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COUNTRY AND INTERCOUNTRY PROGRAMMES AND PROJECTS

Consideration and approval of country programmes

THIRD COUNTRY PROGRAMME FOR INDIA

UNDP assistance requested by the Government of India
for the period April 1985 - March 1990

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*In accordance with decision 81/15, adopted by the Governing Council on 27 June 1981 (E/1981/61/Rev.1, annex I), the third country programme for India is being submitted to the Council without an accompanying note by the Administrator. The previous country programmes for India and the accompanying notes by the Administrator were issued under the document symbols DP/GC/IND/R.1, DP/GC/IND/R.1/Add. 1 and DP/GC/IND/R.2, and DP/GC/IND/R.1/RECOMMENDATION and DP/GC/IND/R.2/RECOMMENDATION, respectively. See also DP/GC/IND/EXTENSION.

Introduction

1. It is more than three decades since India embarked on a path of planned economic development under a mixed-economy system. The sixth five-year plan (1980-1985) started in very difficult circumstances with the drought of 1979-1980, a deterioration in the functioning of the infrastructure, a sharp drop in foodgrains production, a sharp rise in prices and an unfavourable international economic environment. Despite these problems, the basic strategy and the programmes implemented in the sixth plan have yielded good results, particularly in agriculture and industrial production, and in the growth of infrastructure. The annual growth rate is expected to correspond to the targeted rate of 5.2 per cent.

2. It is in this context that the National Planning Commission is working on the formulation of the seventh five-year plan. The National Development Council, in its meeting held in July 1984, finalized the approach to the Seventh Five-Year Plan (1985-1990). The Planning Commission is now engaged in preparing the final draft. However, the approved approach to the seventh plan envisages a total investment of Rs3,200 billion, of which Rs1,800 billion would be in the public sector. The fulfilment of the objectives of the plan would lead to a growth rate of over 5 per cent.

3. In formulating the third Indian country programme, close attention was paid to the overall performance of the economy in the past and the general priorities of the seventh plan. While the third country programme must obviously fit neatly into this pattern, it is realized that its thrusts and priorities cannot follow those of the seventh plan. Due regard has to be paid to the limitations of available UNDP resources in relation to the enormous size of the Indian economy and its technical assistance needs. Consideration also has been given to the special nature of the catalytical support which UNDP can provide through the United Nations development system. Many areas, such as poverty alleviation and rural development, will be accorded a very high priority in the seventh plan, but the bulk of the resources required in these sectors will come from domestic sources. UNDP co-operation, with its international connotation and specific relevance to the transfer of technology, is proposed to be directed at other areas. The country programme, therefore, while being firmly set within the parameters and priorities of the seventh plan, will in no sense be a microcosm of that plan.

4. The country programme exercise began with discussions between UNDP and the Department of Economic Affairs in the Ministry of Finance, responsible for co-ordinating foreign assistance and thus designing the country programme. These discussions included a careful review of the achievements of the previous country programme, particularly in meeting India's technical assistance requirements in areas of new technology. This review was followed by detailed consultations with the Planning Commission to consider sectoral studies and to select major thrust areas. In this connection, the timing of the new country programme was particularly fortunate in that the latest sectoral planning information, and the many comprehensive sectoral studies required for the formulation of the seventh plan, were also available in designing the programme.

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5. The written submissions of the United Nations specialized agencies were then considered in conjunction with proposals from the concerned ministries. An extensive series of interministerial discussions followed, during which inter se priorities of the various project proposals within the thrust areas already identified were established. A briefing session was subsequently held with UNDP and United Nations specialized agencies represented in New Delhi.

6. At this stage the first draft of the third country programme was circulated to the headquarters of UNDP and the United Nations specialized agencies for comments. Their comments received careful consideration and were most useful in the preparation of the final document which is before the Governing Council.

7. The country programme design process, therefore, involved an assessment of the recent performance of UNDP-funded programmes, the identification of new areas for collaboration selected on the basis of their relevance both to seventh plan's priorities and UNDP's proven capabilities, and a very careful consideration of the views of all interested parties in the Government and the United Nations development system.

8. A major difficulty in this formulation exercise was that the vast spectrum of technical assistance possibilities presented by the seventh plan framework greatly exceeded the indicated UNDP resources available for the country programme. It was recognized that in these circumstances the impact of UNDP collaboration would be substantially enhanced by focusing its limited financial resources on a number of carefully selected areas. The choice of these areas was largely governed by the long experience gained from the partnership with UNDP and the United Nations specialized agencies.

9. The history of this collaboration has shown that UNDP resources, concentrating as they do on international technology transfers and pre-investment activities, have a particular relevance in India for all forms of agricultural, scientific and industrial research, development and training. The unique international contacts provided by the United Nations development system, in combination with India's substantial reservoir of skilled manpower, have enabled these programmes to make impressive contributions in these fields over the years, and this broad thrust will be maintained through the new country programme period.

I. DURATION, TIMEFRAME AND ANTICIPATED RESOURCES

10. The duration of the third country programme coincides exactly with that of the seventh national five-year development plan, covering the period April 1985 to March 1990. It straddles 21 months of the third IPF cycle from April 1985 to December 1986 and 39 months of the fourth IPF cycle from January 1987 to March 1990.

11. Although India's IPF for the third cycle 1982-1986 was originally set at \$252 million, constraints in realizing resources at the anticipated levels forced a cut of 45 per cent towards the end of 1982, reducing this figure to \$138.6 million. To this was added the small unspent balance of \$351,000 from

the previous IPF cycle, raising 1982-1986 resources to \$138,951,000. It is confidently expected that this sum will be fully delivered by the end of 1986. Actual expenditures for 1982-1983 and anticipated expenditures for 1984 and the first quarter of 1985 add up to \$87,401,000, leaving a balance of \$51,550,000. In the absence of any firm indication as to the level of UNDP resources available to India in 1987-1991, the Government of India was advised, pending the Governing Council's consideration, to assume that new resources available for the full period of the third country programme will remain at the same level, i.e. \$138.6 million. The period 1987 through March 1990, when the country programme ends, will proportionately provide \$90,090,000 which, when added to the unspent balance of \$51,550,000, indicates the level of resources available for programming during the third country programme, at \$141,640,000.

12. It should perhaps be repeated at this juncture that even the original funding level for the 1982-1986 IPF cycle of \$252 million would have been inadequate in meeting India's immediate technical assistance requirements. A serious handicap of the country programme exercise has been that it is built on zero budget growth even in nominal terms. Historically speaking, the IPF for India had been growing since the first cycle; however, the amount indicated to the Government of India for programming in the third country programme is the same as that for the second. The developmental needs of India's dimension, its past performance and absorptive capacity, will call for a much higher resource input from UNDP. It hardly needs emphasizing that although, in absolute terms, total UNDP assistance to India looks impressive on a per capita basis, it is one of the lowest in the world. Viewed against per capita income, India is, on the other hand, in the adverse end of the spectrum. India's case for higher amounts of UNDP input is, therefore, well recognized. It is indeed the Government's expectation that the fourth IPF cycle for India will reflect an adequate increase in resources. However, pending receipt of any signal to this effect from UNDP, resource constraint has necessitated severe curtailment in the list of projects in the third country programme. This can obviously be expanded in due course as and when higher resource allocation is made available.

13. In the context of the indicated availability of resources, it is estimated that the commitments in respect of the ongoing projects extending into the next country programme period will account for \$49,428,000, while 16 officially-filed pipeline projects at various stages of approval will consume another \$13,216,000, leaving an unprogrammed balance of \$78,996,000 for the new projects outlined below. Out of this balance, it has been decided to keep \$3,996,000 in reserve to cater to unforeseen needs arising during the country programme period, and for the evaluation of projects.

14. Past experience with country programmes shows that, despite concentrated efforts to improve and accelerate project formulation and implementation, inevitable slippages occur which can result in the underutilization of allocated resources. This gap between commitments and disbursements is not unusual with development programmes, but the high technology nature of most of the UNDP support tends to contribute further to these slippages, for many of the sophisticated inputs required are not available on a predictable, off-the-

shelf basis. It may be prudent, therefore, to programme UNDP assistance at a substantially higher level than the resources available for the country programme.

15. In addition to the IPF resources available under the third country programme, India hopes to benefit, even though in a small way, from some other funding sources, such as the United Nations Financing System for Science and Technology for Development (UNFSSTD) and Special Industrial Services (SIS), for which no estimate is possible at this stage.

II. DEVELOPMENT PERSPECTIVE

16. The objectives and priorities of the seventh five-year plan have provided the overall framework within which the country programme document has been formulated. The main principles of the plan continue to be growth, equity and social justice, self-reliance, improved efficiency and productivity. The obvious thrust has to be towards a rapid increase in productivity. It is recognized that, apart from reorientation of investment, this will require wide-ranging reorganization of research and extension, infrastructure input supply, credit and finance. Although the impetus for a large expansion has to come from agriculture, the potential of the industrial sector cannot be minimized. However, in order to economize on resources, the next phase of industrialization has to be based on better utilization and low-cost expansion of existing capacity. The emphasis will have to be on the modernization and upgrading of Indian industrial technology and the introduction of new technologies to raise output. It is also recognized that agricultural and industrial growth will not be feasible without optimization of the infrastructure in sectors like power, coal, transport and communications. At the same time, it is apparent that India cannot afford to stay behind in crucial areas of high technology where fast growth is taking place. Moreover, the scientific and technical capabilities that have been built up have to be used more effectively to promote efficiency, productivity and technological advances in all sectors. The seventh five-year plan approach recognizes that there is a need to improve greatly the physical well-being of the people and the environment in which they live. This will require an improvement in nutritional support of vulnerable groups, an expansion and improvement in health care, fertility control and certain basic needs like provision of clean drinking water and housing.

17. The alleviation of poverty is one of the basic components of the seventh plan strategy. The percentage of the population living below the poverty line would be around 37 per cent at the end of the sixth plan, compared with about 51 per cent at its commencement. By the end of the seventh plan, these figures are to be brought down to about 23 per cent. Direct poverty alleviation programmes are estimated to absorb about 5 to 7 per cent of the total plan outlay. These programmes are proposed to be financed from India's internal resources. This and the employment generation objectives have to be achieved through the accelerated growth of labour-intensive agriculture and rural development and of food production in particular. This entails a thrust for developing these sectors, as well as the sectors that support them. Thus the basic priorities for the seventh plan are food, work and productivity. This will require a strategy built around higher agricultural growth and the creation of employment, improvement in efficiency and in quality of production, technological upgrading in industry and infrastructure, and measures to improve the quality of life.

III. SIGNIFICANT FEATURES OF THE COUNTRY PROGRAMME

A. Focus on new technology

18. The proposals for the use of UNDP resources for the period 1985-1990 which follow in chapter V below have a deliberately targeted emphasis on the bridging of technology gaps in a wide range of activities. The Government has applied this focus to UNDP collaboration ever since the former United Nations Expanded Programme of Technical Assistance (EPTA) began its association with India in 1951. Experience over the years has proved beyond doubt that, in the Indian context, such a concentration not only pays rich dividends in terms of results, impact and multiplier effects, but also contributes substantially to the building of enduring linkages with institutions of high technology and research in other countries.

19. Examples of this success in previous country programmes are manifold. A 15-year collaboration with the Indian Council of Agricultural Research (ICAR) has been particularly successful in upgrading post-graduate agricultural research and education at the country's agricultural universities. An even longer association with the Central Water and Power Research Station (CWPRS) has made striking progress with institution-building activities related to practical research in hydraulic instrumentation, coastal engineering, hydraulic structures, hydro-mechanics and applied earth sciences. An extended partnership with the Council of Scientific and Industrial Research (CSIR) is currently being continued through a programme which provides support to nine of its constituent laboratories; and a long list of UNDP involvement in the transfer of new technologies to India includes sponge iron development, welding techniques, numerical control systems, improved refractory materials, artificial recharge of ground-water resources, geophysical instrumentation, the use of alternative fuels, coal gasification, mushroom-growing technology, fish farming, modern forest-fire fighting techniques and new approaches to wildlife management. A nation-wide advanced vocational training scheme supported under the second country programme was also particularly successful in upgrading skilled industrial manpower. In order to spread the use of these new technologies as widely as possible the Government has established institutional safeguards, such as the National Research Development Corporation (NRDC), which is primarily responsible for ensuring the commercial application of successful CSIR research, and the "lab to land" programmes which are a feature of all the country's agricultural universities and agricultural research institutes. The pilot project approach is also used extensively, and each project concerned with new technologies includes pre-investment activities and the dissemination of results among its key design features. Close attention is paid to these aspects in all monitoring activities.

20. It can be seen that the introduction of many of these new technologies is immediately relevant to the ultimate solution of India's poverty problems. Whereas there is little need for foreign technical assistance in India's vast direct poverty relief programmes, the upgrading of the country's agricultural, scientific and industrial capabilities through technical assistance and manpower development has proven to be a significant contribution to the achievement of its development goals.

B. New dimensions in programme implementation and management

21. The United Nations system's programming techniques have been adapted over the years to the increasingly sophisticated requirements of India's development priorities. Most significant among these trends has been the move away from long-term expert services to technical assistance provided by means of short-term, finely focused missions from internationally recognized scientists and other specialists, which are often repeated several times throughout the course of a project. This has enabled the UNDP programme to bring to India, on a global basis, the highest available level of expertise, thus enhancing the country's own developmental capabilities, without in any way creating a long-term dependency on such support. As a corollary, in the training component under the programme, there was a move away from long-term academic fellowship programmes to specially tailored overseas visits for highly qualified Indian scientists and officials to selected international institutions in their field. The interaction of these two programming components also resulted in the easy identification of the high technology research and training equipment which was best suited to Indian conditions.

22. There have also been significant changes in project management. Under the old system, expensive expatriates were employed as chief technical advisers largely to manage projects on a full-time basis. The Government now appoints local project directors at no cost to the technical assistance funds, and the vast majority of UNDP-funded projects are now managed very successfully in this manner. A start has also been made with the modality of government execution, and a new scheme for the employment of local consultants has also been successfully introduced.

23. Through these changes of programming techniques, a new type of partnership has evolved between India and the United Nations development system which can quickly identify and harness the precise technology transfer and pre-investment assistance required for the country's high-priority development needs.

C. Intercountry programme linkages

24. In designing and implementing previous country programmes, the Government has always been interested in building practical linkages between its country-based development programmes funded by UNDP, and the many intercountry, interregional and global projects in which it participates. In particular, it has joined enthusiastically in the various networking initiatives in the Asia and Pacific region, notably with aquaculture research, agricultural machinery, pesticide development, and training development in the maritime transport sector. It has also extended host facilities to the Economic and Social Commission for Asia and the Pacific (ESCAP), The Regional Centre for Technology Transfer in Bangalore, a regional project for training in forest inventory at the forest survey of India in Dehradun, a regional project for training and research programme on mangrove ecosystems and a regional project on household survey training. It is expected that these linkages will be extended and strengthened through the third country programme.

D. Technical co-operation among developing countries (TCDC)

25. India has had a long tradition in promoting technical co-operation among developing countries. For many years the country's universities and other institutes of learning and research have welcomed foreign students and scholars, particularly from the developing world, with funding from various multilateral, bilateral and private sources. Indian scientists, specialists and administrators assist in multifarious development efforts in other developing countries. Under the auspices of the United Nations system, each year nearly 1,000 foreign trainees from developing countries are accommodated in Indian universities, technical institutions, research establishments and industries.

26. Responding to a call from the UNDP Governing Council in 1980, India was the first developing country to set aside a sizeable amount from its country programme for a TCDC programme. With nine projects already completed, there are five ongoing projects in this area with approved allocations of over \$1.5 million. One project is assisting the Mahaweli Development Scheme in Sri Lanka through the provision of Indian engineers, and another is enabling the participation of senior executives and computer systems specialists from developing countries world wide in the development and testing of software systems for application in the power, railroad and meteorology fields for India and other developing countries. It is anticipated that the third country programme will see a further expansion in these TCDC activities.

E. Transfer of Knowledge through Expatriate Nationals (TOKTEN)

27. Since 1980 a UNDP-sponsored programme, Transfer of Knowledge through Expatriate Nationals (TOKTEN), has offered opportunities for highly qualified professional expatriates to return to India and transmit some of the expertise they had acquired through distinguished careers abroad. Sixty-five consultants have come for highly specialized assignments for periods of two weeks to two months in areas ranging from material science to electrical engineering, electronics and computer science. The success of the programme at minimum cost - with only travel and living expenses provided to the consultants as a charge to the country programme - has led to a phase II project which envisages the deployment during the third country programme period of about an additional 100 short-term consultants in areas which respond to India's development priorities.

F. Integration of women in development

28. India has a deep interest in furthering the role of women in development. At present there are seven ongoing projects financed by the United Nations Voluntary Fund for the UN Decade for Women, which total \$336,000. There are an additional six projects for which a further \$1,124,000 are required.

G. International Drinking Water Supply and Sanitation Decade (IDWSSD)

29. The IDWSSD programme for India was launched on 1 April 1981. The

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programme plans to provide water supplies to 100 per cent of the urban and rural populations by March 1991 and urban sewerage and sanitation to between 50 and 100 per cent of town dwellers depending on the class of town or city, and rural sanitation to 25 per cent of those in the countryside by the same date.

30. The Government of India has increased spending in this crucial area from Rs490 million under the first five-year national development plan to Rs39 million under the sixth plan. An even higher sum will be allocated under the seventh plan.

31. Co-operation at the national level between India and UNDP in Decade activities focuses on the provision of low-cost pour-flush latrines - a programme which also receives substantial support from the United Nations Children's Fund (UNICEF). India also participates in the UNDP interregional programme for the field testing of rural water supply handpumps and promotes and supports women's participation in Decade activities. It is expected that this participation will continue to expand through the third country programme period.

H. Environment

32. The need to conserve natural resources and environmental quality, particularly to prevent damage to fragile and irreparable ecosystems, has been increasingly reflected in national policies for over a decade. It is recognized that all further development programmes must take environmental factors and ecological considerations fully into account. To this end, environmental factors and ecological imperatives will have to be integrated into the design of all developmental projects from the very commencement of their planning.

I. Pre-investment, investment support and follow-up

33. Major pre-investment and/or investment support projects under the current country programme which have resulted or are expected to result in follow-up investments include: demonstration plants for the production of sponge iron and synthetic fibres; feasibility studies for the production of aluminium silicon alloys, calcined alumina, sulphuric acid from pyrite deposits, phosphoric acid from low-grade rock phosphates and synthetic oil from coal; and feasibility studies for low-cost pour-flush water-seal latrines in urban and rural areas. A number of these projects will continue into the next country programme period. Potential areas of thrust in this category of projects during the third country programme include: pilot plant production of liquid fuel from cellulosic material, the establishment of a chemical recovery plant for small paper mills using non-woody materials; the development and promotion of new end-uses of jute and the use of unconventional fibres to produce fine yarn; and the development of composite products in new fibres, new vaccines against widely prevalent diseases and solar energy materials.

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J. Inter-agency co-ordination

34. All foreign aid to India, with the exception of that provided by the regular programmes of the United Nations specialized agencies, is centrally co-ordinated by the Department of Economic Affairs in the Ministry of Finance. The programmes of the United Nations specialized agencies are co-ordinated by the respective technical ministries. Thus, for example, the Ministry of Health and Family Welfare co-ordinates the regular programme activities of the World Health Organization (WHO). In such circumstances, there is no requirement for additional co-ordination.

IV. ORIENTATION OF THE UNDP COUNTRY PROGRAMME AND SECTORAL PROGRAMMES

35. The description below of new areas and fields that have been identified for UNDP technical assistance may be regarded as broad and general only. It has been proposed to retain a flexible approach so that if it becomes necessary during the next five years, certain new and emerging areas may be added while some others may be dropped.

A. Agriculture, forestry and fisheries

1. Agriculture, forestry and fisheries

36. About 70 per cent of the total population of India is engaged in agriculture and about 40 per cent of the national income is generated in the agricultural sector. Consequently, agriculture influences the performance of other sectors as well. In this context, India's development plans have always accorded special priority to the agriculture sector, particularly to self-sufficiency in foodgrains. As a result, the production of foodgrains which at the beginning of the first five-year plan in 1950 was at the level of only 45 million tons, reached about 150 million tons during 1983-1984 and is targeted at 250 million tons by 1994-1995.

37. To meet the ever-increasing food requirements of the country, greater reliance will be placed on better use of resources and higher yields per unit of land, water and energy. For this, a greater understanding of the land and water resources and micro-environments will be necessary. Under conditions of intensive agriculture, problems of water management, pest management, crop nutrition and conservation of fauna and flora need greater attention. Contemporary scientists continue to face the challenge of combining high productivity, high nutritional quality and disease resistance. The development of cell culture and protoplasm fusion techniques for making distant crosses to synthetic new genotypes holds considerable promise. Research on biological processes is receiving greater attention. Energy plantation and biogas production systems are becoming increasingly important in the context of energy shortage. Mixed farming involving crops and animals in the form of crop-livestock systems, crop-fish systems and crop livestock-fish-production systems offers a considerable potential for generating additional income and employment for the farmers.

UNDP co-operation

38. UNDP has been actively involved in the agriculture sector right from the

beginning of its partnership with India in 1951, always placing heavy emphasis on research and the introduction of new and innovative technologies. At present UNDP is participating in 16 ongoing projects in this sector for which it is supplying about \$25 million. Particular reference may be made to a new project, Modern Forest Fire Control (IND/84/003), involving a UNDP contribution of \$4.11 million and Government inputs of Rs86.4 million. The project aims at devising, testing and demonstrating the techniques of prevention, detection and suppression of forest fires, using the latest methods and equipment. Equally important are two ongoing projects aimed at strengthening centres for post-graduate level studies in agriculture education and research, involving a total UNDP contribution of about \$10 million.

39. Keeping in view the importance of the agricultural sector in India's economy, it has been decided to present a number of projects for UNDP assistance in the third country programme. The largest single project is devoted to an extension of the programme in post-graduate agriculture education and research, comprising 24 agricultural universities, 35 central research institutes and 71 all-India co-ordinated research projects.

40. Other areas planned for inclusion in the third country programme under this sector are: (a) the promotion of low-cost bio-fertilizers such as rhizobium culture and blue-green algae for increasing food production, with emphasis on quality control; (b) the development of coastal aquaculture to increase production both from marine and inland resources; (c) the establishment of a high-security animal disease laboratory to effect improvements in livestock through the introduction of exotic inheritance for producing progeny with better productivity and reproductive efficiency; and (d) the strengthening of post-graduate education in food nutrition and child development at agricultural universities, not only to combat malnutrition but also to promote and enhance the culture of greater child care among agricultural scientists, food technologists, family and child welfare experts and educators.

2. Environment

41. The planning and implementation of projects have to be designed to minimize such environmental hazards as loss of genetic diversity, pollution of the nation's air and water and other problems. Environmental planning must be aimed at achieving sustainable development as well as ensuring the quality of life.

UNDP co-operation

42. UNDP is currently assisting in the establishment of the Wildlife Institute of India and is providing about \$1 million to that end. The project (IND/82/003) aims at providing trained manpower and strengthening research capabilities for the conservation and management of wildlife resources of the country. It is proposed to extend this project in order to further develop the Institute's academic and research functions and to set up a national environmental monitoring organization to help build up baseline information on the state of the environment in India. The latter would be achieved by

monitoring abiotic and biotic components of ecosystems with a view to introducing environmental dimensions in economic and technical planning of development projects and building up a capability to assess the environmental impact of projects and to propose environmental safeguards.

B. Natural resources

1. Irrigation

43. The rapid expansion of irrigation is a central element both in the agricultural strategy for the seventh plan and in the strategy for alleviating poverty. Irrigation development will have to be based on the quick completion of ongoing schemes, rapid utilization of potential water resources and better water management. The perspective plan of the country is to realize the ultimate irrigation potential, i.e. 113 million hectares by about 2000, from the sixth plan target of 68 million hectares. In preparing project proposals for the third country programme the Government has reviewed with the constituent organizations the tasks and responsibilities which they would be required to perform in this area during the seventh plan and beyond.

UNDP co-operation

44. UNDP has been actively associated in the irrigation sector for bridging technological gaps. At present, there are 21 ongoing projects involving total UNDP assistance of approximately \$28 million. Some of these projects are close to completion while many others will continue into the next programme cycle. Particular reference should be made to UNDP's collaboration of nearly three decades with the Central Water and Power Research Station, Pune, which has become one of the premier centres in Asia. At present, the station is involved in five ongoing large-scale projects in applied earth sciences, hydro-mechanics, coastal engineering research, hydraulic instrumentation and water and power information systems. UNDP is also assisting the Central Soil and Materials Research Station at Delhi in implementing four projects in soil dynamics, research and testing facilities on rockfill, behaviour of concrete under high triaxial stresses and rock mechanics. In addition, UNDP is participating in projects which are focused on the artificial recharge of ground-water, the use of saline water, drainage of black-cotton soils, canal lining, flood forecasting, the modernization of land and water management schemes, and systems engineering for the development of water resources. Recently, UNDP assistance has also been approved for undertaking ground-water studies in the Kasai and Subarnarekha river basins.

45. Other areas identified for UNDP support in the irrigation subsector are: (a) sedimentation of reservoirs to evolve a rational criteria for their classification and to develop a methodology for the estimation of sediment distribution in different types of reservoirs; (b) updating of technology for the manufacture of instruments required for improved surveillance and safety of dams; and (c) improved hydrological measurements through the introduction of modern methods and equipment for the handling of data so as to obtain a precise assessment of water resources and their optimum utilization.

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2. Minerals

46. Minerals and metals are basic resources on which the entire technological structure rests. India possesses a generous endowment of these natural resources and a wide spectrum of non-ferrous metal ores occur over large areas of the country. It is the proper development and utilization of these minerals and metals that will help to ensure steady industrial growth. India is engaged in the complex task of exploring and exploiting its resource from the initial stages of survey and assessment of existing reserves, regulating their development and exploration, to production and distribution. Planned exploitation of minerals with a view to their conservation for the future is of prime importance to the national economy. Indigenous production of non-ferrous metals in 1983-1984 could meet only a part of the country's demand. In the medium term, planning will be with reference to demand projections for the seventh plan period. Greater emphasis is now being laid on modern and sophisticated survey and exploration techniques in the Geological Survey of India and the Mineral Exploration Corporation Limited. In the minerals and non-ferrous sector research and development has also been given a major thrust in the areas of geology, exploration, mining beneficiation and non-ferrous metallurgy. A large number of research and development programmes are already under implementation and this activity is proposed to be stepped up further during the period of the seventh plan.

UNDP co-operation

47. UNDP assistance had been utilized during the second country programme period in such areas as mineral exploration, underground mining, beneficiation of minerals and feasibility studies for mineral prospects development projects. Two mineral exploration projects in Kerala and Madhya Pradesh, involving a total UNDP contribution of \$5 million, have since been completed. Eleven projects involving total UNDP support of \$4.5 million will continue into the third country programme period.

48. New areas identified for possible UNDP assistance during the ensuing country programme period include: (a) the setting up of a central planning and design organization for base metals to strengthen research and planning capabilities for the development of new mines and the establishment of smelters; (b) the setting up of an aluminium research, development and design centre to promote accelerated production of alumina, aluminium electrolysis and analytical research in material sciences and application techniques, to help accelerated exploitation of large bauxite deposits; (c) the establishment of a mineral processing and ore dressing laboratory and of a pilot plant in support of research and development efforts for utilizing low-grade mineral resources; and (d) the enhancement of the capabilities of the India Bureau of Mines in the evaluation of mineral resources data and techno-economic feasibility studies through overseas training in selected fields of the mineral industry.

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3. Energy

49. The Planning Commission Working Group on Energy Policy has forecast the amounts of oil, electricity and coal available and total energy consumption. Vigorous efforts will be required to correct present imbalances. It is necessary to plan for a gradual transition from the present dependence on oil to coal and electricity in the medium term and on renewable sources of energy in the long term. Even though the current contribution of renewable energy sources to energy supply is insignificant, and many of them are not yet commercially competitive, those technologies have to be developed now so that the transition in future will be smooth. Coal is among the largest sectors in the economy, in the context of investment, employment and production. Over successive plan periods, several measures were introduced to upgrade knowledge of coal resources, such as scientific classification, conservation, mining techniques, distribution, utilization and research and development. Coal production, which stands now at 152 million tons, is expected to rise to 230 million tons by the end of the seventh plan. The pattern of coal consumption has undergone significant changes during the past two decades. In the beginning, the railways were the single largest consumer, using a third of the total consumption. With increased dieselization and electrification, however, consumption of coal by the railways has been declining steadily. On the other hand, demand for coal by the steel industry and for power generation has increased sharply, with other major consumers being the cement, fertilizer, textiles and paper industries.

50. The known sources of energy in India, as in the rest of the world, are limited. With the increased exploitation of these resources through better technologies, they will eventually be depleted. Attention has, therefore, turned to a search for non-conventional energy sources. The Government of India assigned very high priority to this sector and has set up a separate Department of Non-Conventional Energy Sources.

51. At the beginning of the sixth plan, the total oil production in the country was about 10.5 million tons. To meet its needs, the country had to import large quantities of oil every year. With intensive exploration efforts, indigenous production has gone up to about 27 million tons and import requirements have come down to about \$3.4 billion by 1984-1985. Known reserves indicate that it should be possible to achieve self-sufficiency given reasonable demand management for petroleum products. Exploitation efforts will have to be considerably stepped up, along with various measures for the conservation of middle distillates such as diesel and kerosene, and for fuel substitution. In the light of the recent discovery of natural gas in different parts of the country, and keeping in view experience in the utilization of associated gas in the past, a large percentage of which had to be flared, it will be necessary to identify on a continuing basis possible users of gas, techniques of gas production, transportation and distribution, and the substitution of gas for petroleum products. All these activities, although high priority ones, are very investment intensive. Owing to the sheer magnitude of requirement, they would be largely outside the scope of UNDP support. However, because of the unique advantages of UNDP technical assistance, a few selected projects have been incorporated in the country programme.

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52. The total installed generating capacity of electric power was about 31,000 Megawatts by the end of March 1980. It is estimated that during the Sixth Plan, an additional capacity of 14,500 megawatts will be added. A big step up will be required in the seventh plan to meet energy requirements satisfactorily; the target for that period will be around 30,000 megawatts. While superthermal power stations may continue to receive special emphasis, greater attention could also be put on hydro-electric projects to improve hydro-thermal mix, transmission distribution, conservation and the layout of pumping systems which can result in appreciable savings in power consumption. Greater attention also needs to be paid to manpower training.

UNDP co-operation

53. UNDP has extended substantial assistance to the energy sector. There are now 22 ongoing projects involving UNDP collaboration of approximately \$21 million. UNDP assistance has been utilized in such fields as geothermal exploration, the training of engineers in the power sector, the production of gas and synthetic oil from coal, safety engineering in coal mines, advanced techniques in coal mines operations, three-dimensional geophysical seismic survey, modernization of engineering design, and technical manpower development. Special mention should be made of a project involving the establishment of a research institute to study advanced techniques in reservoir engineering and enhanced oil and gas recovery, which involved UNDP assistance of \$3 million.

54. New areas identified for UNDP technical assistance include: (a) improving the capabilities of the Central Electricity Authority in carrying out electricity generation planning studies for formulation of a long-term power sector development plan; (b) the augmentation of training facilities by establishing adequate infrastructure at different hierarchical levels for efficient power plant operation and integrated load dispatch systems; (c) programme for on-the-job training in start-up, manoeuvring and shut-down operations; (d) the establishment of a high voltage dual current (HVDC) experimental transmission line to monitor corona loss, radio influence, performance of conductors, etc.; (e) digital analogue modelling for ground- and surface-water systems for predicting hazards under different mining conditions; (f) investigations into the use of hydro-fracture in modifying workability of coal seams in order to reduce concentration of respirable dust; (g) the setting up of a research and development back-up facility in specialized areas of oil and gas process engineering, stimulation and workover, fluid flow and artificial life, water shut-off and injection, corrosion engineering, pollution safety and environment management, gas engineering, transportation and rheology; (h) improving technology for the production of oil and gas in order to narrow the import bill; (i) strengthening engineering and consultancy services in petroleum refining and petrochemicals; (j) setting up a centralized service to popularize quality polyurethane components for use in footwear, automotive insulation industries, etc; (k) creation of facilities for design and systems engineering, prototype development and pilot production of solar energy products and devices as well as a central facility for solar thermal demonstration projects, materials development, testing and standardization; (l) creation of a facility for solar cells/modules and other components; (m) setting up a wind energy centre

to develop and test indigenously designed 100 megawatt and more acro-generators, as well as the establishment of five wind data monitoring stations at pre-determined high wind sites; (n) pilot plant production of liquid fuel from cellulosic material in order to derive technical and economic parameters; and (o) the design, development, testing and evaluation of a one megawatt-scale ocean and thermal energy conversion pilot plant to generate technical and economic parameters.

C. Industry

1. Industry

55. In a planned economy like that of India, industrial development occupies a high priority. As a result of successive plans, India has been able to establish a fundamental industrial base and infrastructure. To meet the objectives of the seventh plan, however, industrial output will have to grow at about 7 per cent. The emphasis on agricultural production will require adequate production of fertilizers, pesticides and essential agricultural machinery including pump sets, power tillers and tractors. Facilities for the production of basic wage goods and the essentials of mass consumption such as sugar, vegetable oils, drugs, textiles, paper and consumer perishables will need to be modernized and expanded. It is recognized that the industrial sector has played an important role in the structural transformation of some regions of the national economy and a suitably designed strategy for a faster rate of industrial growth will be one of the elements of the strategy to alleviate poverty and generate employment. It will be necessary to ensure that lags in the production of key infrastructural or intermediate goods like steel, cement, coal, railway transport, communication, irrigation and fertilizers do not create mutual bottlenecks.

UNDP co-operation

56. There are at present 17 ongoing projects involving total UNDP resources of \$24 million. Some of these projects will be completed during the second country programme but others will continue into the third. UNDP assistance has been utilized to date in such fields as occupational health services, sewing machine development, bicycle research and development, instruments design and development, micro-processor-based agro-dairy instruments, fluid control research, design of electrical measuring instruments and hand tools, industrial design services, casting and forging industries and leather technology. Particular reference should be made to one project resulting in the establishment of a numerical control centre for the metal working industry which involved UNDP collaboration worth \$2.7 million and which now provides advisory services to industry on all aspects of numerical control engineering production operations. A fatigue laboratory for the automotive industry has also been set up with a contribution from UNDP of \$2.2 million and Government financing of Rs19 million. The project aims to introduce advanced fatigue testing techniques to the automotive and ancillary industry with a view to improving the safety standards of vehicles and to achieving significant weight savings. A project for enhancing the productivity and technological capability of the cement industry has been approved with UNDP assistance of

about \$2 million. UNDP has also helped in setting up a welding research institute which is helping the industry in improving the quality of welding technology and of indigenously manufactured welding equipment and consumables.

57. Areas identified for covering during the third country programme include: (a) the development of micro-precision engineering techniques to strengthen horological inspection and precision training capabilities; (b) the establishment of an integrated electronics industrial development complex capable of training personnel in production and quality control, services to small-scale entrepreneurs, developing products and processes involving advanced technologies, etc; (c) undertaking research on pollution control technologies to avoid the adverse effect of pollutants on humans and other organisms; (d) the establishment of an emission laboratory for the evaluation of exhaust from different types of vehicles and to develop acceptable standards; (e) the promotion of indigenous technical capabilities in metal forming through applied research and development; (f) the setting up of a centre of excellence for training in mechanical wood industries and their strengthening in terms of capacity utilization, product yield, quality, diversification, safety and reduction of waste; (g) pulp and paper research to promote the increased utilization of secondary raw materials such as cereal straw, bagasse and waste paper in order to reduce pressure on forests; (h) the development of a recovery system for chemicals and fibres for small paper mills using non-wood fibres as raw materials; (i) the establishment of a scientific and technological resource for the promotion of industrial research in ceramics; (j) the setting up of a development centre for traction and advanced mass transportation systems and technologies for energy conservation; (k) the setting up of a research facility to encourage the manufacture of a new range of sophisticated pumps required for transportation of solids through pipelines; and (l) the design and development of construction and earthmoving machines with emphasis on design testing and evaluation of structures.

2. Steel

58. Steel is basic to the industrial development of any country. During successive plans, ambitious steel development programmes were taken up, and at present six integrated steel plants are functioning (with a total installed ingot capacity of 11.4 million tons). Of these, five are in the public sector and one is in the private sector. The availability of steel is further supplemented by electric arc furnace units. The present licensed capacity of such steel furnace units is about 4.1 million tons per annum. The steel industry needs, however, considerable modernization and upgrading of technology to improve its efficiency.

UNDP co-operation

59. A pilot project for the production of sponge iron involving a total UNDP contribution of \$4.9 million and Government cost sharing of \$7.2 million was successfully completed during the second country programme. In addition, three other projects in the steel sector involving a total UNDP contribution of \$2.3 million are now under implementation, covering sponge iron melting

technology, the design and development of an experimental blast furnace, and the design and development of a concurrent top and bottom blowing converter for steel-making operations.

60. Areas identified for coverage under the country programme in the steel subsector include: (a) the establishment of a computer-based maintenance system for the steel industry which would cover the development of data bases and analysis, the setting up of a preventive maintenance schedule, the availability of materials and spares, initiation, control and follow-up of jobs; (b) a study of overall energy consumption patterns in the steel industry and evolving measures to optimize them; and (c) the development of expertise in design and engineering of oil and gas pipelines, both on- and off-shore, as well as of slurry pipelines.

3. Chemicals and fertilizers

61. India is an agricultural country and much of its increased agricultural output depends upon increases in the area under cultivation. These approaches, however, have their own limitations. The Government has, therefore, accorded high priority to increasing the production of fertilizers, as a key input for higher agricultural production. Agricultural productivity has increased considerably, leading to agricultural growth and employment opportunities in rural and urban sectors. Although the installed capacity for the production of fertilizers is currently of the order of 5.17 million tons of nitrogen and 1.49 million tons of phosphoric acid (P_2O_5), the country's entire requirement of fertilizers cannot be met out of this available indigenous production. Imports are used to bridge the gap between demand and supply. Further capacity is being created, however, and improvements are being made in utilizing the existing capacity with the result that imports are expected to be sharply reduced in the coming years. In order to achieve self-sufficiency and reduce imports of raw materials, schemes have been framed which will help in developing technologies for exploitation of indigenous sources of rock phosphate and pyrites.

UNDP co-operation

62. Under the second country programme, there are six ongoing projects in the chemical and fertilizer sector involving total UNDP assistance of around \$2 million. Some of these projects will be completed before the third country programme begins. Notable among them are projects to cover investigations in the production of sulphur and sulphuric acid, investigations into the use of low-grade rock phosphates, production of anti-malaria drugs, consultancy services for revamping a vitamin C plant and the manufacture of dapsone.

63. Areas identified for coverage under the third country programme in the chemicals and fertilizers subsector of industry are: (a) the augmentation of existing predictive maintenance facilities for better utilization of installed capacities and for obtaining higher performance efficiency; (b) the setting up of an institute of fertilizer technology; (c) the development of expertise in fertilizer plant operations; (d) a feasibility study for a pilot demonstration plant to produce sulphur from pyrites and pyrrhotite deposits;

(e) the achievement of greater reliability in the safety and performance of equipment and productivity through non-destructive testing facilities in identified gap areas; (f) corrosion evaluation and protection techniques to minimize corrosion losses and failure of equipment in fertilizer and allied industries; (g) immunobiological and chemotherapeutic research in order to evolve drugs for diseases prevalent in the country through the isolation and characterization of antigens for malarial vaccine, polio injectable vaccine, rabies vaccine, measles vaccines and the development of micro-organisms for industrial products and process development for anti-parasitic and anti-cancer drugs; and (h) effluent treatment for chemical industries under environmental protection systems.

4. Textiles

64. The textile industry is the largest segment of India's organized industrial sector. A significant part of the decentralized and rural production base of the country is in the handloom and power-loom sectors. The textile industry contributed over Rs18 billion to the country's total exports of Rs96 billion in 1983-1984. There is still potential for more exports. The main objectives of the Government's textile policy are to increase the production of cloth to meet the needs of the growing population, to promote balanced growth of all sectors of the textile industry, and to achieve a higher export capability. While maintaining the position of cotton as the main fibre, use of man-made fibres and yarns would be progressively encouraged. The Government would also adopt measures for modernization and technological upgrading of the production base, marketing and exports, supported by requisite research and development efforts. The increase in cloth production during the seventh plan would be sought primarily through the expansion and development of the handloom sector. The objectives, priorities and thrust areas during the seventh plan would be related to modernization and technological upgrading, development of the production base, cost reduction, energy conservation, diversification, including the use of new materials and qualitative improvement in marketing and exports supported by requisite research and development efforts.

UNDP co-operation

65. During the second country programme UNDP assistance was extended to the projects relating to the production of synthetic fibres, new fibres and easy-care cotton fabrics. At present, there are four ongoing projects involving UNDP assistance of \$2.5 million. These projects are at various stages of completion. Specific mention should be made of the project Demonstration Plant for the Production of Synthetic Fibres (SASMIRA) (IND/83/015). Under phase II of this project, a pilot plant has been successfully completed and tested for the production of polyester/nylon fibres.

66. The textiles subsector will benefit from UNDP collaboration during the forthcoming country programme in: (a) setting up an institute of garment technology and fashion design to turn out highly skilled professionals with creative ability to meet the requirements of the garment industry; (b) developing and promoting new end uses of jute to stabilize and effect growth

of the jute industry through diversification into non-traditional areas; (c) developing computer-aided designs (woven and printed) in textile technology; and (d) exploring possibilities of using unconventional fibres to produce fine yarn for woven and knitted apparel fibres of consumer appeal and assessing possibilities of making other textile products for different end uses.

D. Science and technology

1. Scientific research

67. Since India's independence, major efforts have been made to create and strengthen the existing scientific and technological infrastructure covering a broad spectrum of disciplines and capabilities. Simultaneously, there has been a significant growth of scientific and technical education. During the Sixth Plan, to give the necessary thrust to emerging areas, new departments of environment, ocean development and non-conventional sources of energy were culled out of the activities of the Department of Science and Technology. The massive application of science and technology has led to great strides in agricultural production since the 1960s. In ocean development, medical research and environment, new initiatives and programmes were undertaken from 1980 to 1985. Three scientific expeditions to Antarctica were organized and a permanent research station was established; in addition, surveys were undertaken to locate polymetallic nodules in the Indian Ocean. In the area of scientific and industrial research, the Council of Scientific and Industrial Research (CSIR), with its chain of 39 national laboratories, has played an important role in attaining self-reliance. In medical research, a modified research strategy and plan of action have been developed through the establishment of task forces on specified areas and problems to co-ordinate activities among different groups and institutions. In science and technology, significant progress has been made by programmes supporting multi-disciplinary research and by programmes in emerging front-line areas of science.

68. So far as the perspective and strategies in the seventh plan are concerned, the main emphasis in the approach to the science and technology sector will be on the identification and adaptation of suitable technologies for the achievement of national priorities, creation of new institutions and centres of excellence and the implementation of special programmes to assist the economically disadvantaged sections of the society.

UNDP co-operation

69. UNDP has long been extending assistance in the field of scientific research under the aegis of the country's premier research institutions. At present, there are 14 ongoing projects involving UNDP contributions of about \$17 million. A number of these projects will be completed during the second country programme while some will continue into the third. UNDP assistance has been utilized in such varied fields as the development of alternative fuels for internal combustion engines; the development of bio-science and bio-engineering; coal gasification, the establishment of primary and transfer standards/vacuum standard; the development of integrated exploration methods

for minerals; the development of process technology and semi-conductor devices and the development of resins, moulding compounds and curing agents for use in the composite industry. Special mention should be made of UNDP collaboration on hydrostatic extrusion and material synthesis, involving UNDP assistance of \$3.3 million. The pilot plant has been fully commissioned and has become operational. The technologies developed under the project are the hydrostatic extrusion of metals and alloys, sheer spinning of tubes in hard-to-form materials and the hot extrusion of super alloys and carbon steels. Another project, which is in support of the Structural Engineering Research Centre and involves UNDP assistance of \$2.4 million, is aimed at setting up a modern automatic tower testing station and strengthening the capability of the structural dynamics laboratory of the Centre.

70. The areas identified for UNDP assistance in the science and technology subsector are: (a) the use of low-cost technologies to develop new vaccines against widely prevalent diseases, thereby contributing to health development plans, with particular emphasis on prophylactic and curative strategies necessary to improve the health care system; (b) plant improvement in nitrogen fixation using modern biological techniques to generate new sources of genetic variability that can be exploited through conventional plant breeding techniques; (c) investigations to eradicate vitiligo and leprosy through active interaction with research groups in other countries; (d) the development of solar energy materials such as photo-thermal and photo-voltaic devices; (e) the provision of modern technology for automated mapping at various scales for developmental purposes including the maintenance of a cartographic digital data base; (f) the design, development and processing of composite products in new fibres and composites; (g) the establishment of a facility for controlled environment (phytotron) through the introduction of related scientific equipment and training; (h) the development of physics-based (including electron, ion beam and x-ray based), electro-optical and test/measuring instruments; (i) the development of a multi-spectral radiation scanner to collect sea truth data for the development of physical/mathematical models on the phenomenon of upwelling; (j) the development of software for processing ocean-related satellite data as an aid to remote sensing for obtaining synoptic information over large areas of the ocean in real time; (k) the production of middle distillates from natural gas, especially methane, through the development of catalysts for direct conversion to hydrocarbons and demonstration of the process on a bench scale; (l) the study of the molecular biology of parasites and enzyme engineering for effective control and cure of leishmaniasis to combat parasitic diseases, serodiagnostic approaches and vaccine development; and (m) the development of carbon-carbon composites for potential applications in industrial, medical and aerospace fields.

2. Electronics

71. Electronics now permeate all economic activities. Practically every field of human effort derives its strength from this branch of science and technology. In the last two decades, the advances in electronics technology have led to an explosion of new products and processes leading to the replacement of much of the existing electro-mechanic products and processes

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offered by other countries. India has generally lagged behind in consumer electronics in the instrumentation sector. The electronics industry provides large employment per unit of investment. Every one million dollars of investment made in electronics creates employment for over 300 persons. The industry also causes a minimum strain on the power infrastructure and the degree of value added is comparatively high. The cost of transporting electronic components and systems is much lower compared with that for goods of equivalent value from other industries. The electronics industry is less location-sensitive and more amenable to regional dispersal in the context of balanced growth. In view of these advantages, special attention has to be given to the development of the electronics sector in the country. Since 1980, the Government of India has adopted a number of liberalized procedures, including an easier licensing and growth-oriented policy, which has created a favourable climate for investment in electronics. In this context, the approaches being pursued are: (a) the creation of an integrated information base around the country; (b) mass communication; (c) audio-visual and computer media in education; (d) increase in productivity through the introduction of procedure control instrumentation, automation of production process, computerized design activity, etc; and (e) research and development for achieving self-reliance.

UNDP co-operation

72. UNDP has been actively associated in the electronics sector during the second country programme. At present, there are five ongoing projects involving total UNDP inputs of \$4 million. UNDP assistance has been utilized for projects in the fields of appropriate automation promotion, computer-aided design, software development and computing techniques, and computer-aided management. Particular reference needs to be made of UNDP's contribution of \$4.7 million in support of the National Informatics Centre (IND/73/002), a project which now is operationally completed. UNDP has helped NIC to become the focal point in the Government for developing, managing and operating information systems. Equally important is the completed project, National Centre for Software Development and Computing Techniques (IND/80/012) involving UNDP assistance of \$3.2 million.

73. Thrust areas included for support under the third country programme in the electronics subsector include: (a) a microprocessor application engineering programme to achieve increased production through quality control, process optimization, energy conservation and utilization of materials and manpower; (b) a telematics development and promotion programme to build up expertise in developing protocols suitable for editorial systems in Indian languages, character coding techniques for scripts and an experimental video-text system; (c) education and research in computer networking to enhance the country's computing resources to produce engineers and managers capable of solving futuristic problems; (d) the establishment of a national centre for knowledge-based computer systems to undertake specific research and development and goal-directed projects in order to achieve inference and intelligent interface functions and development of software; and (e) the setting up of a centre for advanced level maintenance techniques to facilitate the availability of idle replaceable computer units, a reduction in carrying cost of spare parts, etc.

3. Meteorology

74. The Indian Meteorological Department (IMD) is the national meteorological service of the country dealing with all matters concerning meteorology, seismology and allied subjects. Under the five-year plans, IMD has been endeavouring to improve its services to meet increasing and varied demands and to enlarge its supporting research development activities. The main areas to be focussed on by the IMD during the seventh plan are: (a) improvement of the forecasting and cyclone warning system; (b) improvement in agro-meteorological services; (c) improvement of the surface and rainfall network; and (d) studies on meteorology.

UNDP co-operation

75. Specific areas identified for UNDP support in the meteorology subsector under the third country programme are: (a) the establishment of an upper-air meteorological network including technology transfer for partial automation of radiosound observation at ten identified places with the objective of automatic data acquisition, computation of wind and meteorological parameters and preparation of messages in a prescribed format ready for transmission; and (b) the strengthening and modernization of a seismological network to detect and assess earthquake risks in shorter time intervals through sensitive digital recording instruments at ten new seismological stations.

E. Transport and communications

1. Railways

76. India has one of the most extensive and oldest networks of railways in the third world. Since the first five-year plan, there has been a fourfold increase in freight traffic and threefold increase in passenger traffic, handled with only a 2.6-fold increase in wagon capacity and a twofold increase in passenger coaches. All forecasts of traffic growth of Indian Railways indicate that, in the next 15 years, the level of passenger and freight traffic is likely to be more than doubled. The Indian Railways as a system has to gear up to deal with this growth. It would be evident that technological innovations introduced in the 1950s and 1960s have given a significant spurt to productivity. The Government plans to give a fresh impetus to productivity in the coming years, in areas such as electrification of high-density routes, introduction of heavier trains, development of rapid handling terminals, improvement of maintenance facility and practices, and adoption of computer-based information systems.

UNDP co-operation

77. UNDP is assisting with a project designed to improve railway operations and is contributing \$1.5 million to this end. The project is helping to develop expertise in various railway operations by imparting advanced training to Indian engineers abroad.

78. Priority areas identified for UNDP assistance in the railways subsector are: (a) strengthening physical capacity and material resources in bridge technology to meet increasing training requirements in maintenance and rehabilitation of old bridges and design, fabrication and construction of new bridges; and (b) upgrading of research and development facilities to bridge gaps in railway technology and the introduction of modern techniques in signalling systems, metallurgical investigations and design of rolling stock.

2. Shipping and transport

79. For a developing country like India, it is necessary to expand foreign trade efficiently and to keep maritime transport costs at a minimum. To achieve this, management capabilities in the sector need to be continuously developed.

UNDP co-operation

80. During the ensuing country programme period, it is proposed to seek UNDP assistance to train port managers in modern port management techniques to facilitate the development of a national port management training institute.

3. Telecommunications

81. Good telecommunications, which are fast and save energy, improve efficiency over a number of sectors such as administration, industry, trade, transport, agriculture, national security and law and order. While traditional means of communication like mail services are reasonably well developed, the country cannot ignore modern and sophisticated means of communication. Communication technology has been advancing at a rapid rate, as noted particularly in the spectacular development of semi-conductor and computer technology. This has resulted in far-reaching changes in the concept and design of communication systems and computers. The telecommunication service helps to create more job opportunities in areas where information is produced, processed and disseminated. It therefore serves a good social purpose and demands a high priority in the economic development of the country. Studies have revealed that large trade/commercial organizations, banks, etc. spend about 13 per cent of their total operating expenses in telecommunication services and there is a direct correlation between telephone density and per capita value added in industry. Telecommunication services must therefore be both adequate and efficient. As part of the modernization process, technological updating was envisaged in the sixth plan through the introduction of electronic telexes, digital trunk exchanges and microwave systems, satellite communications, etc. India has also put into orbit the Indian National Satellite (INSAT) to strengthen long distance telecommunication links with various cities and remote areas through earth stations at different locations. During the seventh plan period, telecommunication works based on such innovative modes are proposed to be further pursued.

UNDP co-operation

82. There are five UNDP-supported telecommunication projects near completion

involving total UNDP resource of \$2.5 million. Particular reference should be made to UNDP assistance to the Advanced Level Telecommunication Training Centre (ALTTC), Ghaziabad (IND/82/028). ALTTC is one of the country's prestigious centres conducting research and training on advanced level telecommunications. UNDP has been assisting the Centre for over a decade.

83. Priority areas identified for UNDP assistance in the communications subsector under the country programme include: (a) telecommunications research and development to facilitate the study of data and telematic services, satellite communication, system engineering and earth station terminals, studies and planning/operation of wide-band digital radio systems and integrated services digital network; (b) telecommunications training to develop manpower in new emerging technologies such as electronic switching systems, digital transmission network, ducting and pressurization of cables, upgrading of quality control and quality assurance methods; and (c) the improvement of radio frequency management and monitoring facilities in areas of satellite monitoring, introduction of latest techniques in high frequency/very high frequency (HF/VHF) radio direction finding and hardware for at least three automatic multi-functional monitoring bands up to 1000 megahertz, etc.

F. Communication and mass media

84. In a vast and populated country like India, an effective system of information and broadcasting is very necessary. It is recognized that the facilities used in radio communication and television need to be strengthened so that quality programmes reach and educate people in all parts of the country. Hence, various mass communication media will have to give greater attention to the dissemination of knowledge. With the increasing use of digital techniques for television and sound broadcasting systems, the need for a faster switch-over from analogue to digital techniques in broadcasting networks is becoming greater.

UNDP co-operation

85. UNDP assistance in the development of digital and microprocess-based systems is foreseen to keep pace with the increasing automation in television and sound broadcasting systems in order to achieve higher reliability and superior quality.

G. Education

86. Since independence, a major concern of the Government has been to give increasing attention to education as a factor vital to national progress. With this aim in view, the Government has set in motion the process of transforming the educational system in the country in pursuit of the national policy on education. Implementation of this policy will require comprehensive and advanced knowledge on concepts and methods of educational planning. It will also require a comparative study of different educational systems so as to draw benefit from the experience of other countries. It is felt that the existing educational system in India does not fully meet the requirements of

the country and is in need of radical changes. Mere expansion of existing structures, models, methodologies and institutions is not adequate. It is recognized that educational reforms aimed at introducing and reinforcing patterns and designs of education that are flexible and varying, relevant and linked to widely diverse local cultural and social environments, will have to be undertaken. The emphasis has to be on innovation, on low-cost alternatives and societal involvement, all aimed towards linking education effectively to the needs of the people, to employment and to development. The reforms must aim at continuous improvement of standards at all levels and even more importantly, at greater equity. In the educational system, overriding priority will have to be given to universal elementary education for children in the age group of 14-16 years by 1990. This will call for the additional enrolment of 60 million children during the seventh plan period. Both full and part-time systems and formal and non-formal methods have to be adopted with a greater emphasis on retaining children after enrolment and in ensuring that children attain the basic learning objectives. It is quite obvious that innovative and low-cost programmes would need to be evolved to cover the large number of children involved, many of whom cannot attend on a full-time basis for social and economic reasons. It is also clear that recent advances in information and communication technology will need to be used to verify this end. The new approach to education will require substantial financial outlays. In addition, mobilization of community resources and community participation are essential.

UNDP co-operation

87. Under the second country programme, there are 12 projects in the education sector involving a total UNDP contribution of \$9.5 million. The project Special Assistance to Selected University Departments (IND/78/001), involving an input from UNDP of approximately \$3 million, has recently been completed. UNDP assistance was also extended to the Indian Institute of Technology, Bombay, for establishing an Industrial Design Centre. In addition, UNDP assistance has covered post-graduate education and research in the fields of hydrology and engineering and has helped to establish the National Research Laboratory for Conservation of Cultural Property (IND/75/009). Particular reference should be made to the project regarding the establishment of a Central Institute of Educational Technology, New Delhi, involving UNDP assistance of \$2.3 million. The project was approved in February 1984 and is expected to be completed in 1987. The objectives are to enable the country to utilize the latest satellite television technology to bring to its people, especially in rural areas, the benefit of access to information and instructional facilities which are not available in the far-flung areas of the country.

88. Areas inviting UNDP assistance in the new country programme include: (a) curriculum development for the education of technicians and production and dissemination of instructional materials and information resources; (b) education in international management to develop curriculum/special training programmes and strengthen existing infrastructure in this area; (c) advanced studies in biomass refining and bioconversion; (d) establishment of a centre for education in science and technology, which would

promote the development of relevant curricular and equipment, and the exchange, evaluation, research and training of teaching personnel to ensure effective use of modern audio-visual aids and instruments; (e) the introduction of modern audio and video learning materials in a few universities and colleges as an experimental pilot project; and (f) studies on the deterioration and conservation of ancient metals and metallurgy to help conservation of archeological objects.

H. Health

89. India is committed to attain the goal of "health for all" by the year 2000. In so doing, it will develop faster the country's human resources and accelerate socio-economic development. In the seventh plan, the thrust will therefore continue to be on primary health care. In addition, emphasis will be laid on prevention and on organizing effective and efficient health services which are comprehensive in nature, easily and widely available and acceptable to and affordable by the people. Effective co-ordination of health and health-related services and activities, such as nutrition, safe drinking water supply and sanitation, housing, education, information and communication and social welfare will be required in the implementation of health programmes. Qualitative improvements are also needed in health and family planning services. For control and reduction of communicable diseases there must be an adequate provision of essential drugs, vaccines, etc., and programme implementation at all levels needs to be strengthened. Medical research related to the common health problems of the people, which is helpful in evolving cost-effective intervening technologies, will also require greater emphasis.

UNDP co-operation

90. Keeping in view the importance of the health sector, the following areas have been proposed for UNDP assistance in the third country programme: (a) the establishment of infrastructural facilities, such as laboratories, in animal tissues and cell culture to facilitate studies in communicable diseases; (b) tribal health research to improve understanding and management of communicable diseases, nutritional disorders and fertility patterns; (c) research in new contraceptive technologies such as spacing methods, immunological approaches to contraception, male contraception, anti-implantation/menses inducing agents, anti-fertility plant products, etc; (d) fractionalizing of plasma to facilitate storage and transportation of blood for use in hospitals, in support of blood bank transfusion services; and (e) establishing a production unit for tissue culture for rabies vaccine, creating a nucleus for training of personnel and determining an effective, safe and simple dosage schedule at a nominal cost. In addition, assistance approved for low-cost sanitation in rural areas will continue in the third programme period.

I. Employment

91. Labour policy in India is derived from the Directive Principles of

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State Policy as enshrined in the country's Constitution and has been evolving in response to the specific requirements of planned economic development and social justice. One of the important areas of labour policy in India is in the field of mine safety. Continuing research and development effort is therefore crucial in order to eliminate causes of accidents and major calamities due to gas and coal dust explosions, inundation, fire, premature collapse of workings, coal/drop burst at great depths, etc.

UNDP co-operation

92. During the second country programme, UNDP has extended assistance to 16 projects involving \$17 million. The fields covered include road transport, tool design, support for the central labour institute, occupational health, ergonomics, dock safety, industrial hygiene, humanization of work and coal mines safety. Special reference should be made to a project in support of a new Advanced Vocational Training System (IND/75/090), involving sizeable UNDP support of \$11.6 million. Under this project, which is nearly completed, an apex vocational training institute has been set up at Madras and another 21 technical training institutes have been established and/or strengthened with the necessary instructional materials developed and distributed.

93. Areas included for UNDP assistance in the country programme are: (a) the Establishment of a Numerical Control Centre (IND/73/014) to meet its needs of modernization and incorporate new disciplines to cater to technological development needs of industries; (b) a compact pilot project in mines safety to reduce health and accident hazards in the mining industry; and (c) strengthening training facilities in hotel tourism and catering.

J. International trade and development finance

94. The country's earnings from invisible items in the balance of payments have declined substantially from the peak level of 1980-1981. It will therefore be necessary to depend largely on faster growth in exports and on import substitution. The potential for export of engineering goods, products and non-traditional items should be fully exploited. It is in this context that the policy of import liberalization needs to be in step with self-reliance. The establishment of linkages between the user and supplier sectors should be an important step in promoting import substitution. It will be necessary to ensure that the need for essential imports, such as those required to complete ongoing projects and to enable fuller utilization of capacities, those required to avoid bottlenecks, those of essential technologies and those needed to complement internal technological development, is accommodated. India's sixth and seventh plans emphasize the need for the rapid expansion of exports and envisage the maintenance of an export volume in the 7-9 per cent range, allowing scope for an overall growth of imports comparable with 5 per cent growth of the economy.

UNDP co-operation

95. Activities to be assisted during the country programme period include:

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(a) package testing and development at industrial centres to help the packaging industry evaluate and upgrade the quality of products; (b) the strengthening of management capabilities and technical services of the construction industry; and (c) the expansion of electronic support and computer software production.

K. Development planning and administration

96. The need for training public personnel to face new and emerging tasks of planning and development has been emphasized in successive five-year plans. Personnel in the Government have to be equipped with the knowledge, skills and appropriate attitudes to successfully meet the challenges of development plans. Formal efforts have been made at various levels to promote and strengthen training in the Government even while the scope and content of administration in general, and developmental plans and programmes in particular, have become increasingly complex. In spite of these developments, training facilities available to public personnel are not adequate to keep pace with continuing tasks of development and planning.

UNDP co-operation

97. During the second country programme, UNDP assistance is being utilized to provide training fellowships to senior administrators in the field of policy, management and economic planning. Assistance in development of management consultancy services will continue into the third country programme.

98. A modest programme drawn up for UNDP assistance under the third country programme includes: (a) the upgrading of training facilities for trainees and trainers, curriculum development and the design of prototype training packages for personnel engaged in developmental activities; and (b) training of senior administrators in public administration and development, including human resources development and comparative government systems.

Annex

FINANCIAL SUMMARY
(US dollars)

A. Resources

(a) IPF resources

(i) Illustrative IPF for 1982-1986 at 55%	138 600 000
(ii) Balance from previous IPF cycle	351 000
Subtotal	138 951 000
(iii) Less IPF expenditures 1982 to March 1985	(87 401 000)
(iv) Add provisional IPF for 1987 to March 1990	90 090 000
Total IPF resources	141 640 000

(b) Other resources

Total resources available for programming	141 640 000
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B. Use of Resources

(a) Programmed

(i) Ongoing projects	49 428 000
(ii) New projects and new phases of ongoing projects included in the country programme	13 216 000
(iii) Earmarked for specific objectives and activities for which projects are to be worked out at a later stage	75 000 000
Subtotal	137 644 000

(b) Unprogrammed reserve

3 996 000

Total use of resources	141 640 000
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C. Distribution of programme by sector

<u>Sector</u>	<u>Ongoing projects</u>	<u>New projects</u>	<u>Sectoral earmarkings</u>	<u>Total</u>
0200 Development planning and administration	60	95	860	1 015
0300 Natural resources	11 405	685	11 750	23 840
0400 Agriculture, forestry and fisheries	4 735	1 660	10 260	16 655
0500 Industry	17 490	4 951	26 250	48 691
0600 Transport and communication	1 737	750	5 970	8 457
0700 International trade and development finance	220	-	-	220
1000 Health	96	1 000	2 630	3 726
1100 Communication and mass media	-	-	140	140
1100 Education	7 225	2 555	4 620	14 400
1200 Employment	237	1 520	290	2 047
1600 Science and technology	2 308	-	12 230	14 538
- Unallocated funds available under TCDC umbrella	3 915	-	-	3 915
TOTAL	49 428	13 216	75 000	137 644