

12.4.2 Operational Departments, FMWRRD

It is proposed that five Departments as are explained in Figure 12-2 would be provided for proper implementation of the NWRMP, of which the Department of Water Administration that will be newly established is examined under 12.3 of this Chapter.

(1) Department of Dams and Reservoir Operations

It is proposed to have three Divisions, viz. (1) Project Planning and Coordination Division including the proper arrangement for multipurpose water storage and use with a strong inter-linkage among various project organizations and also the technical matters on inter-basin water transfer schemes, (2) Dam Engineering Division and (3) OM Division; for the latter two taking into due account more emphasis upon the urgent solution of current problems and constraints in terms of technical management as are explained in Chapter 4 of the Sector Report.

(2) Department of Irrigation and Drainage

It is suggested to provide three Divisions viz. (1) Project Planning and Coordination, (2) Irrigation and Wetland Development, and (3) Command Area Services in compliance with the work category and related load to be expected during the Plan period. More particularly, each Division would be to perform the following activities and functions:

a) Project Planning and Coordination Division

- Preliminary investigation and reconnaissance.
- Feasibility planning and project formulation.
- Irrigation engineering and project management to assist RBDAs.
- Monitoring and evaluation of OM.
- Institutional / human resources management.

b) Irrigation and Wetland Development Division

- Feasibility planning and project formulation.
- Irrigation engineering and project management.

c) Command Area Services Division

- Field investigation and studies.
- Irrigation engineering and project management.
- Monitoring and evaluation of OM.
- Institutional / human resource management.

While the agricultural extension services to irrigation farmers are generally provided by the State agencies principally by the ADPs, the RBDAs used to have their own extension staff but this service was disbanded in 1986 although some extension staff are retained by some RBDAs. It is critically important that closer linkages are developed between RBDAs and ADPs to ensure adequate agro-allied services for the clients of the former. A number of options are available, but the most practical one appears to be for the ADPs to establish a special branch to provide the required extension services to the RBDA projects. Appointment or secondment of the senior ADP personnel to the RBDA scheme managements would also facilitate the development of needed cooperation; and in the States with substantial areas under the RBDA irrigation, a RBDA representative would be assigned to the ADP management committee.

Urgent attention will be paid at the policy level to forge the strong collaborative links between the various public and private organizations involved in one way or another in the development of all aspects of irrigation and supporting services, as is explained in para. 12.2 of this Chapter. In particular, this Department should develop the strong working links with the Department of Agriculture, FMANR sharing in the responsibilities within their mandates, to apply necessary skills where each has comparative advantages in the irrigation development effort.

(3) Department of Water Supply and Quality Control

For smooth operations of the NWRMP, this Department should have three Divisions, viz. (1) Water Supply and Sanitation Coordination as Federal apex body, (2) Water Engineering in conformity with the Section of the Water Resources Decree for technical assistance and rehabilitation and improvement support to public authorities having the responsibility for public water supply, and (3) Water Quality Control in connection with the FMWRRD mandate to monitor the overall quality of the water resources in cooperation with the FEPA and State Environmental Agencies.

The Water Resources Sector, FMWRRD through its Department of Water Supply and Quality Control is charged with the policy advice and formulation, data collection, resources and demand surveys, monitoring and coordinating of water supply and sanitation development and operations and the initiation of related research development and studies at Federal level. It shall also be responsible for the establishment and operation of the National Water Quality Reference Centers. There is the Federal Ministry of Health and Human Services (FMOH) which is responsible for establishing the standards and quality aspects of public water supplies. The Department also represents the FGN's interest in the processing of external financial assistance for projects within the Sector. It is of the common view that the responsibility of nationwide coordination for water supply and sanitation is most often given to a national ministry of health, being less often to another ministry of public works or water resources. This is because the operational links among water supply, waste disposal and instruction in personal hygiene have always been stressed and they need to be planned together. Health services, housing development and urban planning also have important links to water supply and sanitation. Coordinating and facilitating all these activities which customarily are the responsibility of independent organizations, are presenting another set of organizational challenges which many countries are still struggling to meet.

In Nigeria, too many agencies, mostly the Government-owned are involved in the act of domestic water supply. This may create undesirable rivalry and competition, duplication of efforts, and wastage of scarce resources, and above all the problem still remains: no water for great number of people. More particularly, the following have been observed:

- Aside from the Federal agencies, the State Water Agencies (SWAs) are normally headquartered in a State capital with the Area or Zonal offices in various parts of the State. Generally, these outside offices have very limited powers and should refer most major decisions to the headquarters. In addition, the SWAs are so distant from their out-station offices that the local problems do not attract quick response to prolonged suffering of the people.
- The load of the SWAs is so heavy that they have only attempted to grasp the problems of water supply to the cities and few urban centers with little impact in the rural areas. And, the revenue generating capacity of urban areas is more attractive than in the rural areas. The situation where the SWA managements are located far away means that the rural areas have been marginalised or neglected from the water supply scheme, while the LG Authorities have no direct control over the activities of SWAs.
- The LG Councils only see their involvement in water supply as ad-hoc and are not compelled to provide water or charge for the services provided. It appears that very few LGs undertake serious maintenance of the mini schemes provided through the National Borehole Project.

It may be of an opinion that the present functions of SWAs to supply the treated water to the urban areas be decentralized, meaning that the LG Councils should be responsible for the treatment, distribution, OM and outfits in the urban areas of LGAs operating in areas for the supply of raw water. Under this proposal, the SWAs will be responsible for (1) policy formulation in the State Water Supply Sector, (2) the coordination of the activities of all existing agencies including the international organization for rural communities, (3) the negotiation and approval of grants, loans and subventions for the water supply development, and (4) planning and construction of the joint facilities to supply the raw water to multi-LGAs.

The decentralization of the management of the water works to the LG Authorities level with full responsibility for OM will reduce the problems so far identified for the lack of effective communication in the SWAs. In addition, it is expected that there would be marked improvement in consumer response, revenue generation, debt recovery and better commitment on the part of LGA to provide better service. A period of several years for this transition may be required to enable the LGs develop necessary structures and outfits for this assignment and the SWAs to effect smooth handling over to the LGs.

The schedule of duties to be given to three Divisions under the Department of Water Supply and Quality Control, FMWRRD may be summarized below:

WATER SUPPLY AND SANITATION COORDINATION DIVISION

- Provision of policy guidelines on urban, semi-urban and rural water supply and sanitation sector.
- Overall coordination and supervision of all sanitation and urban, semi-urban and rural water supply activities nationwide.
- Execution of programmes to enhance advocacy and collaboration within the sector.
- Formulation of policies on the following aspects of urban / semi-urban and rural water supply and sanitation in the country:
 - i) Charges for bulk water supply.
 - ii) Water supply tariff structure vis-a-vis cost recovery.
 - iii) Institutional arrangement for rural water supply activities.
 - iv) Periodic review of the statutory provision to water supply and sanitation by the various tiers of Government.
 - v) Community participation for sustainable rural water supply and sanitation.
- Coordination of all projects on rural and urban water supply being partially or fully funded by external support agencies.
- Centralized coordination and storage of data collected on water supply and sanitation in easily retrievable manner to form the framework for improved national water supply and sanitation monitoring, planning and management.

WATER ENGINEERING DIVISION

- Formulation of standards for urban / semi-urban water supply on:
 - i) Network designs, development and analysis.
 - ii) Storage facilities designs and improvement.
 - iii) Water treatment plant operation and maintenance.
- Formulation of standards on the following aspects of rural water supply nationwide:

- i) Devices to be used for abstraction of water for the rural populace.
 - ii) Simple distribution network design suitable for the rural areas.
- Technical assistance to the State & Local Governments on the adherence to design, operation and maintenance standards.
- Development of guidelines on the design, development and adaptation of models and prototypes of mini water works such as:
 - i) Rain water harvest devices.
 - ii) Infiltration galleries.
 - iii) Spring catchment.
- Development of specifications for locally manufactured water supply devices including:
 - i) Water meters, cast iron fittings.
 - ii) Ductile iron / steel pipes.
 - iii) Casings and screens for boreholes.
 - iv) Pumps, both mechanical and electro-mechanical.

QUALITY CONTROL DIVISION

- Establishment of Water Quality Control Laboratories for monitoring and setting up of national guidelines and standards.
- Water quality and pollution control measures relating to water supply in general.
- Quality control monitoring of reservoirs and boreholes / hand-dug wells for the protection of human health.
- Advice on the specifications of locally manufactured water treatment chemicals.
- Studies on pilot schemes on water quality processes.
- Responsible for all quality control related activities including liaising with all Federal and non-Governmental Agencies and dissemination of the FGN's policies and guideline on quality control to all relevant State agencies.
- Setting up of Training Network Centres and resources materials for human development.
- Monitoring of water quality for and from irrigation projects.

- Hydrochemical mapping of national water bodies.
- Creating water quality data bank.

12.4.3 National Water Resources Institute (NWRI)

(1) Evaluation of the NWRI

Reference is made to a report "Assessment and Evaluation of the National Water Resources Institute, Kaduna" as presented by Skoup & Co. ,Ltd (1991) which compiles the present situation with problems and constraints and subsequent recommendations.

The NWRI is a publicly owned and financed organization accountable to the FMWRRD. Overall direction of the NWRI is provided by a Governing Board, and the day-to-day management and direction of the programs are the responsibility of the Director. In the present structural set-up, the NWRI has six centres, viz. Education, Research, Computer, Administration and Finance, Library and Works. Since the Institute has no sub-station as distinct from experimental sites, it appears that the Institute is a data-collating rather than a data-generating agency.

An effective and functional NWRI should be a vital instrument for implementing the national water resources policy. In order to fulfill the objectives of this policy, the FGN has pledged to adequately strengthen and fund the NWRI, universities and Polytechnics to enable them to play their expected roles in water resources and manpower development in "Agricultural Policy in Nigeria" (FMAWRRD, 1988). It is said that the trend in funding has been generous giving an erroneous impression of dwindling financial support. Although the Institute's budget is presented to the Governing Board for approval, the annual work program does not go beyond the Institute's management level so that it is difficult to see how the adequacy or inadequacy of the budget can be determined without considering the work load.

The capacity of the NWRI to meet the training needs of the water resources organizations will depend upon the quality and numbers of the various categories of staff employed by the NWRI to meet its obligations. The

Skoup report explains that the total number of staff in the NWRI is adequate at present and the professional qualification of the senior staff is generally satisfactory. Although the research is an additional function of the NWRI in the water resources field where Nigeria is yet to make a mark, it is absolutely important that the research staff be upgraded through the training to a level of expertise consistent with the desired result. A staff / student ratio of 1 : 5.6 for the Education Centre would appear to be satisfactory when viewed against a ratio of 1 : 10 recommended by the National Universities Commission.

(2) Recommendations in the NWRMP

Aside from the public administration to be vigorously implemented by the FMWRRD in line with the NWRMP towards the year 2020, the NWRI will be substantially strengthened and upgraded as a main body for the research and technical services with the full responsibility to operate the data collection / analysis / banking, hydrological observation / analytical study and training for design / OM of hydraulic structures, for which a proposed organization chart of the NWRI is compiled in Figure 12-3. In this respect, it has been already suggested to transfer the main technical functions of the present Department of Hydrology and Hydrogeology in the FMWRRD Headquarters which has not been directly connected with the public administration. This is explained in para. 12.3 of this Chapter.

At present, there are two principal data processing centers in the Water Resources Sector, FMWRRD, viz. (1) the Water Resources Databank Centre (WRDC) in Abuja under the Department of Planning, Research and Statistics, and (2) the Data Bank and Computer-Based Remote Sensing Centre in Kaduna under the NWRI, both of which were developed under the UNDP Technical Assistance Project initiated in 1989. A UNDP / UNESCO Mission recommended in 1991 that the database should be copied to the WRDC, Abuja to support the planning and administration at the FMWRRD Headquarters, while the database at the NWRI, Kaduna should support the teaching and research, and this recommendation has been the beginning of a Wide Area Network (WAN) for the data exchange in the Water Resources Sector. In accordance with the recommendation to upgrade the technical capability of the NWRI including the transfer of hydrology-related work as mentioned above, it is also suggested to transfer the Water Resources Databank Centre to the NWRI, Kaduna for more technical and engineering consideration, while the

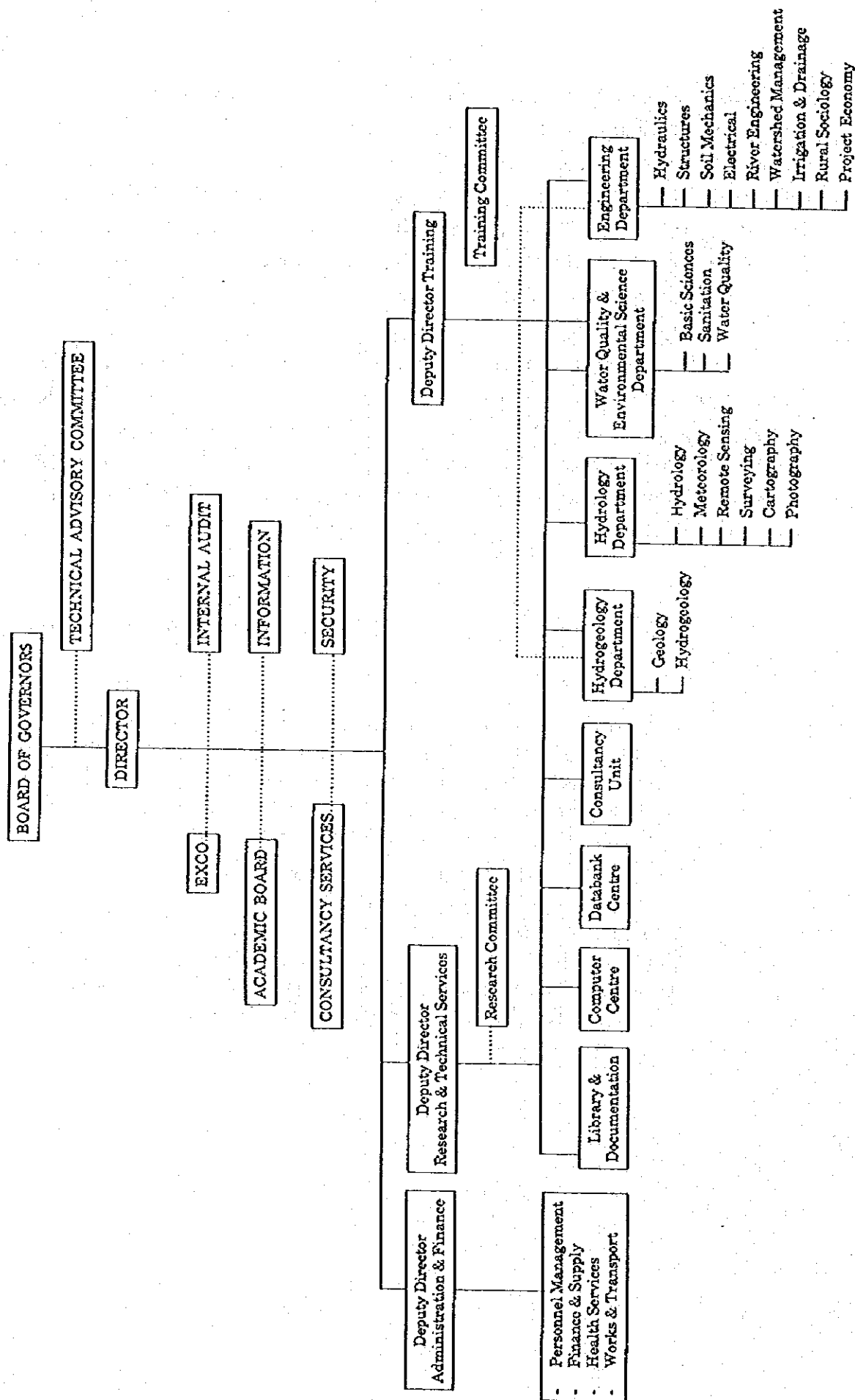
databank centre in Abuja will be directed to be equipped with the function of a Water Resources Management Information System which will be fully utilized for smooth operations of the public administration on the nation's water resources. It may be noted that a report prepared by the JICA Team on January 5, 1993 compiles (1) Present Situation of the Databank Centres in the FMAWRRD, (2) Future Needs in the Databank Centres and (3) Data Processing in the JICA-NWRIS.

It is stressed that more positive effort should be made to upgrade the water resources staff through in-service and on-the-job training. In order to achieve a proper implementation of the NWRMP, the FMWRRD should identify the skill gaps to be filled through such training in the NWRI and other local establishments. Training in overseas institutions would be the last resort where the facilities for training in a particular area are not available in Nigeria.

The JICA team may suggest the following items for proper operations of the NWRI:

- It is observed that a Technical Advisory Committee, the establishment of which is provided for in Section 5 of the NWRI Decree, has not been appointed. This should be appointed for the purpose of giving the guidance on short-and long-term planning of the NWRI program in connection with the NWRMP.
- At this stage, the NWRI operates the Unified Salary Grade Level System as applicable to the Civil Service, while other research institutions of this type in Nigeria have adopted the USS system as applicable to the Universities, Polytechnics and Research Institute. To give more incentives to the NWRI staff, the USS salary scale should be brought up to the appropriate authority for approval.

FIGURE 12-3 PROPOSED ORGANIZATION CHART OF THE NWRI



12. 4. 4 River Basin Development Authorities (12 RBDAs)

(1) Past Achievements

It is clear from the ambitious aims specified for the RBDAs that they were looked upon as the solution to the inefficiency of development planning of the Federal and State Ministries. They have tended to focus on large-scale single-purpose projects with large, sophisticated technology and expensive engineering elements, especially for irrigation schemes. Some of the RBDAs developed large, mechanized, rain-fed farms or were engaged in poultry production or land clearing schemes. Each of the RBDAs developed large and inefficient bureaucracies, and perennial conflicts with the Federal Ministries and State Governments have made the RBDAs to achieve very little progress.

The performance of the RBDAs has been much mixed, few of which were either financially or economically sound. In their tasks of monitoring and managing the water resources, all RBDAs have failed to do a satisfactory work and, to the contrary, have neither installed adequate hydro-gaging systems nor maintained those that have been installed. While their functions are rational, the financial constraints have reduced the programs of several to a size that is inconsistent with their relatively large staff and relevant facilities such as buildings, land, plant and equipment. Chapters 4 & 5 of this Sector Report show the achievements of these RBDAs in terms of irrigation operated and of water source works and related irrigation systems completed or under construction and that await the downstream development.

Like most of the public enterprises, the RBDAs have failed to realize the high expectations of the FGN particularly as vital instruments for the attainment of self-sufficiency in food production. Some of the reasons as already given for their failure include:

- Inadequate funding.
- Lack of technological infrastructure.
- Bureaucratic redtapism in their relations with the supervising Ministry.
- Frequent changes in policies.
- Interference in operating decisions.

- Poor resources allocation.

(2) Partial Commercialization by the TCPC

Accordingly, the main thrust in the program of Commercialization of the RBDAs since the year 1988 is to remedy these observed shortcomings. In designing the reform package of RBDAs, the Technical Committee on Privatisation and Commercialization (TCPC) has taken into consideration the following factors:

- RBDAs occupy a pivotal position in the search for economic development and self-sufficiency particularly in food production and raw materials for industries. The wheat program started some years ago is a shining example of the kind of role which the RBDAs are expected to play in the provision of the raw materials for industries.
- The level of inefficiency, mismanagement and waste in the public enterprises including the RBDAs calls for measures which represent a radical break with past attempts at introducing changes, if the objectives of present commercialization program are to be achieved. The case of non-water assets is a glaring example of the scale of mismanagement of scarce financial resources.
- Investments in such organizations in their present form consume vast financial resources, the scale of which are progressively outstripping the public resource availability.

The RBDAs are part of 24 public enterprises slated for partial commercialization under Schedule II, Part I of the Privatization and Commercialization Decree, No.25 of 1988. According to the Decree, Commercialization means the reorganization of enterprises wholly or partly owned by the FGN in which such commercialized enterprises shall operate as profit making commercial ventures and without subvention from the FGN. They would have to operate as purely commercial enterprises, and being subject to the general regulatory powers of the FGN, the enterprises are to be able to:

- fix rates, prices and charges for goods and services provided;
- capitalize assets;
- borrow money and issue Debentures Stocks; and

- sue and be sued in their corporate names.

Under this guideline, the broad objectives of the partial commercialization of the RBDAs are:

- To re-orientate the RBDAs towards a new horizon of performance improvement and viability through the enforcement of strict commercial principles and practices.
- To remove the bureaucratic bottlenecks in their decision-making procedures and administration to enhance their general operational efficiency.
- To evolve an effective, cost-conscious and goal-oriented management.
- To reorganize and reorientate the RBDA operations and administration to ensure the achievement of the objectives for which they were established.
- To undertake a comprehensive review of the accounting and information system in the RBDAs with a view to install and maintain modern and effective accounting system which will produce promptly and accurately the necessary data for monitoring their financial operations and performance.
- To check their present dependence on the treasury for funding through a more realistic capital structure which will enable them to approach the capital market to fund their operations without the Government guarantees.

The TCPC has recognized that the 11 RBDAs are not the same in their level of development, size of operations and complexity. Indeed, for some of them, after the sale of their non-water assets they will have practically nothing to do. Accordingly in proposing new organization and management structures, the RBDAs have been categorized into three groups:

Group A: Hadejia-Jama'are, Sokoto-Rima and Chad (3)

- Board of Directors (9 members):
 - Managing Director - 1
 - Executive Director - 3 including Operations, Services, and Finance & Administration.

Part-time Directors - 5 including the Chairman and a representative of the Supervising Ministry.

- Cessation of Subventions:

50% recurrent subvention to be withdrawn in 1993 and no subvention as from January 1994.

Group B: Anambra-Imo, Ogun-Oshun, Upper Benue, Lower Benue and Niger (5)

- Board of Directors (7 members):

Managing Director - 1

Executive Directors - 2 including Operations and Services.

Part-time Directors - 4 including the Chairman and a representative of the Supervising Ministry.

- Cessation of Subventions:

33 1/3% of recurrent subvention to be withdrawn in 1994 and none from 1995.

Group C: Cross River, Benin-Owena and Niger Delta (3)

- Board of Directors (5 members)

General Manager - 1

Part-time Directors - 4 including the Chairman and a representative of the Supervising Ministry.

Under the General Manager, two Acting General Managers are positioned for each of Operations and Services.

- **Cessation of Subventions:**

20% of recurrent subvention to be withdrawn each year 1993 - 1996 ending up with no subvention in 1997.

It is also mentioned that after the transition period as given above for continued Federal subvention of both capital and recurrent funds, the RBDAs should, in addition to being financially self-supporting, be able to declare surpluses and pay a return on investment not less than 5 percent annum, and future developments not covered by capital subventions should be financed from the capital market and collateralized by the quality of the balance sheets of the respective RBDAs. In addition, it is recommended that the following functions of the RBDAs should be fully commercialized:

- i) water supply.
- ii) dam maintenance and operations.
- iii) irrigation projects which involve:
 - canal construction.
 - construction of night storage and compensatory reservoirs.
 - procurement and installation of pumps, sprinklers and other necessary equipment.
- iv) boreholes drilling.
- v) land clearing, preparation and management and leasing.
- vi) consultancy services.
- vii) plant hire services.
- viii) soil and water testing laboratories.
- ix) auto repair and services.

(3) Recommendations in the NWRMP

In accordance with the decision to restrict the RBDA operations to the water resources development and subsequent OM, the following future directions are oriented:

- (a) The RBDAs will be responsible for developing multipurpose water storages and supplying the raw water for the purpose of irrigation,

hydropower, water supply and others with the amount and timing as required by the downstream users at the designated points with appropriate costing arrangement. In the case of irrigation, major facilities to be constructed and operated by the RBDA include the storage dams, primary pumps, diversion dams, main and lateral canal network together with major drainage works, and subsequent provision and OM of the terminal service network will be the responsibility of the Water Users Association (WUA) together with the agro-allied services to be carried out by the State ADPs for urgent realization of the anticipated irrigated agriculture under proper arrangement of the State Government. In the case of water supply, the delivery of raw water by the RBDA will be made at a point within the territory of the State Water Agencies. When the hydro sector is included, its specific facilities will be constructed and operated by the NEPA for major hydro or the State Rural Electrification Boards for mini hydro. With this arrangement, the RBDAs will become the public enterprises similar to that of the Water Resources Development Corporation under the supervision of the Ministry of Construction in Japan.

- (b) During the course of the JICA Field Work (III), the RBDAs were asked for the procedures to demarcate the projects and programs for water resources development between the RBDA and the State Government. It may be noted that "The Budget Monitoring Committee Half Year Report" (December 1993) recommends that in view of the dwindling FGN resources, all small agricultural and water resources projects should be handed over to the State Governments. For this, the JICA Team takes a different view that since the State Governments are not equipped with sufficient manpower to manage those projects as are seen in para. 12. 1. 3, all the water resources projects even for small-scaled should be carried out by the RBDAs after substantial upgrading of their engineering capability and in accordance with the consistent policy and guidelines under the FMWRRD. In this event, the State Irrigation Departments would be best merged with the ADPs which have the ability already well-demonstrated to promote the farmer-owned and operated irrigation with the benefit of a strong FGN support and assisted by the World Bank. This recommendation, however, may be against the general decentralization policy between Federal and State, and as the engineering capability in the

State Governments is strengthened during the course of the NWRMP, this may become null and void.

- (c) As is stated in para. 12. 3. 3, the present functions relating to hydrological and meteorological data collection and investigations will be removed from the RBDAs and will be transferred to those of the proposed Regional Water Administration Offices, because these functions are non-revenue yielding without doing any harm to the RBDA operations. However, the hydrological gages to be required directly for hydraulic structure operations will be managed by the RBDAs at their cost, and the data observed will be sent to the NWRI for reference and management.
- (d) The NDBDA took over the responsibilities of the Niger Delta Development Board, Federal Ministry of Transport and Aviation. Unlike other RBDAs, this Authority operates mainly on the water-both sea and fresh water in the delta and creeks. These factors impose very severe and stringent operational conditions and very hard working conditions on specialized machinery such as can work under deltaic soil conditions and withstand the corrosion by saline water. It appears that all these restrict the scope of NDBDA operations and limit the level of its achievements. For the proposed rehabilitation of cutter suction dredgers, it is recommended that a detailed costing will be done to ascertain the feasible and viable charging hire rates for these equipment before investing more funds for this, and concurrently the viability of the use of these equipment for actual operations will be fully assessed for alternative consideration. Currently, the NDBDA is undertaking the schemes to solve the ecological problems of flooding and erosion as are similarly seen in the A-I, LB and B-O RBDAs. It is the view of the JICA Team that these non-commercial schemes together with the activities under the pollution monitoring and control program be funded from the Ecological Disaster Fund to which they more closely relate after careful examination on the content of these proposed activities. The NDBDA should act as an agent of the FGN for these activities not belonging to the Water Resources Sector, FMWRRD and, therefore, be refunded by the FGN through the FMWRRD for any expenditures incurred. This is what is demanded by the new quasi-commercial status of the RBDAs.

It may be noted that it would be difficult to evaluate how the programs of four RBDAs (A-I, B-O, C and ND) justify their existence as independent agencies, and there would appear to be a strong case of reducing the number of RBDAs through amalgamation in the interests of both administrative and technical efficiency. In addition, it is considered that the moves to amalgamate the H-J RBDA and the CBDA will make the significant positive changes to the currently imbalanced water situations between the upper and lower parts of the Lake Chad Basin (HA-VIII). It should also be kept in mind that although the amalgamation would increase the critical mass of qualified and experienced personnel in a new institution, the scope of non-water resources development activities to be assigned to the River Basin and Rural Development Authorities as announced on January 4, 1994 for reversion of the RBDAs (refer to para. (3) of 12. 1.2 of this Chapter) will be carefully evaluated.

12. 4. 5 Strategic Issues in Project Undertakings

(1) Project Preparation

During the first half course of the NWRMP Study, it had proved extremely troublesome to obtain the reports of previous project studies carried out for the FMWRRD and RBDAs. Virtually, there is no central library well-established, and the whereabouts of a report and volumes of a report are frequently unknown. And, the thorough inspection of recent project reports by the Study Team suggests that the requirements for project studies particularly in a feasibility study are improperly understood. The general requirements of the feasibility report are that a study team should collect, analyze and present all necessary information to determine the technical feasibility, environmental soundness, economic viability of a proposed project or program. Many of the previous examples were lacking in many aspects and would be deemed to be described in the mode similar to those of a pre-feasibility study which is normally commissioned to identify a project(s) and determine whether the investment in a full-scale feasibility study is warranted. It is strongly recommended that future studies should be carried out upon setting clear guidelines in line with the internationally recognized standards as applied by the World Bank and similar organizations.

The previous Chapters of the Sector Report have pointed out that much of the existing project undertakings were not properly planned, implemented, operated and in particular maintained with less emphasis upon regular repair works. It is needless to say that the good planning needs sound basic data and next, the effective implementation could result from good design and supervision, fair and disinterested international or domestic competitive bidding, and sound public accountability. Efficient OM should result from training, dedication, motivation, and a proper understanding of the objective and function of the project works, and also the need to generate funds to keep them in a good working order. On the top of these items, the broad participation as is explained in para. 12.2 of this Chapter is required at all levels and stages of development.

(2) Trade Off between Project Preparation and Implementation

The importance of adequate preparatory work has been repeatedly borne out by experience. There is no doubt that better project preparation could reduce the likelihood of implementation problems. In this occasion, a question still remains: how much preparatory work and in what detail is enough. Behind this question lies the recognition that there is, at least beyond a certain point, a trade off between the investment of additional resources in project preparation and the use of those resources to help implement the project.

The terms of trade off can be usefully analyzed in relation with the conditions ranging from "Hard" items such as infrastructure components including civil works and major items of equipment to "Soft" items such as institution building, staff training and the design of mechanisms for users participation. Completing the detailed engineering or design of the "Hard" component before the funds are committed may substantially reduce the risk of construction cost overruns and implementation delays owing to imprecise estimates of the physical works quantity to be executed. On the other, it can be unproductive beyond a point to devote detailed preparation effort to a project "Soft" component, the success of which is largely determined by the behavior patterns about which less can be known in advance. After the project starts, the design of such component may require considerable adaptation to cope with various users requirements or a rapidly changing natural and social environment.

Even when there is much that cannot be known in advance, it is essential that the project preparation makes the fullest possible use of the information available. Such preparation should specify clearly the project objective, ensure definitely the commitment of all parties concerned including the proposed users and beneficiaries to those objectives and then positive participation, and outline in detail the required inputs and arrangements with respect to organizations, institutions and procedures. For example, a common shortcoming of the training program when included as a component in projects has been that this has not been adequately prepared in advance, and there are consequent delays, misunderstandings and mistakes during the course of project implementation. As a matter of fact, there may be a point beyond which more elaborate analysis is not justified by the collection of knowledges.

When the important uncertainties exist, sufficient flexibility should be built into the project layout and design so that the elements can be reappraised and the arrangements and procedures modified in the light of practical experience. The need for flexible implementation should be anticipated during the project preparation, and the staff resources should be accordingly budgeted. When the uncertainties with respect to project design in "Soft" term are large, it may be preferable to begin with a small-scale pilot demonstration scheme as a development model that is deliberately experimental in nature and to evaluate its implementation closely.

(3) Planning and Managing the Project Implementation: General

Needless to say, most work done in the earlier stages of the project cycle such as identification, preparation and appraisal is directed towards ensuring successful implementation. In Nigeria, breaking ground for a new project or signing a loan with an external agency attracts much official and press attentions; however, the project implementation has received little attention not only from the supervising government agencies but also from those directly engaged in the development process. The long, slow process of tackling the myriad of problems that frequently arise during the project implementation is seldom in the limelight unless the things go badly. In the real societies, events seldom go strictly according to the plan; both external circumstances and some of the project principle factors change; and consequently, the project implementation takes on a life of its own.

In a broad sense, the implementation of a project begins when the resources are committed to a particular investment, but an irrigation and drainage project, for example, comprises a variety of associated activities such as construction of main systems, on-farm works, provision of extension and marketing services, credit to farmers, training program, and so forth that are of more or less importance and that begin and end at different times. In Nigeria, planning the implementation of a project, virtually tended to be neglected. The emphasis was on the decision-making process without taking adequate account of the capacity of the institutions to execute and operate them. The resulting shortcomings, difficulties, and failures have helped to direct attention to the need to plan explicitly for implementation.

The subject item in this paragraph may take up three main planning and organizational issues: (1) the selection of an implementation unit from among different organizational alternatives along with the related issues of coordination and supervision; (2) the organizational implications of different technologies and types of projects; and (3) techniques for planning and managing implementation being composed of critical path analysis including the most common method of the PERT (Program Evaluation and Review Technique): PERT/Time and PERT/cost, monitoring and evaluation, and management information system. The next sub-paragraphs will examine the coordinating mechanisms, and the techniques for managing the project implementation in some detail.

(4) Coordinating Mechanisms

An difficult organizational issue arises in the case of multicomponent projects such as those for irrigation and drainage and of multipurpose projects such as those of dams and water conveyance canals, that have to be implemented by several agencies. Appropriate coordinating mechanism should be established among these agencies, and there are some possibilities, but many experiences have suggested that any coordinating mechanism can be effective only if it satisfies two conditions: (1) a clear definition of the responsibilities for each of the participating agencies, and (2) adequate incentives for each of them to work constructively to achieve the project objectives. There would be three alternatives as given below:

- One solution to the need for coordination should establish a special project unit through which funds are channelled from the Federal budget in the Federal Ministry of Finance to the implementing agencies.
- Another is for one implementing agency to take the leading role acting as a project unit to coordinate the activities of other participating agencies and sometimes to allocate funds. In this alternative, a special unit for the irrigation projects and multipurpose dam projects may be provided in the Project Planning and Coordination Divisions of both the Departments of Irrigation and Drainage, and Dams and Reservoir Operations, respectively.
- A third alternative frequently adopted is to appoint some type of coordinating committee which should be given the requisite authority. Each participant should be as close as possible to actual operations. Any committee of ministers or other high-level officials with many other responsibilities have seldom performed well.

(5) Monitoring and Evaluation During Project Implementation

Monitoring of the progress of a project focuses primarily on "What" is or is not happening in relation to both inputs and outputs; while Evaluation either during or after project implementation seeks to explain "Why" project outputs, effects and impacts were or were not achieved. A monitoring and evaluation system examines three aspects of a project: (1) its physical progress; (2) project cost; and (3) project benefit. The analysis of information about these three aspects constitutes a logical sequence of activities; therefore, this system may be considered as a composite group of activities to monitor physical process, cost and benefit; to subsequently evaluate the project; and finally to take whatever action might be needed, corrective or otherwise, as indicated by the evaluation. More strictly;

- Monitoring is defined as the timely gathering of information on project inputs (costs incurred), outputs (physical progress of works), and complementary activities that are crucial to the attainment of the project objectives.
- Evaluation, on the other hand, involves the comparison of effects and impacts of the project against the established plans, and this seek to establish "Why" there are discrepancies between the actual results and targets and draw the policy implications.

The Monitoring can be a relatively straight forward and inexpensive system which provides an early warning to the project management about potential or actual problems, and should be based upon a set of simple indicators that can be collected and processed in time for management to take necessary actions. The Monitoring is, in effect, a streamlined management information system with the design of appropriate indicators. It can also be used to inform the higher officials in the project departments, FMWRRD or the Federal Ministry of Finance of implementation progress and problems.

The Evaluation in this context is an on-going activities, as distinct from "Ex Post Evaluation" which is undertaken when the implementation has been completed and is used for accountability, planning of future projects, and research. The purpose of on-going evaluation is to reassess the project objectives and the means of achieving them in the light of experience and new development as the implementation proceeds. And, this goes hand in hand with the project monitoring, drawing on information supplied through monitoring as well as special duties to reconsider the project objectives and modify them accordingly. The Evaluation should be done on a timely basis if it is to serve its purpose - an obvious point, but one that is often missed.

The Monitoring and Evaluation are normal functions of the project management, to be performed and then used directly by it. Generally, a monitoring and evaluation unit is established under the project director and needs to be well integrated with the rest of the organizational structure for project implementation. It is commonly observed in many other countries that the practice has not necessarily been consistent with the theory. There are many instances in which the monitoring and evaluation systems have made a substantial contribution to the improved project implementation; on the other hand, the monitoring has often become just another data gathering effort, seldom influencing the management's decisions, in other words, large amounts of data were collected but not processed; if processed, they were not used. Several pre-requisites may be suggested for success:

- Project directors should desire the project monitoring and evaluation system and be committed to its use.
- Decisions for the data to be collected should be focussed upon the problems that will need to be solved during the project implementation.

- Requirements for the data collection should be adapted to the realistic standards of accuracy, timeliness, and cost.
- The project monitoring and evaluation system should be designed at an early stage of the project preparation, in particular, during the course of a feasibility study, and the baseline data related to "Project Benefit" through a benchmark survey should be collected well in advance.

(6) Management Information

The unsatisfactory state of the management information systems has been identified in several of the developing countries including Nigeria. In fact, their endemic inadequacy has been shifted by the international financing agencies to the employment of the above-mentioned project monitoring and evaluation system as a simplified and more feasible technique for managing the information. However, the minimum information systems covering financial transactions as well as technical and staffing issues are required for project implementation and later for project OM. Experience has shown that being similar to the project monitoring, this information system should be adapted to the local conditions and customs and made compatible with the information of the parent agency.

Different types of the water resources projects need different information systems. At one extreme, conventional infrastructure or water supply projects which can use the standard technologies may adapt well-established systems and procedures designed for similar-natured projects in other fields of Nigeria and also in other countries. At the other extreme, the people-oriented projects such as for irrigation and drainage and integrated river basin, management program that include the provision of services by many public and private agencies in geographically scattered areas need an information system sensitive to the local circumstances and to the nearly impossibility of keeping accurate records at local level.

Categorized into this is, for example, the training and visit extension system which is essential for the dissemination of irrigated agriculture as is examined in Chapter 5 of Vol. Two: Sector Report. This is usually adopting an extreme solution: to reduce the report writing to a minimum extent, and the extension agent's only obligation is to keep a diary to record the visit to

farmers, the type of advice given, and the problems raised by farmers. This is an incentive to keep the agent in the field and out of the office, since one of the main risks of a cumbersome management information system has been the wrong signal it gives to concentrate on reports instead of field work. This degree of simplicity, however, cannot be maintained for all activities of type. The application of this training and visit principle to the health delivery system to be involved in the water supply and sanitation program has already identified that the minimal information requirements would be more elaborate than those for irrigated agriculture extension because of the wide range of services provided. The requirements for activities that entail the financial transfers, such as agricultural marketing or inputs supply in agriculture extension service, may inevitably have to be more complex.

12.4.6 Special Remarks on Proper Institutional Building-Up

The following paragraphs have been quoted from the "Lessons of World Bank Experience: Investing in Development" (World Bank, 1988) which would be useful references for proper institutional building-up of the Water Resources Sector, FMWRRD:

- **Common Problems Encountered:**

In most developing countries, the policy-makers and managers alike should strike a balance between applying the generalized lessons of experience and devising innovative solutions to suit their unique requirements and problems. That balance is particularly difficult to achieve, and particularly important, in the design and management of development institutions. Nevertheless, some common problems are identifiable across a wide range of countries as well as sectors. Likewise, some general lessons can be drawn from the experience of countries at different stages of development about what to encourage and what to avoid in designing and managing the institutions that are charged with the task of development.

The countries that have been most successful in recent decades in establishing strong institutions cover a wide spectrum - Japan, India, and Brazil would be on most lists. Although they still have many institutional shortcomings, these countries have devoted strong and sustained efforts to building-up the capacity of their institutions to manage high-priority activities, and all of them

have recognized that the institutional development entails a lengthy process of experiment and adaptation that does not take place spontaneously, even in response to market forces.

Consultants and Training

In many countries, the responsibility for devising and carrying through the institutional and policy reforms of the public service falls on the shoulders of a very small group of senior decision-makers. These officials have many other responsibilities, and in any event cannot directly supervise the implementation of complex reform programs. Specialized skills from outside the public sector, or from outside the country, may therefore be needed. The international lending agencies have relied heavily on consultants both for its diagnostic studies and for its lending work in conjunction with administrative reform. They have usually looked for people who are familiar with the country and already known to the government. The multifaceted nature of work on public administration often calls for a combination of expatriate and local consultants, generalists and specialists, on long- and short-term assignments. There are, however, few consulting firms or organizations that can yet provide the mix of reputation, technical skills, and international experience that is needed.

The political sensitivity of the subject and the lack of ready-made technical solutions add to the risks in seeking advice or technical assistance from abroad. When expatriate consultants are used, two additional but important tasks should be assigned to them: helping to build up a local consulting capacity, and training local officials as counterparts to the foreign advisers.

In sum, institutional reform of the public administration is a difficult and lengthy process; progress is likely to be slow and subject to frequent reversals as the political fortunes change. At times there may be a danger of substituting form for substance: studies may be completed, committees established, legislation passed, or regulations issued without any real change in performance occurring. Yet in many countries, the weaknesses of public administration remain such a serious obstacle in the path of development that the cost of failing to come to grips with them - or at least to make a start and persist in the face of setbacks - is high.

Civil Service Staffing and Compensation

At the heart of the performance of the public administration lie issues concerning the efficiency, competence, and morale of civil servants. It is common in Nigeria to find the public service grossly overstaffed at lower levels, while salaries and benefits at the higher levels are inadequate to attract, retain, and motivate the

competent professional staff. In Nigeria, the real wages in the public sector have fallen over the last decade, with managers' salaries falling particularly sharply compared with what the private sector pays.

Administrative regulations and procedures, often inherited or transplanted from the developed countries but ill-suited to local circumstances, may further reduce the efficiency of the civil service, sometimes drastically. The efforts to improve these aspects of public administration may include:

- Strengthening the personnel management by conducting diagnostic studies, by training the staff of the agency that has oversight responsibility for the civil service, and by reforming rules and regulations.
- Reducing staff on the government payroll by identifying redundant worker and helping to retrain and relocate them, and by designing programs to control public employment.
- Selectively raising civil service compensation, when this is necessary to bring it more closely in line with that of competing positions in the private sector.
- Changing the organization and procedures of public agencies to improve efficiency, generate timely and more accurate information, and make the agencies more responsive to their public.
- Improving the training programs for the Government personnel.

12.5 MANPOWER DEVELOPMENT FOR THE NWRMP IMPLEMENTATION

12.5.1 General

It appears at a glance that the present institutions in Water Resources Sector typically suffer from serious shortages of skilled and experienced staff, an excessive number of untrained staff, overloaded services and facilities, inadequate wages and salaries, and a counterproductive policy environment. In particular, at the heart of the public administration performance lies the issues concerning the efficiency, competence and morale of civil servants. It is common in Nigeria to find the public service grossly overstaffed at junior level, while salaries and benefits at senior level are inadequate to attract, retain and motivate competent professional staff; as a matter of fact, real wages in the public sector would have fallen over the last decade(s) with managers' salaries falling particularly sharply compared with what the private sector pays.

There would be the needs to improve these aspects of the public administration including:

- Strengthening the personnel management by conducting diagnostic studies, by training the staff of the agencies that have oversight responsibility for the civil service, and by reforming the rules and regulations.
- Reducing staff on the government payroll, by identifying the redundant workers and helping to retain and relocate them, and by designing the programs to control public employment.
- Selectively raising the civil service compensation when this is necessary to bring it more closely in line with that of competing positions in the private sector.
- Changing the organization and procedures of public agencies to improve efficiency, generate more timely and accurate information and make the agencies more responsive to their public.
- Improving the training programs for government personnel.

It is stressed that deficiencies of the government agencies in managing the investment programs frequently are an impediment on public sector activities, hence an important area in need of attention. Programs and activities to ensure the most economic use of public resources and improve the

speed and efficiency with which the decisions are made should be sought to improve the decision-making process so as to curb inappropriate or excessive investment. To accomplish this, the programs should support better coordination between the NPC and other agencies concerned and a clear definition of the responsibility for evaluating and monitoring investment being combined with the improvement in government's ability to identify new investments and to set the priorities among them.

It is hoped that the substantial change along these lines will be achieved by the FMWRRD during the earlier course of the NWRMP period with a possible reform that will proceed step by step through the introduction of such procedures as the painstaking in investment decision-making system after eliminating several factors as poor inter-departmental coordination and inadequate information on which to base decisions or guide actions have slowed progress.

The project institutions need to be planned as part of an articulated institutional development strategy for the parent agency such as RBDAs, for the Water Resources Sector, and indeed for the country. The importance of management and staff development to the effective functioning of project institutions is a large and complex theme, because the pervasive shortage of managers and skilled staff are an almost universal characteristic in Nigeria. The leading issue, however, can be identified; the primary one is incentives for all staff, but particularly for managers and middle-class professionals whose performance has the most decisive impact on institutional efficiency.

This is a difficult problem in the public service, since the financial incentives cannot match those in the private sector, but much can be done, and the gross disparities can be narrowed; easier lateral entry and exit can encourage the public service as a regular part of a career; "Super-Grades" outside the normal system may be considered to meet extreme needs; elements of the financial package other than salaries may be made more attractive. Managers and staff respond to the work incentives as well as the material incentives: to being given the responsibility, to being judged fairly on their performance, and to working in a good institution. In addition, the decision makers can encourage the positive trends by increasing the managerial autonomy, by involving the staff in designing tasks and organizational solutions, and by instituting the performance appraisal and promotion systems.

And also, the counterpart to improved management and staff incentives is the improved accountability.

Finally, the management and staff need the training and skill development, because the training in the absence of the other factors as mentioned above has the limited utility. The need for skilled professionals remains urgent, and so the search for training strategies relevant to institutional needs should continue. In recent years, some countries such as India and the Philippines have experienced with "Action-Learning" or "Action-Research" approaches to the training scheme. These try to break down the artificial barriers between the training and the work by giving trainees the practical problems in real organizational settings to solve, review and discuss collegially, and this approach has proved particularly useful for entry-level staff.

In other cases, more resources are being devoted to the management education for middle-level and senior personnel in midcareer; often both civil service and public enterprise staff are covered. Occasionally, the programs for public sector managers are integrated with those for private sector managers. The emphasis is increasingly on participatory and problem-solving approaches and on developing the ability of managers to relate specific operational solutions to broader strategic objectives.

The training of its personnel is something of a gamble for an agency or institution because of the frequent loss of people, once they are trained, through resignations, transfers, promotions, and the like. Bonding the staff to serve for a specified time after their training may help, but it is not a long-run solution and may be difficult to enforce. A better way to cope with this type of attrition is to recognize the problem explicitly and to plan for it by training more staff than are immediately required. It is true that this augments the problem of finding suitable candidates and relieving them from their existing duties for training, but it also spreads the benefits of training more widely through the economy and in that way contributes to the overall development effort.

12.5.2 Manpower Projection

(1) 'Skoup' Manpower Projection

Reference is made to para. 12.1.3 of this Chapter where the Skoup Manpower Survey is explained. In this Survey, an additional questionnaire form gave the projection of potential manpower resources by the States, Agencies and FMWRRD on the short-term (1995), the medium-term (2000 to 2005) and the long-term period (2010). It may be noted that firstly, there was a general lack of any scientific bases to make any rational projections since no indication was given as to the potential work load on which manpower projections would be based, and secondly, the agencies are considered to be in a better position, under the circumstance, to project their work force based on their estimated rate of growth in activities.

Based on this Survey, the manpower projection for each of the 28 responding States and FCT is shown in Table 24 "Manpower Projection by States and Agencies in Vol. Three "Water Resources Inventory Survey", and that for the FMWRRD, RBDAs and NWRI in Table 12-4. The indication is that by the year 2010, the labor force in the FMWRRD, RBDAs and NWRI will be 2,903 up from its current level of 2,186 showing an additional 717 staff. Much of this growth will take place in the technical areas which will grow from their current level of 780 to 1,524; however, the Limnologists and Oceanographers are projected to show no growth potential. Again, much of the benefits accruing from this growth will occur in the RBDAs which will account for 335 or 61 percent of the growth potential. The NWRI is projected to grow at a higher rate from its current level of 31 to 199 for the year 2010 which dims the prospects of its ability to cope with the training needs of the growing RBDAs.

(2) General Remarks on the Projection

Implementing the projects and programs and related policies for managing the water resources as are detailed previously in this Sector Report requires the adjustments in the number of staff and also the level of skill and mix of staff that can only be achieved progressively over time. Introducing new policies will require more specialists who need the training in various methodologies. The new aspects of water-related operations will require more staff and will need to be reflected in the resources assigned to such operations,

including the provision of a rationale for institutional arrangements for implementation, particularly the division of responsibilities between government and non-governmental or financially autonomous entities. The qualitative and quantitative upgrading of specialized and other staff is essential to meet the crucial changes of managing the water resources in line with the priority reforms and activities which may deal with the issues such as (1) appropriate incentive framework and pricing; (2) service delivery to the poor; (3) public investment priorities; (4) environmental restoration and protection; (5) water resources assessment and data requirements; (6) comprehensive analytical framework; and (7) legislation, institutional structures, and capacity.

In General, projection of the manpower during the course of implementing the NWRMP would be a matter to be given by reference to the programs and work loads envisaged in line with an acceptable ratio of the number of management, senior technical and administrative and junior staff. During the course of Field Work (III), the counterpart effort had been made on the collection of relationship and ratio or proportion of each of these categories of staff in the public service through the positive contact with the Federal Ministry of Establishment and Service Matters; however, there has been no information available on the positions as stated above. It is suggested in the NWRMP that the Department of Planning, Research and Statistics, FMWRRD will delineate its manpower needs in quantitative and qualitative terms appropriated for proper implementation of the recommended NWRMP, and this information will be of help in drawing up a detailed scope of work for the proposed National Water Resources Manpower Training Program that is discussed later.

In accordance with the request made by the FMWRRD, some of the typical manpower arrangements are shown for future reference:

(a) A Division of the Operational Department, FMWRRD

It should be understood that a Division of the Operational Department in the FMWRRD is responsible for the public administration of the particular water resources-related projects at nationwide level in a routine manner as an apex body. It may be assumed that such Division would be subdivided into three Sections such as Planning, Guidance, and Monitoring and Evaluation.

As is explained in para (2) of 12.3.3 in this Chapter, an entire country will be divided into four Zones, each of which may involve 7 to 8 States. Two senior technical staff in forties and twenties to thirties, each for any two Zone taking into account future transfer of a staff to another office would be responsible, under the direction of an Assistant Director, for collection and filing of the data and information within their territory and preparation of the action plans and instructions required for subsequent technical and administrative work. In this occasion, one Division will take 15 senior staff in general, as given below:

Section	Deputy Director	Assistant Director	Senior 10yr. Experience	Senior 5yr. Experience
Planning	1	1	2	1
Guidance	-	1	2	2
Monitoring & Evaluation	-	1	2	2
Total	1	3	6	5

(b) Project Office for Construction and OM

A typical example is given to the irrigation and drainage project with a water storage which may be classified into large, medium and small. Apart from the pre-feasibility and feasibility studies and detailed engineering which would be mainly entrusted to the consulting engineering firms, it will be common that the construction works are executed under the technical assistance of the consultants. The manpower requirements in a standard mode are given below as an example:

	Large	Medium	Small
Service Area (ha)/unit	10,000	1,500	300
No. of Service Units	1	4	10
Total Area Managed (ha)	10,000	6,000	3,000

• Construction

Staff	Minimum Experience			
Project Manager	15	1	1	1
Dam Engineer	10	1	1	-
Engineering Geologist	5	1	1	1
Irrigation Engineer	10	1	1	-
Irrigation Engineer	5	1	1	1
Technic	3	4	4	4
Administrative	3	2	2	2
Accountant	3	1	1	1

• OM

Staff	Minimum Experience			
Project Manager	15	1	1	1
- Water Source Work				
Dam Engineer	10	1	1	-
Hydrographer	5	1	1	-
Gate / Valve Tender	2	1	1	-
Mechanic	5	1	1	-
Electric	5	1	1	-
Technic	2	5	4	3
- Irrigation and Driange System				
Water Master	10	2	-	-
Zone Man	5	10	4	-
Gate / Canal Tender	2	30	20	10

Note: An optimum area to be managed:

Project Manager	20 to 30 × 10 ³ ha
Water Master	5 to 6 × 10 ³ ha
Zone Man	1 to 1.5 × 10 ³ ha
Gate/Canal Tender	300 to 400 ha

TABLE 12-4 MANPOWER PROJECTION BY FMWRRD AND TWO PARASTATALS

C/E = Civil Engr
 M/E = Mechanical Engr
 WSE = Water Supply Engr
 E/E = Electrical Engr
 C/E = Chemical Engr
 A/E = Agric Engr
 O/E = Oceanographer
 M/E = Marine Engr
 I/E = Irrigation Engr
 Surr = Surveyor
 Limn = Limnologist
 W/Analyst = Water Analyst
 D/E = Drilling Engr
 HydroGeol = Hydrogeologist
 Technol = Technologist
 Tech Staff = Technical Staff
 Admin = Administrator
 Acct = Accountant
 Aud = Auditor
 Soil Tech = Soil Technician
 Soil Sc = Soil Scientist
 Tech Asst = Technical Assistant
 Lab = Laboratory
 W/Shop = Workshop
 H/E = Hydro Engr
 Ecol = Ecologist

OCCUPATIONAL CATEGORY	FMWRRD						RBDAs						NWRI						TOTAL							
	1995		2000		2005		1995		2000		2005		1995		2000		2005		1995		2000		2005		2010	
C/E	29	36	39	46	58	70	74	8	12	15	20	83	106	124	145											
WS/E	7	12	22	13	17	22	24	4	8	12	15	24	37	56	59											
ME/E	3	4	5	15	17	24	27	2	4	6	12	20	25	35	45											
EL/E	-	-	-	15	18	25	28	4	5	6	7	5	6	8	9											
CH/E	-	-	-	1	1	2	2	4	5	6	7	4	4	5	6											
AG/E	13	18	21	22	21	28	31	6	8	10	18	41	47	59	77											
MA/E	-	-	-	-	-	-	-	1	2	3	4	1	2	3	4											
IR/E	26	29	32	41	50	64	72	6	8	10	15	73	87	106	126											
Limno	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-											
Oceano	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-											
Surv	7	12	14	17	18	20	21	2	5	6	8	26	35	40	47											
Chem/W. Analyst	16	26	36	14	18	19	21	8	12	14	16	38	56	69	83											
DR/E	-	-	-	8	9	11	12	4	6	8	10	12	15	19	22											
Hydro/Geol	112	132	147	41	43	50	54	10	14	18	22	163	189	215	238											
H/E	-	-	-	2	2	3	3	1	1	1	1	3	3	4	4											
Ecol/Soil.Sc	4	5	7	25	26	29	30	3	5	7	9	32	36	43	49											
Technol/Tech	26	32	38	151	159	173	183	10	15	20	22	187	206	231	249											
Other Staff	24	24	24	246	266	283	295	5	8	12	15	275	298	319	334											
Sub-total	267	330	385	657	723	823	877	76	116	152	199	1,000	1,169	1,360	1,524											
Admin	12	12	12	112	116	130	144	4	6	8	10	128	134	150	166											
Acct/Aud	16	16	16	106	115	131	139	4	6	8	12	126	137	155	168											
Other Admn Staff	29	30	31	98	106	120	133	4	4	4	4	131	140	155	169											
Sub-total	57	58	59	316	337	381	416	12	16	20	26	385	411	460	503											
Tech Asst/Tech Off.	42	58	70	321	337	359	336	20	20	20	20	383	415	449	466											
Draughtsmen	5	10	12	18	20	21	22	1	1	1	1	24	31	34	38											
Soil Tech	-	-	-	24	25	25	26	1	1	1	1	25	26	26	27											
Soil Tech	1	2	4	30	39	42	47	-	-	-	-	31	41	46	51											
Surv Assts	10	25	35	20	23	24	28	-	-	-	-	30	48	59	68											
Hydro Assts	-	-	-	25	29	33	34	3	3	3	3	146	154	177	189											
Lab/W/Shop Assts	44	47	57	102	107	120	124	-	-	-	-	667	747	827	876											
Others	102	142	178	540	580	624	647	25	25	25	25	25	25	25	25											
Sub-total	426	530	622	1,513	1,640	1,828	1,940	113	157	197	250	2,052	2,327	2,647	2,903											
TOTAL	426	530	622	1,513	1,640	1,828	1,940	113	157	197	250	2,052	2,327	2,647	2,903											

SOURCE: MANPOWER SURVEY IN THE WATER RESOURCES SECTOR (1993).

12. 5. 3 Proposed National Water Resources Manpower Training Program

The manpower training both at the formal and informal levels in the Water Resources Sector has been grossly neglected by various agencies with the expenditure on this activity that remained at an all-time low. It may be mentioned that most agencies so far visited would lack any comprehensive training and retraining program to update and upgrade the knowledge of their staff. The Skoup Report on Manpower Survey points out that the budgets of the FMWRRD and their parastatals were looked into and the revelation is that in the past three years or so, there ceased to be any properly articulated and judiciously executed program on training by the FMWRRD, hence, the training activities have remained largely ad hoc, uncoordinated and a response to external aid signals.

Implementing the NWRMP as outlined in this Report requires appropriate adjustments in the level of skill and mix of staff that can only be achieved progressively over time. This will require more specialists, and staff will need substantial trainings in the methodologies for project preparation that incorporates the multisectoral aspects and in the participatory approaches to designing, implementing and operating projects. The newly refined strategies of water-related operations under the NWRMP will require more staff time and will need to be reflected in the manpower resources assigned to such operations. The quantitative and qualitative upgrading of specialized and other staff should be essential to meet a challenging task of proper water resources management and development as are recommended in the NWRMP.

It is stressed that severe shortage of the trained manpower may be a major constraint of implementing the NWRMP in an appropriate manner. At this stage, virtually all the work for feasibility study, design and construction supervision of the water projects are entrusted to the local or expatriate consultants. Because of an emphasis upon medium and small-sized projects as recommended in the NWRMP, effort should be made to train more skilled in-house manpower and to give more incentives to keep them. Although a temporary solution may be to engage the local or expatriate consultants, the FMWRRD should arrange for intensive training of water resources staff to take over from them, as well as for long-term training of younger agency staff and university graduates. When the consultants are employed, an additional but

important take for training the government officials as counterparts to the consulting experts should be assigned to them.

The NWRMP has identified that the transfer and development of appropriate water resources and environmental technologies are a long and painstaking venture for proper implementation of the NWRMP by the FMWRRD which calls for the National Water Resources Manpower Training Program from external multinational or bilateral agencies to assist the NWRI in all aspects. This proposed Program should be, if possible, carried out during the early period of the NWRMP at least by 2000 in line with the strategic implementation schedule to be involved in the NWRMP layout. A major requirement is to initiate the necessary machinery in a manner with "action-learning" or "action-research" approach for training to translate or adapt the proven technologies in the donor or related countries to those appropriate for use in Nigeria. The proposed Technical Assistance Program (TA) can be seen more as long-term institutional development and capacity building venture than as the traditional short-term intervention aimed at the strengthening of virtually non-existent capabilities in Nigeria, and this TA should also be self-perpetuating in that the water resources sector in Nigeria enables the recipient of the TA to develop its own capabilities.

The proposed TA that has been incorporated into the National Water Master Action Plan by 2000 on the aspect of institutional development and manpower capacity building would be mainly stationed at the NWRI, Kaduna for intensive group training programs, workshops and seminars with part time stays at RBDAs and State Governments to break down the artificial barriers between training and work by giving the trainees practical problems to solve, review and discuss collegially as well as for advisory work on the water resources, policy framework and program management for the FMWRRD in Abuja. The Program may include such expertise as water administration, dam, irrigation, water supply, gully erosion and flood control, hydrology and hydrogeology, and part-time specialists to be led by a team leader and supported by a coordinator, as summarized below:

Objective : Institutional development and manpower capacity building.

- Enforcement of Water Resources Decree.

- Engineering on planning, design, construction and OM for dam and reservoir, irrigation and drainage, water supply and sanitation, and gully erosion and flood control.
- Observation, data processing and monitoring/surveillance on water quantity and quality for surface and groundwater.
- Water-related environmental effects and EIA guidelines for projects.

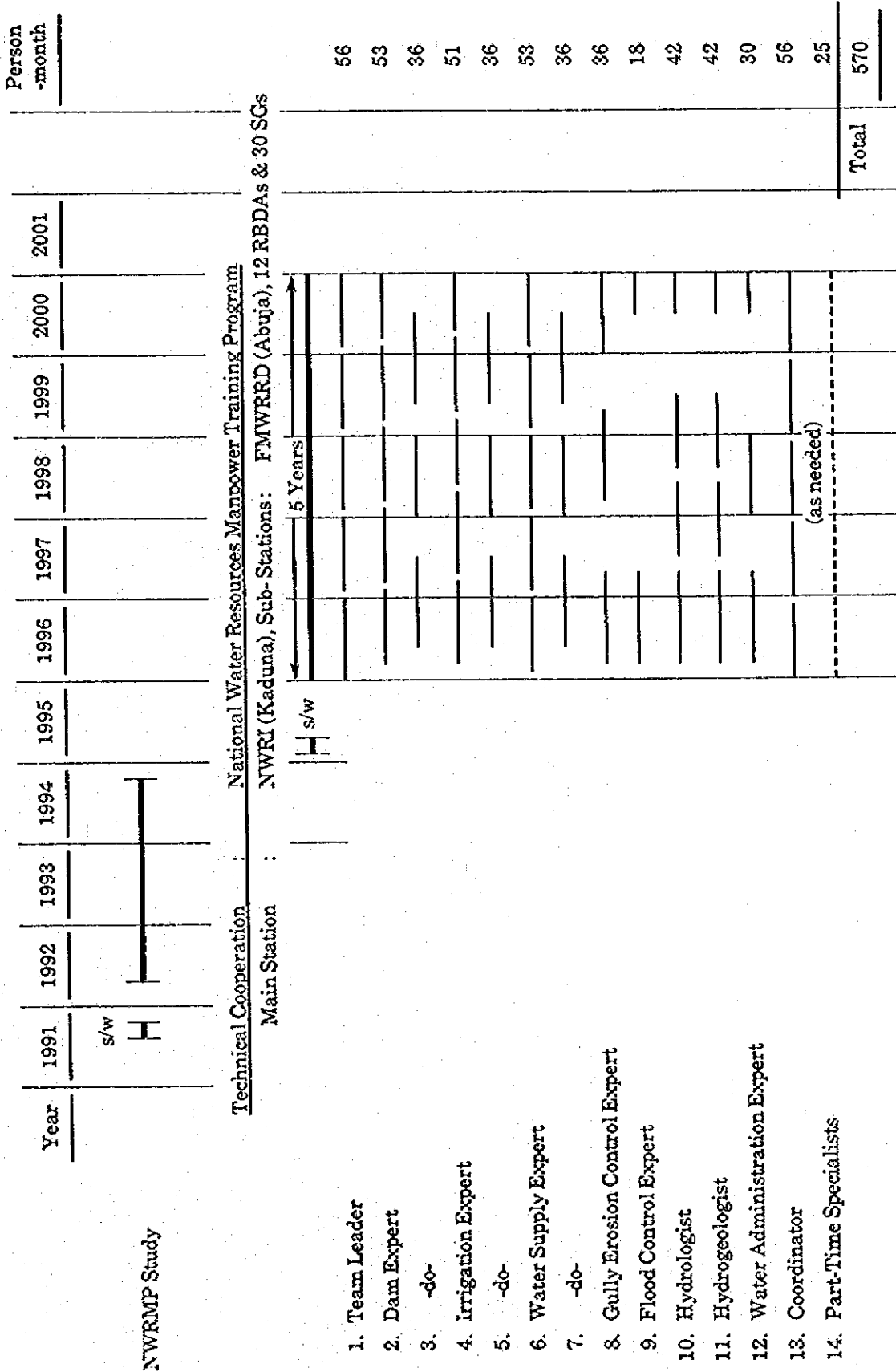
Agencies : FMWRRD (lead), NWRI, RBDAs, FEPA and State Governments.

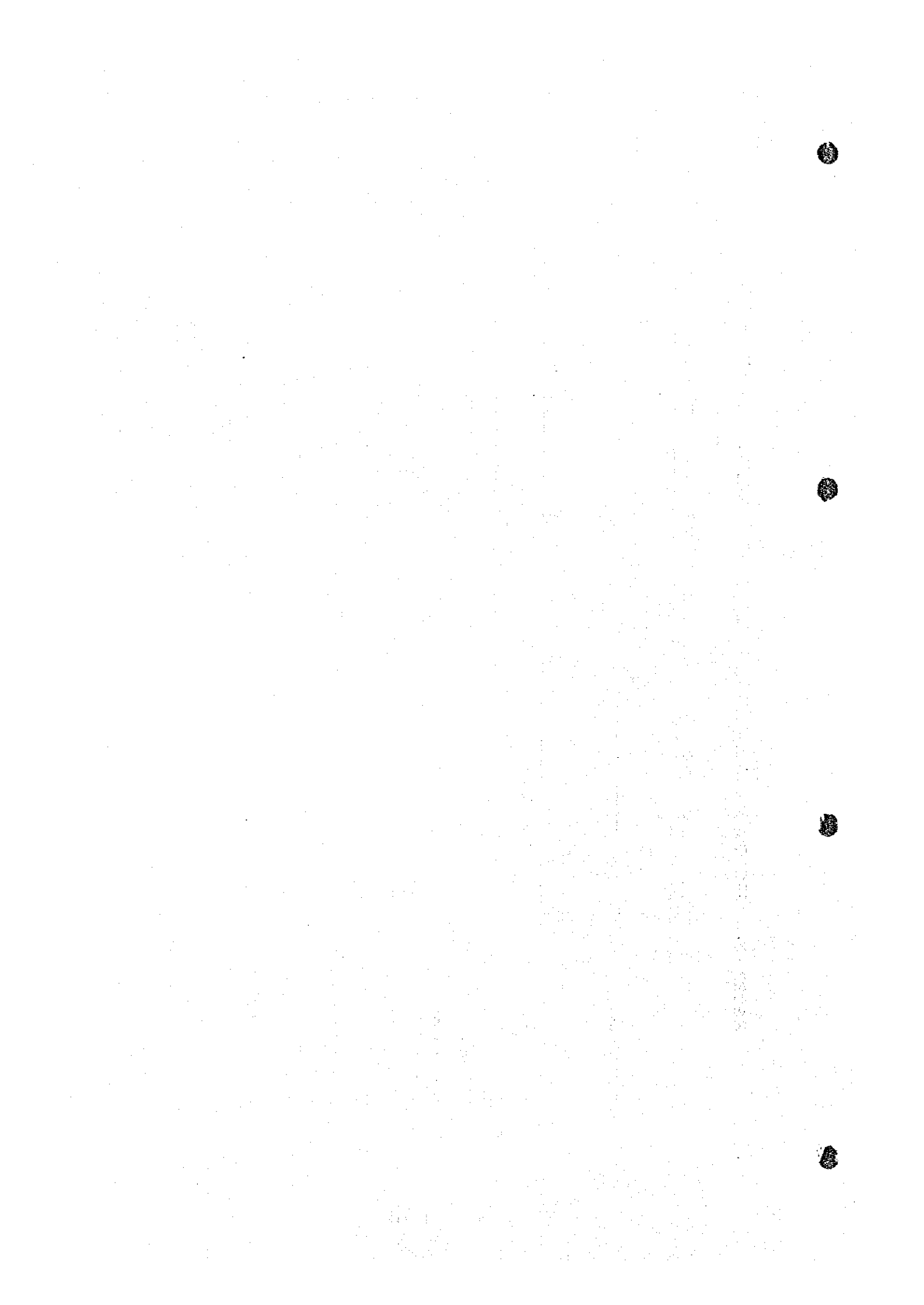
External Inputs : Dispatch of Experts and provision of equipment and materials.

Implementing Schedule Proposed : Five years from 1996, with experts inputs tentatively assumed in Figure 12-4.

In addition to this Program in general, particular considerations have been made to ensure satisfactory operations of the projects and programs to be involved in the National Water Master Action Plan. These include a series of the technical assistance programs by external agencies for three items with the dispatch of survey teams and a financial assistance program by external agencies for Dadin Kowa hydro scheme. The former includes (1) Water Resources Management Program in Upper Hadejia, (2) EIA Study and Environmental Monitoring Program, and (3) Preparation of Medium/Small Dams Package Program (one survey team for each of three priority basins). For reference, items (1) and (3) are compiled in Chapter 4, item (2) in Chapter 11 and the Dadin Kowa hydro in Chapter 8 of the Sector Report.

FIGURE 12-4 PROPOSED NATIONAL WATER RESOURCES MANPOWER TRAINING PROGRAM





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