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Issue of Structural Adjustment for
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STRUCTURAL ADJUSTMENT FOR THE TRANSITION TO DISARMAMENT

Report by the UNCTAD secretariat

CONTENTS

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CONTENTS (continued)

ABBREVIATIONS

CIS	Commonwealth of Independent States
DAC	Development Assistance Committee (OECD)
FDI	foreign direct investment
HEU	highly enriched uranium
NASA	National Aeronautics and Space Agency (United States)
ODA	official development assistance
OECD	Organization for Economic Cooperation and Development
O & M	operations and maintenance
R & D	research and development
SATD	structural adjustment for the transition to disarmament
SIPRI	Stockholm International Peace Research Institute
TNC	transnational corporation
UNDP	United Nations Development Programme
UNRISD	United Nations Research Institute for Social Development
US ACDA	United States Arms Control and Disarmament Agency

Part I

BACKGROUND

Chapter 1

INTRODUCTION

1.1 Mandate

1. The Cartagena Commitment 1/ states:

> 99. The intergovernmental machinery of UNCTAD, with the appropriate support from the secretariat, should explore the issue of structural adjustment for the transition to disarmament and the implications for world economic growth and development.

and

> 63 (4). ... The economic aspects of conversion of military capacities to civilian uses should also be addressed.

2. As a result, the Board decided, in its decision 399 (XXXIX), to establish an ad hoc working group to explore the issue of structural adjustment for the transition to disarmament. Consequently the Trade and Development Board adopted decision 420 (XLI) which laid down the terms of reference for an ad hoc working group on the subject. Its substantive task is defined in paragraph 1:

> In accordance with paragraph 99 of A New Partnership for Development: the Cartagena Commitment, the Ad Hoc Working Group, with the appropriate support from the UNCTAD secretariat, should explore the issue of structural adjustment for the transition to disarmament and the implications for world economic growth and development.

3. In order to ensure that duplication is avoided (decision 420/XLI, para. 3), this report situates itself within the framework of UNCTAD's fundamental mandate, as stated in the Declaration of the Trade and Development Board on the thirtieth anniversary of UNCTAD:

> As the most appropriate focal point within the United Nations proper for the integrated treatment of development and interrelated issues in key areas, and particularly since the incorporation within it of programmes relating to transnational corporations and to science and technology, UNCTAD is well placed to conduct a systematic exploration of the interlinkages between economies, sectors and issues and to promote consensus for the adoption of appropriate policies ... Member States reaffirm their commitment to the primary development objectives of UNCTAD. 2/

4. The Cartagena Commitment sets disarmament in context: "All countries should consider the possibilities that exist in their specific and individual

situation for the reduction of military expenditures" 3/. The reduction should, it stresses, be as great "as is compatible with legitimate security needs". 4/

1.2 The peace dividend

5. World military expenditure reached a peak in 1987, and according to UNDP, it fell from $995 billion in 1987 to $767 billion in 1994, at 1991 prices and exchange rates (table 1.1). UNDP refers to the military expenditure not incurred during 1988-1994 relative to the 1987 base line as a peace dividend.

Table 1.1

Global military expenditure and the peace dividend

Global military expenditure and the peace dividend

(US$ billions in 1991 prices and exchange rates)

	1987	1988	1989	1990	1991	1992	1993 (est)	1994 (est)	Total 1987-94
Actual military spending									
World	995	970	945	890	855	815	790	767	7 027
Industrial countries a/	850	835	815	760	725	690	669	649	5 993
Developing countries	145	135	130	130	130	125	121	118	1 034
Actual cumulative peace dividend									
World	0	25	50	105	140	180	205	228	933
Industrial countries a/	0	15	35	90	125	160	181	201	807
Developing countries	0	10	15	15	15	20	24	27	126

Source: UNDP, 1994, table 3.1.

a/ China is included in the group of industrial countries for this comparison.

As a share of GNP, the decline was substantial in both developed and developing countries. Between 1987 and 1993, the ratio of military expenditure to GNP declined from 5.4 per cent to 3.4 per cent in the developed countries and from 4.7 to 3.1 per cent in the developing countries (figure 1.1).

6. The share of military expenditure in central government expenditure declined in both developed and developing countries over the period 1987-1993, although the movement was more erratic in the developing than the developed countries. To some extent the fluctuations in this ratio in developing countries reflect the fluctuations in the share of central government expenditure in GNP, which were greater in the developing countries (figure 1.1).

7. World arms trade, notwithstanding the efforts of some major arms suppliers to increase their sales abroad as a way of compensating for the decline in domestic markets, has fallen still faster than global military expenditure and procurement since 1987. In total it fell from 74 billion

constant 1993 dollars in 1987 to 22 billion in 1993 (figure 1.2). Most arms imports are by developing countries, and the fall in arms imports is also mainly due to developing countries. These imports fell from 59 billion 1993 dollars in 1987 to 17 billion in 1993. 5/

8. The aspiration was often expressed during the cold war that military expenditure should be reduced in order to increase ODA. In absolute terms, these aspirations seem indeed to have been met by DAC countries during the period 1987-1993. The military expenditure of these countries fell between 1987 and 1993 by a cumulative total of 207.4 billion constant 1993 dollars, while ODA rose by a cumulative total of $31.2 billion. Increased ODA was thus equivalent to 15 per cent of the savings (military expenditure figures have been calculated on the basis of data in US-ACDA, 1995; ODA figures are drawn from OECD, 1995). However, as a percentage of GNP, DAC ODA has fallen steadily, from 0.34 in 1988 to 0.29 in 1994. ODA from OPEC countries did not follow this pattern; data on ODA from the former socialist countries of Eastern Europe are not available. It is essential that the donor community recommit itself to increasing ODA substantially. A rise in ODA to levels relative to GNP that obtained in 1988 would require the allocation to ODA of around 5 per cent of the 1994 peace dividend accruing in the industrial countries, a not unreasonable figure. 6/ However, it must be said that the general political environment in many DAC member countries is such that excessive hopes should not be pinned on the likelihood of a significant increase in ODA flows in the near future.

9. As the World Economic and Social Survey 1995 puts it, " 'aid fatigue' ... is having a very negative impact on the availability of ... ODA ... Aid fatigue does seem to reflect reduced expectations that are widespread about the broad economic capacities of States, donor and recipient" (United Nations, 1995, p. 5). It is perhaps because of this unpropitious political environment that the World Economic and Social Survey 1995 suggests that: "the future of ODA may lie in a new model of assistance, one in which international programmes and projects increasingly focus on concrete, internationally shared concerns and are part of jointly pursued activities" (United Nations, 1995, p. 5). The international community has often stated that a reduction in military expenditure is desirable. The transition to disarmament can undoubtedly be included among these internationally shared concerns. To make it possible, a supportive international environment is required. This includes an environment in which real and perceived national security requirements call for less military activity. As the Development Assistance Committee of OECD declared in its statement on "Development Partnerships in the New Global Context":

> Experience has shown that achievements in sustainable development, and effective cooperation, need to integrate a number of key elements [including] addressing root causes of potential conflict, limiting military expenditure, and targeting reconstruction and peace-building efforts toward longer-term reconciliation and development. 7/

10. A supportive international environment includes international cooperation in overcoming the initial extra costs involved in making the transition to disarmament. The latter point is developed in section 1.3.

1.3 Disarmament as an investment process

11. UNIDIR provides a framework for the policy analysis in this report in a study of which the subtitle is self-explanatory: "Disarmament as an Investment Process" (UNIDIR, 1993). Military expenditure involves various types of cost. Opportunity cost is a useful concept in this context. Military expenditure includes expenditure on some inputs which can more or less readily be shifted to other activities provided there is a market for the other activities. Dual-use outputs and technologies - i.e. ones which can serve military and civilian ends equally well - are among those which can be readily shifted from military to civilian use from a technical point of view. Demand management can stimulate the exploitation of opportunities of this kind.

12. Other elements of military expenditure constitute sunk costs which cannot easily be put to other uses. Capital goods designed specifically to produce particular types of military goods, or some military goods themselves, are examples. As other instances, some areas have been irreversibly polluted by military activity to such a degree that they are no longer inhabitable, or some highly skilled manpower of middle age or beyond cannot economically be retrained for new employment. Extra costs may actually be involved in scrapping military equipment, installations or areas or making them available for civilian use. These transitional costs are discussed in section 1.5.

13. Above all, UNIDIR, 1993 stresses the point that disarmament involves costs as a prerequisite to later benefits. A rate of return can be calculated from the flow of costs and benefits. It is the return which constitutes the dividend. Figure 1.3 (a) represents the argument. The analysis in figure 1.3 (a) provides a framework for considering scenarios in different economies (UNIDIR, 1993, p. 70).

It can be applied to entities at a number of levels: the national economy, a region, a locality, a sector or an enterprise.

14. The existence of costs in the process of conversion from military to civilian activity and the inescapable need to meet these costs before the benefits of the new civilian activities can be reaped have political significance. Often the initial costs are a deterrent to disarmament; the larger they loom, the more the entities concerned will resist disarmament. The costs depend decisively on the economic environment in which the entity in question is operating. For instance, if the economy is growing, if unemployment is low, and if there is already a satisfactory general structure of education and training in the geographical area concerned, then the marginal costs of transferring labour to new activities will be lower. In short, the shape of the curve in figure 1.3 (a) depends not only on the decisions of the entity in question, but also on factors beyond its control. Similarly, its shape in one time period will influence its shape in later periods; an abrupt downturn in arms production may be more costly and

time-consuming for the adjustment into converted activity than a more gently phased process. In so far as countries import arms, the transition is eased to the extent that resources devoted to purchasing arms abroad can now be allocated to other uses or simply saved.

Figure 1.3 (a): The costs and benefits of disarmament

Source: UNIDIR, 1993, figure IX, p. 71.

15. The incentive to convert is further reduced in so far as the costs are not incurred by the same entity as reaps the benefits. The lower the private returns the less the incentive for the entity incurring the costs to take the indispensable steps: the benefits are externalities as far as the entity is concerned. Its behaviour can be influenced by internalizing them. Public action may be required to ensure that economic actors are facing correct incentives. UNIDIR, 1993, chapter IX, goes into this question in more detail. See figure 1.3 (b).

16. Figure 1.3 (b) stresses location effects. In the transition to disarmament, some geographical areas may suffer economic losses while others reap the benefits of redistributed expenditure. The effect on firms may be the same. Firms specialized in supplying goods and services to the military may face shrinkage while other firms face improved market prospects. The armed forces themselves as economic entities face shrinkage in their military activities.

Figure 1.3 (b): The costs of disarmament

17. The aim of SATD is usually not to achieve the highest internal rate of return among all economic policy options, but to maximize it given a specific decision to reduce military expenditure, either by smoothing and shortening the transition as far as possible (viz. the area below the time axis in figure 1.3 (a)) or selecting new civilian activities which are as beneficial as possible in so far as this is considered a policy variable. This rate of return may be lower than the marginal rate for the economy as a whole; it may even be negative. For instance, in scenario II, figure 1.3 (a), the costs incurred in phase 1 are so great and spread over such a long period that they are unlikely to be compensated by the small benefits in the distant future if costs and benefits are discounted in the normal manner.

18. Practical policy analysis of SATD requires an examination of costs and benefits at each point in the process, including the identification of those on whom the costs and the benefits fall; it also involves examining the shape of the curve of costs and benefits over time and the means of modifying it so that benefits are maximized and costs minimized within the constraints of particular circumstances. Exchanges of national experience with respect to these characteristics would help countries undertaking SATD to achieve maximum net benefits and to ensure that the process best serves world economic growth and development.

Part II

SECTORAL ISSUES

Chapter 2

CONVERSION

19. This chapter deals with the conversion from military to civilian use of three types of resource: facilities producing goods and services for the military, military installations and bases, and lastly manpower. Manpower in turn involves both the armed forces themselves and personnel engaged in production for the military. The chapter discusses the relationship between conversion and privatization. It ends with an examination of clean-up activities, i.e. those which need to be undertaken in order to prepare the way for the conversion of military resources to civilian use.

2.1 The conversion of military production

20. Military industries have been obliged to adjust to the downturn in military expenditures and exports. The impact has been more severe in Central and Eastern Europe and in some developing countries than in the developed countries. A rough indication of the impact is given by the share of military production in total manufacturing. At the end of the 1980s, in Western Europe it amounted to almost 10 per cent in the United Kingdom, 5-8 per cent in France and 1.5-3 per cent in several other countries. The share was much higher in the Soviet Union, where the military sector represented around 30 per cent of the industrial sector. In the developing world, which produced about 15 per cent of world military output in 1985, the share was less than 1 per cent. It was, however, heavily concentrated in a small number of countries. Thus for instance, 10 developing countries then possessed an aircraft industry, 7 produced tanks and 7 produced tactical missiles.

21. The challenge of conversion depends not only on the size of the military sector in the economy but also on the pace of change. In some cases the decline has been so rapid as to constitute a form of shock; in other cases steps have been taken to ensure a smoother and more gradual pace.

22. For any particular firm producing military products, the challenge of adjustment depends on the degree to which it relies on that work. Many firms produce both military and civilian goods. In China, civilian output of the defence industrial complex was around 8 per cent in 1979; it had risen to an estimated 70 per cent by 1994 (Berthélemy and Deger, p. 25) (Box 2.1 (b)). In 1989, civilian production accounted for more than 40 per cent of the output of the USSR’s defence sector. In 1988, arms constituted only 16 per cent of the total output of the world’s 100 largest arms contractors (excluding the USSR, Eastern Europe and China) (Renner, 1995, table 34).

Box 2.1(a)
Industrial conversion in Russia

It appears that among countries carrying out defence industry conversion the Russian Federation has been facing particularly acute difficulties in this process fraught with enormous economic and social costs. As a result, instead of becoming a "locomotive" of far-reaching economic restructuring, drastic reduction of military expenditures and production in 1992-1994 has created further serious problems on the way to economic stabilization and take-off.

The reasons for this dramatic situation are manifold and include: (a) an extremely high degree of militarization of the Russian economy inherited from the ex-Soviet Union; (b) the "shock" character of the reduction of arms procurement by the Russian Government; (c) a domestic economic environment in crisis, e.g. an unprecedented fall in overall demand and production with uncertain prospects for the immediate future; (d) the dissolution of the Soviet Union and of the Warsaw Treaty Organization where well developed cooperation ties among military enterprises had existed; (e) a certain delay in elaboration of a new Russian post-Cold-War military doctrine; and (f) losses of important foreign markets for Russian-made weaponry.

Owing to a unique combination of numerous unfavourable factors and conditions, production not only of arms but also of civilian goods in Russia's military industrial complex (MIC) has been falling since 1991. Although the share of civilian goods in the MIC's overall production increased from 64 per cent in 1991 to about 80 per cent in 1994, this development can hardly be defined as a success as it was due not to conversion of military capacities to civilian uses but mainly due to more rapid decline in production of arms than of civilian goods.

Against this background some noteworthy trends have recently been observed as regards the Russian Government's policy in the area of denationalization/privatization of MIC enterprises. By the beginning of 1994 one-quarter of those enterprises had already been denationalized, while in the course of 1994 the share of MIC enterprises which had been denationalized or earmarked for denationalization/privatization reached 75 per cent. This process has contributed to a considerable growth of conversion initiatives "from the bottom", e.g. concerning dividing huge enterprises into more flexible entities, creating corporative associations, restoring economic ties with enterprises in ex-Soviet republics and ex-Warsaw Treaty member countries, self-financing conversion attracting funds from non-budgetary sources, inviting foreign partners for joint ventures, etc.

So far, Russian military enterprises have established more than 300 joint ventures with firms from about 40 countries, mainly Western ones.* However, the number of joint ventures with partners from developing countries (e.g. Brazil, Republic of Korea, India, South Africa) is also growing, including export-oriented projects both in Russia and abroad. One of the largest projects with partners from a developing country is a joint venture "Hyundai-Jak Aerospace Co" established by "Hyundai Technology and Development Corp." of the Republic of Korea and the Russian "Yakovlev Design Bureau" (known for development of military aircraft). In the framework of this project the "Yak-42H" and "Yak-40H" business jet aeroplanes will be assembled in the Republic of Korea for sale on foreign markets, including South-East Asia, North America and Europe.

Box 2.1(a) contd.

Another large project envisages establishing in Brazil a joint enterprise "Aviatica do Brazil" for annual production of more than 100 ultralight airplanes "Aviatica-890". This plane was developed by the Russian joint-stock company "Aviatica" founded in the course of privatization of the defence enterprises by Moscow Dementiev Aircraft Plant (known for production of MIG-29 fighters), Gromov Flight Research Institute and Moscow Aviation Institute. The agreement on creation of Russian-Republic of Korean Industrial Complex "Technopark" in the Far Eastern free economic zone "Nachodka", signed in September 1994, envisages the realization of scientific and technological projects, using, inter alia, highly skilled workers and engineers from MIC enterprises in the region.

Special attention is also being paid by the Russian Government to restoration and development of industrial and technological ties between MIC enterprises of Russia and other CIS countries. Such ties, covering both cooperation in military production and realization of joint conversion projects exist now among 1,500 enterprises in the CIS. Bilateral governmental agreements on industrial and technological cooperation among defence enterprises have been signed between Russia and all other CIS countries except Tajikistan (where there is no military industry). Those developments should alleviate, albeit with a delay, severe economic difficulties which many MIC enterprises in the CIS have been experiencing since the dissolution of the Soviet Union and the cancellation of contracts for military products and research by the central government.

One of the biggest "inter-republican" conversion projects was announced in December 1994. It envisaged the creation of the international consortium "MAKS" for completion of the development and for the operation of a transatmospheric aerospace vehicle with participation of Russian, Ukrainian and Kazakh enterprises, as well as some Western European firms. The realization of this project, including 12-25 planned launches per year, guarantees up to 400,000 work places in Russia, Ukraine and Kazakhstan.

It is hoped that in parallel with the progress of economic stabilization and reforms, the prospects for cooperation between Russian and foreign enterprises in the area of conversion will improve further.

* See United Nations 1995, pp.150-152

Source: Economic Aspects of Conversion In Russia, by S. Belov, Russian Institute for Strategic Studies, 1995.

Box 2.1(b)
Industrial conversion in China

Conversion in China began at the end of the 1970s, following the policy of combining military and civilian production. In Yunan province for instance, the civilian output of military industry has grown by 20 per cent per year since the middle 1970s while military orders from the Government fell. At the end of 1994, civilian products accounted for more than 90 per cent of production.

Technology has played a major role in conversion, given the technical capability of military industries. Effective combinations between enterprises, universities and research institutes have allowed inventions in the military sector to be applied to the needs of the civilian market.

Export orientation has also provided a stimulus. As a senior Yunan official said: "Our policy is to encourage military factories to produce and export civil-use goods. By promoting production for export, our factories improved their sense of quality control, the external appearance and packaging of their products, and strengthened their capacity to meet deadlines and provide after sales service, thereby increasing the civilian products' competitive power on the market".

For security reasons, military industrial enterprises were often located in mountain areas far from cities. With support from central and local government, many of these enterprises and related research institutes have been moved to urban locations. Some went further. For instance, military industries of Guizhou province have since the beginning of the 1990s established "window enterprises" in the coastal special economic zones and cities, in cooperation with other industrial enterprises. These became a bridge connecting enterprises in the remote areas and the international market, by transferring to the original enterprises marketing information, new styles of products, advanced technology and management experience.

The State and local governments have played an essential role in the defence conversion programme. The State established the guiding policy of combining the military with the civilian. It also provides funds to support technology innovations by these enterprises. It has allocated significant funds to help enterprises on the "third front" (in the interior provinces) to compensate for their unfavourable location and to adjust to a market-oriented economy. This programme stabilized the scientific and technological labour force and accelerated the adjustment of products. The local government of Guizhou - to take an example - took specific measures in response to its local situation. The production of civil-use goods by military industries is included in the provincial economic and social development plan. At the initial stage of conversion, the local government gave these enterprises preferential rights in loans, taxes and land-use fees, assisted them in taking part in market competition and encouraged them to seek foreign capital as a way of participating in international competition. The provincial government encouraged military industrial enterprises to form various types of arrangements with civil enterprises, thus rooting defence conversion in the local economy.

This box has been compiled by the UNCTAD secretariat on the basis of the presentations by Lei Xun, Director, Guizhou Provincial Office of Science and Technology Industry for National Defence and Liu Shou Zhon, Deputy Director, Yunan Provincial Office of Science and Technology and Industry for National Defence, to the CAPUMIT/OECD Development Centre, International Conference on the Conversion of China's Military Industries, Beijing, 26-27 June 1995.

23. It is often argued that "there is nothing intrinsically different about the conversion of military facilities to civilian uses: a [comparable] process already goes on in civilian economic life on a daily basis, with some economic activity finishing and others beginning" (Suter 1995). A SIPRI publication points out that: "Many if not all OECD countries have demonstrated their ability to absorb reductions in capacity in other industrial sectors which employed large numbers of people and generated a significant percentage of national income - such as the textile, coal, steel or shipbuilding industries. The defence industries of the member States of the OECD are undoubtedly facing local difficulties, and certain regions will take time to recover from the social and economic impact of declining defence industrial activity". (Anthony 1994, pp. 126-127). Worldwide, employment in arms production decreased from about 16 million to not more than 11.5 million in the first five years of the 1990s. The loss of employment in arms production has proved to be a serious problem in some countries, of which the Russian Federation is the most important: job losses in the Russian Federation account for more than 60 per cent of the estimated worldwide total. In several countries - such as Argentina, Belgium, Brazil, Germany, Poland and Slovakia - employment in the arms industry has fallen sharply. The consequences of job losses differ depending mostly on the general capacity of the economy to create demand for civilian goods (Brzoska, Kingma and Wulf 1995, p.4).

2.2 Conversion of military bases

24. There are of course military bases in every country with military forces. There are foreign military bases, or foreign armed forces use facilities, in many countries, whether they be developed, developing or in transition. This section deals in the first instance with foreign military bases in developing countries, since their conversion opens the question of development prospects in a particularly evident way. The argument can easily be extended to the conversion of national military facilities.

2.2.1 Types of military installation

25. Very large foreign naval, air and land bases are seldom found in the developing countries or in countries in transition. Such bases generally cover a large part of the spectrum of military activities, ranging from the positioning of heavy tactical forces, with their logistics and all their different resources, to communications, intelligence and research activities. Only the United States and the former USSR had, since the 1950s, deployed significant tactical forces in third world countries of such a size as to require the establishment of extensive and complex infrastructures. The 1990s saw a number of changes in the geography of large foreign bases in developing countries. The large American bases in the Philippines were handed back to that country in 1991. The Soviet bases in Viet Nam and Cuba were handed back by Russia. A series of changes have thus taken place in recent years. A number of large foreign military bases and installations in developing countries were transferred directly to the armed forces of the host countries, which adopted them for their higher level infrastructures and scrapped part of their own or transferred them to the civil sector. Others, not located,

strictly speaking, in the third world, have seen their role and their equipment expand, examples being Guam and Diego Garcia, while some, finally, have already been transferred to civilian authorities, which has led in some cases to their reorientation. We shall refer to this point again later.

26. A second level of bases and installations in developing countries are those where small to medium-sized foreign tactical military forces are stationed. The naval and air bases and installations concerned are generally owned by the host country and may be civil ports and airports, of which a part is held by the national armed forces. The naval and air forces of the foreign Power have at their disposal an area whose equipment varies according to the scale of the foreign presence.

27. At a third level there is the deployment of forces associated with the functions of support, logistics and pre-positioning of military equipment. The installations (we can no longer speak here of bases) that are used for this type of function are fairly numerous in absolute terms - particularly for support and logistic functions. For these activities the locally-stationed foreign forces are few in numbers (a few dozen men and women) and the infrastructures are relatively light. In the case of pre-positioned equipment, the foreign presence is reduced to management and supervisory personnel and the installations consist in storage areas, generally mere warehouses. The principal third world countries currently concerned with pre-positioning of equipment are the Gulf countries allied with the United States.

28. Most of the foreign military installations in third world countries fall in the category of "technical" and applied research military functions. These are light installations - compared with the types previously identified - that are autonomous and may be administered by the foreign Power, the host country or both. A part of the activities conducted on them is not solely military and may be administered by civilian personnel. This is the case of a number of research or monitoring activities which have direct civil applications in addition to their important military role (meteorology, seismology, medical research, etc.). This means that a considerable part of these installations is unaffected by geopolitical changes.

29. The last category of functions which lead to the military presence of a foreign Power is the simplest support and logistics function, which does not involve the presence of permanent foreign forces.

2.2.2. Possibility of reconversion of military bases and installations

30. Let us now consider, by types of structure, the technical possibilities offered by the installations we have identified, in terms of reconversion to civil activities capable of generating economic profitability and contributing to development.

31. Large naval and air bases are the facilities most likely to offer prospects of reconversion to economically profitable activities. Their principal resources are their infrastructure for communication with the outside world: deep water ports and long runways; and the associated equipment: storage sheds, aircraft shelters, warehouses, management

structures, road networks and services, dwellings and offices, hospitals, kitchens, messes, etc. The recent departure of the United States forces from the Philippines and of the Russian forces from Viet Nam, the giant bases at Subic Bay, Clark Field to a lesser extent, 8/ Cam Ranh Bay and Da-Nang, all with equipment far superior to that which the host countries could produce, soon led to the development of ambitious reconversion projects. Subic Bay is the focus of a project that is national in scale and aims to transform this former giant military complex into a regional production and export centre and an express mail logistics centre for east Asia. The port of Da-Nang, too, has been partly converted into a free trade area for the export of manufactured goods. Walvis Bay in Namibia, a former South African military port of average size, is currently the subject of a project for its reconversion into an industrial free trade area aimed at the South African market and an offshore centre.

32. The examples mentioned above are in fact the largest projects for reconversion of giant bases in the third world. While the prospects are immense, the investment required and the obstacles to be faced are very considerable. The transformation costs may be enormous as a substantial proportion of the equipment will have been removed and the factors that determined the morphology of the installations are not the same as those for an industrial zone or a commercial airport. The cost of environmental rehabilitation, particularly in storage and training areas, constitutes a further financial burden. The magnitude of the outlay required may therefore constitute a major constraint in attracting developers and investors. In addition to the internal constraints, a number of external constraints may render any reconversion difficult. For example, these bases may be remote from potential markets, from sources of manpower, from commercial shipping routes and from other requirements for their assumption of a new role. While the former large military bases in Asia seem to present opportunities, this is as much because of the level of their infrastructure as because of their geographical position in the country concerned and their geographical position within an economic region experiencing strong growth. Although the investment required is substantial, the regional growth prospects make the risk worthwhile. Evaluation of the potential must therefore take account, not only of the infrastructure, but also of the constraints and opportunities as a whole.

33. Military camps, whose equipment is of lesser value for the development of activities linked with international transport, offer different prospects. The conventional infrastructure of a military camp includes mainly dwellings in the form of dormitories, together with their sanitary facilities; apartments and villas; cafeterias; offices; garages and storage facilities; as well as open spaces for training (firing ranges, sports facilities, manoeuvring areas), etc. In the case of evacuation, such camps are treated in the same way as the large bases and their level of reusable equipment is low. Except in the case of Panama, the foreign military camps in third world countries generally seem to be poorly equipped. The French camps in Africa offer only limited opportunities for reconversion, apart from the sale of dwellings. This last possibility would appear to constitute the main option for this type of facility, with the additional possibility of selling or letting storage areas.

34. The major communication network, which includes relay stations and broadcasting and receiving stations, offers even fewer possibilities. When such equipment forms a part of other facilities, it suffers the fate of the latter and is abandoned or dismantled. The possibility of its reuse for civilian purposes is limited by the fact that it is generally produced according to military standards related to very specific functions that have no equivalent in the civilian field.

Research facilities are probably the ones most readily transferred to the non-military activities sector. Because of their characteristics, the most probable scenario is a simple "change of ownership", with modification of the orientation of certain research activities and of the form of distribution of information. However agreement on the transfer of ownership will be required.

35. The possibilities of conversion of military bases and installations situated in third world countries into tools for economic growth, such as free trade areas, free ports and airports, industrial zones, storage areas and other facilities, seem generally to be less promising than for those in developed countries and the countries formerly members of the Soviet Bloc. Their equipment with facilities offering real possibilities is considerably below that to be found in the latter countries and the economic possibilities are therefore equally reduced. An important factor is the great diversity of the inheritance upon the ending of the cold war, with some regions having great possibilities of reconversion, which is not only planned, but is already partly under way, while in others the prospects are more limited. In the latter regions the contribution of reconversion to development may be regarded as negligible.

36. An exchange of experience between countries which have undertaken such conversion could benefit not only them but also countries envisaging such conversion in the future.

2.3 Manpower

2.3.1 Demobilization

37. Two main types of situation can be distinguished: demobilization at the end of an armed conflict and demobilization in peacetime.

38. Many developing countries are confronted with the challenge of demobilizing armed forces at the end of an armed conflict. It is an element of rebuilding a war-torn society (World Bank 1993, Srivastava 1994, Kingma and Sayers 1995).

39. The personal and communal consequences of the trauma of armed conflict have to be dealt with. The mental problems of people - combatants and non-combatants - who have lived through such deep crises will have a continuing, often powerful effect upon every aspect of life after the end of the armed conflict; they constitute a real threat to the people directly concerned and to their society (Utting 1994). To pursue development at the end of an armed conflict requires political, social, psychological and judicial as well as economic rebuilding (UNRISD 1995, pp. 120-121). Training

in the wide array of skills required not only for development after a conflict but also for the transition to development is essential and challenging, but it is only one element among the many required if the transition is to succeed.

40. All former combatants need to adjust to the different context in which they will henceforth be leading their lives. Depending on how the conflict ended, demobilized soldiers may have to face the hostility of a population which considers itself their victims (Engel 1995). Experience shows that special programmes will be needed not only for the combatants themselves but for those having to help them reintegrate. Child soldiers are in special need of assistance to overcome the stress, trauma and disruption of family relations which they have suffered. The particular problems of women combatants also need to be taken into account. Women who have experienced considerable independence and responsibility are unlikely to appreciate being driven back into subordination to the men in their families.

41. Demobilized combatants need means of support during the transition to productive civilian life. This normally involves an allowance in money and often in food as well. Materials and tools for rebuilding and engaging in an economic activity are normally provided in smooth transitions.

42. In largely peasant societies, return to the land may seem a natural path for social reintegration. It does, however, present problems, some of which may be intractable. As a result of population movements, the access to land may be contested. Land-mines may have reduced the land effectively usable. Former combatants may have particular difficulty settling into a peasant lifestyle. As a result, many demobilization programmes try to help former combatants to take up non-agricultural activity. In many cases it is useful to distinguish the conversion of officers from that of soldiers. Officers may well have a level of education and of technical or managerial training which could be valuable to the dynamism of the civilian economy (see, for instance, OECD 1993). Experience shows that in developing countries reintegration processes take a long time. Five years is often mentioned as a likely period.

43. The question is often asked why former combatants are singled out as beneficiaries of the types of process just outlined. Refugees, displaced people and even those who remained on the spot have suffered similar traumas and disruptions (UNRISD 1995, Box 7.3). Indeed, many programmes cover both civilians and ex-combatants: Srivastava (1994) mentions Cambodia, Liberia, Sudan, El Salvador, Guatemala and Nicaragua.

44. There is however one practical reason for making particular efforts to achieve successful demobilization and transition to civilian life: ex-combatants have the skills, the experience and the equipment for an easy transition to banditry or to armed bands which may or may not have political objectives (Rufin 1995, Rana 1995). UNRISD (1995) (p. 117) mentions that within three years of the end of the war in Nicaragua, 26 new armed groups had emerged. Meanwhile other former military personnel may become security guards to protect fee-paying members of the public from the others who have turned to banditry. These security services are often offered by private firms, thereby contributing to the privatization of police-type activity.

45. Schemes to buy back weapons from former combatants have been tried and found normally to be ineffective, since the rate of return on a weapon like a kalashnikov can be extraordinarily high. An economic buy-back price is thus likely to be prohibitive. Even if it is not, it is likely to be so much higher than the replacement cost of the weapon that it merely provides an incentive to import further weapons. The World Bank (1993) takes a more sanguine point of view with respect to the merits of buy-back schemes.

46. Demobilization during a period of peace may simply be a consequence of reducing military expenditure. It may also be a consequence of a military policy shift towards more professional, higher-technology armed forces. The latter case does not necessarily involve lower expenditure, but it does require less relatively unskilled manpower. SATD in either of these cases calls for policies which promote the employment of the relatively unskilled above all.

47. Whether demobilization occurs in peacetime or at the end of an armed conflict, demobilized military personnel may be tempted to take up mercenary service abroad (Dufey 1995, Kingma and Sayers 1995, p. 6). Economic measures to diminish the supply of mercenaries face hurdles similar to those facing policies to prevent the movement of small arms into the civilian economy.

48. In short, demobilization is more likely to be successful if it takes place in a supportive economic environment in which economic policy offers conditions such that the manpower released is likely to find attractive and remunerative work elsewhere in the economy.

49. International exchange of experience with respect to demobilization could prove particularly fruitful, especially for countries where the possibility of demobilization lies in the future. Effective planning and preparation for demobilization in advance of the occasion can itself hasten the end of conflict by providing reassurance that post-conflict peace-building can be effectively carried out.

2.3.2 Use of the armed forces for civilian purposes

50. Where soldiers lack civilian skills and where the prospects of productive work in the civilian economy are poor, there may be a good case for keeping soldiers in the disciplined structures of the armed forces. It may be cheaper in terms of total direct and indirect social costs to preserve the military structures than to demobilize.

51. The armed forces are often regarded as an effective instrument for inculcating civic virtue in young people. In this perspective, national service may have a value beyond military security. Several European countries thus apply the structures of national service to civilian ends. In some cases conscripts perform civilian duties under military control, while in others the national service is under the auspices of other ministries.

52. In all these circumstances it may be worth exploring the degree to which the armed forces could usefully engage in civilian activities. Judiciously chosen civilian activities may furthermore enhance the image of the armed forces. On the other hand, to maintain larger numbers of military personnel

than are required by their primary mission may nurture a culture of militarism, which is widely regarded by market economists as disadvantageous to the workings of the liberal market economy. There are few current examples of the armed forces being used on a large scale on a continuous basis for civilian ends of public service, with the possible exception of dual-use public works like transport infrastructure. The armed forces often perform humanitarian and disaster-relief missions. Occasionally new roles within public order are assigned to the military.

53. On the other hand in several countries, many of them developing, the armed forces have become heavily involved in private-type business often resource-based, like forestry or mining.

2.3.3 The conversion of industrial personnel

54. Military requirements are met by the output of all sectors of the economy. By and large, the diminished demand for labour which accompanies a fall in military demand for goods and services is no different from a fall in demand from any other economic cause. Arrangements for the re-employment of the labour thus freed are of the same nature as those required in other cases.

55. There are however categories of manpower which call for particular concern when military demand for their services declines, military R & D personnel in particular. As experience in the former Soviet Union shows, under particularly unfavourable economic conditions the absence of special State support programmes may lead to the meltdown of many scientific and research institutions as a result of sudden cuts in military R & D funding. Smaller ex-Soviet republics with relatively limited capacities to adjust have proved to be particularly vulnerable in this regard.

56. On the other hand, many scientists and technologists engaged in military R & D have skills and experience with little alternative use. To retrain them to enable them to maintain their standard of living by working in other, civilian, fields may prove costly and time-consuming. Scientists and technologists of this kind may prefer to seek new employers in the field they know, i.e. to pursue military R & D in a different country. The decline in military R & D in technologically advanced countries can thus have proliferation as a side-effect rather than disarmament. If disarmament is the objective, specific measures to support such personnel may be needed.

2.4 Conversion, privatization and commercialization

57. In market economies privatization simply involves a shift from public to private ownership of certain enterprises, while for the countries in transition, privatization is a much broader process involving not only the transfer of ownership of enterprises, but the creation of the governmental and financial institutions of a market economy (Gültekin and Goldstein 1994, p. 72). In all contexts, however, relations between the State and military production have a distinct character more on the marketing side, whether the State is itself the buyer or whether it is assisting in sales to third parties. The domestic market for major weapon systems in a country where they are produced locally normally takes the form of a monopsony buyer dealing with

a monopoly or oligopoly. Prices will be determined by a complex bargaining process involving political as well as economic considerations. The characteristics of this market are described in UNIDIR 1993, pp. 20-22.

58. Increasingly, military goods and services are outputs of dual-use producers. Dual-use enterprises include civilian firms that have no specific relationship with the defence sector except that their civilian products or research have military potential, or scope for "spin-on". 9/ The dynamism of dual-use enterprises is stimulated by their location in a competitive private economy. The growing importance of spin-on confirms that this environment produces more impressive results than an isolated military sector.

59. Arms exports may be profitable for the most competitive firms. However, the export market has been substantially shrinking and cannot avoid the need for structural adjustment to the worldwide decline of the military sector (see section 1.2). The export of major weapon systems normally involves active support by the Government of the producing country. Although competition with suppliers from other countries may be a factor, marketing still involves a complex political and economic bargaining process. There is an intimate relationship between enterprises producing major weapon systems, the Government of a producing country and the Government of the purchasing country, regardless of the ownership of the enterprise. With respect to major weapon systems, government plays a decisive role, regardless of whether the producer is in the public or the private sector.

60. The market for small arms is more complex (Rana 1995). The private sector plays a greater role in it, possibly in production and certainly in trade. Government intervention in trade is not infrequent, even in cases where both the suppliers and the purchasers are non-governmental. Since the end of the cold war, trade in surplus weapons has become important. Supplies spring from disarmament in the supplying countries, but there is a movement of surplus weapons from North to South, with areas of crises and war as major customers (Laurance and Wulf 1995, esp. p. 15).

61. In short, the issue is not so much privatization as commercialization. It is not so much ownership as entrepreneurial attitudes which are decisive in effective conversion of military industry (Berthélemy and Deger 1995, pp. 87-88). The scope for exercising entrepreneurial attitudes furthermore depends not only on the structure of the firm itself including its ownership, but also on the market environment in which it functions. Producers for the military in both market and planned economies have more in common with each other than either has in common with civilian manufacturers. For instance, with respect to major weapons systems, the market is monopsonistic. Producers in market economies no less than in command economies must bargain with a single buyer, the Government, to determine not only the financial terms but the characteristics of any given programme. Such firms are largely isolated from the commercial economy by a wall of government regulation and red tape (Anthony 1994, pp. 125-126). 10/ Producers of small arms often operate in a much freer international market closer to the stereotype of the liberal market economy. Even in this case, however, the element of secrecy sets the arms market to some extent apart from the market in general. Privatization, like industrial conversion, depends on an economic environment which goes well beyond the firm itself.

2.5 Clean-up activities

62. The transition to disarmament can include activities like disposing of equipment or weapons or cleaning up military sites, production facilities or the leftovers of armed conflict. Cleaning up, whatever the ultimate objective, can serve as a source of employment to smooth the transition or even as an instrument of macroeconomic management. Clean-up activities may be considered an investment in so far as they involve preparing a former military site for civilian use expected to be profitable. Some transitional activities may be profitable in their own right although limited to a transitional period by their very nature, like recovering scrap metal or other resaleable elements from military goods no longer needed. Other clean-up activities may be unprofitable. In some cases the costs may be prohibitive, and outside assistance may be required to meet essential objectives the importance of which go well beyond simple considerations of profitability. The legacy of land-mines is a case in point. To restore society to working order, agricultural land must be rendered usable once more and infrastructure networks like electricity, water and transport must be restored or replaced, notwithstanding the high human and economic costs involved (UNICEF 1994, Louise 1995).

63. Clean-up activities may be justified although unprofitable, if they aim at non-economic ends. Where international security is involved, Governments are willing to meet significant costs. Such has been the case with destroying nuclear weapons and their delivery systems. Another reason for cleaning up may be environmental. The degree to which expenditure is incurred for this purpose depends on the importance attached by public authorities or private benefactors to the environment. It is unlikely that all the leftovers of military activity will be cleaned up to allow subsequent civilian use. Some areas will remain unconverted or even unconvertible for a long time to come.

Chapter 3

COMMODITIES

64. The end of the cold war has had significant effects on military expenditures and thus on the production and export of some commodities. At the end of the cold war, military use was thought to account for about 11 per cent of copper, 10 per cent of rubber, 8 per cent of lead and 6 per cent of aluminium consumption. For some minor non-ferrous metals, the share was even higher. These specific figures should be taken as no more than illustrative given the great importance of dual-use production which makes it conceptually difficult to distinguish military from civilian output.

65. This chapter concentrates on "strategic" commodities. A commodity is generally considered as strategic when it is (1) vital for the pursuit of national objectives, (2) scarce in the countries where it is used, (3) difficult to replace with a substitute in the short term. A commodity is all the more strategic the more criteria are fulfilled. These characteristics apply to a greater or smaller extent to a number of commodities. Petroleum is still for the time being the quintessentially strategic commodity. Two others were of major concern. Vanadium, a high-tech additive to steel, was until recently considered strategic from an OECD perspective because although it is quite common in the crust of the earth, only the Russian Federation, China and South Africa mine it. The same applied to platinum, of which the Russian Federation accounted for 20 per cent of output and South Africa 75 per cent. Nickel, although abundant, also used to be considered strategic because it has few substitutes. Its strategic character is declining as metallic alloys including nickel are being replaced by advanced composite materials.

66. It is not possible to separate changes in strictly military demand from the general consequences of the end of the cold war on demand for commodities. Though less direct than reductions in military spending, other consequences of the end of the cold war have been no less important for commodity markets. With the end of the cold war, economic considerations are likely to grow in importance. One positive long-term effect should be the disappearance of severe restrictions on trade and the reintegration into the world market of a market of some 400 million people. Furthermore, military demand has discouraged non-military use of minor metals because it has maintained their prices at a high level. Lower prices will benefit users of minor metals; whether or not they will benefit producers depends on the nature of the costs of production and long-term elasticities of demand.

67. The political and economic changes which have followed the end of the cold war have also altered security considerations in the supply of these commodities. The most obvious arise from major political changes in some of the main supplying countries. In some cases these changes have improved the prospects of secure supply but in others the opposite has occurred. The demise of the former Soviet Union has had far-reaching effects on the production and trade of many mineral and energy commodities, thereby increasing price instability, at least in the immediate.

68. The notion of strategic stock goes back to the First World War, and was further developed before and during the Second World War. In the early 1970s, in the context of large increases in the price of raw materials (oil in 1973, metals in 1973-1974) and of the example set by OPEC of using raw materials as a lever for the development of third world exporting countries, industrialized countries' anxiety for the security of their supplies grew. While they reduced the risk of raw material shortages by developing mining exploration and diversifying production sources, some countries decided to constitute strategic stocks of the most sensitive metals. In some countries the stocks were held by government, while in others they were held by enterprises with or without government financial support. Compared to the United States stocks, the others were relatively marginal.

69. In 1986 the United States decided to reduce its strategic stock dramatically and other countries decided to sell some or all of their stocks. In the case of China, sales were also related to a shift in demand as the Chinese army shifted to more sophisticated armaments. Its sales related to a declining need for commodities like tungsten.

70. Budgetary pressure and the political changes in the former socialist countries and in South Africa encouraged a further reduction of strategic stocks. In 1993 the United States Department of Defense reported to the Congress that because of developments in military needs and in the physical and political availability of new resources, only eight materials were still considered as essential.

71. Arms control established in a variety of international agreements has created a supply of surplus weapons and the challenge of dismantling them. So far, the discussion has focused on the economic recycling of military uranium (HEU) used in nuclear weapons. Technically speaking, the disposal of HEU presents no intractable problems. It can be converted to fuel for nuclear power plants. The problem is that, while on the one hand the end of the cold war has made available large quantities of military uranium and plutonium, on the other there has been a fall-off in the growth of nuclear power. As a result, supplies of uranium and plutonium are now outstripping demand. More generally, the recycling of materials from scrapped weapons has contributed to oversupply on world markets.

72. A militaristic environment is not necessarily more favourable for developing commodity-producing countries than a peaceful international environment, since it may drive important consumers towards national self-sufficiency. The Iraq-Iran war of the early 1980s, which created a strong sense of insecurity, pushed Western countries to reduce their dependence on traditional oil exporters. Throughout the twentieth century, rearmament and war have provided a forcing-house for technical developments to substitute for imported commodities. Hence the development of synthetic rubber, fibres, polyethylene or PVC.

73. It is hard to estimate the global impact of military changes on the demand for raw materials. In recent years, the number of strategic commodities has been fairly small. The declining interest of military industry in minor metals may encourage their non-military use thanks to lower

prices. The decrease in military requirements affects relative costs and prices not only of raw materials but also of other goods and services; it can have indirect effects elsewhere on the economy which do not always tend in the same direction. It seems clear in any event that in recent years security considerations have been less important with respect to strategic commodities while price considerations have gained in importance. Market factors have thus become more influential, constituting an aspect of the structural adjustment involved in the transition to disarmament.

74. In any event, there is little doubt that the economic recession over recent years was the primary cause of the levelling-off of consumption and falling commodity prices until mid-1993. General economic conditions have equally been primary causes of the pick-up in nominal prices since then, amplified by financial factors. In so far as conscious policies are pursued in order to ensure that resources released from the military sector are redeployed to other activities and in so far as the macroeconomic environment supports these policies, cuts in military expenditure can occur without exacerbating disorder on the markets for the commodities formerly classified as strategic.

Chapter 4

TECHNOLOGY 11/

75. In the setting of the impact of disarmament and conversion on world economic growth and development, international technology flows and the exchange of experience with respect to national technology policy are of particular interest. UNCTAD has a long-standing mandate in this respect (see, for example, *The Cartagena Commitment*, paras. 164-176). Paragraph 24 of *The Cartagena Commitment* states:

> The conversion of military capacities and technologies to civilian uses would also provide opportunities to adjust production structures to development priority needs and facilitate new trade, technological and financial flows.

76. The Commission on Science and Technology for Development, at its session in May 1995, considered the report by the UNCTAD secretariat and recommended to the Economic and Social Council the adoption of the following decision:

> The Economic and Social Council, ...
>
> Takes note of the report entitled "Scientific and technological aspects of the conversion of military capacities for civilian use and sustainable development" (E/CN.16/1995/13) and Recommends the continuation of the work of the Commission on Science and Technology for Development on scientific and technological aspects of the conversion of military capacities in close co-operation with other relevant bodies of the United Nations system and with other organizations. 12/

77. It should be noted that this decision neither specifies the directions which the Commission's work should take on this subject, nor recommends additional resources in this area. The Working Group may therefore wish to express views on how this decision might be effectively followed up, and to make these views known to the Commission.

78. The present report focuses on the conversion of military technological capacity to civilian use and the incidence of dual-purpose technologies on international technology flows.

79. During the cold war, OECD countries and the Soviet Union together accounted for about 95-98 per cent of global military research and development (R & D). This is not to say that military R & D is not important to the national economies of several other countries, even though they may add little to total world expenditure.

80. OECD and CIS countries continue to be by far the largest spenders on military R & D. In OECD countries, the share of military R & D in total government-funded R & D has evolved differently from one country to another. In a few it fell significantly, while in others it rose; in many it simply fluctuated. In the United States if fell from 69 per cent in 1987 to 59 per cent in 1994. In the Russian Federation, military R & D has fallen at much the same rate as civilian R & D; thus the share of military R & D in

total R & D seems to have remained at about 70 per cent. Furthermore, many Russian scientists have stayed on in military R & D establishments because of lack of opportunities elsewhere. Thus the decline in official employment figures has been less pronounced (Brzoska, Kingma and Wulf 1995, pp. 18-19).

81. In the 1970s stress was often laid on the spin-off from military R & D to civilian uses. Since then, military R & D has concentrated increasingly around particular high technologies of limited use for civilian purposes. Indeed, military technology has increasingly drawn on the fruits of civilian R & D, "spin-on". This further complicates the prospects for converting military R & D to civilian purposes, since the military R & D has focused more and more on specifically military problems without civilian applications. 13/

82. Experience in China has been that conversion was more successful when totally new production machinery was installed, in particular if automated. Having its own R & D and its own reservoir of highly qualified human resources, Chinese military industry can master bought-in technology, with dramatic increases in efficiency when converting to civilian production (Berthélemy and Deger 1995, p. 90).

83. Military R & D has different characteristics from civilian. For instance it tends to be highly secretive, leading to compartmentalization. In market economies, marketing skills for military R & D, and indeed for other forms of military production, are different from those which are effective in selling to a non-governmental civilian market. In entities used to supplying output to a small number of government customers, there is lack of knowledge of how to get a product into the hands of a multiplicity of non-governmental, civilian customers. The skills required for civilian sales range from identifying markets for products and services to developing promotional materials, targeting market segments, establishing pricing policies, and setting up distribution networks, while focusing on costing, pricing and competitive efficiency.

84. In the former socialist countries, the central Government was the financier, planner, main client, intellectual property coordinator and sole agent for science and technology. The scientific communities were able to devote their full attention to research and development. They did not need to design a corporate strategy. In present conditions, lack of knowledge about marketing and finance hampers R & D institutions' efforts to progress in the effective development and sale of their products. Although R & D resources in these countries have been deteriorating rapidly since the end of the cold war, there remains a good array of outstanding science and technology. Many foreign companies recognize this potential. However, lack of business skills on the part of the science institutes has cost them dearly: intellectual property rights have been sold for a fraction of their value because of lack of knowledge of international standards and insufficient skill in contracts and negotiation. Furthermore, the protection of intellectual property is weak, resulting in loss of potential revenue to finance the continuation of R & D activities. UNCTAD can offer, and indeed has been offering, technical assistance with respect to this type of problem: for more details, see "*Activities of the programme on international investment and transnational corporations*" (TD/B/ITNC/Misc.3), March 1995.

85. The ability of R & D institutions in the economies in transition to collect and exchange information has actually worsened in the last few years. Most R & D institutes have been virtually cut off from the international science community because of lack of funding for science journals, internet connections and professional travel. Among other consequences, this increases the risk of duplicating work being done elsewhere or of failing to ensure that production corresponds to international standards. 14/

86. Many technologies can be used to produce both weapons and civilian goods. Dual-use technologies can be pervasive. Indeed, through informatics, they underlie large tracts of the civilian economy. They therefore play an essential role in the development of developing economies.

87. A number of international arrangements have been established by technologically more advanced countries to restrict the proliferation to other countries of military or dual-use technologies. Concerns focus on the manufacture of nuclear, chemical and biological weapons as well as missiles, but other technologies are also affected. Extensive information can be found, for instance, in Deltac and Saferworld (1995).

88. In concentrating mainly on security issues, the literature on these controls reflects the international negotiations regarding them, notwithstanding the concern of many developing countries and countries in transition that the control regimes hinder the development of their civilian economy. Not only security motives, but commercial ones as well, may hinder developing countries' access to technology needed for development. As Berthélemy and Deger say with respect to China: "Systematically encouraged by the authorities, transfers of technology from abroad are still extremely difficult to obtain and limited by the reticence, for commercial reasons, of the foreign competitors" (p. 90).

89. The effect on economic development of restrictions on dual-purpose technologies is not clear. Some observers maintain that controls on the export of technology have a higher economic cost for the potential exporter than for the thwarted importer and therefore that the controls can be justified only on military grounds. For an expression of both this and the view that exporters do not suffer so greatly from such export restrictions, see Lodgaard and Pfaltzgraff 1995, pp. 221, 227. However, restrictions may simply shift the import of technology from the controlled step in the production process to one, perhaps more upstream, which is not controlled. The migration of scientists from the former Soviet Union and elsewhere to some technologically advanced developing countries may also reflect a response to such controls. In any event, countries which wish to acquire relatively sophisticated dual-use technologies are likely to have the technical capacity to develop it by their own means. South Africa is now an arms exporter. Its armaments industry was developed in response to a long period of international sanctions.

90. Export control regimes are often evaded, for instance through export or re-export from a non-party or through the black market. If a control regime is recognized as being legitimate, it is more likely to be effective. The nuclear non-proliferation regime originally negotiated in the mid-1960s was

designed to encourage access to nuclear technology subject to controls preventing its use for military ends (Deltac and Saferworld 1995, Chap. I).

91. In order to reduce the risk of interfering with developing countries' efforts to modernize technologically, a promising approach would be to shift "the focus of export controls away from denying the export of technologies to a situation where there is a tendency to permit trade in conjunction with increased monitoring and verification of end-use" (Deltac and Saferworld 1995, p. 189). Such an approach would serve the objective expressed in *The Cartagena Commitment*, paragraph 24, quoted at the beginning of this chapter.

92. The debate on export control regimes is now largely conducted in terms of security and by experts in that field. It is important that the incidence of control regimes on the development of the civilian economy of developing countries be properly taken into account. As an institution whose main concern is development, UNCTAD can provide an effective forum and technical support for considering the developmental aspects of the question.

Chapter 5

FINAL REMARKS AND CONCLUSIONS

93. The end of the cold war has resulted in a new situation raising novel challenges under the heading of structural adjustment for the transition to disarmament. It is not just that military expenditure has declined substantially: the end of the cold war has been followed by severe economic decline in the economies in transition; in the developing countries, central government expenditure has declined as a share of GNP (figure 1.1), reflecting a smaller role of government in macroeconomic management. The relations between all these factors are complex; disarmament cannot be treated as an isolated phenomenon.

94. Experience since the end of the cold war has shown that the costs of the transition to disarmament are greater than was expected, while the benefits have been slower to emerge and smaller than were hoped (chap. 1.2).

95. International cooperation can help individual countries to minimize costs and maximize the benefits of SATD, including conversion. This applies to both countries which have already reduced their military expenditure and which are now in the phase when economic and social costs are high (figure 1.3 (a)), as well as to countries which are considering a reduction in military expenditure: the prospect of international cooperation to smooth and shorten the process of SATD can indeed facilitate reducing military expenditure.

96. International cooperation can take a number of forms. One is appropriately targeted increases in ODA. Reduced military expenditure in developed countries releases resources for other uses. Uses which support SATD and conversion in developing countries and countries in transition, or which more generally promote world economic growth and development can be particularly encouraged.

97. Since SATD affects different types of economies in different ways, it is useful to distinguish between the effects on economies which export arms or commodities consumed by the military, economies which import them and economies which to a large extent meet domestic military requirements from domestic sources. Furthermore, SATD has different implications in each of those types of country depending on whether they are market economies, economies in transition or developing economies. In some countries, a high proportion of which are developed economies or economies in transition, military production is the sector most at issue in SATD, while in others - often developing countries - the demobilization of armed forces is closer to the heart of the issue. In the light of these differences, the challenge of SATD takes on different forms in the developing countries and the economies in transition which distinguishes it from SATD in the developed countries. None the less, there are shared as well as distinguishing features between as well as among these countries. Each can draw lessons from the positive and negative experiences of the others.

98. In the area of SATD and conversion, given these differences, exchange of national experience can prove fruitful. Indeed, paragraph 63 (4) of the Cartagena Commitment, which deals with "sharing and discussion of national

development experiences and policies, paying due regard to different national circumstances and to relevant aspects of the international economic environment", specifically states that the economic aspects of conversion of military capacities to civilian uses should be addressed in that context.

99. The Agenda for Development proposes world hearings on the connection between disarmament and development, to be conducted by the President of the General Assembly (A/49/665, para. 33). Should these hearings be convened, UNCTAD would have a distinctive contribution to offer to them.

100. SATD will be a factor in the world economy for some time to come. To tackle it effectively is a valuable contribution to world economic growth and development. Furthermore, there is a peace-to-development continuum. SATD, which peace makes possible, can if appropriately managed strengthen the civil order which is a prerequisite for the investment which underlies world economic growth and development.

Notes

1/ TD/364.

2/ Trade and Development Board decision 416 (XLI).

3/ TD/364 para. 98.

4/ TD/364 para. 24.

5/ US ACDA, 1995, table II, p. 91.

6/ The peace dividend is estimated in relation to the base year 1987 as calculated by UNDP, 1994 (see table 1.1 of the present report).

7/ Paragraph 3 of the statement, reproduced in OECD press release SG/PRESS(95)31.

8/ The base was evacuated from 17 to 19 June 1991 during the disastrous eruption of the Pinatubo volcano.

9/ In the 1960s and 1970s "spin-off" was often mentioned as a benefit of military expenditure: products and processes developed for military needs incidentally had civilian uses as well. In recent years, the opposite process - named "spin-on" by analogy - has gained in importance: goods, services and technology already existing in the civilian economy are increasingly being purchased for incorporation into specifically military goods and services.

10/ This passage in Anthony 1994 in turn quotes a number of other sources.

11/ The reader is referred to two further reports by the UNCTAD secretariat on this subject: *Scientific and technological aspects of the conversion of military capacities for civilian use and sustainable development* (E/CN.16/1995/13) and *Commercialization of science and technology activities in transitional economies* (TD/B/ITNC/4).

12/ Economic and Social Council resolution 1995/4, para. 19.

13/ The foregoing paragraphs draw heavily on Brzoska *et al.* 1995, chap. 5.

14/ Paragraphs 82-85 are closely based on TD/B/ITNC/4, paras. 19-46.

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