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DISARMAMENT AND DEVELOPMENT: A SURVEY OF THE ISSUES

by

Robin Luckham

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ABSTRACT

This paper is a revised and expanded version of a background study prepared for the United Nations, Department of Disarmament Affairs. The earlier version was drawn on by the UN Secretariat when preparing the documentation for the forthcoming (August 1987) UN Special Conference on Disarmament and Development.*

It argues that disarmament and development are distinct yet interlinked processes and that both are related to security. Military reductions would not automatically release resources for development. Nor would economic prosperity necessarily diminish the conflicts that sustain military spending. Nevertheless there is little doubt that the acceleration of the arms race has made it tangibly more difficult to organise development; whilst depressed global economic conditions have contributed to insecurity.

The first three sections of the paper situate disarmament and development in the context of the multiple international crises that have erupted since the late 1970s, arguing that despite their evident dangers, these crises have also opened up opportunities for change. Different global policies from those now prevailing - based on a recognition of the interdependence between industrial and developing countries - could reverse the cumulative deteriorations which have brought the world to the brink of catastrophe.

The next three sections are devoted to a more detailed examination of the military sector itself and its effects on economic resource allocation, in both the developed and the developing countries. It is argued that although not all the effects of defence spending on the economy are negative, such spending is an unsuitable instrument for short-run economic stabilisation, and tends to depress long-term productivity growth. Better understanding is needed of the factors which account for the growth of military spending as well as of how it relates to differences in development strategy and variations in economic structure.

The final two sections of the paper suggest that war and military spending have aggravated other development emergencies faced by the developing countries: in particular famine, mass population movements, resource scarcities and ecological stresses. Disarmament and the resolution of armed conflict could well be the most effective form of emergency assistance many developing countries could receive.

*Nevertheless it differs substantially from the paper on "Disarmament and Development in All its Aspects, With a View to Drawing Appropriate Conclusions" finally drafted by the UN Secretariat for the Conference.

Biographical Note

Robin Luckham has been a Senior Research Fellow at the Peace Research Centre, ANU since October 1986. He is concurrently a Fellow of the Institute of Development Studies, University of Sussex, England, where he has held a Fellowship since 1974. He was educated at Oxford University and the University of Chicago, and obtained a Ph.D in Sociology from the latter in 1969. He was a visiting professor at the University of Ghana from 1979 to 1982 and has taught or held research positions at Ahmadu Bello University, Nigeria, the University of Manchester, England and Harvard University, USA.

He has written extensively on the military and militarisation in Africa and on different aspects of disarmament and development, including a book on the Nigerian Military, a contribution to the 1985 SIPRI yearbook on militarisation in Africa, two UN consultancy reports and several other edited books, chapters and articles. He edited a special issue of the IDS Bulletin on 'Disarmament and World Development' (Vol. 6, No. 4, October 1985). He has recently been awarded a MacArthur Foundation grant to undertake a research project on weapons and mass culture.

The Changing International Background

Disarmament and development have each been central concerns of the United Nations since the signature of the UN Charter in 1945. The "complex and multidimensional"¹ relationship between the two has been recognised almost as long. As the 1962 Report of the Secretary General on the Economic and Social Consequences of Disarmament expressed it:

The present level of military expenditure not only represents a grave political danger but also imposes a heavy economic and social burden ... both in the highly industrialized countries, which at the present time incur the bulk of the world's military expenditures, and in the less developed areas.²

Similar assessments have been made in subsequent United Nations studies, among which the 1981 Report of the Secretary-General on the Relationship between Disarmament and Development provides the most comprehensive survey of the issues to date. Yet they have had little or no impact on how political priorities and the allocation of economic resources are determined, in an uncertain international environment. As observed in the final Document of the first United Nations Special Session on Disarmament (UNSSOD 1) in 1978:

While it is true that some limited agreements have been reached, 'effective measures relating to the cessation of the nuclear arms race at an early date and to nuclear disarmament' continue to elude man's grasp. Yet the implementation of such measures is still urgently required. There has not been any real progress either that might lead to the conclusion of a treaty on general and complete disarmament under effective international control. Furthermore, it has not been possible to free any amount, however modest, of the enormous resources, both material and human, which are wasted on the unproductive and spiralling arms race and which should be made available for the purpose of economic and social development.³

Seven years later (in 1985) global military spending was, at \$850-\$870 billion dollars, thirty per cent higher in constant price terms than in

¹ Report of the Secretary General on the Relationship Between Disarmament and Development A/36/356, United Nations, New York 1981, p.7, para.21.

² Report of the Secretary General on the Economic and Social Consequences of Disarmament E/3593/Rev. 1, United Nations, New York 1962, p.47, para.166.

³ United Nations, Final Document of Assembly Session on Disarmament (23 May - 1 July 1978) DPI/618-40708 - June 1980:1-2.

1978.⁴ The great bulk of this spending and the greater part of the recent increases were concentrated in the developed countries. Meanwhile the late 1970s had brought the demise of detente. Arms negotiations between the major nuclear weapons powers had become stalemated. And the arms race had accelerated, seeming to enter a qualitatively different phase, with the planned development of entirely new generations of weapons systems. These developments began to undermine the existing system of international security organized around mutual deterrence and quantitative arms limitation, without yet providing any internationally acceptable replacement.

This acceleration of the arms race coincided with and reinforced global economic dislocations. The hierarchical and bipolar structure of East-West relations contrasts sharply, however, with interdependence in the world economy. With only 11 per cent of the world population and 36 per cent of the global product, the United States and the Soviet Union were responsible (according to the Stockholm International Peace Research Institute) for at least 53 per cent of world military spending in 1985 and for some 80 per cent of military R and D, besides controlling 97 per cent of the world's inventory of nuclear weapons. Moreover until the early 1980s their rates of productivity and of growth had lagged, not only behind that of other developed nations, but also behind that of several newly industrializing countries. Their share of the global product and of international trade had also been in decline. Hence a disparity had emerged between the sources of military power and of global economic revitalisation. The consequent structural rigidities complicated the task of managing a complex and crisis-prone international economy.

Coinciding with the renewal of the arms race, the early 1980s also witnessed the worst global economic recession since World War II, from which recovery has been slow and so far incomplete. The consequent "socio-economic imbalances and dislocations", have been:

unprecedented in the post-war period, and quite different in nature and extent from earlier disturbances.⁵

Unlike the earlier cyclical downturn of the mid-1970s which could be accommodated through flexibilities built into the international trade and financial framework (including the recycling of surplus oil revenues through the Eurodollar market and the growth of commercial bank lending to the developing countries),

⁴ SIPRI, World Armaments and Disarmament: SIPRI Yearbook, 1986, Taylor and Francis: London 1986, p.211.

⁵ World Economic Survey 1985 United Nations publications, Sales no. E/185/54 ST/ESA/164 p.73.

the dislocations of the 1980s have not only been world-wide but also, because of the sharp curtailment of the resources for accommodation, much more severe and pervasive.⁶

At the same time both the development and the security of developing countries have been endangered by rearrangements in the structures of economic and of military-strategic risk. Greater priority is attached to access to, and control over, energy, strategic minerals and other natural resources. Major world powers have tended to perceive North-South economic relations in terms of their own short-run geopolitical interests. Official development assistance to the developing countries has been on the decline and is increasingly provided on a bilateral basis. There has been a marked decline in the finance made available through multilateral institutions. Dialogue on the New International Economic Order (NIEO) has virtually ceased. Prospects for global economic negotiations appear as dim as they have ever been since the NIEO was placed on the international agenda in the early 1970s.

Moreover, major increases in the developed countries' military spending have persisted through the subsequent phase of world economic recovery. It is as difficult to ascertain whether causal relationships exist between these increases and the economic upswing as it is to ascertain how far military spending could be blamed for the previous recession. What can, however, be said is that military expenditures may have influenced the direction and pace of recovery. In particular they have been a major factor in the budget, trade, and balance of payments deficits incurred by the major military spenders (especially the United States). These imbalances in turn have made recovery hesitant and uneven, especially as it affects the developing countries. Whatever the short-run counter-cyclical effects of military spending, moreover, it continues to have long term negative effects on economic performance.

The brunt of the adjustments to these global dislocations has been borne by the poorest countries. Developing countries have been obliged to pay higher interest on their external debts at a time when their main export markets (especially those for primary commodities) have remained depressed. Many of them have been obliged to absorb major structural adjustments in their economies - including major cuts in government budgets, social services and employment. Yet their recovery (except that of some newly industrialising countries) has lagged behind that of the developed countries.

Per capita real income of developing countries as a whole is still below the level reached in the late 1970s. "Dozens of countries have lost a decade or more of development".⁷ Thus the economic and social achievements of developing countries over the previous twenty years - when (between

⁶ Ibid.

⁷ World Development Report 1985, Oxford University Press for the World Bank, 1985, p.1.

Table 1: World Output and Military Expenditure, by Economic Groups, 1980-5

	Growth (annual percentage increase)						Share (percentage of world total 1983)
	1980-5 annual	1981	1982	1983 ^a	1984 ^b	1985	
World							
GDP	2.4	1.7	0.8	2.2	4.0	3.5	100 ^d
Military spending	3.2	2.2	6.1	2.7	1.7	3.2	100
Industrial market economies							
GDP	2.1	1.5	-0.2	2.0	4.0	3.0	63 ^d
Military spending	4.9	3.8	6.2	5.4	3.1	6.1	51
Non-market economies ^c							
NMP	3.7	2.4	3.7	4.3	4.0	4.0	21 ^d
Military spending	0.3	-3.0	2.2	0.1	2.0	0.5	30
Developing countries							
GDP	1.8	1.6	0.5	0.0	3.5	3.5	17
Military spending	3.1	7.4	12.6	-0.3	-2.6	-0.8	19

^a Preliminary estimates of world output figures.

^b Forecasts of world output figures and preliminary estimates of military expenditure figures.

^c WTO and China only.

^d World gross national product shares.

Sources: SIPRI Yearbook 1986; Sivard, World Military and Social Expenditures, 1986.

1960 and 1980) GDP growth averaged 6 per cent, infant mortality was halved and life expectancy and school enrolments were substantially increased—are in real danger of being lost. The most severely affected countries are no longer able to feed their own people, let alone find extra resources for development. Millions still live near the margins of existence, without adequate nutrition, safe water, health care or education for their children.

These economic dislocations have also had a direct impact on the military outlays of the developing countries. The rise in their military spending and in their weapons imports has been brought to a halt (Table 1). In relatively few cases, however, have cuts followed from deliberate policy restraint, aimed at transferring resources from the military sector to development. The reasons are complex, but it is clear that the worsened economic situation has been a major factor. Former capital surplus oil-producing countries have seen their foreign balances shrink; other middle income developing countries have found it harder to raise money in international financial markets; and the poorest countries remain crushed by the burdens of international economic instability and underdevelopment. They have neither been able to provide for their own security, nor have been able to find the resources for development.

Nevertheless, these multiple crises in the international arena have also opened important opportunities for change. These are visible in the present economic recovery (despite its unevenness), in the improvement of relations between the major alliance systems and in the resumption of arms negotiations between the United States and the Soviet Union. It is crucial for the future of humankind that these opportunities should not be missed.

The Concepts of Disarmament, Development and Security

The international community's inability to progress on either disarmament or development, suggests that the two concepts and their interrelationship may require some rethinking. Both are abstract concepts which are seldom clearly defined, especially by policy-makers. Nevertheless they have quite concrete consequences: for example, for parents who worry for the future of their children in a nuclear-armed world; for refugees driven from home by war and famine; for peasants who lack access to schools and clinics; and for residents of shanty-towns who have difficulty obtaining clean water, sanitation and employment, whilst their country's scarce resources are diverted to weapons; or indeed for employees in military enterprises who are obliged to find new jobs when military spending is reduced or production is relocated. Both disarmament and development are clearly relevant to their situation; yet we still need to spell out precisely how.

Disarmament is commonly taken to refer to decisions taken by governments to cut military spending or to undertake quantitative and qualitative reductions in stocks of weapons. Yet it would also require the reversal of the powerful social processes that have become embodied in weapons systems, force structures, strategic doctrines and military budgets. Amongst these, military innovation is one of the most crucial,

besides being linked to technological change in the civilian economy. In addition, however, the arms race has called into play a broader range of social, political and economic support structures, at both the national and the international levels. Failure to address them is a well recognised shortcoming of arms control. Quantitative limits on the acquisition or transfer of weapons have all too often been made obsolete by technological progress, economic change or fresh political developments, such as those associated with the renewal of the arms race in the early 1980s.

Thus disarmament cannot be restricted to choices about quantitative levels of arms and military spending. It requires a series of decisions about such matters as the rate and direction of technological progress (including its redirection toward civilian uses), about the reallocation of economic resources, about the international order and about development.

Likewise there is broad agreement that development cannot be quantified purely in terms of growth in the national product, as measured by the particular set of statistical procedures contained in national accounts. Nevertheless some practitioners of development still believe that the benefits of growth – both world wide and in each national economy – will "trickle down" to the least prosperous economies and the poorest people. Others to the contrary, contend that quantitatively measured GNP or net material product is imperfectly correlated with other measures of well-being. Basic needs such as adequate nutrition, clean water, health care, education, employment and protection from the risks of war and conflict are entitlements that neither national governments nor the international community can ignore.⁸ Without them, development is not politically and socially sustainable. It may not even produce the most efficient allocation of economic resources.⁹

Development involves qualitative choices not merely about standards of life but also concerning types of economic and social systems. Development can occur under market or socialist economic systems. It may be externally-oriented toward the international economy, or it may stress economic self reliance. Often in the past, development analysis emphasised the central role of the state as the manager of the process of development. More recently, this view has been challenged by those who contend that economic efficiency can best be assured through the operation of the market. In reality there is an interaction (in different forms and degrees) between the allocation of economic resources through states and through markets, in both centrally planned and market economies. This interaction is of direct relevance here because of the intricate connec-

⁸ See in particular Amartya Sen "Development: Which Way Now?", Economic Journal, 93 (December 1983) and P. Streeten et al., First Things First: Meeting Basic Needs in Developing Countries, New York: OUP for the World Bank 1981.

⁹ Hollis Chenery, et al. (eds) Redistribution With Growth, London, Oxford University Press, 1974.

tions between state policy and the nature of the economic and social arrangements protected by military power.

Disarmament and development remain parallel and distinct processes, although there are many ways in which they can reinforce each other. Both in turn are widely held to be interlinked with security. Whilst conditions of international insecurity and domestic turmoil prevail, it is as difficult to persuade governments to cease arming themselves as it is to plan for development.

Yet security is a still more abstract goal than either disarmament or development. The "collective security" of nations was a term that came into use in the League of Nations following World War I. Since then, however, the word has been combined with other qualifying terms, such as "international security", "regional security", "national security", or "internal security". But none of these terms indicate what it means to say that an international system, a region or a nation-state is secure; nor from whom or what it is thought to be protected. Yet the citizens of modern nation states only accept the obligations governments impose on them in the name of security (for example to pay taxes for defence) on the assumption that they gain real protection from the risks of war, civil strife or economic disruption.

In an economically interdependent world, national and international security have also become closely allied to other uses of the term, such as social security, food security, or energy security. The existence of non-military threats to security is widely recognised; although such recognition by no means implies that it is appropriate to deal with them by utilising military power.

Most of the above uses of the term imply that security is what economists call a public good. But unlike the eradication of malaria, the provision of clean water or roads, it is peculiarly elusive. The best efforts of the major powers to buy security by increasing their stocks of weapons have tended, in the circumstances of the arms race, to become self defeating. The governments of smaller states can scarcely even buy the illusion of security, since many of the decisions that affect their safety are out of their hands. Just as no single individual can eradicate malaria by his or her own unaided efforts, no individual state can eradicate insecurity. National security is attainable only if efforts to assure it can be harmonized at the international level.

Meanwhile, national governments still have to defend the interests of the people they represent, in a confused and hostile international environment. Inevitably they allocate scarce resources to defence. However in order not to become self-defeating, their defence efforts must be no more than proportionate to the threats they face. They should not provoke the very dangers from which protection is sought and they should not damage the fragile framework of international security. Defence must also be provided at least cost to their own economies, preferably in a manner that is compatible with both national and international development. In

sum, choices about defence necessarily imply choices about opportunity costs and therefore about development.

Building Upon the Common Interest : the Reallocation of Resources for Development

Any reallocation of resources from military purposes to development must necessarily involve the major nuclear-weapons states and the two alliance systems. They are the fulcrum of the arms race, and

although many under-developed countries devote significant proportions of their resources to military purposes, the great bulk of the resources released by disarmament would be concentrated in a very few countries.¹⁰

Between them the two alliance systems are responsible for at least three quarters of world military spending. Moreover, since the late 1970s their military outlays have been accelerating. Disarmament thus requires not merely military cuts, but reversing a process of rearmament. It would necessarily involve the construction of alternative security arrangements. It would also require carefully planned short-term shifts in the use of economic resources. Nevertheless, these shifts need not be any greater than those which have already taken place in the opposite direction. They would certainly be much less than those that have occurred in the past, when economies have adjusted to war output or have been converted back to peacetime production, as at the end of World War II.

The scope for the reallocation of resources is amply demonstrated by input-output simulations of the global economy, such as the Institute for Economic Analysis study summarised in the 1981 Report of the Secretary General on the Relationship between Disarmament and Development, as well as the two more recent simulations summarised below. All these studies come to essentially the same conclusions: namely that concomitant cuts in military spending and increases in Official Development Assistance (ODA) would both benefit developing countries and contribute indirectly to the prosperity of the developed countries, offsetting any short run economic losses that might result from disarmament.

One of these simulations, based on the UNITAD model of the global economy, assumes major cuts in global military spending in the 1990s, by which time the world economy is back on a steady growth path and the required disarmament negotiations have been concluded.¹¹ There are two important differences from earlier simulations. First, it is not assumed that the

¹⁰ Report of the Secretary General, Economic and Social Consequences of Disarmament, 1962, p.4.

¹¹ J. Royer, "The Long-Term Employment Impact of Disarmament Policies", Disarmament and Employment Programme, Working Paper No. 3, International Labour Office, Geneva, 1986.

expansion of the developed countries is constrained (in a period of widespread unemployment) by the growth of the labour force. Second, two different scenarios for change in the developing countries are distinguished. In the first, a No Income Distribution (NOD) scenario is simulated, in which the finance released by military cuts are assumed to follow purely from the trickle-down of growth. In the second, Basic Needs (BN) policies are pursued, under which the finance released by military cuts is used to fund the parallel promotion of small scale economic activities in developing countries, alongside their high-productivity modern sectors.

Two alternative sets of assumptions about the disarmament dividend are made. Under the first, the cuts are sufficient to bring Official Development Assistance (ODA) up to the internationally agreed target of 0.7 per cent of donor country GNP. Under a second, more ambitious set of assumptions, donors transfer funds amounting to one third of their military expenditures, and the developing countries themselves also put aside a corresponding one third of their military outlays to finance development programmes. The increases in growth and employment during the period 1990-2000 resulting from this simulation are shown in Table 2.

In developed countries the additional growth and employment would be modest. In the short-to-medium term, military cuts might still cause employment losses and depress demand, until these were offset by the expansion transmitted from the developing countries. In the latter, however, the improvements in growth and employment would be substantial, especially if increased development assistance were combined with Basic Needs oriented economic policies. It would add 1.4 or 1.9 per cent to GNP growth (under the different assumptions concerning disarmament) and create 127 million or 169 million new jobs, besides significantly improving income distribution.

However, a number of important provisos must be stated. Firstly, military cuts and development assistance would only have positive effects if supported by appropriate international measures, including trade liberalisation and easier money.¹² For the gains from disarmament could all too easily be wiped out by non-tariff barriers on the developing countries' exports and increased interest and debt repayments of the kind already burdening the developing countries. Nor would the extra resources generated by military cuts suffice by themselves to deal with the manifold problems of development. For example, even under the model's most optimistic Basic Needs assumptions, real consumption per capita in Sub-Saharan Africa would continue to decline because of rapid population increase and slow agricultural growth. There is no hope of improving the welfare of the

¹² Royer, *op. cit.*, pp.15-17; and L.R. Klein, "Disarmament and Socio-Economic Development", *Disarmament*, Vol. 9, No. I, Spring, 1986.

Table 2: Effects of Disarmament on Growth and Employment Under No Income Distribution (NOD) and Basic Needs (BN) Development Scenarios

Assumptions concerning disarmament	Growth Rates 1990-2000 (% per annum)			
	Developed Countries		Developing Countries	
	No Income Distribution	Basic Needs	No Income Distribution	Basic Needs
Baseline trend: no disarmament	3.3	--	7.5	--
Disarmament: ODA 0.7% of GNP	3.3	3.6	7.7	8.9
Disarmament: 1/3 cuts in Military Spending	3.5	3.7	8.6	9.4
Increases in Employment, Compared to Baseline (millions of additional jobs compared to baseline)				
	Developed Countries		Developing Countries	
	No Income Distribution	Basic Needs	No Income Distribution	Basic Needs
Disarmament: ODA 0.7% of GNP	2	8	19	127
Disarmament: 1/3 cuts in Military Spending	7	10	73	169

Source: J. Royer, "The Long-Term Employment Impact of Disarmament Policies", Disarmament and Employment Programme, Working Paper No. 3, International Labour Office, Geneva, 1986.

great majority of that continent's population without a substantial increase in agricultural productivity.¹³

Major efforts are thus required on the part of the developing countries themselves. This is underscored by the results of a third simulation based on the project LINK model of the international economy. According to this model, military cuts linked to aid increases, bringing the latter up to 0.7 per cent of GDP by 1990, would result in a 1.7 per cent GNP rise in the developing countries and a 0.2 per cent rise in developed countries, on the rather optimistic assumption that all of the additional aid is spent on investment goods.¹⁴ If, however, this assistance were all to underwrite consumption, the GNP of the developing countries would remain approximately the same; whilst that of developed countries would actually fall by 0.3 per cent. The developed countries would only break even if developing countries used at least 60 per cent of the increased resources made available to them to finance productive investment.

The question still remains how the international community can translate the common interests of developed and developing countries into feasible policies for change. A well established feature of the arms race is the transformation through action and reaction of zero sum games (under which each participant seeks temporary advantages at the expense of the others) into negative sum games (in which all participants are worse off than they were before). Likewise, the cumulative deteriorations liable to be produced by protectionist economic policies have become pervasive within the international economy.¹⁵ Instead, the international community should seek ways of making both disarmament and economic improvement cumulative and mutually sustaining positive sum games, from which all can benefit. If it is accepted that the adverse international developments of recent years can be "explained in part by past policy choices as well as underlying economic and social conditions",¹⁶ different policies can help to reverse them.

¹³ Royer, op. cit., p.21. The decline of consumption relates to the 84 per cent of the population in the low-productivity sector of the economy; and occurs in spite of the fact that the model uses optimistic assumptions concerning agricultural growth, which are well above the growth actually achieved.

¹⁴ Klein, op. cit.

¹⁵ However, it has been questioned whether protectionism has been as important as other factors in the present global economic difficulties - such as the disarray in financial policy and long-term productivity slow-down: See Susan Strange, "Protectionism and World Politics", International Organisation, Vol. 39, No. 2, Spring 1985.

¹⁶ World Development Report 1984, Oxford University Press for the World Bank 1984, p.12.

The Benefits and Costs of Disarmament in Developed Countries

Far from disarming, the major military spenders have been transferring resources from civilian to military purpose over most of the past decade. The effects of rearmament on their economies should be assessed, before considering how the increases might be curbed and what economic adjustments would be needed. Unfortunately neither economic theory nor empirical studies provide clear guidance for this evaluation.¹⁷

According to neoclassical economic models of defence, social welfare can be assumed to be:

a function of civilian output and an unobserved variable, security; and that security depends, among other things, on military expenditure. The role of the State is then to balance the welfare benefits of extra security derived from military expenditure with its opportunity cost in foregone civilian output.¹⁸

However, since military goods and services are not cleared in the market place, like other commodities, there is no objective way (short of war) to determine how much military spending is enough. It is conceivable that greater security could contribute to civilian output, to the extent that the investment climate is sometimes influenced by political considerations; although this is a matter on which economic analysis itself provides little help.

In demand-constrained economies, with excess capacity and high unemployment, such as is presently the case in most industrial market economies, it is conceivable that military spending might stimulate economic expansion, at least over the shorter run. Standard Keynesian macro-economic analysis allows that military spending can stimulate aggregate demand and create employment, especially in economies suffering from surplus capacity. More radical strands in economic theory also regard the fiscal stimulant of the "permanent arms economy" as being crucial, but suggest that its benefits primarily take the form of greater profits and employment in the large-scale corporate sectors of the

¹⁷ Useful summaries of the theoretical arguments are provided by Jacques Fontanel and Ron Smith, "Analyses économiques des dépenses militaires", Stratégique, 3, 1985; Dan Smith and Ron Smith, The Economics of Militarism (London: Pluto Press, 1983) and John Tirman, "The Defense-Economy Debate" in Tirman (ed.) The Militarization of High Technology Cambridge, Mass: Ballinger 1984, Chapter 1.

¹⁸ Ron Smith, "The Demand for Military Expenditure", Economic Journal 90, December 1980, p.811.

economy.¹⁹ Nevertheless neither of these analyses provides any basis for thinking that the multiplier effects of defence would be any greater than those of alternative forms of public spending.

Some economists have argued that military spending has positive "spinoffs" on technological progress and productivity in the civilian economy. Others consider that these spin-offs are limited and that the opportunity costs of defence spending relative to more productive uses of resources are substantial, especially over the long run.²⁰ Even in the short run there may be severe constraints upon military-induced expansion. These may result from supply-side shortages of the skilled labour and specialised industrial inputs the military sector requires. They may also arise from fiscal or financial limits, including budget deficits and inflationary pressures curtailing expansion before full employment is reached.

In reality, however, the decision to spend more on defence would almost invariably be taken on political and strategic rather than economic grounds. This in itself introduces political and bureaucratic rigidities which make defence spending an inappropriate instrument of economic management. Not only do defence programmes, especially those involving R&D and weapons procurement, have long gestation periods, making them difficult to cancel, but they also stimulate their own "demand" through arms race mechanisms. The defence budget is not a fiscal tap that can be turned on and off at will to stabilise the economy.

Broadly speaking, empirical comparisons seem to support the view that military spending has high long run opportunity costs, in terms of foregone productivity, investments, employment and growth. Over most of the period since World War II, the United States and the United Kingdom have spent consistently more on defence, relative to GNP than other industrial market economies. Their economies have also performed consistently worse, whether measured by real rates of growth, investment in productive capacity or growth in manufacturing productivity. Conversely, Japan and the Federal Republic of Germany have borne much lighter relative burdens, complementing their more dynamic economic performance. In the centrally planned economies it is also recognised that the "impelled

¹⁹ L.J. Griffin, M. Wallace, and J. Devine, "The Political Economy of Military Spending: Evidence from the United States", Cambridge Journal of Economics, Vol. 6, No. 1 provide a useful summary of this version of the neo-Marxist argument, supporting it with econometric evidence from the United States. See also Miroslav Nincic, "Capital, Labor and the Spoils of War", Journal of Peace Research, Vol. XVII, No. 2, 1980, whose evidence suggests that organised labour rather than capital has benefited most from military increases.

²⁰ Kaldor, Mary, The Baroque Arsenal, New York: Hill and Wang, 1981.

necessity"²¹ of military spending has imposed strains upon the economy, especially in the Soviet Union. (Nevertheless this picture is qualified by the fact that there are some countries, such as France, which have managed to combine large defence outlays with relatively rapid non-military growth, especially in high-technology sectors).

Such comparisons by no means prove that low defence burdens make for good civilian sector economic performance. Yet at the very least they establish that military spending is not essential for economic prosperity. Moreover, they are supported by existing econometric analyses which have repeatedly concluded that military spending has competed directly with civilian productive investment.²² The consequent depressing effects on growth have in general exceeded military expenditure's positive direct effects through technological "spin-offs" and the stimulation of aggregate demand. These findings have been replicated both in international comparisons between countries and by studies within individual countries over different time-periods. Similar conclusions have been reached in studies of developing countries and of centrally planned economies. In the latter, indeed, the trade-off between military spending and more productive uses of resources is even more straightforward, because the Keynesian arguments concerning the stimulation of aggregate demand by military spending simply do not apply.

The evidence concerning the effects of military spending on other economic indicators, including inflation, the balance of payments and employment is less clear. As regards inflation, it is well known that military price increases are more rapid than those of civilian goods, but it is virtually impossible to disentangle increases which are due to "product improvement" (i.e. increments in weapons systems performance) from price increases per se.²³ It might seem that by contributing to budget deficits defence expenditure also adds to inflationary pressure in the economy as a whole;²⁴ but the available empirical evidence suggests that whilst this

²¹ Disarmament Commission, Soviet Peace Committee, Socio-Economic Problems of Disarmament, International Institute for Peace, Vienna, n.d., p.2.

²² The studies are too numerous to be cited in full here. Useful summaries are provided by Fontanel and Smith, op. cit. and by Goran Lindgren, Armaments and Economic Performance in Industrialised Market Economies, Report No. 26, Department of Peace and Conflict Research, Uppsala University, 1985.

²³ Elizabeth Skons, "Military Prices" in SIPRI Yearbook 1983.

²⁴ Michael Moffitt, "Economic Decline, Reagan-Style: Dollars, Debt and Inflation", World Policy, Vol. II, No. 3, Summer 1985.

happens in some industrial market economies it does not occur in others.²⁵ In particular, the United States seems to have accommodated major military increases in recent years, without adding to inflation; but in doing so it has increased its trade and current account deficits instead. There is also a prima facie case that military spending increases balance of payments problems, both directly in the short run, and over the long run through its overall negative effects on the economy; but there is no conclusive empirical proof. Arms exports no doubt helped to offset these adverse balance of payments effects in the 1970s; but they no longer do so in the depressed international arms market of the early 1980s.

A major concern for any government is the effect of military increases or reductions on employment. Whilst it may be true that defence spending creates jobs, empirical studies question whether it creates any more than an equivalent expenditure in the civilian sector.²⁶ Other studies suggest that defence procurement (normally a large share of defence budget increases) creates fewer jobs, because military industries are more capital-intensive than their civilian counterparts.²⁷ Moreover, the use of defence spending to create employment involves costs as well as benefits, especially when the military sector absorbs technical and scientific labor which is scarce elsewhere in the economy. The evidence of cross-sectional econometric comparisons between different countries suggests that there is no clear relationship between the share of military spending in GNP and rates of unemployment. Nevertheless recent studies in France and in the United Kingdom suggest that when this relationship is considered over time, higher military spending has tended to be associated with higher unemployment.²⁸

Yet even if the balance of the evidence is that military spending has damping effects on the economy, military cuts would still necessitate painful economic adjustments over the shorter run. A great deal turns on how the savings generated by the cuts are made available to the civilian

²⁵ Harvey Starr, et al., "The Relationship Between Defence Spending and Inflation", Journal of Conflict Resolution, Vol. 28, No. 1, March 1984, find there was such a relationship in the 1956-79 period in France and the Federal Republic of Germany, but not in the United Kingdom and the United States.

²⁶ There is a useful review of these studies in Nicole Ball, "Converting Military Facilities: Shared Responsibilities and the Need for Planning", Disarmament Research Programme Working Paper (WEP 2-41/WP.1) International Labour Office, Geneva, 1985.

²⁷ Robert W. DeGrasse, Jr., Military Expansion, Economic Decline, New York: Council on Economic Priorities, 1983: 48-49.

²⁸ Lindgren, op. cit.: 19-23 and S. Martin, R.P. Smith and J. Fontanel, "Time-Series Estimates of the Macroeconomic Impact of Defence Spending in France and Britain", Birkbeck College, London and CEDSI, Grenoble, 1985 mimeo.

economy; whether through tax cuts, by reducing budget deficits, through higher welfare expenditures or by means of direct government investment in infrastructure and production.

It is not certain whether the findings of empirical studies based on earlier time periods still apply in present economic conditions. In demand-constrained economies with excess productive capacity and high unemployment, different theoretical and empirical considerations come into play from those relevant to the previous era of steady economic growth. Since the late 1970s, military spending has been the most dynamic element in the government budgets of many developed market economies. It is sometimes argued that the military sector has played a role in the current economic recovery, especially in the United States. Nevertheless, this is an argument which must be approached with some caution. The increases in military spending began before the cyclical downturn of the 1980s, for reasons which were largely independent of it. They took place at a time when the previous Keynesian orthodoxy was being replaced in official circles by monetarist and supply-side economics, to which fiscal pump-priming, by whatever means, was anathema. And military increases did not prevent the early 1980s recession from taking place, even if they might take some credit for the subsequent recovery. But above all, the opportunity costs of military-led reflation are substantial, relative to other ways of effecting economic expansion.

Moreover, military increases also involve potential social costs which are not always adequately considered. The social consensus sustaining the welfare state in many industrial countries has been breaking down. The rise in military spending and accompanying cuts in social expenditures - including foreign aid as well as health, education and welfare outlays - may well reinforce this process. Nevertheless empirical studies suggest that until recently there has been relatively little trade-off at the margin between military and social spending. Over most of the post World-War II period, the considerations that have influenced governments to increase military budgets have on the whole been distinct from those which have led them to spend more on social welfare.²⁹ Sometimes, indeed, they have chosen both, usually with adverse effects upon their fiscal performance. Nevertheless over the longer run (between the early 1950s and the late 1970s) the military share of GDP gradually declined and the size and cost of the welfare state increased, though with variations from one country to another.

For a variety of reasons, both the economic conditions and the political arrangements which permitted this state of affairs to continue seem to have come to an end. The electorates and policy-makers of developed market economies are presently being asked to make more explicit choices between

²⁹ See Bruce Russett, "Defense Expenditures and National Well-being", American Political Science Review, Vol. 76, 1982: 767-777 and William K. Domke et al., "The Illusion of Choice: Defense and Welfare in Advanced Industrial Democracies", American Political Science Review, Vol. 77, 1983:20-35.

military guns and welfare butter. Sometimes the alternatives are posed in purely economic terms, as by those who argue that military spending has a more positive effect on the supply-side of the economy, and thus upon industrial performance, than spending on hospitals, schools or social security. But in reality deep-rooted differences in political philosophy are at stake in the choices being made between national security, welfare and growth.

Most serious empirical analyses suggest (as might be expected) that international insecurity has normally been a major determinant of military spending. But domestic influences have also been important, establishing a causal chain of "reactive linkages"³⁰ between the arms race and the domestic supports for military spending. Several different domestic explanations have been adduced,³¹ including the electoral process; demand management by national governments; the bureaucratic politics of national security bureaucracies; the product cycle for military goods and services; and the planning cycle (in centrally planned economies).³² The relative weight of these factors has seemingly differed from country to country and from one period to another. The situation is further complicated because the two major nuclear powers have tended to adjust their military budgets in the light of each other's military programmes; whereas the other members of their respective alliance systems have tended to follow their lead.³³

None of these partial explanations of military spending, however, adequately capture its dynamic character, and its intricate links with the political process. Better understanding of these links is badly needed, not just to explain the current military increases, but also to delineate how military reductions have been achieved in the past and could be in sought the future.

The Military Sector and Technological Change

The military sector itself is regarded by some as an appropriate starting point for change in the broader economy. It can be viewed as a vast planning system and as a "leading sector" industry: "a breaking up of old and creating of new positions of power, civilisation, valuation, beliefs

³⁰ Charles Ostrom, Jr., "A Reactive Linkage Model of the United States Defense Expenditure Policy-Making Process", American Political Science Review, Vol. 22, 1978:941-957.

³¹ Lindgren, op. cit., 24-34.

³² Miroslav Nincic, "Fluctuations in Soviet Defense Spending: A Research Note", Journal of Conflict Resolution, Vol. 27, No. 4, December 1983.

³³ Smith, "The Demand for Military Expenditure", op. cit.

and practices".³⁴ It is indeed the largest such planning system within the major industrial countries, controlling a major share of the government budget and a not negligible share of GNP. This is so both in market and in centrally planned economies, although in the latter it is integrated within the broader framework of the central planning mechanism. There is no reason in principle why this planning system could not be used to plan military cuts as well as increases.

Nevertheless, the military sector, and in particular the arms industry, shares the difficulties of other planning systems, increased in its case by the special nature of its product and the rapid rate of technological progress. It is commonly held, at least in the industrial market economies, that defence production is inefficient and wasteful because it is sheltered from the cost-minimising discipline of the market. Yet it is extremely difficult to assess its economic performance relative to other sectors; and just as hard to estimate its impact on the rest of the economy through industrial demand and technological spin-offs. The arms industry is in reality a subsystem of production integrating a number of industries (shipbuilding, aircraft construction, military electronics, etc.) cutting across the established industrial base of the economy. Yet at the same time it operates according to different production criteria and maintains a unique cross-sectoral structure shaped by its relationship to a single major purchaser, the defence establishment.³⁵ Neither the prices of military goods, nor changes in those prices can be regarded as reflecting market values:

They do not qualify as a measure of true costs - since the allocation of the contractor's costs to the individual contracts is in practice quite arbitrary - nor as a measure of a value in use. In effect, the market for military goods... suffers the same element of arbitrariness as the "market" in centrally planned economies, and there is no guarantee that the prices used to value output are a sound basis for comparison with other sectors.³⁶

³⁴ J.A. Schumpeter, *Business Cycles*, Vol. 2, New York: McGraw Hill 1939, quoted in Jay M. Stein, "Militarisation as a Domestic Planning Issue", *Urban and Regional Research*, Vol. 9, No. 3, September 1985.

³⁵ Robin Luckham, "Transnational Corporations in the Arms Industry", paper prepared for the United Nations Centre on Transnational Corporations, New York (Institute of Development Studies, University of Sussex, 1984).

³⁶ Judith Reppy, "Labor Use and Productivity in Military and Non-Military Related Industry", paper prepared for the International Labor Organisation, Cornell University, November 1985, p.32.

The defence industries and their products are extremely technology-intensive. World military R & D expenditure, at around \$80 billion in 1985, is between 9 and 10 per cent of global military spending.³⁷ It is highly concentrated in a few countries, with the USA, the USSR, the UK, France, China and the Federal Republic of Germany accounting for more than 90 per cent of the total. In the USA, the UK and France military R&D has ranged between 20 and 30 per cent of gross domestic expenditure on R&D (estimates for the USSR are not available, although the ratio is thought to be at least comparable). It is often argued that it crowds out civilian innovation. Indeed it is not unusual for military R&D to absorb as much as 40 per cent of the budget for the development and procurement of new weapons; whilst in contrast R & D spending in the civilian industries of industrial market economies typically average between 3 and 4 per cent of the value of sales.

Nevertheless, the concentration of high technology in the defence sector does not necessarily translate itself into high labour productivity in defence production. Military R&D is oriented toward "improving" the performance characteristics (firepower, speed, manoeuvrability, accuracy, etc) of the military product; and not toward innovation in manufacturing processes or improved inputs. Studies in the United States have shown that only about a quarter of all innovations are process innovations, of the kind which lead directly to higher productivity; and that the share of process innovations in the military industries has tended to be even lower.³⁸ According to engineering studies of the labour hours needed to perform contracts, defence projects are said to operate at an average of around 30 per cent of established work measurement standards, compared with 85-95 per cent in commercial projects.³⁹ Nevertheless, few direct comparisons have been made between productivity in the defence industries and in industries engaged in comparable civilian production. Those that are available do not suggest quite as dramatic differences as the above studies might seem to suggest.

Turning now to the effects on the broader civilian economy, it is often argued that military R & D generates "spin offs" that increase the rate of technological progress when transferred to the civilian economy; all the more so because most modern production technology is science-based. Even if this is so, the military sector's claims on scarce scientific manpower and technological capacity are so broad-reaching, that the "spin-offs" would need to be truly spectacular to justify such a massive diversion of resources. Yet incomplete data for patents arising out of federal contract R&D in the United States suggest that there is relatively little export and import of R&D between the defence industry and other sectors of the

³⁷ World Armaments and Disarmament: SIPRI Yearbook 1986, Chapter 15.

³⁸ F.M. Sherer, Innovation and Growth Cambridge, Mass: MIT Press, 1984, chapter 3.

³⁹ These estimates are again for the United States and are quoted in Reppy, op. cit.

economy.⁴⁰ It is true that many of the most critical industrial technologies in use today, like numerically controlled machine tools, integrated circuits and computer-aided design, were originally developed for military use. However, the argument that such technologies would not have emerged without or at much reduced levels of military R&D, though plausible, is well nigh impossible to settle. It is clear that the commercial advantages accruing to the firms and countries that originally developed the technologies have been ephemeral.⁴¹ In the case of numerically controlled design and integrated circuits, United States firms have been elbowed out of global markets by competitors in Japan, Europe and the more advanced NICs. So far only in computer-aided-design technologies have they been able (at least temporarily) to translate the impetus provided by military R&D into market dominance.

Though commanding immense assets, in sum, the military industries are not an efficient base for technological progress and productivity growth in the civilian economy. In order to recapture the benefits of technological progress for productive purposes, major rigidities have to be overcome: both in the defence sector itself; and in the allocation to it of the lion's share of scarce scientific resources by national governments.

Disarmament and Economic Performance in Developing Countries

The first concern of the less developed countries is the eradication of poverty. Disarmament is relevant to the extent that it can be demonstrated, not simply assumed, that it improves conditions of life for those whose horizons are limited by low incomes, disease, hunger, exploitation and conflict. It can do so in four main respects. Firstly, some of the savings from military cuts in developed countries can be used to increase development assistance, in the manner described earlier. Secondly, disarmament is relevant to the extent that the arms race has added to the disarray in the global economy and thereby to the less developed countries' economic difficulties. Thirdly, by reducing global insecurity and conflict, disarmament can facilitate the reduction of military spending. Finally, cuts in the developing countries' own military expenditures can release their domestic resources for development.

However, the scope for cuts in many developing countries is limited. Since peaking in 1982, their military spending has indeed declined. Previously it had increased faster than that of developed countries, more than doubling in real terms in the 1960s and almost doubling again in the 1970s; rising from some 3.6 per cent of the developing countries aggregate GNP in 1960 to 4.3 per cent in 1970 and 5.5 per cent by 1982. However, this military spending has always been unevenly spread. The bulk has been

⁴⁰ Sherer, *op. cit.*

⁴¹ Raphael Kaplinsky, "Guns and/or Butter: the Relationship Between the Economy and the Military", *IDS Bulletin*, Vol. 16, No. 4, October 1985: 73-79.

concentrated in the oil exporting and other higher income developing countries. Their relative shares of total spending by the developing countries on the military in 1985 were 48 and 30 per cent respectively; as compared with only 22 per cent for all the remaining less developed countries.⁴² The transfer of weapons to developing countries declined even more sharply in the first part of the 1980s, after the rapid increases of the previous two decades (Figure 3). A small number of countries, the majority either oil exporters or located in the Middle East (or both), have continued to dominate the arms import market.

Nevertheless, it is not easy to assess the developing countries' military burden or to reach firm conclusions concerning the effects on economic performance. Military expenditure and arms trade figures are often unreliable and protected by official secrecy. Moreover, such figures are seldom disaggregated in a way that permits detailed examination of the effects on the economy. It is almost never possible to ascertain the foreign exchange component of military budgets. The financial terms of arms purchases are seldom disclosed. The contribution of military spending to balance of payments problems and debt can at best be imputed, not directly measured. The military expenditure figures provided in the main international statistical sources do not distinguish between capital and recurrent expenditures. Nor do they include other security expenditures such as spending on paramilitary forces or the police. Some of these breakdowns are provided in national budgets, but the latter vary greatly in coverage and are not always easy to obtain.⁴³ The difficulties are not confined to the military figures alone. Many of the standard macroeconomic indicators - national accounts, government budgets, balance of payments figures - presuppose the economic structures of industrial market economies. Hence they are of limited value in diagnosing the problems of the less developed countries.⁴⁴

The argument that military outlays are a form of unproductive expenditure seems all the more compelling in developing countries. Funds used to pay the salaries of soldiers cannot be used for agricultural extension programmes or schools. Scarce foreign earnings diverted to purchase military equipment cannot be used to import tractors, industrial machinery and medicine.

⁴² World Armaments and Disarmament: SIPRI Yearbook, 1986, Table IIA.1, p.231. These figures exclude China, categorised with the 'Non-market economies' in the SIPRI estimates.

⁴³ These statistical problems are fully described in Nicole Ball, Third World Security Expenditure: A Statistical Compendium. FOA Report C10250-M5, National Defence Research Institute, Stockholm, 1984; and Michael Brzoska, "Arms Transfer Data Sources", Journal of Conflict Resolution, Vol. 26, No. 1, 1982.

⁴⁴ Dudley Seers, "Statistical Needs" in Political Economy of Nationalism, Oxford University Press, Oxford 1983.

Military expenditure depresses capital formation directly through the trade off between defence outlays and government investment (although there is rarely a one-to-one correspondence, since other budget items or the government's current account surplus can also be adjusted).⁴⁵ It reduces capital formation indirectly by diverting other cooperating factors of production, such as skilled labour, infrastructure or vital intermediate inputs. It also aggravates one of the most crucial bottlenecks faced by planners in developing countries, the shortage of foreign exchange. The opportunity costs of military hardware are especially high since most developing countries are obliged to purchase from the international arms market. Nevertheless military budgets do not necessarily require heavy capital outlays and foreign exchange costs. The share of arms purchases relative to other budget components - expenditures on administration, barracks, wages and salaries - varies significantly from country to country.⁴⁶

It has sometimes been suggested that defence spending may also stimulate economic performance.⁴⁷ As in the developed countries, it can create "spin-offs", transferring technological capacity and forming aptitudes and skills that may be used in civilian production. When there exists underemployment and underutilised productive capacity, as is often the case, military spending can stimulate aggregate demand and create employment. By contributing to security and the creation of a strong developmental state, military spending may increase the capacity of the government to manage the economy; in addition to which it may encourage savings and investment by stabilising economic expectations.

There is no conclusive way of settling whether the negative effects exceed the positive stimulation. It seems likely, however, that most of the positive "spin-offs" would be concentrated in a limited number of developing countries particularly those which assemble or produce their own weapons. Even in their case, it is uncertain whether the specialised technology embodied in weapons systems and arms production is easily transferable to the civilian sector. A crucial case study in one of the countries (India) where "spin-offs" are most likely to occur, suggests that defence spending has had an almost negligible impact on unit costs

⁴⁵ For further elaboration of the points developed in this paragraph, see Saadet Deger and Ron Smith, "Military Expenditure and Development: The Economic Linkages", IDS Bulletin, Vol. 16, No. 4, October 1985.

⁴⁶ Nicole Ball, "The Security Sector, the Budget and Development", IDS Bulletin, Vol. 16, No. 4, October 1985.

⁴⁷ Emile Benoit, "Growth and Defence in Developing Countries", Economic Development and Cultural Change, Vol. 26, No. 2, 1978; and David Evans, "Back to Benoit?", IDS Bulletin, Vol. 16, No. 4, October 1985.

and industrial output in a range of military-related industries.⁴⁸ Furthermore, in many developing countries any multiplier effects created by military spending would tend to be limited by supply-side constraints, such as shortages of skills, of intermediate inputs or of foreign exchange.

The way defence is financed is as crucial as in the developed countries. However, in the absence of strong tax bases and well-developed securities markets, there is a strong temptation for governments to resort to money-financed budget deficits and inflation. Alternatively they may reduce spending on other items in the state budget, such as social expenditures or investment in agriculture.

The evidence concerning the trade-offs between military budgets and social expenditures is fragmentary and based mainly on one continent, Latin America. A recent time-series statistical analysis of spending on education and defence in eighteen Latin American countries between 1948 and 1978, found that in no less than six countries the military and education budgets increased and declined simultaneously; in seven countries there was no significant relation one way or the other; and in only one country were military increases associated with education decreases.⁴⁹ Clearly the allocation process varies widely from country to country. One reason military and education expenditures do not always compete with each other could be that both tend to be favoured by developmentally active governments, or alternatively by governments wishing to buy social support for military increases. Another, is that both military and education expenditures tend to be associated with powerful urban pressure groups. Hence it is more likely that budget cuts will be made in expenditures benefiting marginalised groups and sectors, which lack access to the public policy process. This affects not only social programmes, but also productive activities in the informal sector and in agriculture. There is some preliminary statistical evidence that high military burdens have tended to correlate with low agricultural shares in the GDP.⁵⁰

⁴⁸ Saadet Deger and Somnath Sen, "Military Expenditure, Spin-off and Economic Development", Journal of Development Economics, Vol. 13, August 1983.

⁴⁹ Joel G. Verner, "Budgetary Trade-offs between Education and Defence in Latin America: a Research Note", Journal of Developing Areas, 18, October 1983.

⁵⁰ R. Faini, P. Arnez, and L. Taylor, "Defence Spending, Economic Structure and Growth: Evidence Among Countries and Over Time", Economic Development and Cultural Change, Vol. 32, April 1984.

In the final analysis, whether the negative predominate over the positive effects of military spending is an empirical question. Earlier and methodologically cruder studies found military expenditures to be positively associated with measured economic growth.⁵¹ The bulk of more recent studies have come to a different conclusion. Using sophisticated multi-equation models they show that military spending can sometimes have a positive direct impact on growth; but almost invariably this is neutralised or outweighed by the negative effects upon savings, investment and the formation of human capital.⁵²

Nevertheless, most of the studies are based on data covering the period of steady growth that ended in the 1970s. It remains to be seen whether their conclusions will remain valid following the major economic discontinuities introduced by the global recession of the early 1980s. A recent empirical study,⁵³ based on World Bank indicators of economic performance for a sample of developing countries during the 1970s, suggests that some rethinking may be required. Not only did the direct positive effects of military spending outweigh the negative effects, but also military spending correlated positively with a number of indicators of the capacity of the state to undertake development planning.

The conclusions that can be drawn from such statistical comparisons are also limited by qualitative discontinuities; between different ways of organising development, as well as between different time-frames. Military spending cannot be expected to have precisely the same effects in capital surplus oil-exporting countries, where foreign exchange constraints could (until recently) be disregarded; in newly industrialising countries (NICs) where the potential stimulus of military upon industrial growth has been greatest; and in lower-income economies where the burden of military spending presses most severely on scarce resources. The structural adjustment and austerity programmes required of large numbers of developing countries as the price of debt rescheduling and international credit have often imposed heavy social costs. Such programmes were in effect under IMF stand-by and extended agreements in close to 70 countries

⁵¹ Benoit, op. cit.

⁵² The most comprehensive survey of the empirical evidence is to be found in Saadet Deger, Military Expenditure in Third World Countries. The Economic Effects, London: Routledge and Kegan Paul, 1986. See also Faini et al., op. cit. and D. Lim, "Another look at Growth and Defence in Less Developed Countries", Economic Development and Cultural Change, Vol. 31, No. 2 (1983).

⁵³ David Evans, "Back to Benoit?", IDS Bulletin, Vol. 16, October 1985.

during the period 1980-1984;⁵⁴ and could well have increased the demand for security expenditure.⁵⁵

There is an intricate relationship between military spending and the exercise of state power. One way of describing this relationship is in terms of the military sector's "output" of force or threats to use force. This output could well have as much bearing on development as the demands that military spending places on a society's resources. It may be negative when a government uses force simply to stay in power or to implement inappropriate and unpopular development policies. It may be positive, to the extent that a basic assurance of stability and public order is required for any strategy of development to remain viable. However, it is difficult in practice to evaluate particular uses of military power without forming political judgements about the policies being implemented with their backing. Around half the developing countries are presently ruled by governments of military origin. Not all such governments, to be sure, lack popular support: nor do all increase their military spending. Yet neither does military rule necessarily imply strong, effective government. Often, to the contrary, it is evidence of the fragility of power and of the persistence of deep-rooted conflicts.

It is difficult, therefore, to separate analysis of the effects of military spending from its causes. A recent cross-national statistical study,⁵⁶ based on data from a sample of developing countries in the period 1973-1980 permits some limited conclusions to be drawn. Four major factors were found to have an independent influence on the military burden, as measured by the proportion of military expenditure in GDP and by the military budget's share of total central government expenditure.

First, the military burdens of countries involved in armed conflicts were one and a half to two and a half per cent higher and absorbed six and a half to seven and a half more percentage points of the central government budget than in other developing countries, after the effects of other variables had been controlled for. Secondly, military government - especially when associated with frequent use of violence against the public - was found to be associated with higher military spending. Under military regimes, the share of military expenditure relative to GDP was some two percentage points higher and the military component of the central government budget was four to four and a half per cent higher than

⁵⁴ United Nations, 1985 Report on the World Social Situation, ST/ESA/165 E/CN/5/1980/2/Rev. 1, page 9.

⁵⁵ Though see H.S. Bienen, and M. Gersovitz, "Economic Stabilisation, Conditionality and Political Stability", International Organisation, Vol. 39, No. 4, Autumn 1985, for a somewhat skeptical assessment of this argument.

⁵⁶ A. Maizels, and M.K. Nissanke, The Determinants of Military Expenditures in Developing Countries, Department of Political Economy, University College of London, Discussion paper 85-18, April 1985.

under constitutional governments. Thirdly, the availability of foreign exchange earnings from the international economy (notably from the oil sector) was a major determinant. Fourthly, military spending tended to be higher in countries embedded in global strategic alliances. Countries depending wholly or mainly on one external supplier of military equipment tended, on average, to have a two and a half per cent higher military share in the government budget, than developing countries with more diversified arms procurement. There were significant variations from region to region, with stronger statistical relationships in Asia, in the Middle East and in Africa (where it was armed conflict and non-constitutional government that were the dominant influences) than in Latin America.

Each of the major determinants of military spending is linked in a complex web of interrelationships; and each directly influences the process of development. Wars and armed conflicts are sometimes a consequence of development failures, and almost always impose heavy economic and human costs on the countries involved in them. Political and strategic alliances between major world powers and the governments of developing countries influence the flow of military and non-military aid and other financial transfers; as well as shaping development choices.⁵⁷ Adding to the incentives to acquire arms, there are the supply-side pressures emanating from the arms industries of the major military producers. Yet efforts to increase exports in order to earn the foreign exchange required for military or other government purchases, foreclose other more self-reliant development options.⁵⁸

The policy choices available to the governments of developing countries are correspondingly limited. Although many governments are aware of the opportunity costs of defence, their decisions to increase or reduce it are usually influenced by quite separate considerations. In some countries, reductions are unlikely to occur without significant changes in domestic political power structures and economic arrangements. In others the major obstacle is regional and international insecurity.⁵⁹ Much could be done to strengthen the regional security and conflict-reduction mechanisms of developing regions themselves. This task - and the reallocation of resources to development - would be far easier if developing countries

⁵⁷ Robin Luckham, "Disarmament and Development: The International Context" and "Anarchy or Transformation? Scenarios for Change" in IDS Bulletin, Vol. 16, No. 4, October 1985.

⁵⁸ Robin Luckham, "Militarism and International Dependence" in M. Graham, R. Jolly and C. Smith (eds) Disarmament and World Development, Oxford: Pergamon Press, 2nd ed. 1986; and Michael Brzozska, "Militarization and the Foreign Economic Exposure of Third World Countries", Development and Peace, No. 5, Autumn 1984: 148-60.

⁵⁹ M. Abdul-Monem Al-Mashat, National Security in the Third World, Westview Press, Boulder, Colorado, 1985.

could be released from their strategic alliances with major powers as part of a global process of disarmament.

Armed Conflict as a Development Emergency

The World Health Organisation has described nuclear conflict as the final epidemic. If it were ever to occur, it would destroy hundreds of millions of human lives and cause irreversible harm to the natural environment. Yet much less consideration has been given to other potential collateral effects, including the disruption of the international economy, secondary conflicts over resources that remained uncontaminated, the disintegration of entire political systems and a situation of international anarchy.⁶⁰

In some developing countries disaster has already struck. Ecological destruction - soil degradation, the cutting down of forests, desertification - is in many areas almost irreversible. Recession has propelled some of the poorest economies - especially those in Sub-Saharan Africa - from stagnation into outright decline. While the developed countries contemplate the prospect of potential nuclear holocaust, parts of the developing world are already engulfed in violence: both the direct violence of armed conflict, and the silent emergencies of famine, disease, mass population movements and poverty. Any inventory of those most at risk from such emergencies would overlap with those at risk from war. The target-groups of poverty-focused development assistance are too frequently also the victims of military violence.

War and conflict are thus links in a wider chain of actual and potential catastrophe. Almost all recent analyses of disaster situations concur that the human damage has been rising. Yet in few cases are changed geophysical and natural conditions sufficient to explain the increases.⁶¹ In famines, for example, it has been demonstrated that absolute food shortages are no more crucial than distribution breakdowns, lack of employment, income losses and failures in social support systems.⁶²

Most of these disasters are in principle avoidable. It cannot be denied, of course, that they have deep social, economic and political roots. Nor is it easy, in the case of armed conflicts, to envisage the abolition of the insecurity that sustains them. Seeing war, however, as part of a

⁶⁰ Yves Laulan, "Economic Consequences: Back to the Dark Ages" in Royal Swedish Academy of Sciences, Nuclear War - the Aftermath, special issue of *Ambio*, Pergamon Press, Oxford 1983.

⁶¹ Anders Wijkman, and Lloyd Timberlake, Natural Disasters: Acts of God or Acts of Man?, London: Earthscan, 1984 and K. Hewitt (ed), Interpretations of Calamity, Allen and Unwin, London 1983.

⁶² Amartya Sen, Poverty and Famines: an Essay on Entitlement and Deprivation, Clarendon Press, Oxford 1981.

broader family of emergencies within a fragile and interdependent world, is another way of reasserting the mutual interdependence of disarmament and development. If the international community accepts that famine, desertification and mass flights of human populations are emergencies whose causes as well as symptoms must be addressed, it must also give priority to the quest for a securer, less conflict-ridden international order.

Enormous difficulties surround estimation of the spread of war and of its human and material costs. About broad trends, however, there is little dispute. More wars have occurred since World War II and more have been killed in them than at any period in history except the two World Wars themselves. According to one recent estimate, some 120 wars (involving more than a thousand casualties) have taken place since 1945, bringing in their train 19 million or so deaths, more than 60 percent of them civilians.⁶³ Another analysis using broader definitions, estimates no less than 277 wars between 1945 and 1982, all but 18 in the developing regions; 15 were major wars between states, 62 were border conflicts and the remainder (200 or 72 per cent of the total) were internal civil conflicts.⁶⁴ A third study estimates 192 conflicts, involving 27 million combatants. These brought about some 51 million civilian and military casualties (including those wounded and missing) and converted some 49 million people into internal or international refugees.⁶⁵ A majority of these conflicts have been marked by various forms of intervention by the developed countries⁶⁶ - varying from covert assistance or limited logistical support to full participation, often at the invitation of one or another of the local participants.

The scale of human tragedy is as great as any of the other emergencies that have beset the developing world. As can be seen in Table 3, the annual numbers of persons killed in wars in the 1960s and 1970s substantially exceeded those dying directly from all other major categories of emergency. It is conceivable that the disaster estimates on which the table is based err on the conservative side and that war casualties tend to be exaggerated. In addition, there is an element of double-counting, since war casualties sometimes include civilian victims of economic

⁶³ Computed from lists in Ruth Leger Sivard, World Military and Social Expenditures, Washington: World Priorities, 1985: 9-11.

⁶⁴ Michael Kidron and Dan Smith, The War Atlas, London: Pan, 1983, charts 1-4. They define war as open armed conflict in which regular uniformed forces are engaged on at least one side: the fighters and the fighting are organised centrally to some extent; and there is some continuity between armed clashes.

⁶⁵ J.F. Dunningan and A. Bay, A Quick and Dirty Guide to War, Morrow, New York 1985, p.335.

⁶⁶ Report of the Secretary General, Study on Conventional Disarmament, A/39/348 (1984) Paras.55-56, p.15.

Table 3: Human Costs of War and Other Emergencies

Type of Event	Number Dying Per Year (Thousands)		Number of People Affected Per Year (Thousands)	
	1960s	1970s	1960s	1970s
Drought	1	23	18,500	24,400
Flood	2	5	5,200	15,400
Tropical Cyclones	11	34	2,500	2,800
Earthquakes	5	39	200	1,200
Others (a)	6	42	1,300	4,500
Total Disasters	23	143	27,700	48,300
Deaths in Wars	439	587	n.a.	n.a.
Civilians as Percentage of War Dead	52%	68%	--	--

Note: (a) includes some victims of civil strife and conflict.

Sources: Disaster casualties are Red Cross figures presented in Anders Wijkman and Lloyd Timberlake, Natural Disasters: Acts of God or Acts of Man? London: Earthscan, 1984. War deaths are from Ruth L. Sivard, World Military and Social Expenditures, 1985.

Figure 4: War, Drought and Famine in Africa (1984)



Source: UNICEF, Within Human Reach: A Future for Africa's Children, 1985, p.19.

warfare and war-induced famine; whilst disaster estimates in their turn include the casualties of civil strife. Nevertheless, the differences are large enough to sustain the comparison.

As the figures indicate, the risks of war are increasingly borne by civilians. In World War I only around 11 per cent of casualties were civilians; in World War II the corresponding proportion had risen to 53 per cent. In the wars of the 1960s, 1970s, and 1980s it was 52, 68, and 76 per cent respectively. The new generations of conventional weapons, such as cluster and fragmentation bombs, napalm and fuel-air explosives, cause indiscriminate damage across far wider areas than existing munitions. Devastation is increased by the use of techniques of economic denial, including the destruction of crops and human settlements and economic blockades. Added to this, there is the fact that many conflicts are not conventional wars between states, being rooted in deep social antagonisms within local communities and national societies; often sharpened, however, by the external impetus of the Cold War.

Most major emergencies affect many more people than those whose deaths they cause directly, as can be seen in Table 3. So do war and armed conflict. Yet there are no estimates that are even remotely reliable. One major consequence of any war situation is the displacement of large numbers of persons from their homes, employment and livelihood. There are currently about 11 million refugees worldwide, the great majority (approximately 9 million) migrating from and finding refuge in the developing countries.⁶⁷ In addition, there are millions displaced within their own countries, whose numbers can only be guessed at within very wide margins of error. One source estimates that they could amount to anywhere between two and a half and seven and a half million.⁶⁸

War has often combined with and aggravated other emergencies. As Figure 4 illustrates, the African countries seriously affected by drought and famine overlap with those which have been disrupted by armed conflict, a pattern not uncommon in other parts of the developing world. There are many other reasons why famines occur. Yet in societies where millions live near the margin of existence war has frequently provided the critical exogenous shock that dislocates the rural economy, interrupts food chains and spreads hunger in its wake. War may destroy crops or prevent them being harvested. It may obstruct seasonal migrations of pastoralists in search of water for their animals. It may prevent the free flow of food between different rural areas, disorganise markets and drive up food prices. It may destroy employment opportunities and lead to panic sales of land, livestock and household assets. And it often precipitates large scale population movements, bringing decline to some parts of the rural

⁶⁷ The estimates are based on UNHCR figures for 1984. They do not differ significantly from figures in the US Committee for Refugees' World Refugee Survey 1984 and in the US Department of State's World Refugee Report, 1985.

⁶⁸ World Refugee Survey 1984, *op. cit.*, p.41.

economy and exporting famine to others. All of these events are links in the chain of social breakdowns that are known to produce famines.⁶⁹

There is a cumulation of evidence that the suffering caused by war is unevenly spread. Like other disasters it tends to have a more severe effect on the more vulnerable and discriminated-against groups: women, children,⁷⁰ refugees, the poor and the low in status. Refugees are more likely to fall sick, suffer mental illness and lack medical care, relative both to those they have left behind them and to their host communities.⁷¹

A detailed case study of demographic trends in rural Bangladesh during and after the 1971 civil war found major increases in the mortality rate during the two critical years, due mainly to food shortages and disruptions in medical services. This resulted in approximately half a million deaths in excess of those which would normally have occurred during the time period in question.⁷² Other studies in South-East Asia, suggest that wars have had especially severe effects on agricultural output and have induced long term declines in the rural economy which have proved difficult to reverse.⁷³

In sum, relief from the burdens of armed conflict and international insecurity may be the most crucial form of emergency assistance many developing countries could receive. No adequate estimates exist of the financial costs of recent wars in the developing countries. Studies of

⁶⁹ These are extrapolated from Peter Cutler's general model of famine in The Use of Economic and Social Indicators in Famine Prediction and Response. Report prepared for the Overseas Development Administration, Research Scheme No. R3779; Food Emergencies Research Unit, London School of Hygiene and Tropical Medicine, September 1985.

⁷⁰ J.P.W. Rivers, "Women and Children Last: an Essay on Sex Discrimination in Disaster", Disasters, Vol. 6, No. 4, 1982.

⁷¹ Dick Bruce and Stephanie Simmonds, "Refugee Health Care: Similar but Different?", Disasters, Vol. 7, No. 4, 1983.

⁷² G.T. Curlin, et al., "Demographic Crisis: the Impact of the Bangladesh Civil War (1971) on Births and Deaths in a Rural Area of Bangladesh", Population Studies, Vol. 30, No. 1, 1976.

⁷³ Meng Try Ea, "War and Famine: the Case of Kampuchea", in Bruce Currey and Graeme Hugo, Famine as a Geographical Phenomenon Geojournal Library, vol. 1.

individual wars suggest they can be substantial.⁷⁴ Most crucial of all, war makes it tangibly more difficult to plan long term development in regions where it is entrenched - as in Southern Africa, the Horn of Africa, Central America and parts of South and South-East Asia. Even if there may be other reasons for poor development performance, for which armed conflict should not provide an alibi, these in turn are often made worse by the effects of war and insecurity.

Encroachment by the Arms Race on the Global Commons

Broadly conceived, resources - oceans, the atmosphere, fresh water, forests, agricultural land as well as mineral resources - are part of the common heritage of human-kind. However, both military and economic developments have led to their use for more narrow purposes, in an international process which can be likened in some respects to the enclosures of common land in late medieval Europe. A strategic dimension has been added by the global military deployments of the major military powers, under the influence of the concept that defence has unlimited perimeters. These strategic deployments have also been sustained by a perception among Western industrial countries, especially widespread after the world energy market dislocations of the 1970s, that they face serious non-military threats to their security.

Encroachments on the global commons also threaten global security in the more comprehensive sense of the term analysed earlier in this paper. They interconnect with a series of global resource deficits, some of which are spelt out in Table 5. Indeed it has been argued that the sustainability of human life on this planet is in the balance as a result of the greenhouse effect' produced by pollution, deforestation and the exhaustion of the atmosphere⁷⁵; not to speak of the 'nuclear winter' which might follow a nuclear war.⁷⁶

⁷⁴ The Nigerian Civil War of 1967-70 is one of the few cases where a serious effort has been made to establish the economic costs of conflict. See "Proceedings of the Conference on National Development and Development in Nigeria", March 1969; and E. Wayne Nafziger, The Economics of Political Instability Nigerian-Biafran War, Boulder: Westview 1983. The long-term economic effects of the war were much less than they might have been, due to the fact that they were offset by large increases in Nigeria's oil revenues in the early 1970s.

⁷⁵ A.B. Pittock, Climatic Catastrophes: the International Implications of the Greenhouse Effect and Nuclear Winter, Working Paper No. 20, Peace Research Centre, Australian National University, Canberra, 1987.

⁷⁶ Ibid. The baseline studies of the effects of nuclear war include Royal Swedish Academy of Sciences, Nuclear War - the Aftermath, special issue of Ambio, Oxford, Pergamon Press, 1983; P.R. Erlich, et al., The Nuclear Winter: the World After Nuclear War, London, Sidgwick and Jackson, 1984; and the two reports by the Scientific Committee on Problems of the

Although such deficits are usually characterised in ecological terms - the depletion of non-renewable resources and the conversion of renewable resources into non-renewable ones - they translate sooner or later into economic shortages. For as the Worldwatch Institute has put it,

Economic deficits may dominate our headlines, but ecological deficits will dominate our future. Accounting systems signal when a country begins to run up an economic deficit, but they do not indicate when the sustainable yield threshold of a biological resource, such as a forest, has been crossed. Ecological deficits such as a loss of tree cover or of topsoil often go unnoticed until they begin to affect economic indicators.⁷⁷

Moreover

The extensive deterioration of natural support systems and the declining economic conditions evident in much of the Third World pose threats to national and international security that now rival the traditional military ones. Ecological stresses and resource scarcities eventually translate into economic stresses with social and political dimensions: falling per capita income, or rising external debt, to cite a few.⁷⁸

The problem runs deeper than ecologically defined 'limits to growth'.⁷⁹ It is sharpened by global cycles of economic expansion and decline. These have all too often operated "in such a way that the major effects of pollution and depletion have been placed at the feet of the weak"⁸⁰ and in particular upon the developing countries. The latter have tended to become hosts of polluting industries, producing goods belonging to relatively early phases of the product cycle. At the same time their resources have

Environment (SCOPE), Environmental Consequences of Nuclear War, SCOPE28, Volume 1: Physical and Atmospheric Effects (A.B. Pittock, et al.) and Volume 2: Ecological and Agricultural Effects (M.A. Harwell and T.C. Hutchison), New York, Wiley, 1986. A more skeptical view of the nuclear winter hypothesis is advanced in S.L. Thompson and S.H. Scheider, "Nuclear Winter Reappraised", Foreign Affairs, Vol. 64, No. 5, Summer 1986.

⁷⁷ L.R. Brown, et al., State of the World 1986. A Worldwatch Institute Report on Progress Toward a Sustainable Society, Norton, New York, 1986, p.8.

⁷⁸ Ibid., p.204.

⁷⁹ D.H. Meadows, et al., The Limits of Growth: a Report for the Club of Rome's Project on the Predicament of Mankind, New York, Universe Books, 1972.

⁸⁰ J. Galtung, "The 'Limits to Growth' and Class Politics", review article, Journal of Peace Research, Vol. 10, No. 3, 1973, p.107.

Table 5

Resource Depletion That is Adversely Affecting Global Economy

Resource	Extent of Depletion
Forests	World's tropical forests disappearing at 2 percent per year. Far faster in West Africa and southeast Asia, where moist tropical forests will have virtually disappeared by end of century. Previously stable forests in temperate zone now suffering from air pollution and acid rain.
Grasslands	Excessive pressure on grasslands, closely paralleling growing pressure on forests and soils, has led to deterioration, which is most advanced in Africa and Middle East. Herd liquidation in pastoral economies of Africa now commonplace.
Fisheries	Rapid growth in world fish catch during fifties and sixties now history; overfishing often the rule, not the exception. Fish catch per person, including from fish farming, down 15 percent since 1970. Biggest consumption cuts in Third World.
Soil	Soil erosion exceeding new soil formation on 35 percent of world's cropland. World losing an estimated 7 percent of topsoil per decade. Effects most evident in Africa, where 40 percent of people live in countries where land productivity is lower than it was a generation ago.
Water	Growing water demand exceeding sustainable supplies in many locations, leading to scarcity. Falling water tables now found on every continent and in key food-producing regions.
Oil	Increases in the price of oil, the principal commercial fuel, sharply reduced world economic growth since 1973: partly due to ill-conceived responses to oil price hikes, notably the heavy borrowing by Third World countries. Progress in developing renewable alternatives is lagging. Nevertheless, prices brought down by recession and oil glut in 1980s.

Source: Adapted from Worldwatch Institute, State of the World, 1986, p.10.

been depleted to sustain global consumption levels skewed in favour of the richer and more powerful nations and social groups.

The opening up of these inequalities has revived a geopolitical vision of the world in which military power entrenches positions of economic advantage. However a novel strategic dimension has been added by the advent of warmaking on a planetary scale, aided by the transparency revolution in military technology:

With the atomic bomb, the ballistic missile, and now with earthspanning sensing, communication and computing networks, the ability to destroy, transport and target has become planetary in scale. With the advent of planetary warmaking, security strategy has been based on the militarisation of the global commons - the ocean depths, the atmosphere and orbital space. With the enclosure of the planet by warmaking systems, security itself has become indivisible, a commons in its own right.⁸¹

Disarmament and reduction of global military deployments are desirable in themselves and because they diminish the temptation to use military force in response to non-military threats to security. They could also be a catalyst for a more balanced and sustainable use of the global commons.

It must be recognised, however, that fundamental differences in social purpose lurk behind existing proposals for the management of these commons. Major powers persist in seeing the oceans and atmosphere primarily as open corridors for trade and the projection of military power, whilst smaller countries believe sovereign control over their resources, airspace and adjoining oceans is essential to their security and economic survival. The majority of the members of the international community believe that the commons would be best protected by international agreements controlling their exploitation, as proposed under the International Law of the Sea. Nevertheless, others (including some of the economically most powerful states) believe that bilateral agreements and the normal operation of market forces would ensure a more efficient use of resources.⁸²

1. Military and Industrial Consumption of Energy and Natural Resources.

In a world of finite resources, military consumption competes with other claims and in particular with those of socio-economic development, also influencing the allocation of resources not directly claimed for military

⁸¹ D. Deudney, "Whole Earth Security: a Geopolitics of Peace", Worldwatch Paper 55, Worldwatch Institute, 1983, p.6.

⁸² S.D. Krasner, Structural Conflict: the Third World Against Global Liberalism, Berkeley, University of California Press, 1985, Chapter 9.

purposes. It aggravates conflicts arising from resource constraints. Such conflicts in their turn become a factor in the arms race.⁸³

Estimating global consumption of energy and minerals for military purposes is fraught with difficulty, not least because it can only be done by extrapolating data from the United States. Direct military consumption of energy accounted for some 3 per cent of US energy consumption (in the 1970s) or 7 per cent of total consumption of petroleum. If military-related consumption (ie the energy consumed by industries supplying the military sector with goods and services) is added, the figure rises to some 7-8 per cent of total energy use.⁸⁴ According to the US Department of Defence, this consumption would perhaps treble in the event of a major war. The military sector is also a major consumer of minerals. However, due to advances in military technology, the composition of military demand has shifted. The relative importance of materials such as iron and steel has declined, while that of aluminium, titanium and other more exotic minerals has increased. Military consumption of the major mineral groups varied (in the 1970s) between some 2 per cent (for manganese) and 11 per cent (for copper) of total consumption,⁸⁵ although it is believed it might double under war conditions.⁸⁶

An acceleration of the arms race would significantly increase military claims on resources. Nevertheless, due to the depressing effects of military spending upon economic activity, it would not necessarily increase total global consumption of these resources. Indeed as can be seen from the Institute For Economic Analysis simulations shown in Table 6, it could actually reduce demand for some raw materials, due to a slower overall rate of economic growth, whilst significantly increasing demand for others, notably petroleum and nickel.

Conversely, by stimulating economic activity, disarmament and the reallocation of some of the savings to development assistance could actually increase the pressure on resources, assuming that there were no other changes in prevailing resource use patterns. In the process it might conceivably benefit some raw material exporting countries by raising the prices of their products. But by themselves military cuts cannot be counted on to produce a more sustainable use of global natural resources.

⁸³ Economic and Social Consequences of the Arms Race and of Military Expenditures, Report of the Secretary General, 1983, A/37/386, para.56.

⁸⁴ Helge Hveem, "Militarization of Nature: Conflict and Control are Strategic Resources and some implications for Peace Policies", Journal of Peace Research, Vol. 16, No. 1, 1979.

⁸⁵ Report of the Secretary General on The Relationship Between Disarmament and Development, A/36/1982, para.139.

⁸⁶ Hveem, op. cit.

Table 6: Percentage Changes in World Resource Output
Relative to Base Scenario (a) an Accelerated Arms Race and
(b) Disarmament, over the Period 1970-2000

Resources	Accelerated Arms Race Scenario: Percentage Change Relative to Base Scenario	Disarmament Scenario: Percentage Change Relative to Base Scenario
Petroleum	3.9	1.0
Nickel	3.1	2.2
Copper	-0.3	2.4
Zinc	-0.3	2.7
Bauxite	-1.1	3.0
Lead	-1.8	3.2
Iron	-3.9	3.4
Coal	-5.5	4.0
Natural Gas	-6.5	3.4
Other Resources	-9.7	5.5

Source: Wassily Leontief and Faye Duchin, Military Spending, Facts and Figures, Worldwide Implications and Future Outlook, New York and Oxford: Oxford University Press, pp.47 and 55. The changes are relative to the Institute for Economic Analysis base scenario, based on extrapolation of existing trends from 1970. The accelerated arms race scenario assumes significant increases in military spending: the disarmament scenario assumes both military cuts and a reallocation of part of the savings to development assistance.

As crucial as absolute scarcities, is how resources are allocated. Disarmament could facilitate a more equitable distribution of resource consumption as between developed and developing countries. If combined with "basic needs" oriented development policies it might well make fewer demands on resources than continuation of the arms race alongside more capital-intensive patterns of growth.

Since the dislocations in international energy markets which took place in the 1970s, the major military powers have been as much concerned with security of access to energy and raw material supplies as with scarcities per se. This in turn has encouraged them to build up forward deployment forces, equipped for intervention in conflicts beyond the geographical confines of the major alliance systems. Under the worst case scenarios which they typically assume, major cuts in the supply of energy or industrial materials could significantly reduce the industrial output and GNP of the industrial countries.

Petroleum, as we have seen, has been particularly responsive to changes in military demand; and its stockpiling is difficult. Yet in the present period of excess supply, the arguments for the use of military means to protect access to oil fields and supply routes have lost much of their force. On both the demand and the supply sides, the response to petroleum price changes was much greater than the pessimists predicted. Over the medium run, the price rises of the 1970s significantly reduced demand through the normal operation of the market, encouraging energy conservation and changes in industrial structure. They made it more economic to bring new oil fields into production with the result that it is generally recognised that it is now energy demand which is the major source of uncertainty in the market.⁸⁷

As regards other raw materials, short-run sensitivity to supply interruptions seldom implies long-term vulnerability, of a kind which cannot be redressed by stockpiling, recycling, the development of substitutes and the use of material-conserving technologies - though each have their difficulties. Indeed, recent evaluations suggest that there are relatively few strategic raw materials whose supply could feasibly be interrupted in such a manner as to constitute even a short-term economic or security risk.⁸⁸ Other assessments suggest that defence supply bottlenecks are just as likely to arise in respect of certain key indust-

⁸⁷ Robert Belgrave, "The Uncertainty of Energy Supplies in a Geopolitical Perspective", International Affairs, Vol. 61, No. 2, Spring 1985. Eliyahu Kanovsky, "The Rise and Fall of Arab Oil Power", Middle East Review, Vol. 18, No. 1, Fall 1985.

⁸⁸ The general case is made in Michael Shafer, "Mineral Myths", Foreign Policy, Summer 1982. Ray Weston, Strategic Materials. A World Survey London: Croom Helm, 1984, provides a commodity by commodity survey, which concludes that only in the case of three materials (beryllium, chromium, and columbium) might a critical supply situation conceivably arise in a crisis.

tial products - like precision miniature bearings, timing devices, or large high quality forgings - currently produced in insufficient quantity or by a few economically precarious enterprises.⁸⁹

Thus, non-military threats to national security arise not merely in respect of potential mineral supply scarcities; but also from the complex interdependence of industrial economies. But from another point of view, it is precisely this interdependence which would be the bedrock of a more cooperative global order⁹⁰ and, hence of international security in the broad sense defined earlier in this paper.

2. Oceans and Seas

The oceans and seas are a "common heritage of mankind"⁹¹ containing immense resources.⁹² Fish provide almost a quarter of the world's protein. The sea bed is an important source of energy and minerals, whose full potential remains to be exploited. There are many renewable energy sources to be tapped, such as tidal energy, wave energy, salinity gradients and sea thermal power. The sea, moreover, serves as a medium for the international movement of goods and people. Sea-based trade accounts for more than 80 per cent of international trade by volume.

⁸⁹ Richard Donnelly, (Director of Industrial Resources, Office of the Under-Secretary of Defense for Research and Engineering), "US Policy and its Implementation" in Uri Ra'anani and Charles M. Perry, Strategic Minerals and International Security, London: Pergamon-Brassey's, 1985.

⁹⁰ This is the position which has been argued at length by the theorists of 'complex interdependence' in international relations. They have come under attack from 'neo-realists' who have argued that national economic and political interests remain paramount in the international system; and that the stability of existing international economic arrangements can only be assured under the hegemonic protection of one or more major powers (in effect the USA with the assistance of other members of the Western alliance system). The danger of such arguments is that they can be deployed to rule out virtually any change in existing international arrangements, however well argued in terms of changing geopolitical realities. See Robert O. Keohane, After Hegemony: Cooperation and Discord in the World Political Economy, Princeton, Princeton University Press, 1984, for an attempt to restate the arguments for international cooperation in the light of the neorealist criticism; though he arguably concedes too much to the latter.

⁹¹ United Nations Convention on the Law of the Sea, article 136.

⁹² For a more detailed analysis of these resources see Study on the Nuclear Arms Race: Report of the Secretary General A/40/535 (1985) upon which this section draws heavily.

Historically, the management of the oceans has been associated with the maintenance of the freedom of the high seas. This has permitted unhindered international trade and shipping, and the exploitation of marine resources. Just as crucial, it has kept the high seas open as the medium for the marine diplomacy of the naval powers. Technological developments have permitted the extension of the nuclear arms race into the oceans, with the deployment of ballistic missile nuclear submarines (SSBNs), which now carry some 40 per cent of the superpowers' strategic missiles. Sea-launched cruise missiles, which began to appear in the navies of the United States and the Soviet Union in 1984, also present difficult problems of arms control, because they can carry both conventional and nuclear warheads. Alongside these, moreover, there has been a build-up of conventional naval forces, enhancing the ability of the major powers to carry out naval diplomacy and to project their power in distant regions of the world.

In parallel to these developments and partly in response to them there has occurred an increasing 'territorialisation' of the ocean.⁹³ The impetus has partly come from coastal states, many of them developing countries, who have lacked the naval capacities to take advantage of the freedom of the seas, whilst often seeing their traditional fishing grounds overfished by the fishing vessels of other nations. Several years of international negotiation culminated in the United Nations Convention on the Law of the Sea which, if and when it comes into force, will guarantee the sovereign rights of coastal states with respect to natural resources and economic exploitation in exclusive economic zones (EEZs). These zones extend up to 200 miles from their respective coastlines and comprise some 40 per cent of the world's oceans. The Convention attempts, however, to strike a balance between the coastal states' interests and those of other states, who still enjoy freedom of navigation and overflight, freedom to lay submarine cables and pipelines and other internationally lawful uses of the sea. It also establishes international machinery to supervise the economic exploitation of the sea bed, beyond the limits of the EEZs, although these provisions have been objected to by a small number of industrial market countries (notably the United States) which have refused their assent to the Convention.

Disarmament could make a major contribution to the peaceful management of the world's ocean resources. It would reduce the maritime powers' anxieties concerning interruptions in the sea-borne supply of energy and raw materials, thus allowing them to cut back their world-wide naval deployments. This in turn, along with diminished naval deployments of nuclear weapons, would make the coastal states less insecure, allowing them to reallocate scarce resources from military to civilian purposes. It would also reduce the risks of pollution from nuclear testing, emissions and accidents. Admittedly, some security dilemmas would remain, especially those of small countries which lack the naval capability to police their expanded economic zones. However, the international community

⁹³ Ken Booth, "Naval Strategy and the Spread of Psycho-Legal Boundaries at Sea", International Journal, Vol. 38, No. 3, Summer 1983.

can ill afford to allow the international regime for the management of the liquid commons which has emerged through painstaking international negotiation to be swept aside by an accelerating naval arms race.

3. Rivers, Lakes and River Basins

Fresh water is a basic necessity of life. It is essential for agriculture; is required for many industrial purposes; and is widely used for the generation of electrical energy. On a global basis there are 214 rivers or lake basins shared by two or more countries, around two thirds of them developing countries.⁹⁴ Nine river and lake basins are shared by six or more countries. Seven of these (the Niger, Nile, Zaire, Zambezi, Amazon and Mekong rivers and Lake Chad) are in developing regions.

As a result of increased water demand and pollution, disagreements between states sharing the same river and lake basins or aquifers are likely to intensify. The hydropolitics of large river systems tends to be complicated by regional political disputes. Such disputes have not always prevented agreement concerning the joint management of water resources, as in the case of the Nile.⁹⁵ Yet in other instances conflicts have emerged over the utilisation of the waters from international rivers; and these acquired a military dimension, or have aggravated existing military conflicts as in the case of the Jordan.⁹⁶ Disarmament, linked to more effective regional dispute-resolution, could facilitate management of scarce water resources on a more rational and equitable basis.

4. Outer Space

Outer Space has become the high frontier of technological achievement.⁹⁷ Like the oceans, the land, and the atmosphere, it can be used by many different users for different purposes, both military and civilian. The main objective of space technology is not the production of specific material products, but rather an immaterial output-related activity: in particular the registration, relay and transmission of information. Communications satellites have revolutionised international communications and broadcasting; and can help developing countries

⁹⁴ A. Biswas, "Major Water Problems Facing the World", International Journal of Water Resources Development, 1983.

⁹⁵ John Waterbury, Hydropolitics of the Nile, Syracuse University Press, 1979.

⁹⁶ John K. Cooley, "The War Over Water", Foreign Policy, No. 54, Spring 1984.

⁹⁷ Daniel Deudney, Space: The High Frontier in Perspective, World-watch Paper No. 50, August 1982.

leap-frog technological stages in the development of their internal communications systems.⁹⁸

Remote-sensing by satellite has evolved rapidly since it was first used for weather prediction in the 1960s. It is widely used for mineral and petroleum prospection and exploration. It can provide better knowledge of existing productive resources, such as soils, water, vegetation and fisheries.⁹⁹ It can be used to monitor deforestation and the onset of desertification. And it has potential applications in the broad area of disaster management.¹⁰⁰ The application of these technologies has been enhanced by major cost-reductions in space-based technologies; by the increased availability of satellites for communication to large numbers of highly dispersed users; by the availability of launching facilities for a wider range of potential customers; and by the participation of a small but growing number of developing countries in space programmes.

Thus the case for international cooperation is strong. Yet the legal and social arrangements for the use of space lag well behind technological developments. Enormous problems lie ahead with regard, among other things, to the sharing of economically and politically sensitive information; to commercialization of space facilities and the role of transnational corporations; and to the allocation of available spaces for and minimization of interference between communication satellites operating in geostationary orbit; and the increasing problems of space pollution.

Cooperation is not made any easier by the development of an arms race in space, placing further pressure upon limited space resources.¹⁰¹ Military and civilian space technologies have always been closely interlinked.

⁹⁸ Overviews of the non-military uses of space are to be found in the Report of the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space, Vienna, 9-21 August 1982; James E. Katz, "The Winds of Star Wars", Society, Vol. 21, No. 2, January/February 1984; Sikke Hempenius and Caesar Voute, "Human Development and the Conquest of Space", Space Policy, Vol. 1, No. 2, May 1985; A.M. Rutkowski "Space WARC: The Stake of the Developing Countries", David S. Myers, "Remote Sensing of Natural Resources" and Ivan G. Roederer, "The Participation of Developing Countries in Space Research", all in Space Policy, Vol. 1, No. 3, August 1985; and Douglas A. Rekenthaler, "World Surveillance from Space in the 1980s", NATO's Sixteen Nations, Vol. 29, No. 6, November 1984.

⁹⁹ United Nations Center on Transnational Corporations, Transborder Data Flows: Transnational Corporations and Remote-Sensing Data, United Nations, New York 1984, Sales No. E.84.II.A.8, part III.

¹⁰⁰ UNDRO, Space Applications for the Acquisition and Dissemination of Disaster-Related Data, Expert Meeting, Geneva, 14-17 June 1983.

¹⁰¹ Jasani Bhupendra (ed.), Space Weapons-The Arms Control Dilemma, London: Taylor and Francis for SIPRI, 1984.

Meteorological information, for example, can as easily be used to measure weather conditions over drought-stricken regions as to facilitate operation by military aircraft. However, in recent years the balance has shifted toward military applications.¹⁰² Some 75 per cent of the 2,200 odd satellites in orbit are designated for military uses; and 70-75 per cent of the space budgets of the United States and the Soviet Union are allocated to military purposes.¹⁰³ Not all of these military uses are destabilising. Some, such as the use of satellites for verification purposes, are a necessary contribution to confidence building and arms limitation. Others, like Anti-Satellite Weapons and the use of space-systems to enhance the capabilities of weapons systems, probably increase the momentum of the arms race.

Arms control and disarmament in space, therefore, could reduce the overall pressure on scarce space resources and help limit space pollution. It would decrease the risk of interference with and attacks on civilian and dual-capable systems. It would help create an international climate in which it would be easier to settle outstanding differences over the use of space. International cooperation on the utilization of space technology for development would also be facilitated.

5. Effects of War on the Natural Environment

Substantial empirical evidence has accumulated concerning the potential effects of nuclear war and of other weapons of mass destruction upon the natural environment. Although the bulk of the damage would fall upon the nuclear states and their allies, it would not be confined to them, nor even to the Northern hemisphere. It is too easily forgotten, however, that war and war preparation have already begun to disturb fragile balances in the natural and man-made environments.¹⁰⁴ Wars waged across the territory of the developing countries will cause even greater harm if the present tendency to proliferate destructive weapons persists. One area of particular concern regards the potential spread of chemical weapons. They are relatively cheap, often easy to manufacture and their use is not easy to verify. The use of chemical toxins and of poison gas in armed conflicts has already been alleged in a small number of post-World War II conflicts.¹⁰⁵ Negotiations for a multilateral convention prohibiting the

¹⁰² Marcia Smith, "The First Quarter-Century of Spaceflight", Futures, Vol. 14, No. 5, October 1982.

¹⁰³ Deudney, op. cit., pp.16-17; John Turner, Arms in the 1980s London: Taylor and Francis for SIPRI, 1985, pp.41-50.

¹⁰⁴ United Nations Environmental Program (UNEP) The State of the Environment 1980, Section V; UNEP The World Environment 1972-1982, Chapter 16; and Johan Galtung, Environment, Development and Military Activity Oslo: Universitetsforlaget.

¹⁰⁵ Kidron and Smith, The War Atlas, Chart 11.

development, production and stockpiling of such weapons continue; but meanwhile there remain wide areas of legal ambiguity concerning their manufacture and use.¹⁰⁶

Although the damage potential of all forms of modern weaponry is enormous, it is extremely difficult to arrive at precise estimates of the environmental harm. A careful analysis of the environmental impact of weapons prepared on behalf of the United Nations Environment Program distinguishes three composite stress factors, namely soil damage, destruction of plant cover, and biocide.¹⁰⁷ All the main weapon categories (high explosives, incendiary weapons, chemical agents and herbicides, biological weapons and nuclear weapons) would place stress on ecosystems in one or more of these three ways. The effects would be greatest in tropical forest regions and in arid areas which lack species diversity and where soils are thin and deficient in nutrient and waterholding capacity - that is in the majority of the developing countries. In such regions, nutrient-dumping, erosion and decline in moisture-levels are especially likely to occur, and could spread secondary effects well beyond the original areas of devastation.

Yet the same study doubts whether any use of non-nuclear weapons could bring about:

Human consequences comparable to that of the Sahel disaster unless that use were on a scale so massive as to serve no other purpose. Only the use of nuclear weapons might result in an effect unintendedly, and even then the numbers used might have to be large enough to encompass entire nomadic areas within their overall zone of herbicidal action. In such a case the direct damage to the human population might dwarf the ecosystematically mediated damage.¹⁰⁸

However, high explosive weapons, especially when used in conjunction with chemical herbicides can cause substantial localised environmental harm. Thus far, only the major military powers have commanded the resources to inflict damage on such a scale as to cause significant direct economic losses. South East Asia (in the course of the Vietnam War) is the only area where the effects of armed conflict have been documented for long enough since termination to permit dispassionate assessment of the long-term consequences.¹⁰⁹ Military damage was inflicted in a variety of different forms, including bomb and artillery craters, damage to

¹⁰⁶ The cornerstone of chemical arms control efforts has been the Geneva Protocol of 1925, which prohibits the use in war of asphyxiating, poisonous or other gases and of all analogous liquids, materials or devices, as well as of bacteriological methods of warfare.

¹⁰⁷ J.P. Robinson, The Effects of Weapons on Ecosystems, UNEP Studies, Vol. 1, Pergamon Press, for UNEP, 1979.

¹⁰⁸ Robinson, op. cit., p.59.

¹⁰⁹ SIPRI Yearbook 1982, chapter 11.

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vegetation by flying metal fragments, tree removal, use of chemical herbicides, and the destruction of human settlements. In the affected areas up to 4 per cent of the forest cover was obliterated and just over a half was partly damaged; up to 40 per cent of rubber plantation trees and 41 per cent of the mangrove habitat was destroyed; and roughly a fifth of all farm land was taken out of production. And in spite of a gradual agricultural recovery, Vietnam and its neighbours caught up by the conflict remain food deficit economies rather than (as before) food exporters. The lessons that can be extracted are limited by the fact that in few other conflicts have the techniques of high technology warfare been so intensively applied.

In a broader view, the environmental effects of wars can also be mediated through population movements and changes in human settlement patterns. About these, however, knowledge is only fragmentary. Forced removal and resettlement of populations can lead to significant changes in agricultural practices and land use. The abandonment of irrigated land and other man-made habitats can lead to long-term agricultural deterioration and disturb ecological balances. Mass movements of refugees and displaced persons can intensify demographic pressures on the land and hasten erosion and other environmental damage.¹¹⁰

Military-induced destruction fits within a broader complex of factors leading to deforestation, desertification and other forms of environmental degradation. Other determinants - like increased cash crop production, overfarming and overgrazing of land and commercial exploitation of tropical forests - have almost certainly had a greater overall impact. Yet these too have been aggravated by an overall international pattern of resource allocation shaped at every level by the accumulation of military power. Hence conversely the reallocation of resources from military to civilian purposes would necessarily form part of any framework for the protection and regeneration of the natural environment.

¹¹⁰ Lincoln Young, "A General Assessment of the Environmental Impact of Refugees in Somalia, with Attention to the Refugees Agricultural Programme", *Disasters*, Vol. 9, No. 2, 1985.