Technical Assistance and Article IV of the NPT

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The main concepts expressed in article IV of the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) can also be found in the Statute of the International Atomic Energy Agency. My predecessor, Mr. Upendra Goswami, wrote the following some years ago:[1] "Even today, after a lapse of 14 years, the IAEA often presents to the outside world the aspect of an organization in which the control activities loom large and the promotional activities appear as a bit of thin icing on a "safeguards" cake. But a closer look at the organization today would convince the intelligent observer that whatever might have been the object of the founding fathers, the organization promotes peaceful uses no less vigorously than it controls proliferation of nuclear arms."

Since the IAEA's technical assistance programme started in 1958 and the NPT only came into existence ten years later, it is quite clear that the IAEA already had considerable experience in promoting the peaceful uses of atomic energy. However, in my view, we should always keep in mind that the technical assistance programme derives primarily from the Statute of the IAEA through a liberal interpretation of the intentions of our founding fathers, and in fact emerges as the sum total of requests from developing Member States.

Since its inception in 1958, the IAEA's technical assistance programme has undergone some changes in its orientation and it is to this matter that I would like to call attention.

In the early 60's, the emphasis in the programme was on the utilization of research reactors in developing Member States for, inter alia, the production of isotopes and labelled compounds, and on training of personnel, on the one hand to carry out government programmes utilizing nuclear techniques in their economic and social development plans, and on the other hand as part of the creation of a scientific infrastructure in universities and other institutes of higher education.

The increasing emphasis now emerging on nuclear technology is reflected in the requests for assistance which is, in turn, a reflection of the needs for increased energy in developing Member States. At present, eight Member States receiving technical assistance have nuclear power stations in operation or under construction. Many others, foreseeing the shortage of conventional power sources in the next two decades, have carried out or are carrying out feasibility studies. The whole process of the introduction of nuclear power requires the State concerned to start planning at least eight to ten years before a nuclear plant is to go into operation, and in preparation for this work the technical assistance programme is being increasingly utilized by Member States for the essential training of personnel.

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[1] IAEA Bulletin, vol. 14, no 1, 1972

It is possible to identify four stages with regard to the introduction of nuclear power.

– The first is a preliminary survey by the Government.
– The second is a preliminary study and technical assistance is utilized at this stage, particularly to show if the time scale is realistic.
– The third stage is a feasibility study, which is normally carried out by a firm of consulting engineers and followed by the preparation of tenders and the provision of assistance in evaluating the bids received. For this stage, the Agency's technical assistance programme is also utilized, especially in helping the Government to choose a suitable consultant engineering firm.
– At the fourth stage, assistance is provided in supervising the construction work and in the eventual commissioning of the power reactor, which is normally carried out by one of the consultant engineering firms.

NO SET PATTERNS OF TECHNICAL ASSISTANCE

The manner in which the Agency's technical assistance programme can assist in the introduction of nuclear power varies according to the stage of power development in, and the energy requirements of, individual developing countries. For example, the Agency's assistance involvement in one country is spread over several years and carried out in two phases. In another country it is starting at the construction stage, with emphasis being placed on safety matters. In yet another case the Agency has provided assistance to the electrical power authorities during the initial planning stages of the country's nuclear power programme. The assistance required is unlikely to follow a set pattern, and a pragmatic approach to meeting needs, based on a joint assessment of the situation by the Agency and the requesting Government, is therefore expected to yield the best results.

The introduction of nuclear power also requires close co-operation between the atomic energy authorities and the electrical power authorities at the national level in the developing countries. Assistance to promote such co-operation has been given by the Agency to participants representing these two authorities in successful regional and interregional seminars which dealt with the practicality of the introduction of nuclear power in the developing countries. It is expected that this type of assistance will continue and be expanded.

Recent increases in world oil prices are expected to lead to a considerable increase in the number of developing countries embarking on nuclear power programmes.

Fourteen developing countries in Asia, South-East Europe and Latin America have been surveyed to determine the size and timing of the installations of nuclear power plants that for economic reasons could justifiably be built during 1980-89. The survey was undertaken by the Agency with the financial help of the International Bank for Reconstruction and Development (IBRD), the Inter-American Development Bank and several industrialized Member States. At present only eight developing countries have nuclear power plants in operation or under construction, namely Argentina, Brazil, Bulgaria, the Czechoslovak Socialist Republic, India, Mexico, Pakistan and the Republic of Korea. It has been calculated that 15 developing countries would initiate nuclear power projects at an early date and that about the same number again are interested in the possibilities at a somewhat later stage.

The future demand for uranium, estimated to increase by a factor of three to four between now and 1980 warrants concentrated investigation of what were formerly considered to be economically "marginal" deposits of uranium ore, as well as devoting more attention and funds to the completion and the updating of the findings of overall mineral resource surveys. The facilities and funds made available to carry out uranium resource surveys are likely to grow rapidly with the development of atomic energy programmes and the expanded use of nuclear power in developed and developing countries in future. The technical assistance available from the Agency in this respect is usually financed from its own resources in the case of work done at the initial planning and investigatory stages, whereas assistance in respect of activities at the development (that is, pre-investment) stage is financed under the United Nations Development Programme (UNDP).

TRAINED PERSONNEL ESSENTIAL

For the application of nuclear technology to national development, it is essential to have a sufficiently large cadre of trained personnel available at all levels. Training is an integral part of the Agency's technical assistance programme and is organized to help the developing countries create the scientific infrastructure needed to make progress. Training in the use of nuclear techniques in agricultural, medical, industrial and technological programmes applied to local conditions is a valuable tool, at the senior staff level, in creating groups of research scientists to staff national institutes. These programmes require strong support at the intermediate staff level by superintendents with a good knowledge of the technical and engineering aspects of the utilization of nuclear techniques. The amount of training organized under governmental programmes and in co-operation with the private sector in developed countries is likely to increase in the near future. Provision for the supply and retention of sufficient numbers of specialized technicians must be made by the Governments of the developing countries, and emphasis is being increasingly placed on training programmes at the national level, supplemented by regional and interregional training courses where there is an insufficient number of participants to warrant group training at the national level.

An expansion of the Agency's training activities in relation to the introduction of nuclear power into developing Member States has been planned for 1975-80, the cornerstone of which will be training courses in nuclear power engineering. They will differ from the usual course in that they will be designed to provide qualified technical personnel for the planning, construction and operation phases of nuclear power plants. Complementary to these courses, three or four comparatively short, highly specialized courses will be held covering licensing and regulatory aspects, planning and scheduling for the first nuclear power plant, quality assurance and non-destructive testing, radiation and health physics, economic planning of power systems, considerations for the selection of reactor types and vendors and safety standards. Special fellowships will also be granted.

INTEGRATED PROGRAMMING MULTILATERAL AID

The overall financial situation of the Agency's technical assistance programme was, in common with all multilateral aid programmes, subject to the vagaries of the world-wide financial instability in 1973/4. Any increase in monetary and in kind resources was largely offset by inflation. It is therefore necessary to make the optimum use of the scarce cash resources provided for the implementation of the regular programme and the resources made available in kind, as well as the local counterpart personnel and facilities

Table 1
Voluntary contributions to the General Fund

Year	Established target (in millions of dollars)	Cash contributions pledged to the General Fund				
		Amount $	Percentage of target	Shortfall or (overrun) $	Number of Members pledging	Percentage of Members pledging
1968	2.0	1 423 557	71.2	576 443	63 of 99	63.6
1969	2.0	1 488 426	74.4	511 574	68 of 102	66.7
1970	2.0	1 672 933	83.6	327 067	74 of 103	70.9
1971	2.5	2 151 375	86.1	348 625	72 of 102	70.6
1972	3.0	2 485 405	82.8	514 595	71 of 102	69.6
1973	3.0	2 841 756	94.7	158 244	65 of 104	62.5
1974[a]	3.0	3 042 194	101.4	(42 194)	57 of 104	54.8
1975	4.5					

[a] As at 30 Dec. 1974

Table 2
Experts and equipment: 1969-1975

Year	Value of requests received (in thousands of dollars)	Value of assistance approved (in thousands of dollars)	Percentage of requests met
1969	3700	977.0	26.4
1970	3400	1250.0	36.8
1971	3600	1891.0	52.5
1972	5268	2123.6	40.3
1973	5657	2279.0	40.3
1974	5849	2262.7	38.7
1975	7264	3085.5	–

put at the disposal of projects by the recipient Governments. These facilities are often supported through capital aid and technical assistance provided under bilateral arrangements or through private investment. To ensure that there is no duplication in the provision of assistance, integrated programming by the recipient Government and the multilateral aid organization is essential. In the case of the IAEA, procedures have been established in co-operation with recipient Governments in recent years to ensure that programme planning is integrated at the national level and that there is no duplication, for example, of assistance provided by the IAEA and UNDP.

The financial situation with which all multilateral aid programmes are confronted is giving cause for concern, and the IAEA's regular programme of technical assistance, covering experts, equipment and exchange and training activities, is no exception. To give but a few examples: the cost to the IAEA of providing expert services has increased by 55% since 1962, the cost of equipment is now rising at an estimated rate of 12% per year, and the cost of fellowship training had increased by over 80% in the last 12 years. In recognition of this, the General Conference in September 1974 accepted the Board's recommendation and established the target for voluntary cash contributions to the General Fund for the year 1975 at $4,500,000, i.e. a 50% increase over the 1974 target of $3,000,000.

Experience has shown that the need for a regular programme to be used as "seed money" for large-scale projects which are financed from UNDP over a longer period of years than that under the regular programme, is essential.

THREE MAJOR GROWTH AREAS

Little has been said in detail in this article on the use of nuclear techniques in medicine, agriculture, biology and so forth. These are tending to become standardized, even conventional, and whilst it may be said that the IAEA's technical assistance programme has considerably assisted in this development through its training and other support activities, I have been concerned to highlight the shift in emphasis of the programme as reflected in government plans and priorities. In summary, three major growth areas have now emerged: nuclear power, various applications of radiation to industry, and exploration for, and mining of, nuclear raw materials.

The trend towards assistance in nuclear power and the application of nuclear technology at the initial stage of industrial development means that these programmes are moving out of the jurisdiction of atomic energy commissions – power is controlled by public utilities; industry, as soon as techniques have become conventionalized, is usually handed to the private sector; and raw materials development is a matter for the technical departments of government, including the national geological survey. In those countries with atomic energy commissions, or their equivalent, it is essential to establish effective relations with the controlling authority and to ensure that there is adequate definition of the role and responsibilities of the commissions in these three areas.

As the development process proceeds in recipient countries, so the capacity of the government machinery and infrastructure to absorb and make effective use of programmes involving the application of nuclear techniques is likely to increase. Developing countries other than the least developed, who devote a larger share of their programmes to agriculture and education, plan their expenditures in industry and science and technology. The IAEA's technical assistance programme is, therefore, becoming increasingly concentrated in the more developed of the developing countries.