savings are accompanied by a sufficient increase in development aid, the income gap between developed and developing countries is apt to widen (see paragraphs 33 and 34);

(e) The imagination of the public in all countries should be kindled by information on conversion possibilities as indicated in paragraph 37 and in the findings of annex II;

(f) Public opinion within Member States should be alerted to the planning for alternative, civilian uses of resources, facilities and

^{14/} See foot-note 2 above.

^{15/} Ibid., para. 120 (4).

manpower, which is recommended to be made as part of planning military production and purchases in paragraphs 40 and 41;

(g) In particular, all media should draw attention to the tremendous inherent potentialities of redirecting military research and development to development objectives, as indicated in paragraph 43 and illustrated in annex III. Comparisons of facts such as the contrast between military research and development costing \$25 billion a year and health research costing only about \$6 billion are telling examples which should be played up by mass media in order to appeal directly to human interest.

51. The objectives of disarmament and development could be effectively promoted if the public in each country were kept informed of hopeful moves in these directions made in other countries.

52. Appeal should be made to mass media in general as well as to the information services of the United Nations and organizations of the United Nations family to develop programmes of information on the subject of this report.

V. SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

53. Disarmament and development are of the greatest importance to the world community. But fundamentally they stand separately from one another. The United Nations has agreed to seek each one vigorously in its own right, regardless of the pace of progress in approaching the other. Specifically, nations have agreed that national and international efforts to promote development should be neither postponed nor allowed to lag merely because progress in disarmament is slow.

54. However, disarmament and development can be linked to each other because the enormous amount of resources wasted in the arms race might be utilized to facilitate development and progress. Furthermore, the blatant contrast between this waste of resources and the unfilled needs of development can be used to help rouse public opinion in favour of effective disarmament, and in favour of the achievement of further progress in development particularly of the developing countries.

55. So far, in the field of disarmament, several important international agreements on certain types of arms have been reached; they have been "partial" or "collateral" measures mostly of a non-armament character. They may have forestalled increases in military spending but they have not reduced it.

56. World military expenditures in 1970 were roughly \$200 billion, i.e. 6.5 per cent of the GNP of the countries of the world. Military expenditures of the countries which provide aid for development are estimated to be approximately 6.7 per cent of their GNP, or 25 times greater than the official development assistance they provide. The major part of the world's military expenditure is made by a very small number of countries; the six main military spenders are responsible for more than four fifths of the total. The developing countries spend approximately 4.2 per cent of their GNP, or only about 7 per cent of the world total, although for some of them, the share of military expenditure in their GNP is high.

57. An agreed programme for the Disarmament Decade does not exist. General and complete disarmament under effective international control remains the main objective. Its achievement would represent a momentous political change and would release massive resources for peaceful uses.

We agree with the authors of earlier studies that there would be no insuperable technical difficulties in ensuring the redeployment of the released resources to peaceful uses. Partial measures are a second best, but more of them may be introduced before agreement is reached on general and complete disarmament.

58. The two principal aims of policies of world-wide economic and social development are the increase in the levels of living of all peoples and the reduction in income disparities both within and between countries. On the basis of the modest achievements of the First United Nations Development Decade, and even if growth objectives of the Second United Nations Development Decade are attained, the problem of reducing mass poverty and unemployment in the less developed regions of the world still remains. More efforts therefore should be made by the world community. While, in the opinion of the Group, developing countries bear responsibility for adopting adequate measures to mobilize their own resources more effectively, and for reducing income disparities, the solution of that problem would, in many developing countries, depend on the contribution to their external resources made by expansion of their exports and also, to a significant extent, on stepped-up foreign assistance.

59. Disarmament would contribute to economic and social development through the promotion of peace and the relaxation of international tensions as well as through the release of resources for peaceful uses. The transfer to peaceful uses of resources used in each country for military purposes will bring about greater satisfaction of civilian needs of the country. The resources thus released, sometimes referred to as the "disarmament dividend", can be redirected to raise standards of living and to promote faster growth.

60. There will be considerable variation among developing countries respecting the magnitude of their own "disarmament dividend". In case of general and complete disarmament - and also, to a lesser extent when the cuts in military expenditure are significant but less than total - economic assistance granted by developed to developing countries could and should be greatly increased and should be given higher priority in the allocation of released resources. Since military expenditures now absorb a larger proportion of the combined GNP of the developed than of the developing countries, a general (proportional) reduction in military expenditures will increase the non-military part of the GNP of the first

group of countries proportionally more than that of the second group. However, a simultaneous increase in the fraction of GNP in the advanced donor countries allocated to international development assistance could not only prevent a widening of the "gap", but contribute greatly to its closing.

61. The Group suggests that consideration should be given to progress in disarmament in the periodic reviews and appraisals of progress towards achieving the goals and objectives of the International Development Strategy for the Second United Nations Development Decade.

62. Most of the resources released by disarmament, total or partial would be readily transferable to other uses - for example, manpower, food, clothing, transport, fuel and products of the metal and engineering industries. Budgetary action to raise civil demand will be enough to induce redeployment of these resources either to investment or to consumption, public or private. But other resources - for example, nuclear weapon plants and military aircraft and missile plants - may not be readily transferable.

63. The Group suggests that Governments, when placing orders for specialized military production or creating specialized plants likely to give rise to transfer difficulties in the event of disarmament, should make advance plans to deal with the redeployment to peaceful work of the manpower and plant (in so far as the latter is reusable).

64. Apart from catering for these areas of special difficulty, all countries might be urged to consider what would be the most valuable ways of redeploying resources from military to civil use and to consider, in particular: (a) which specialized resources now used by the military might make a particularly valuable contribution to development in any area; and (b) in the light of such an assessment, which specialized resources would be suitable as aid or technical assistance from developed to developing countries. Planning of this kind would benefit from international co-operation.

65. Research and development needs special consideration. The world's expenditure of research and development has grown tremendously since the Second World War, but a very large part of the effort has been military. These research and development resources, when diverted to peaceful uses, might have a great impact on development. A large and imaginative increase in peaceful research and development budgets will be required if all, or even a large part, of the research and development manpower

employed on military work is to find peaceful research and development work. There is a vast range of problems in the developing countries and there are huge sophisticated resources absorbed by military research and development in the developed countries. The range of possibilities of transfer appears to be extremely wide.

66. The goals of international disarmament must constantly be kept alive in the minds of the people of the world. The Group considers that at the present stage public opinion should be mobilized mainly with a view to following up the results already achieved in the field of disarmament by new steps towards general and complete disarmament. The Group calls upon public opinion to work for the achievement of agreements on disarmament at all levels - bilateral, regional and international.

67. Likewise, the goals of promoting economic development in order to secure social development for all people in all nations must receive a greater share in the building of public opinion everywhere. The shocking discrepancy between world expenditures for armaments and for aid to the poorer nations should be regularly publicized.

68. The appeal voiced by a Group of Experts in 1971 in the report entitled Economic and Social Consequences of the Arms Race and of Military Expenditures ^{16/} should be reiterated. The Group wants particularly to support the general recommendation: "In order to draw the attention of the Governments and peoples of the world to the direction the arms race is taking, the Secretary-General should keep the facts under periodic review", ^{17/}

69. Public opinion within Member States should be alerted to the planning for alternative civilian uses of resources, facilities and manpower now used for military purposes.

70. Appeal should be made to mass media in general as well as to the information services of the United Nations and organizations of the United Nations family to develop programmes of information on the subjects of this report.

^{16/} See foot-note 2 above.

^{17/} Ibid., para. 120 (4).

ANNEXES

Annex I

STATISTICAL TABLES

Table 1. Gross national product, military expenditures,
and official development assistance to
developing countries, 1970
(billions of dollars)

	Gross national product	Military expenditures	Official development assistance <u>a/</u>
World	3,219	208	
Developing countries <u>b/</u> .	341	14	
Donor countries	2,878	194	7.7
Six main military spenders <u>c/</u>	2,046	171	5.6
Other	832	23	2.2

Source: For GNP and military expenditures, United States Arms Control and Disarmament Agency, World Military Expenditures, 1971 (Washington, D.C., 1972), table II. In conformity with usage followed in the report entitled Economic and Social Consequences of the Arms Race and of Military Expenditures (see foot-notes 2 and 3 above), this Agency was used as source of data for individual countries which have been regrouped for the purposes of the present report. For official development assistance, source was Centre for Development Planning, Projections and Policies of the United Nations Secretariat which used OECD and national sources.

a/ Estimate of assistance given by centrally planned donor countries is annual average bilateral commitments, 1966-1970, as statistics of disbursements are not available. Includes assistance to a small number of developing countries not included, owing to lack of data, among the developing countries covered in tables 1 and 2. Details do not add to total because of rounding.

b/ These countries are identified in table 2, foot-notes b to d.

c/ China, Federal Republic of Germany, France, United Kingdom of Great Britain and Northern Ireland, United States of America, USSR.

Table 2. Developing countries, 1970: population, gross national product, military expenditures and bilateral official development assistance received

Group of developing countries classed by military expenditure as percentage of GNP	Number of countries	Population (million)	GNP (billions of dollars)	Military expenditure		Bilateral official development assistance received a/	
				Billions of dollars	Percentage of GNP	Billions of dollars	Percentage of GNP
5 and over <u>b/</u>	17	219	54	7.2	13.4	1.3	2.4
2.5 to 4.9 <u>c/</u>	18	1,012	151	5.0	3.3	2.6	1.7
Under 2.5 <u>d/</u>	46	428	136	2.0	1.5	1.3	0.9
Total	81	1,659	341	14.2	4.2	5.2	1.5

Source: For population, Demographic Yearbook, 1970 (United Nations publication, Sales No. E/F.71.XIII.1) and Monthly Bulletin of Statistics (United Nations publication). For other data, same as table 1.

a/ Statistics of receipts of multilateral development assistance are not available. Estimate of bilateral assistance received from centrally planned donor countries is average annual bilateral commitments, 1966-1970, as statistics of disbursements are not available. Owing to rounding, percentages do not necessarily correspond exactly to data shown.

b/ Burma, Cuba, Democratic People's Republic of Korea, Democratic Republic of Viet-Nam, Egypt, Iran, Iraq, Israel, Jordan, Khmer Republic, Laos, Malaysia, Republic of Viet-Nam, Saudi Arabia, Somalia, Sudan, Syrian Arab Republic.

c/ Brazil, Central African Republic, Chad, Chile, Congo, Guinea, India, Indonesia, Kuwait, Lebanon, Mauritania, Morocco, Pakistan, Peru, Republic of Korea, Thailand, Yemen, Zaire.

d/ Afghanistan, Algeria, Argentina, Bolivia, Cameroon, Ceylon, Colombia, Dahomey, Dominican Republic, Ecuador, El Salvador, Ethiopia, Gabon, Ghana, Guatemala, Guyana, Haiti, Honduras, Ivory Coast, Jamaica, Kenya, Liberia, Libyan Arab Republic, Madagascar, Malawi, Mali, Mexico, Nepal, Nicaragua, Niger, Nigeria, Panama, Paraguay, Philippines, Senegal, Sierra Leone, Southern Rhodesia, Togo, Trinidad and Tobago, Tunisia, Uganda, United Republic of Tanzania, Upper Volta, Uruguay, Venezuela, Zambia.

Annex IITHE IMPACT ON THE ECONOMY OF THE UNITED STATES OF AMERICA OF
COMPENSATORY ALTERNATIVES TO MILITARY EXPENDITURES a/

1. The percentage of total employment attributable to military expenditure in the economy of the United States in 1970 is estimated to have been 8.4 per cent (table 3). However, the military impact was strong in relatively few industries: ordnance (81.5 per cent), government (30.5 per cent), transportation equipment (27.3 per cent), electrical equipment (17.8 per cent), metal mining (13.3 per cent), and instruments (12.3 per cent). Alternative hypothetical shifts equal to 20 per cent of total military expenditures, from military expenditure to domestic private consumption or to assistance to developing countries in the form of capital goods, or in the form of a broad range of goods, would have negative impacts on total employment and would be sufficiently small so that they could readily be offset by appropriate economic policies. The impacts would differ somewhat in magnitude depending on whether it was strategic or non-strategic military expenditure that was reduced. The number of industries suffering negative impacts would be smaller when the replacement for military expenditure was assistance to developing countries than when the replacement was domestic personal consumption.
2. The proportion of the total use of raw materials in 1970 attributable to military expenditure is estimated (table 4) to have ranged - among the commodities most affected - from 4.8 per cent (petroleum) to 14.0 per cent (bauxite). For all these commodities, except petroleum, demand would increase when military expenditure was replaced by assistance to developing countries, and would decrease when the replacement was domestic personal consumption.

a/ Prepared by the United Nations Secretariat on the basis of statistical estimates by Stephen P. Dresch, Yale University, New Haven, Connecticut, and the National Bureau of Economic Research, New York, N.Y., who was a consultant to the United Nations Secretariat.

Table 3. Impacts of military expenditure and of selected shifts from military to non-military expenditure on employment by industry, United States of America, 1970

	Military use, <u>b/</u> 1970 (percentage)	Percentage change in employment by industry attributable to hypothetical shifts from military to non-military expenditure equal to 20 per cent of total military expenditure <u>a/</u>					
		S/CG	NS/CG	S/AG	NS/AG	S/PC	NS/PC
Ordnance	81.5	-15.6	-14.6	-15.8	-14.7	-15.7	-14.6
Government	30.5	- 4.3	- 6.4	- 4.3	- 6.4	- 4.3	- 6.4
Transportation equipment	27.3	1.3	0.8	- 2.4	- 2.9	- 4.3	- 4.9
Electrical equipment	17.8	1.1	2.7	- 1.8	- 0.1	- 4.2	- 2.5
Metal mining	13.3	- 2.1	- 0.7	- 1.7	- 1.0	- 4.9	- 2.1
Instruments.	12.3	- 0.1	- 0.2	1.4	1.3	- 1.4	- 1.5
Non-electrical machinery	9.6	10.4	8.4	3.5	3.8	- 1.7	- 1.3
Primary metal.	9.6	2.5	2.6	2.1	2.2	- 1.3	- 1.1
Fabricated metal	7.0	1.7	1.8	0.7	0.9	- 0.8	- 0.5
Transportation, warehousing.	5.5	0.3	0.3	1.5	1.5	0.2	0.2
Chemicals, plastics.	5.4	- 0.7	-	2.2	2.8	- 0.3	0.3
Rubber, leather.	5.4	0.7	0.8	1.0	1.1	0.3	0.5
Miscellaneous <u>c/</u>	5.0	- 0.3	- 0.1	- 0.2	-	0.3	0.5
Coal, stone etc.	5.0	0.1	0.3	0.9	1.1	- 0.3	- 0.1
All industries <u>d/</u>	8.4	- 0.3	- 0.5	- 0.3	- 0.5	- 0.1	- 0.3

Source: Estimates by Stephen P. Dresch, Yale University, New Haven, Connecticut and the National Bureau of Economic Research, New York, N.Y., who was a consultant to the United Nations Secretariat.

Note: - signifies negligible or zero.

a/ Based on hypothetical pattern of military expenditure derived from data on the actual composition of military expenditure in 1963 and on total military expenditure in 1970. The hypothetical shifts are identified by the following symbols:

S - from strategic military expenditure

NS - from non-strategic military expenditure

CG - to assistance to developing countries in the form of capital goods (machinery exports serving as a proxy for capital goods)

AG - to assistance to developing countries in the form of all goods exported to developing countries (assuming that all exports to developing countries increase in the same proportion)

PC - to domestic personal consumption (thus assuming that the developing countries receive no additional external resources from disarmament in the United States of America).

b/ Percentage of employment in industry attributable to military expenditure.

c/ Includes government enterprises and research and development.

d/ Includes the above-mentioned 14 industries plus 21 industries in which the percentage of employment attributable to military use is under 5 per cent and for which data are not cited. Impacts of hypothetical shifts in the industries not cited are smaller on average (mainly positive or negligible).

Table 4. Impact of military expenditure and of selected shifts from military to non-military expenditure on consumption of selected raw materials, United States of America, 1970

	Military use, <u>b/</u> 1970 (percentage)	Percentage change in final demand for selected raw materials attributable to hypothetical shifts from military to non-military expenditure equal to 20 per cent of total military expenditure <u>a/</u>					
		S/ME _{CG}	NS/ME _{CG}	S/ME _{CG}	NS/ME _{CG}	S/PC	NS/PC
Bauxite	14.0	1.0	1.2	0.9	1.1	- 2.0	- 2.0
Copper	13.7	0.9	1.1	1.0	1.2	- 2.0	- 1.8
Lead	11.3	1.8	2.1	1.0	1.2	- 1.3	- 1.1
Zinc	11.0	1.7	1.8	1.4	1.6	- 1.5	- 1.3
Nickel	9.7	4.2	4.7	1.8	2.3	- 1.6	- 1.2
Molybdenum	9.3	4.8	5.1	2.3	2.6	- 1.4	- 1.1
Tin	8.8	1.1	1.2	2.1	2.3	- 0.3	- 0.2
Chromium	7.6	2.5	2.7	1.5	1.7	- 0.9	- 0.5
Iron	7.5	2.7	2.9	2.5	2.7	- 0.9	- 0.6
Manganese	7.5	2.9	3.1	2.5	2.7	- 0.9	- 0.6
Petroleum	4.8	- 0.3	- 0.2	0.4	0.5	0.5	0.6

Source: Same as table 3.

a/ See table 3, foot-note a.

b/ Percentage of total use of each commodity.

Annex IIIPEACEFUL USES OF MILITARY RESEARCH AND DEVELOPMENT a/

Military R and D	Peaceful R and D
1. Chemical and biological warfare	<p>High-yielding varieties of staple food</p> <p>Edible protein</p> <p>Pest and vector control</p> <p>Communicable diseases control (including parasitic diseases) <u>b/</u></p> <p>Toxicological research</p> <p>Cancer research</p>
2. Nuclear military programmes	<p>Nuclear energy research and development</p> <p>Nuclear explosions for stimulation of gas and oil reservoirs and for fracturing of ore bodies</p> <p>Nuclear explosions for large civil engineering projects</p> <p>Research on:</p> <p>(i) Small and medium nuclear power reactors for developing countries</p> <p>(ii) Agro-industrial complexes</p> <p>(iii) Desalination</p>
3. Civil engineering institutes for defence work	<p>Urban renewal in general</p> <p>Research on indigenous building and construction materials for developing countries</p>

a/ Prepared by the United Nations Secretariat in co-operation with the secretariat of the World Health Organization. Many of the subjects listed are elaborated upon in the World Plan of Action for the Application of Science and Technology to Development (United Nations publication, Sales No. E.71.II.A.18).

b/ Particularly trypanosomiasis, leprosy, cholera, schistosomiasis.

Annex III (continued)

Military R and D	Peaceful R and D
4. Military aerospace research, engineering, electronics and telecommunications	<p>Housing construction methods for quicker, lower cost production of houses for developing countries</p> <p>Urban waste disposal, sanitary equipment and pollution</p> <p>Highways, railroads, airports for both developed and developing countries</p> <p>Appropriate aircraft and airport facilities for developing countries</p> <p>Artificial organs and limbs</p> <p>Recording of human organs' function for diagnostic and monitoring purposes</p> <p>Models of vital organs (teaching purposes)</p> <p>Observation of various health parameters by means of telemetric technology</p> <p>Environmental health monitoring</p> <p>Improvement of various laboratory control methods through automated instrumentation (higher precision; acceleration; design of various portable medical devices etc.)</p> <p>Improvement of pharmaceutical control</p> <p>Natural resource surveys by remote sensing from aircraft or satellites</p> <p>Fuel cells</p> <p>Solar energy (with or without use of satellites)</p> <p>Geothermal energy</p> <p>Natural disasters warning and meteorological research on tropical cyclones</p>

Annex III (continued)

Military R and D	Peaceful R and D
5. Early detection of ICBM by satellite networks	Natural disasters warning systems
Military telecommunications agencies and institutes	Broadcasting, television
Military space technology	Communications satellites for education and training
6. Systems analysis techniques and computer technology used for military, aerospace and nuclear operations, military computerized data banks	Telephones
	Systems analysis techniques and computer technology applied to development problems, including health planning and operations
	Computer-aided instruction
	Training programmes on computers, data processing and programming in developing countries
	Science and technology information systems for developing countries
	Transfer of technology
7. Naval research institutes	Ocean shipping and ports of developing countries
	Off-shore oil exploration
	Mineral resources of the sea; exploration and inventory of water resources of developing countries
	Tidal power
	Fish research assessment
	Aquaculture R and D
8. Military engineering programmes	Human environment:
	(i) Non-pollutive sources of energy
	(ii) Recycling of waste
	(iii) Research on non-pollutive sources of energy (solar satellites, geothermal, fuel cells and other batteries for automobiles, solar cells)

Annex III (continued)

Military R and D	Peaceful R and D
9. Armaments industries under contracts by the military	Industrial research and design applied to local materials of developing countries - glass and ceramics Metallurgical processing Industrial chemicals Household chemicals for personal hygienic use Processing of natural fibres Plant and equipment design Appropriate technology Industrial research
10. Military institutes for research on food supplies	Storage and preservation of agricultural products
11. Military institutes for petroleum	Research, exploration and development of petroleum and gas
12. Military vehicles research	Design of automobiles adapted to the needs of developing countries Effects on man of noise and vibration
13. Release of classified information	Advances in peaceful research in any number of areas Transfer of technology
14. Armed forces training programmes	Science and technology education Improvement and strengthening of science teaching in secondary schools of developing countries; building up of scientific and technological capacity
15. Military research in physiology, pathology and hygiene	Nutritional problems Health hazards of climate

Annex III (continued)

Military R and D

Peaceful R and D

Occupational hazards and personal
protection

Readaptation processes

Reanimation

Mental health research

Health hazards of ultrasonic waves

Plastic surgery and burns

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