

# SECURITY ASSISTANCE PERSPECTIVES

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## UNDERSTANDING ARMS PRODUCTION IN DEVELOPING COUNTRIES

By

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[Editor's Note. The following is a reprint of the introductory chapter to Arms Production in Developing Countries: An Analysis of Decision Making, James E. Katz, Ed., Lexington Books, 1984 (reprinted with the permission of the publisher). The book examines arms production and arms transfer programs throughout the Third World, and provides explicit case studies of 14 developing countries (Argentina, Brazil, China, Egypt, India, Israel, South Korea, North Korea, Mexico, Pakistan, the Philippines, South Africa, Taiwan, and Yugoslavia). The chapter reprinted below provides a general survey of the growing phenomenon of Third World arms production/transfers; for a more detailed analysis, the reader is encouraged to examine the full text.]

This chapter will briefly illustrate some arms production activities in developing countries, describe the motives for them, and analyze the obstacles they face. (Developing countries will be called LDCs, for less developed countries.)[1]

The past decade has witnessed an explosion in arms production in LDCs. Today, they produce between 5 and 10 percent of the arms sold to Third World countries, up from a small fraction of that number in the 1960s. Brazil and Israel are among the world's top ten arms exporters. That arms sales can be an important part of a nation's economy is nowhere better illustrated than in France. Although France is not an LDC by any standard, it has attained an unusual status that may provide a model for some LDCs: France earns more foreign exchange, that is, has its largest export earning, from weapons sales.

Following in this path is Brazil. Brazil is the leading Third World exporter of arms, and has explicitly made arms sales to LDCs an integral part of its foreign policy. The best-known Brazilian export is its EE-9 Cascavel and EE-11 Urutu armored cars. They are used by the Iraqi, Libyan, and Qatari armies, as well as by Brazil's own army. It also produces tank destroyers and rocket launchers, and has at least four other rocket systems under development.

EMBRAER, Brazil's major aircraft manufacturer, produces transports, trainers, ground attack and reconnaissance aircraft, and will soon begin producing Latin America's first supersonic jet fighter, the AMX lightweight strike aircraft, in cooperation with Italy. Brazil also produces helicopters, missiles (including heat-seeking air-to-air missiles), frigates, and patrol ships. Brazil will be building submarines with Italian help.

Israel has the most sophisticated arms industry among the LDCs. Despite its highly sophisticated conflict environment, the Israel Military Industries (IMI) is able to meet nearly all its defense needs, by type if not by quantity, except in the area of tank engines and aircraft. Further, its extensive arms production industry is able to generate over a billion dollars annually in export sales, second only to Brazil in the Third World. Israel has designed and built an innovative tank, the Merkava (Chariot) Mk-1, which has a laser range finder and ballistic computer. Israel also makes its own armored wheeled vehicles, an array of howitzers, and missiles--including air-to-air, surface-to-surface, and antiship missiles. It produces the Kfir jet fighter and is planning a new generation of aircraft, the Lavi; it also makes a STOL (short takeoff and landing) vehicle, and is designing a utility helicopter. Israel's remotely piloted vehicle (the Scout) became an important part of its Lebanon Campaign.

Israel also manufactures patrol boats and electronic and ECM (electronic counter measure) equipment. Its Uzi submachine gun is world renowned, and its Galil assault rifle enjoys wide sales abroad.

Driven by an international embargo, South Africa has joined the ranks of major arms producers outside the major powers. It has designed and built its own armored personnel carrier (Ratel), 90mm field gun, and a 105mm howitzer. There are reports that it has indigenously created an air-to-air missile, various electronics, engines, and chemical weapons (including napalm and nerve gas). South Africa has made under license STOL aircraft and fighter aircraft, fast missile craft, frigates, and strike aircraft.

The Republic of China (ROC) has undertaken a sophisticated program to develop its own armaments, all the way from infantry weapons to missiles and aircraft engines, and from helicopters to turboprop transports.

This listing for the above countries is by no means complete. These are but a few of the very active and successful LDC arms production programs. Other nations and representative products include Egypt (missiles, aircraft, jeeps, helicopters); Iran (antitank missiles); South Korea (gas masks, communication and electronic equipment, howitzers, two-stage surface-to-surface missiles); North Korea (frigates, patrol craft, submarines coproduced with the People's Republic of China); People's Republic of China (atomic bombs, submarine and surface ballistic missiles, military satellites); the Philippines (rifles, helicopters, ships); India (tanks, attack fighters, avionics and fire-control systems); Indonesia (simple aircraft, ships, and helicopters); Pakistan (nonlethal equipment, rebuilt aircraft); Singapore (rifles, fast missile boats, electronics); Argentina (tanks, aircraft, submarine assemblage, missiles); Chile (troop carriers, mines, bombs, trainer aircraft); Colombia (mid-get submarine assemblage); Mexico (rifles, armored vehicles, fast patrol boats); Peru (submachine guns, coastal patrol boats); and Yugoslavia (laser equipment, antitank and anti-aircraft missiles, jet fighters, attack missile craft, submarines). This listing represents an impressive and rapidly growing array of weapons and support equipment that is being produced by Third World countries.

## MOTIVES FOR PRODUCING ARMS

The most important factor driving LDCs to produce arms can be summarized quite easily: autonomy, that is, freedom of action in the domestic and international spheres. For any nation, being in the position of having some other nation choke off needed arms supplies in order to get it to alter its behavior is unacceptable. Most nations will go to great lengths to preserve their policy options.

The United States is no different from Israel, the ROC, or Argentina in this regard. For example, we in the United States have spent billions of dollars on a strategic petroleum reserve and a strategic material stockpile. This was done so that our country would not be subject to the dictates of other nations.[2] LDCs are not different from the United States in terms of motivations, only in resources.

Further, what the LDCs might be missing in terms of a perceived global role, which the United States has, is offset by an ideology of independence. This is especially apparent in light of the rising consciousness of the global structure on the part of the nonaligned nations. They want to escape both outright and perceived colonialism and neocolonialism.[3]

Within this broad category of autonomy, several specific motives are readily discernible. Security of arms supplies is paramount among them. All major LDC arms producers have either been subjected to actual arms embargoes and constraints, or have had threats of such actions made by their major suppliers. This has also been the case for many of the small producers as well. The LDC's first response is to seek other sources of arms. Because of the diverse, large, and intensely competitive international arms market, it is likely to succeed. But eventually it may seek to establish its own industry to bolster its autonomy.

A closely related security motive is the situation in which an LDC feels threatened by attacks from other states, or is an expansive power itself. The perceived threats need not necessarily come from other nations: they can come from within.

The security rationale easily blends into those of broader national political objectives. A government's leaders might want an arms production program so that they can pursue aggressive, expansionistic, or hegemonistic policies. A country's military exports can be used to help maintain trade leverage with those upon whom the country depends for natural resources and as an instrument to help in the conduct of its foreign policy.

Arms production programs are also motivated by economic rationales. Often it is hoped that by manufacturing equipment and weapons indigenously, a country can secure them more cheaply than if purchased abroad. This would save foreign exchange and make available additional resources for other projects. Further, if the products can be sold abroad, there are potential foreign-exchange earnings. The program can also mean greater employment opportunities for workers.

It may also provide an incentive for technically trained manpower to remain in the country, reducing the brain drain. Individuals who might

otherwise be tempted to emigrate, seeking appropriate jobs in developed countries, can find suitable positions at home.

There is also an educational bonus. Putting production programs into place requires generally upgrading the skills of local workers. These skills may be translatable into other economically productive skills.

For a country simply to buy arms has economic drawbacks. No jobs are created, tax money and foreign-exchange earnings are drained. The domestic economy is hurt. Manufacturing arms, while admittedly having drawbacks that will be discussed later, avoids these drains on a country.

In opposition to the outright purchase of material from developed countries, the technology transfer issue is often a rallying point for LDCs. They feel that if they could possess Western technology, their domestic economies would grow and they could compete more effectively in the international marketplace. Arms production technology is no exception to this viewpoint. By either receiving the technology, or recreating it itself, an LDC might be able to force development in particular areas. But beyond national economic motives lie strong institutional incentives. Aggressive arms production programs, if handled through the private sector, mean profits for the capitalists, or, if handled through the governmental sector, new fiefdoms, positions, and perquisites for bureaucrats and political elites.

As Irving Louis Horowitz indicates in Beyond Empire and Revolution, the military has become the basis of power in most LDCs.[4] The militaries have become a major force regulating national development. Arms production programs are generally viewed by the militaries as a decided advantage in fulfilling their national security mission. The programs also boost greatly their professional image and role.

Finally, the symbolic importance of arms production programs cannot be overlooked.[5] For a country that has suffered defeats from colonizing armies, been chastened by its neighbors, or riven by ethnic factionalism, an arms production program signifies much. The ruling elites seize upon its arms production programs to indicate their competence and effectiveness. The pride Argentines feel about their locally produced tanks and aircraft, or the Brazilians' pride in their planes and ships, is great and widespread. This is even more the case when things do not go well with foreign adventures or the domestic economy.

## FACILITATING FACTORS

Desires and motives are one thing; the actual ability to carry out an arms production program is another. There are several factors that greatly affect an LDC's ability to bring an arms production program to fruition.

The amount of capital available for investment is a key determinant of self-productive capability. Arms industry development requires enormous amounts of capital, especially if the program is developed completely independent of foreign assistance. This puts a great strain on LDC financial resources, and explains why so many weapons programs have been terminated even after production has begun. It also explains why the richer countries

among the Third World are the ones who are often the weapons producers. Even the inexpensive labor costs of LDCs do not ipso facto make production cheaper, since other factors counterbalance the wage scale benefits, such as infrastructure, specialized materials, and the needed know-how. In fact, these other factors usually make arms production more expensive than out-right purchase.[6]

A second important capacity-determining factor is whether or not an LDC has a large landmass and a large population. Although there are exceptions, such as Israel and Singapore, most LDC arms producers are large countries. They also have large military establishments to absorb weapons and equipment. India, the People's Republic of China (PRC), Brazil, Argentina, and South Africa are typical examples. Having large populations facilitates great specialization among the work force and the marshaling of a critical mass of personnel. Large countries have large militaries, and these in turn permit the well-known economies of scale to take place in production runs. Large armies are correlated with large landmasses. All large, heavily-populated countries have large armies, and nearly all of these countries have significant arms production programs.

As alluded to earlier, the possession of technically-trained manpower and a research base, and institutions for educating technicians in particular areas, are also facilitating factors. This is one area where LDCs are notably weak. It was only through the active assistance of foreign scientists, engineers, and technicians that LDCs were able to develop their arms industries, with the partial exception of Israel and South Africa. Israel, of course, benefited greatly from emigre specialists. But even these two semi-exceptions have had substantial assistance, both covert and overt, from developed nations. For countries without a strong technical base, the withdrawal of foreign advisers and managers can spell disaster for the indigenous arms production programs.

By the same token, if there is a dramatic slowdown in arms development in Western countries, we can expect that experts from these countries will seek employment in LDCs, especially those that have large incomes, such as in many oil-exporting countries. The surplus capital possessed by these nations has been used to attract nuclear specialists from developed countries to help LDCs with their own indigenous nuclear energy programs. The drying up of jobs in the West made the salaries and professional opportunities offered by LDCs even more attractive. It is doubtful, however, that a slowdown in arms development will take place as it has in the nuclear area.[7]

Another crucial facilitating factor is the overall extent of industrial development of the LDC in question. If it has highly developed collateral industries, a smoothly running economic and organizational structure, and a united and supportive central governmental administration, it will be much easier to put an arms production program into place. Many of the financial problems that have occurred in LDC arms production programs are the result of inadequate industrial development. By not having indigenous industrial capacity, several factors aggravate the already great problems facing an arms production program. These include the high price of imported industrial materials and components, delays required to import the materials, lack of technical support facilities, low utilization rates of productive capacity (which

often operates in surges, alternately straining and idling productive capacity), and low worker productivity partially caused by ineffective work habits and styles.[8]

The following section, which covers the way in which arms programs are actually implemented in developing countries, discusses the importance of collateral industries in more detail.

### IMPLEMENTING THE ARMS PRODUCTION PROGRAMS

Once an LDC decides to undertake an arms production program, and begins devoting resources to it, there is a fairly predictable series of steps that a country goes through in its pursuit of arms production capability. While these steps are not ironclad, there does seem to be a logical and empirically validated order to the process. We have already looked at the first step: a desire to participate in the arms production process. This may be a fully developed plan with goals and strategies for their attainment, as has been the case with Israel. Or the desire can be expressed more sporadically and simply be based on opportunities as they sequentially emerge. This seems to be the case in Singapore. Those countries with aggressive, strongly supported programs are the most markedly successful in terms of growth.

There is a "natural history" in the actualization of a weapons-system production program once the motive has been established. First, facilities to service and overhaul weapons are set up. Second, licenses are obtained for assembling kits produced in other countries. Next, the less complex components of systems are manufactured within the country in question, while more complex parts of the system are manufactured elsewhere. The actual assemblage might take place either domestically or abroad. It is at this point that an LDC can earn foreign exchange, by selling items either to the licensor or to other purchasers. Fourth, the LDC gradually reduces the proportion of [imported] components in a system under license. Finally, an LDC is able to produce an entire weapons system from design to production by itself.[9]

Throughout this entire process, the degree to which an LDC is industrialized strongly affects its ability to undertake an arms production program. In fact, the civilian industry can, in certain areas, be rapidly adapted to defense production. This area of overlap, called dual-use technology, represents one of the easiest paths to local arms production programs for LDCs. Automotive production lines can be readily adapted to produce armored personnel carriers, military trucks, and even tanks. For example, Brazil has restructured its Volkswagen assembly lines to produce tanks. Electrical equipment industries can manufacture aeronautical and naval electrical systems and hydraulic mechanisms for gun systems. Household appliance, food-processing, and textile industries are easily adaptable for making military logistical equipment. South Korea is a significant exporter of such equipment, based on its own industries.

The rapid adoption of highly complex arms manufacturing technologies is much more difficult for LDCs. This point is well illustrated by their efforts to create a domestic rocket-missile industry. Both Egypt and the Philippines, for example, launched ambitious programs on this technology in the 1960s, but neither program yielded much. Experiences such as these have made

some LDCs quite cautious about the level of complexity in the technology that they will try to either create or coproduce. Thus, in the late 1970s, Brazil rejected a U.S. proposal to coproduce the F-5 aircraft. They did so on the grounds that its technology could not take root in their industrial system; they preferred instead programs that could be pinned to the absorptive capability of their local infrastructure and which could provide a basis for direct and transferable managerial, physical plant, and engineering capability development.

Because of this and related technology transfer problems, some have argued that coproduction or indigenous design and production of advanced technology will not become a politico-military problem for developed countries. Critics maintain that the technology is simply too sophisticated to be successfully adopted by an LDC. However, this point has been challenged by those who see that some technologies are rapidly adaptable, and [also] dangerous, not because of the sophisticated nature of the technology, but because it is available. Even twenty-year-old technology can be awesome when contrasted to forty-year-old technology. Moreover, one analyst maintains that intermediate range, surface-to-surface missiles are simpler to produce than jet airframes, and the technology is more readily available; and consequently this can be far more destabilizing.[10]

In either case, however, it is clear that by adapting dual-use technology, an LDC can become an arms producer very quickly, or, if already producing equipment of a low level of sophistication, can upgrade its adaptability significantly. For example, light civilian aircraft can be readily upgradeable to ground support, counterinsurgency, or trainer roles. To illustrate, Argentina, by using its Piper Cherokee technology, produces counterinsurgency aircraft. It does this by restressing the airframe, hardening the underwing areas, and adding pods. Not a very formidable step in technology, but one having potentially important military significance in a guerrilla war. Likewise, trainers can be upgraded into light attack aircraft. India did this with its Kiran Mk-I jet trainer.

Dual-use technology can also be adapted in ways that might transform the military balance of power. One can easily envision this happening in the area of surface-to-surface missiles or cruise missiles. Here, I am not referring to the intercontinental ballistic missile (ICBM), or even the air-launched nuclear cruise missile. I mean rather a much simpler technology that is capable of remotely delivering a payload onto either a military or civilian target. This incidentally need not be an explosive warhead, but could be chemical or biological. One of the easiest pieces of equipment to adapt are remotely piloted vehicles (RPVs). These are now manufactured in the Third World for forestry and pipeline surveillance, aerial photography, and air sampling. Manufacturers include Saudi Arabia and South Africa. Even regular aircraft can be adapted for remote piloting. Indigenous construction of airframes is relatively easy for advanced LDCs, and propulsion systems are readily available. But guidance systems become highly problematical beyond the simplest requirements. Only Israel and perhaps India have hope of independently devising such a system.[11]

The proliferating LDC arms production programs are likely to alter regional balances of power and military doctrine in the Third World and along

the periphery of the Western and Eastern blocs. Because of space limitations, this subject cannot be discussed here; however, it is important to recognize that arms production programs do promise change in this area.[12]

### MARKETING PROBLEMS

The importance of arms production programs in conserving foreign exchange has already been discussed, and it has been noted that the exchange savings may not always be as great as first anticipated. However, arms production programs are perceived not only as foreign-exchange conservers, but often as exchange earners. Several LDC arms production programs have been launched in the expectation that as Third World (and even developed countries') military expenditures continue to rise, new markets for their products will open up. Indeed, worldwide defense spending is likely to continue to grow, so there will be opportunities for LDC arms sales.

Countries like India, the People's Republic of China, and even Argentina rely on large military forces that need to be armed. Since arms can be expensive, price will be a factor. Certainly in situations short of actual war, these mass armies can be impressive and intimidate a nation's neighbors. So these armies, navies, and air forces may represent significant export opportunities for cheap, serviceable weapons. But the record of recent wars, if carefully studied, may not lead to continued expenditure on the cheap, mass-produced weapon. Rather, emphasis may begin shifting to high technology. The South Atlantic and the Lebanese wars have shown the importance of high technology in warfare. Small numbers of sophisticated equipment prevailed over much larger numbers of more rudimentary weapons. Thus, to the extent possible, procurement in the future will probably be oriented toward purchasing the most sophisticated equipment possible. This trend would diminish the potential sales of LDCs, since they almost universally stress simpler equipment. Still, some military establishments will undoubtedly continue to stress mass tactics and arms, and this will provide important markets for LDCs. Further, such sophisticated equipment might not be available to LDC mass armies, and they may have no other choice but to rely on simple equipment.[13] Nonetheless, this problem remains a dark cloud over LDC arms sales projections, and poor foreign sales will diminish the economies of scale and exchange earnings that may initially have been anticipated by the LDC manufacturers. This would exacerbate their arms production programs' already significant difficulties.

### SOCIETAL IMPLICATIONS

It is clear that the military is one of the preeminent institutions in developing countries, and often provides the direction for modernization and development. Arms production programs tend to further reinforce the military's already strong societal position. The programs also tend to give greater power to the government at the expense of those outside the government, and can enhance a government's ability to suppress opposition to itself, including insurgencies. Arms production programs, since they can contribute to an LDC's autonomy, can also permit it a greater offensive strike capability, and make it independent of the constraints placed on it by developed countries. This autonomy implies a reciprocal decline in the manipulation and

control that can be exercised by other nations. Indeed, it is only through indigenous arms production programs that Israel, South Africa, and the Republic of China have been able to exercise the independent national policies that they have.

The obstacles LDCs must overcome in the development of their arms production programs are often great. The determined pursuit by so many LDCs of arms production programs in many areas is testimony to the powerful and deep motives they have for undertaking such programs.

#### ENDNOTES

1. For the purposes of this book, developing countries are all the countries of Latin America, Africa, the Middle East, and Asia (except Japan). Yugoslavia, being neither a member of the Western or Eastern blocs, and because of its economic status, is also considered a developing country. The term "developing countries" covers what is usually considered the Third World. See Irving Louis Horowitz, Three Worlds of Development (rev. ed.), (New York: Oxford University Press, 1972).
2. James Everett Katz, "The Strategic Petroleum Reserve," Energy 2, no. 9 (1981): 927-32.
3. See Stephanie Neuman and Robert Harkavy (eds.), Arms Transfers in the Modern World, (New York: Praeger, 1979). See also Benjamin Cohen, The Question of Imperialism (New York: Basic Books, 1973).
4. Irving Louis Horowitz, Beyond Empire and Revolution (New York: Oxford University Press, 1982). See also Tae Dong Chung, "Soldiers in Politics: A Comparative Overview of the Military as a Social Force in Developing Countries," Asian Perspective 6 (Summer 1982): 66-87; Claude E. Welch, Jr., and Arthur K. Smith, Military Role and Rule (Belmont, Ca.: Wadsworth, 1974); and also Horowitz, note 1.
5. John Sanders, "Of Arms and Sovereignty," Defense and Foreign Affairs 9 (August-September 1981): 9-11, 13-14; T.L. Horowitz and Ellen Trimberger, "State Power and Military Nationalism in Latin America," Comparative Politics 8 (January 1978): 223-44.
6. Jan Oberg, "Third World Armament: Domestic Production in Israel, South Africa, Brazil, Argentina and India, 1950-75," Instant Research on Peace and Violence 5 (1975): 222-39.
7. This point was touched on in terms of potential LDC missile development in Maurice Eisenstein, "Third World Missiles and Nuclear Proliferation," Washington Quarterly (Summer 1982): 112-15.
8. Ilan Peleg, "Military Production in Third World Countries," in Pat McGowan and Charles Kegley, Jr., (eds.) Threats, Weapons, and Foreign Policy, Sage International Yearbook of Foreign Policies Studies, Vol. 5 (Beverly Hills, Calif.: Sage Publications, 1980). See also Dennis Anderson, "Small Industry in Developing Countries," World Development 10, No. 11 (1982): 913-48.

9. Michael Moodie, Sovereignty, Security and Arms. Washington Papers, Vol. 7 (Beverly Hills, Calif.: Sage Publications, 1979).
10. Eisenstein, pp. 114-15.
11. See Science Applications, Inc., Implications for Arms Control in Technology Transfer to Less-Developed Countries. Prepared for the U.S. Arms Control and Disarmament Agency, September 1980.
12. This point is touched on in a broader context in Edward J. Kolodziej, "Implications of Security Patterns Among Developing States," Air University Review 33 (September-October 1982): 2-22.
13. I am indebted to Frans Bax for this point.

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